

REFLECTIONS OF ECONOMIC DEVELOPMENT

EDITOR

ASSOC. PROF. DR. ALİYE AKIN

AUTHORS

PROF. DR. ADNAN ÇELİK

ASSIST. PROF. DR. ALTUĞ OCAK

ASSIST. PROF. DR. ARZU TUYGUN TOKLU

ASSIST. PROF. DR. SERKAN ARAS

PH.D. GONCA REYHAN AKKARTAL

PH.D. GÜRKAN BOZMA

ESRA UYSAL

ÖMER FARUK DİKEN



REFLECTIONS OF ECONOMIC DEVELOPMENT

EDITED BY

ASSOC. PROF. DR. ALİYE AKIN

AUTHORS

PROF. DR. ADNAN ÇELİK

ASSIST. PROF. DR. ALTUĞ OCAK

ASSIST. PROF. DR. ARZU TUYGUN TOKLU

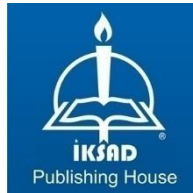
ASSIST. PROF. DR. SERKAN ARAS

PH.D. GONCA REYHAN AKKARTAL

PH.D. GÜRKAN BOZMA

ESRA UYSAL

ÖMER FARUK DİKEN



Copyright © 2021 by iksad publishing house
All rights reserved. No part of this publication may be reproduced,
distributed or transmitted in any form or by
any means, including photocopying, recording or other electronic or
mechanical methods, without the prior written permission of the publisher,
except in the case of
brief quotations embodied in critical reviews and certain other
noncommercial uses permitted by copyright law. Institution of Economic
Development and Social
Researches Publications®
(The Licence Number of Publisher: 2014/31220)
TURKEY TR: +90 342 606 06 75
USA: +1 631 685 0 853
E mail: iksadyayinevi@gmail.com
www.iksadyayinevi.com

It is responsibility of the author to abide by the publishing ethics rules.
Iksad Publications – 2021©

ISBN: 978-625-7636-63-6
Cover Design: İbrahim KAYA
May / 2021
Ankara / Turkey
Size = 16x24 cm

CONTENTS

PREFACE

Assoc. Prof. Dr. Aliye AKIN1

CHAPTER 1

ANALYZING EFFECT OF FOREIGN OUTPUT LEVELS ON TURKISH EXPORTS

Ph.D. Gürkan BOZMA3

CHAPTER 2

THE IMPACT OF THE CUSTOMS ON LOGISTICS PERFORMANCE: A RESEARCH ON THE SARP BORDER GATE

Assist. Prof. Dr. Arzu TUYGUN TOKLU25

CHAPTER 3

EFFECTS OF THOMAS COOK'S BANKRUPTCY ON TURKISH TOURISM

Prof. Dr. Adnan CELİK

Omer Faruk DİKEN

Esra UYSAL53

CHAPTER 4

UNIVERSITIES IN A COMPETITIVE GLOBAL MARKETPLACE: DIGITAL MARKETING VERSUS TRADITIONAL MARKETING

Assist. Prof. Dr. Altuğ OCAK75

CHAPTER 5

BAGGING AND BOOSTING CLASSIFIERS FOR CREDIT RISK EVALUATION

Assist. Prof. Dr. Serkan ARAS.....121

CHAPTER 6

METHODS DEVELOPING CUSTOMER SERVICE IN SUPPLY CHAIN MANAGEMENT

Ph. D. Gonca Reyhan AKKARTAL.....151

PREFACE

The growth and development of countries in a globalizing world undoubtedly depend on their economic activities. Businesses operating in the economy try to achieve competitive advantage by closely following the technology and developing different strategies in the production and marketing of goods and services. The tourism sector and the export of high value added products also contribute to the economic development of a country. It also provides a significant amount of foreign currency inflow to the country. Therefore, in the competitive global market, it is important for businesses to focus on these sectoral and economic activities. In this way, countries will be able to feel the reflections of economic developments.

The book, which includes economically different and special studies, consists of six chapters. Eight authors, who are experts in their fields, contributed to the creation of this book, *Reflections of Economic Development*. In the first part, the effect of foreign output levels on Turkish exports is analyzed by Gürkan BOZMA. In this study, the effects of foreign income, real exchange rate and real imports on real exports were analyzed using annual data for the period 1980-2019 for Turkey. The relationship between Turkey's foreign trade partner in the Arab world, East Asia and the Pacific, the European Union, Latin America and the Caribbean, the Middle East and North Africa, North America, South Asia, OECD and sub-Saharan country groups has been evaluated. In the second part, Arzu Tuygun TOKLU investigated the effect of customs on logistics performance. The logistics performance of the Sarp Border Gate, Turkey's busiest border gate,

has been evaluated. In addition, the contribution of the Sarp Border Gate to the foreign trade of the country has been revealed.

Thomas Cook is a worldwide known tour operator. This firm plays an important role in international tourism activities. Adnan CELİK, Omer Faruk DİKEN, Esra UYSAL evaluated the effects of Thomas Cook's bankruptcy on the Turkish tourism industry in the third section. In the next section, there is Altuğ OCAK's study covering the strategic marketing efforts of universities in today's competitive global market. In the fifth chapter, Serkan ARAS's study, which reveals the credit risk assessments of individuals with various statistical analyzes, is included. In the last part, Gonca Reyhan AKKARTAL researched what should be done to increase the level of customer service in parallel with the changes occurring in today's supply chain processes.

I would like to thank Zeynep AVŞAR from ISPEC Agency, Designer Mr. İbrahim KAYA who has worked in the preparation of this work, IKSAD Chief Advisor and IKSAD International Publication House Supervisor Mr. Sefa Salih BILDIRICI, and IKSAD President Mr. Mustafa Latif EMEK who supported us in every matter. I would also like to express our gratitude to our authors for their significant contributions to the work.

Finally, I would like to state that all academic and legal responsibility regarding academic research in the book belongs entirely to the authors.

Assoc. Prof. Dr. Aliye AKIN¹

May 2021

¹ Bolu Abant İzzet Baysal University, Faculty of Tourism, Department of Tourism Management, Bolu, Turkey, aliye.akin@ibu.edu.tr, ORCID: 0000-0001-8589-7547

CHAPTER 1

ANALYZING EFFECT OF FOREIGN OUTPUT LEVELS ON TURKISH EXPORTS¹

Ph.D. Gürkan BOZMA²

¹ This study is an updated version (data and literature) of paper presented to İĞDIR INTERNATIONAL CONFERENCE ON MULTIDISCIPLINARY STUDIES.

² İğdır University, Faculty of Economics and Administrative Sciences, Economics, İğdır, Turkey, grknbm@gmail.com, ORCID: 0000-0003-4047-9012

INTRODUCTION

The importance of exports for countries has been the subject of study throughout the literature. Mercantilists defined the source of economic growth as the increase in the country's gold stock as a result of foreign trade. In the next process, it is seen that export is a necessity rather than a requirement for economic growth, with the sale of surplus production to other countries through specialization and exchange in classical economic thought. With the Keynesian school, exports were included in the total expenditure equation and became one of the factors that increase economic growth after consumption and investment. It can be said that exports, which are an important factor for economic growth, are a function of real exchange rate and foreign income (Ünsal, 2016). Exports increase or decrease according to the increases and decreases in the real exchange rate. The real appreciation of a country's currency is seen as an obstacle to exports. The appreciation of the domestic currency causes the exported goods to become expensive, so exports are decreasing. Öztürk and Acaravcı (2006), Gül and Ekinçi (2006), Aktaş (2010) and Tapşın and Karabulut (2013) have conducted studies revealing that increases and decreases in exchange rates are effective on exports. On the other hand, Aksu et al. (2017) claimed that the effect of positive and negative shocks in exchange rates on foreign trade is different. On the one hand, the increase in foreign income will increase the disposable income of households and increase their demand for export goods. According to TUIK (2018), Turkey realized 47% of its exports to EU

(28) countries in 2017. Also, in terms of selected groups of countries, part of 52% of Turkey's exports to OECD countries it has been made. It should be emphasized that the increases and decreases in the income of these countries will direct Turkey's exports Balcılar et al. (2014), in their study for Turkey, found that foreign income positively affected exports. On the contrary, Rose and Yellen (1989) could not prove the existence of a long-term relationship between real exchange rate, domestic income, foreign income and foreign trade balance in their study for the USA.

For Turkey, it is important to add the export function to its import. According to UNCTAD (2017), among the commodity groups imported by Turkey in 2017, mineral fuels, mineral oils and products obtained from their distillation, bituminous substances, mineral waxes ranks first with a share of 15%. Boilers, machinery, mechanical devices and tools, nuclear reactors, their machinery and parts follow this with 11%. It would not be wrong to say that exports in Turkey are a function of imports, considering that the weight of the products in the top 10 among the imported goods groups in total imports is 70% and the majority of these goods are commodities used in the export sector. In addition, examination of import content in exports is another indicator of how important imports are for Turkey's exports. According to OECD (2018), the import content of the goods exported in the manufacturing sector in Turkey in the middle of 2000 is 0.292. Accordingly, approximately \$ 30 of the \$ 100 exported goods consist of imported goods.

In this study, the effect of the real exchange rate, import, and foreign income level on exports is tried to be measured from 1980 through 2019. Nine models were used in the study. Each model in different country groups is intended to measure the impact of Turkey's exports. The rest of the study includes the econometric method and data set. In the last part, the results and suggestions section are given.

1. LITERATURE REVIEW

When the relevant literature is examined, many studies have been made on the determinants of exports. However, it is noteworthy that there are not many studies on the impact of foreign revenues on exports. While Öztürk and Acaravcı (2006) found in their study that the increases in the exchange rate for the period 1989-2002 decreased exports, Aksu et al. (2017) found that the changes in the real exchange rate had asymmetric effects on exports. On the other hand, Gül and Ekinici (2006) claimed that there was a long-term relationship between real exchange rate and exports in the period 1900-2006. At the same time, one-way causality from real exchange rate to exports has been determined. Similarly, Aktaş (2010) demonstrated the existence of long-term relations between real exchange rate, import, and export. Tapşın and Karabulut (2013), on the other hand, determined unidirectional causality relationships from import to export and from real exchange rate to export in their analysis for the period 1980-2011. On the one hand, Terzi and Zengin (1999) analyzed the relationship between exchange rate and total and sectoral foreign trade by using monthly data for the period 1989-1996. According to the findings,

they revealed that there is no statistically significant relationship between exchange rate and foreign trade balance. Akbostanci (2004) reached the findings showing that the increases in the exchange rate positively affect the trade balance in the long run. In another study, Yamak and Korkmaz (2005) concluded that the real exchange rate does not affect the foreign trade balance in the long run. Sweidan (2013) found that the exchange rate is effective on exports in the short term. In a cross-sectional study conducted by Bahmani-Oskooee and Ltaifa (1992), it was determined that the volatility of the exchange rate decreased the exports of both developed and less developed countries. On the other hand, Hwang and Lee (2005) claimed that the effect of uncertainty in the exchange rate on exports is limited in their time series analysis. Contrary to other studies, Sivri and Usta (2001) could not find a significant causal relationship between real exchange rate and exports. In the study conducted by Zengin and Terzi (1995), no causality relationship could be obtained between exports, real exchange rate, and imports. However, Gerni et al. (2018) reached the results emphasizing that imports are important for export. In table 1 below, a summary of the literature regarding the studies dealing with the relations between exports, real exchange rate, import, and foreign income is given. Table 1 in Turkey and other countries' work to address the determinants of exports are summarized.

Table 1. Literature Review

Researcher	Range	Method	Definition
Rose and Yellen (1989)	1960:1-1985:4	Time Series	As a result of the findings, a long-term relationship between real exchange rate, domestic income, foreign income, and foreign trade balance could not be determined.
Rose (1991)	1974:01-1986:12	Time Series	It has been determined that the real exchange rate has no effect on export and import, ie foreign trade balance sheets.
Egeli (1992)	1980-1990	Time Series	It was determined that the real exchange rate increases increased exports.
Zengin and Terzi (1995)	1950-1994 1950-1979 1980-1994	Time Series	As a result of the findings, causality relationships between exports, nominal exchange rate, and imports could not be determined.
Zengin (2001)	1994-2000	Time Series	A long-term relationship has been determined between exports, imports, and real exchange rates.
Öztürk and Acaravcı (2003)	1989:1-2002:8	Time Series	It has been determined that changes in the exchange rate have a negative effect on

			exports.
Aydın et al. (2004)	1987:1-2003:03	Time Series	It has been determined that the real exchange rate is an important factor for imports but has no effect on exports.
Balcılar et al. (2014)	1995-2012	Time Series	As a result of the findings obtained, while real exchange rate and real wage index affect export volume negatively, foreign income and productivity affect export volume positively.
Gerni et al. (2018)	2003:Q1-2017:Q4	Time Series	It is concluded that the effects of changes in exchange rates and imports on exports are symmetrical.

2. ECONOMETRIC METHODOLOGY AND DATA SET

2.1. Econometric Methodology

The Johansen Cointegration test is based on the VAR system, which includes data with the same stationarity levels. The VAR system is defined as follows.

$$\Delta Y_t = \Gamma_1 \Delta Y_{t-1} + \dots + \Gamma_{k-1} \Delta Y_{t-k} + \Pi \Delta Y_{t-k} + \varepsilon_t \quad (1)$$

$$\Gamma_i = -1 + \Pi_1 + \dots + \Pi_i, i = 1, \dots, k \quad (2)$$

In equation (1), the Π coefficients matrix, ε_t is an error term without autocorrelation.

Johansen and Juselius (1990) have developed a maximum likelihood test procedure on the number of cointegrated vectors. Two test statistics used in the test result are defined, these are Trace and Maximum Eigenvalues. As a result, using the test statistics, the null hypothesis is tested whether there is r or more cointegrated vectors (Greene, 2000).

$$\lambda_{trace}(r) = -T \sum_{j=r+1}^p \ln(1 - \lambda_j) \quad (3)$$

$$\lambda_{max}(r) = -T \ln(1 - \lambda_{r+1}) \quad (4)$$

In equations (3) and (4), λ_j denotes eigenvalues, T denotes the number of observations. In the second test, it is tested against the hypothesis that suggests that there are as many cointegrated vectors as the null hypothesis, $r + 1$ (Johansen and Juselius, 1990).

2.2. Data Set

In this study, the effect of imports, real exchange rate, and foreign income on exports has been tried to be determined. In other words, using an expanded export function, the effect of variables on exports is tested. Accordingly, from the World Development Indicators (WDI) database, exports (2010 \$), imports (2010 \$), foreign income (Arab World, East Asia and Pacific, European Union, Latin America and Caribbean, Middle East and North Africa, Figures for North America, South Asia, OECD and Sub-Saharan Countries (\$ 2010) are drawn annually. The real exchange rate (2003 = 100) series was obtained

from the CBRT database. Estimates are made by taking the natural logarithm of the series. Some descriptive statistics belonging to the series whose natural logarithms are taken are presented in Table 2.

Table 2. Descriptive Statistics

	EXP	IMP	REALEX	N.A MERICA	ARAB	EAST ASIA	EUROPEAN	LATIN	MIDDLE EAST	OECD	SAHARA N	SOUTH ASIA
Mean.	20.344	20.770	4.507	10.636	8.516	8.606	10.251	8.933	8.688	10.336	7.210	6.685
Max.	22.141	22.089	4.849	10.921	8.772	9.274	10.521	9.169	8.964	10.579	7.419	7.567
Min.	18.345	19.345	4.117	10.262	8.249	7.982	9.900	8.725	8.414	9.983	7.027	6.005
Std. D.	0.8616	0.768	0.173	0.1971	0.172	0.380	0.202	0.152	0.176	0.189	0.135	0.479
Skew.	0.077	-0.004	-0.163	-0.4066	0.124	0.097	-0.397	0.388	0.134	-0.491	0.274	0.358
Kur.	2.681	1.896	2.424	1.907	1.635	1.921	1.775	1.625	1.688	1.934	1.610	1.868
Jarque-Bera	0.209 (0.900)	2.030 (0.362)	0.729 (0.694)	3.090 (0.213)	3.204 (0.201)	2.001 (0.367)	3.552 (0.169)	4.153 (0.125)	2.990 (0.224)	3.502 (0.174)	3.722 (0.156)	2.988 (0.224)

Note: Parentheses show the probability value.

Table 2 shows the descriptive statistics of the series whose natural logarithm is taken. Accordingly, the average of exports was determined as 20.344 and its standard deviation as 0.86, while these values for imports were determined as 20.770 and 0.76, respectively. Accordingly, real imports were realized more than real exports between 1980-2019. This situation reveals Turkey's chronic trade deficit. Mean and standard deviation values of the real exchange rate were determined as 4.507 and 0.17, respectively. The null hypothesis, which shows that all series are normally distributed at the 1% significance level in the Jarque-Bera statistic, which shows whether the series is normally distributed or not, could not be rejected. Accordingly, the series is normally distributed. The stationary analysis of the series was used the Dickey-Fuller unit root test proposed by Dickey and Fuller (1981) and the PP unit root test proposed by Phillips-Perron (1988). The results of unit root tests are presented in Table 3 below.

3. EMPIRICAL FINDINGS

In this study, the effect of foreign income, import, and real exchange rate on exports will be estimated by cointegration analysis. The model used in the study is given below in equation (5).

$$Exp = f(F.Income, IMP, Re alEx) \quad (5)$$

Equation (5) shows real export with the natural logarithm of Exp, per capita GDP with the natural logarithm of F.Income, and Realex shows

the real exchange rate with its natural logarithm. The regression form of equation (5) is as in equation (6) below:

$$Exp = \alpha_0 + \beta_1 F.Income + \beta_2 Imp + \phi_1 RealEx + \varepsilon \quad (6)$$

Here, the constant term α_0 , β_1, β_2, ϕ_1 denote the coefficients of the variables. According to the related article, while β_1 is expected to be positive, it can be stated that β_2 and ϕ_1 values differ in terms of countries and periods. However, it has been determined in the relevant literature that the real exchange rate has a negative effect on exports. The decline in the prices of goods produced within the country compared to those of other countries will affect exports positively. Thus, the decline in the real exchange rate in terms of Turkey's exports is expected to affect positively. In the study, it is necessary to make the stationary analysis of the series to estimate the effect of foreign income, import, and real exchange rate on exports by cointegration analysis.

Table 3. Unit Root Tests Results

Variables	I(0)			
	PP		ADF	
	Constant	Constant-Trend	Constant	Constant-Trend
N. AMERICA	-1.3862	-1.536	-1.29	-1.9112
ARAB	-0.3778	-4.8821***	0.1106	-4.6538
EAST ASIA	0.7254	-1.365	0.8151	-1.1722

EUROPEAN	-1.6555	-0.6372	-1.6555	-0.6372
LATIN	0.4073	-3.2456*	0.5792	-3.2942
MIDDLE EAST	-0.1786	-4.4556***	0.535	-4.4556***
OECD	-2.3242	-0.7174	-2.3782	-0.6618
REALEX	-2.0196	-2.1492	-1.9694	-2.1319
EXP	-1.1111	-3.6567	-1.1039	-3.4897*
IMP	-0.8821	-3.7158	-0.8895	-4.6725***
SAHARAN	-0.4751	-2.3216	-0.6382	-2.2099
SOUTH ASIA	3.4784*	-1.0176	3.3852*	-1.0284
I(1)				
N. AMERICA	-4.2272***	-4.1847***	-4.3246***	-4.4065***
ARAB	-4.0913***	-4.7808***	-4.1939***	-4.6455***
EAST ASIA	-4.8319***	-4.8381***	-4.8319***	-4.8381***
EUROPEAN	-4.2921***	-4.5363***	-4.3356***	-4.6581***
LATIN	-4.5373***	-4.5758	-4.6118***	-4.6442***
MIDDLE EAST	-3.2554***	-3.4793***	-3.3404***	-3.4793***
OECD	-4.2236***	-4.751***	-4.2503***	-4.7367***
REALEX	-7.7304***	-7.6476***	-7.7517***	-7.666***
EXP	-6.2604***	-6.1687***	-6.1477***	-6.0507***
IMP	-9.3553***	-9.0897***	-6.1069	-6.0178***
SAHARAN	-3.0601*	-3.3192***	-3.1137***	-3.394***
SOUTH ASIA	-4.1874***	-5.3845***	-4.2305***	-5.4606***

Note: *, ** and *** show the 10%, 5% and 1% significance levels, respectively.

As can be seen from Table 3, according to the ADF unit root test results proposed by Dickey and Fuller (1981), all variables in the constant model are not stationary at 1%, 5%, and 10% significance

levels in level values. On the other hand, in the constant-trend model, per capita income of Arab World, Middle East, and North African countries were found to be stationary at 1% significance level and real import and real export series at 5% significance level. When the first differences of the series were taken, as a result of the ADF unit root test, it was seen that the series were stationary at 1% and 5% significance levels in constant and constant-trend models. The PP unit root test results suggested by Phillips and Perron (1988) support the results obtained from the ADF unit root test. The results of the Johansen cointegration test are presented in Table 4.

Table 4. Johansen Cointegration Test (Trace)

Hypothesis	$H_0=r=0$ $H_a=r \geq 1$	$H_0=r \leq 1$ $H_a=r \geq 2$	$H_0=r \leq 2$ $H_a=r \geq 3$	$H_0=r \leq 3$ $H_a=r \geq 4$
N. AMERICA	31.450	15.410	6.057	0.682
ARAB	64.238***	13.332	5.334	1.236
EAST ASIA	35.488	16.659	3.352	0.369
EUROPEAN	32.706	18.657	9.198	1.138
LATIN	36.469	15.288	4.483	0.046
MIDDLE EAST	50.964**	15.408	6.759	2.100
OECD	33.270	18.286	8.333	1.645
SAHARAN	35.288	19.279	7.080	0.541
SOUTH ASIA	49.538**	23.015	8.779	0.023

Note: ***, ** indicates the significance level at 1% and 5% level, respectively.

As can be seen from Table 4, in the models established for all countries, there are only long-term relationships at 1% and 5%

significance levels between the export, import, real exchange rate, and income of Arab, Middle Eastern, and South Asian country groups. In 2017, Turkey has approximately \$ 157 billion in exports. 51% of this export was made to OECD countries and 28% to member countries of the Organization of Islamic Cooperation (TUIK, 2018). Looking through this window, the results obtained seem to be consistent. According to these results, with the increases of 1% in per capita income in the Arab countries, Turkey's exports increase by approximately 20%. Similarly, the Middle East and 1% increase in per capita income group of countries in South Asian countries is increasing Turkey's exports by approximately 15% and 3.5% respectively. To be specific, Turkey has been exporting agricultural products to the region. Especially in 2019, approximately 2.8 billion \$ worth of exports were made to Iraq. These export figures with Iraq, Turkey has taken the second place among the countries where the export. Also, Turkey's biggest exporter among the first 10 countries, with South Asian countries India and Egypt which is located in the North African country. Figure 1 shows the distribution according to Turkey's exports to the country have made in 2019 can be seen. On the other hand, it can be seen from the table that the coefficient of the real exchange rate is negative and statistically significant in models with a cointegration relationship. The results are in line with the relevant article. The decreases in the real exchange rate increase exports. Because the decrease in the real price of the goods of the country against the goods of other countries increases the export volume. Besides, real imports have been found to have a negative effect on real

exports in the models. The biggest economic problem of Turkey in recent years, it can be stated that the adoption of a production model dependent on imports. Due to the import-dependent production model, uncertainties in commodity prices can cause a decrease in the supply side, as well as upward pressure on producer prices and real exchange rate. On the other hand, according to TUIK (2018), the use of imported goods in the manufacturing industry was 11.86% in 1998, while this share increased to 18.17% in 2012. Besides, according to TUIK (2018), the import content of the goods exported in the manufacturing industry was 8.92% in 1995, while this share was determined as 25.75% in 2011.

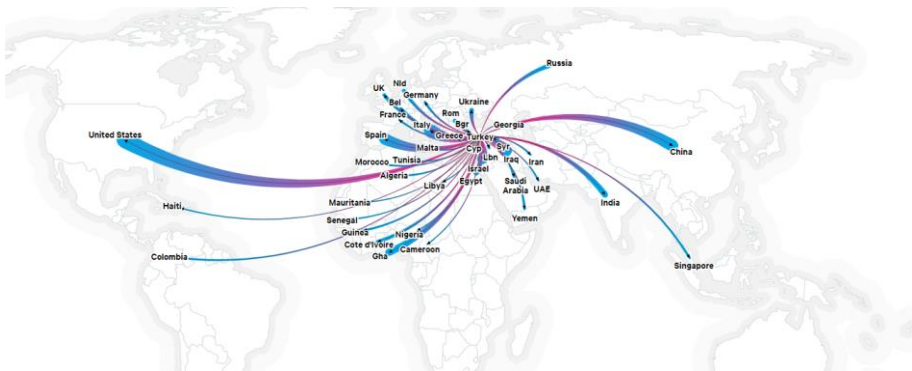


Figure 1. Distribution of Exports by Country (2019)

Source: Chatham House, 2021.

As a result of the Johansen cointegration test, long-term relationships were found for only three country groups. Error correction model has been made for countries with cointegration relationship and the results are presented in Table 5. First of all, if we look at the diagnostic tests for error correction models, it is seen that no heteroscedasticity and

autocorrelation problems are varying at 1%, 5%, and 10% significance levels. This result shows that the coefficients extracted from the established models can be interpreted statistically and significantly. If we look at the results, in the model established for Arab countries, the error correction parameter was found to be -0.050. When the related literature is examined, this coefficient is expected to be between -1 and 0. According to the result of the study, shocks that will occur in the income of the Arab countries, imports, and real exchange rate are approaching the balance at the rate of 0.05% in the following year. Error correction parameters obtained from models with the Middle East and South Asian country groups were calculated as -0.095 and -0.204, respectively. These results are statistically significant at the 1% level.

Table 5. Error Correction Model and Long-Term Coefficients

Variable	ARAB	MIDDLE EAST	SOUTH ASIA
F.Income	19.011*** (2.589)	14.424*** (2.606)	3.2040*** (0.751)
RealEx	-3.441*** (1.404)	-3.510*** (1.334)	-0.863* (0.482)
IMP	-3.639*** (0.514)	-2.369*** (0.516)	-1.238*** (0.457)
ECM	-0.050*** (0.018)	-0.095*** (0.027)	-0.204*** (0.065)
χ^2_{SC}	22.043 [0.114]	20.694 [0.193]	17.378 [0.364]
χ^2_{HET}	204.7003 [0.394]	199.297 [0.500]	180.223 [0.838]

Note: *, ** and *** show the 10%, 5% and 1% significance levels, respectively. Parentheses indicate standard errors. The square brackets are probability values. χ^2_{SC} and χ^2_{HET} refer to LM and ARCH tests conducted to test whether error terms contain autocorrelation and heteroscedasticity. The ECM adjustment coefficient, that is, the deviations that occur in the short term indicate whether it is directed towards balance in the long term.

CONCLUSION

Export is an important factor for economic growth. In this century, in which the trade between countries has increased rapidly, countries should increase their exports to reach further economic levels. The higher the increase in exports, the greater the income growth of the countries. In terms of less developed countries, this situation will result in convergence to the income of high-income countries, while for developed countries, increases in exports may lead to an acceleration of development through income increases. In the economic theory, it states that the income increases of foreign trade partners will cause mutual increases in income. As a result, income increases will increase exports by increasing demand. In this research, we examine the effects of foreign income, real exchange rate, and real import on real export using yearly data from the period 1980 to 2019 for Turkey. Turkey's foreign trade partner in the Arab world, East Asia and Pacific, European Union, Latin America, and the Caribbean, the Middle East and North Africa, North America, South Asia, the OECD, and sub-Saharan country groups are discussed. Besides, real import and real exchange rates were added to the established models to create an export function. According to empirical evidence, we found long-term relationships between per capita income of Arab, Middle East, and South Asian countries and Turkey's exports. Moreover, we suggested that an increase of Arab and the Middle East countries per capita rise Turkey's exports 19% and 14%, respectively, while increasing per capita of South Asian rise by 3%. On the other

hand, real exchange rate and real import variables have also been found to negatively affect real exports.

Different from the study of Rose and Yellen (1989) and Shevchuk (2013), the existence of long-term relationships between the incomes of foreign trade partners and exports was revealed in this study. On the other hand, Shane et al. (2008) found that US agricultural exports increased in direct proportion to the increase in income of foreign trade partners, in line with the findings of this study. In addition, Berument et al. (2014) in their study for Turkey, it is stated that the findings in this study coincide with the findings showing that the increase in income in foreign trade partners is effective in the export demand of sub-sectors.

As a result of the findings, it is suggested to policymakers that steps should be taken to improve foreign trade relations with export partners. Specifically, if the EU of Turkey's most important export partner that considered, is expected to provide more acquisition of Turkey's export trade with corresponding steps to be taken. Also, the increase of the country's export composition of Turkey is important to rise export demand. In other words, it is necessary to produce and export products that contain very high technology rather than low and medium technology product range.

REFERENCES

- Akbostanci, E. (2004). Dynamics of the trade balance: the Turkish J-curve. *Emerging Markets Finance and Trade*, 40(5), 57-73.
- Aksu, H., Başar, S., Eren, M., and Bozma, G. (2017). Döviz Kurunun Dış Ticaret Dengesi Üzerindeki Asimetrik Etkisi: Türkiye Örneği. *Atatürk Üniversitesi İktisadi Ve İdari Bilimler Dergisi*, 31(3), 477-488.
- Aktaş, C. (2010). Türkiye’de Reel Döviz Kuru İle İhracat Ve İthalat Arasındaki İlişkinin Var Tekniğiyle Analizi. *Zkü Sosyal Bilimler Dergisi*, 6 (11), 123–140.
- Aydın, M. F., Çıplak, U. and Yücel, M. E. (2004). Export Supply And İmport Demand Models for The Turkish Economy. The Central Bank of The Republic Of Turkey Research Department Working Paper, 4(09).
- Bahmani-Oskooee, M. and Ltaifa, N. (1992). Effects of Exchange Rate Risk on Exports: Crosscountry Analysis. *World Development*, 20(8), 1173-1181.
- Balcılar, M., Bal, H., Algan, N. and Demiral, M. (2014). Türkiye'in İhracat Performansı: İhracat Hacminin Temel Belirleyicilerinin İncelenmesi (1995-2012). *Ege Academic Review*, 14(3).
- Berument, M. H., Dincer, N. N. and Mustafaoglu, Z. (2014). External income shocks and Turkish exports: A sectoral analysis. *Economic Modelling*, 37, 476-484.
- Chatham House, The Royal Institute of International Affairs, 2021
- Dickey, D. A. and Fuller, W. A. (1981). Likelihood Ratio Statistics For Autoregressive Time Series With A Unit Root. *Econometrica*, 49(4), 1057-1072. Doi:10.2307/1912517
- Egeli, H. A. (1992). Türkiye’de 1980 Sonrası Dönemde İhracatın Gelişimi Ve İzlenen Politikaların Etkinlikleri.
- Gerni, C., Aksu, H. and Emsen, Ö. (2018). Türkiye Ekonomisinde İhracat İle İthalat Ve Döviz Kuru Arasındaki İlişkiler. *Cumhuriyet Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 19 (1), 78-91 .
- Greene, W. (2000). *Econometric Analysis*. USA: Prentice Hall.

- Gül, E. and Ekinci, A. (2006). Türkiye’de Reel Döviz Kuru İle İhracat Ve İthalat Arasındaki Nedensellik İlişkisi: 1990 – 2006. Dumlupınar Üniversitesi Sosyal Bilimler Dergisi, Sayı:16, 165-190.
- Hwang, H. and Lee, J. (2005). Exchange Rate Volatility and Trade Flows Of The U.K. İn 1990’s. International Area Studies Review, Hankuk University Of Foreign Studies, 8(1), 173-182.
- Johansen, S. and Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Co-İntegration With Applications To The Demand For Money. Oxford Bulletin of Economics and Statistics, 52(2), 169-210.
- OECD (2018), Import content of exports (indicator). doi: 10.1787/5834f58a-en (Accessed on 12 November 2018)
- Öztürk, I. and Acaravcı, A. (2003). Döviz Kurundaki Değişkenliğin Türkiye İhracatı Üzerine Etkisi. Review of Social, Economic and Business Studies, 2, 197-206.
- Öztürk, İ. and Acaravcı A. (2006). The Effects of Exchange Rate Volatility on The Turkish Export: An Empirical Investigation. Review of Social, Economic and Business Studies, 2(2002-2003), 197-206
- Phillips, P. C. B. and Perron, P. (1988). Testing for A Unit Root İn Time Series Regression. Biometrika, 75(2), 335-346. Doi:10.1093/Biomet/75.2.335
- Rose, A. K. (1991). The Role of Exchange Rates İn A Popular Model of International Trade: Does The ‘Marshall–Lerner’condition Hold? Journal Of International Economics, 30(3-4), 301-316.
- Rose, A. K. and Yellen, J. L. (1989). Is There A J-Curve? Journal of Monetary Economics, 24(1), 53-68.
- Shane, M., Roe, T. L. and Somwaru, A. (2008). Exchange rates, foreign income, and US agricultural exports. Agricultural and Resource Economics Review, 37(1203-2016-95246), 160-175.
- Shevchuk, V. (2013). Modelling of price and income effects on Ukraine’s agricultural export growth. Information Systems in Management, 2.
- Sivri, U. and Usta, C. (2001). Reel Döviz Kuru, İhracat Ve İthalat Arasındaki İlişki. Uludağ Üniversitesi İİB Dergisi, 19(4), 1-9.

- Sweidan, O.D. (2013). The Effect of Exchange Rate On Exports And Imports: The Case Of Jordan. *The International Trade Journal*, 27(2), 156-172.
- Tapşın, G. and Karabulut, A. T. (2013). Reel Döviz Kuru, İthalat Ve İhracat Arasındaki Nedensellik İlişkisi: Türkiye Örneği. *Akdeniz İ.İ.B.F. Dergisi*, (26), 190-205.
- Terzi, H. and Zengin, A. (1999). Kur politikasının dış ticaret dengesini sağlamadaki etkinliği: Türkiye uygulaması. *Ekonomik Yaklaşım*, 10(33), 48-65.
- TUIK (2018), Dış Ticaret İstatistikleri. www.tuik.gov.tr
- UNCTAD, G. (2017). Trade and Development Report 2017. United Nations Publication.
- Ünsal, E. M. (2013). Makro İktisat, 10. B., Ankara, İmaj Yayınevi.
- Yamak, R. and Korkmaz, A. (2005). Reel döviz kuru ve dış ticaret dengesi ilişkisi. *Ekonometri ve İstatistik e-Dergisi*, (2), 16-38.
- Zengin, A. (2001) Reel Döviz Kuru Hareketleri Ve Dış Ticaret Fiyatları: Türkiye Ekonomisi Üzerine Ampirik Bulgular, *Cumhuriyet Üniv. İktisadi Ve İdari Birimler Dergisi*, 2(2):27-41.
- Zengin, A. and Terzi, H. (1995). Türkiye’de Kur Politikası, İthalat, İhracat Ve Dış Ticaret Dengesi İlişkisinin Ekonometrik Analizi. *Gazi Üniversitesi İİBf Dergisi*, 11(1-2), 247-266.

CHAPTER 2

THE IMPACT OF THE CUSTOMS ON LOGISTICS PERFORMANCE: A RESEARCH ON THE SARP BORDER GATE

Asst. Prof. Dr. Arzu TUYGUN TOKLU¹

¹ Recep Tayyip Erdogan University, Findikli School of Applied Sciences,
International Trade and Logistics Department, Rize, Turkey,
arzu.tuyguntoklu@erdogan.edu.tr <https://orcid.org/0000-0003-2041-0747>

INTRODUCTION

Logistics plays a major role in international trade relations since it is found positively correlated to international trade through different analytical approaches (Beysenbaev and Dus, 2020). The demand for flexible and timely deliveries in the highly competitive business environment leads firms to increase their competitiveness with logistics functions (Jazairy et al., 2017). Firms need to overcome the dilemma between quality standards and customer satisfaction. Logistics services quality mediates the relationship between logistics capabilities and customer satisfaction (Fernandes et al., 2018).

Although customers demand consistently faster delivery with on time and no damage for their products, logistics services providers suffer from increased costs due to time delays resulting from mainly insufficient government agency coordination, complex compliance requirements, and general lack of cohesion (Hummels and Schaur, 2013). At this point, logistics managers need to set performance goals such as efficiency or effectiveness and strive to achieve them to provide a net value to customers in today's competitive environment (Fugate et al., 2010). If firms pay attention to their suppliers and customers, they can record better logistics performance utilizing improved cost savings, distribution, flexibility, service levels, customer services, and customer satisfaction (Kim, 2009). Resource sharing, supplier and customer cooperation, and supply chain integration are considered as a base in offering a better service (Jayaram and Tan, 2010). Successful service quality and their

sustainable practices of logistics service providers result in recovered operational performance by decreasing costs and increasing sales (Gupta and Singh, 2020). It is proved that competitive logistics sustainable capabilities are essential in positively affecting organizational performance (Rajagopal et al., 2018)

Meanwhile, resources are the issues to be carefully paid attention to. In logistics literature, resources are classified as tangible and intangible by some scholars (Karia and Wong, 2013). Tangible resources are a fleet, plant, equipment, hardware, and so on, while intangible resources are know-how, reputation, organizational processes, and skills, and so on. Both of them have a positive relationship with the performance which helps for better profit and competitive advantage (Yang and Lirn, 2017), and they are identified as important factors in improving logistics services and logistics performance in the complicated and very competitive logistics sector (Liang et al., 2006).

The aim of this study is to investigate the effects of tangibles on logistics performance. The importance of the research is that the Sarp is among Turkey's busiest border gates. Academic research of the subject with different aspects can contribute to the development of logistics performance and consequently foreign trade.

The Sarp customs sometimes comes up with a long truck queue, and this subjects to complaints. Waiting to cross the border for a long time and the loss of time of trucks in these areas increases the financial and moral costs of logistics firms and negatively affects their logistics

performance. As these losses increase the logistics costs of foreign trade firms, the inability of the goods to reach the buyers on time can delay the payments and cause negatively for getting next orders. These delays also impact poorly supply chain management of the firms. Similarly, the prolongation of transit time is another factor that negatively affects customer satisfaction.

Numerous publications are using the Servqual scale to evaluate service quality. However, as far as I am concerned there are limited researches for logistics concerning service quality. To my knowledge, it was observed that border crossings were not examined among the researchers related to logistics performance. The study is meaningful in terms of bringing this issue to the agenda and contributing to literature in filling the gap. It investigates the effect of tangibles of the border gate, a dimension of Servqual, on logistic performance. It is expected that the change will be favorable for the parties at the reconstructed border gate with great investments. First, the research model reveals the effect of tangibles on overall service quality. Then, its effects on logistics performance are examined. The research is significant in terms of revealing the effect of the modernization of the buildings compared to the previous situations. It is believed that the results obtained offer value to the parties of practitioners and scholars interested in logistics and foreign trade.

1. THEORETICAL BASIS AND HYPOTHESIS DEVELOPMENT

1.1. The Sarp Border Gate

The Sarp border gate is a place that belongs to the Artvin province in the northeast Black Sea coast of Turkey. The border gate, which is 252 meters above sea level, was opened in 1989. It is important not only as a gate opening to Georgia but also as a border gate on the highway opening to the Caucasus and Central Asian countries. Figure 1 demonstrates the satellite photograph of the location on Google Map. The customs in Sarp operates also as a transit entry-exit gate for transit passengers, goods, and vehicles from/to Turkey. Trucks come from or go to Georgia, Azerbaijan, Russia, Kazakhstan, Turkmenistan, Kyrgyzstan, Tajikistan, and Uzbekistan mainly.

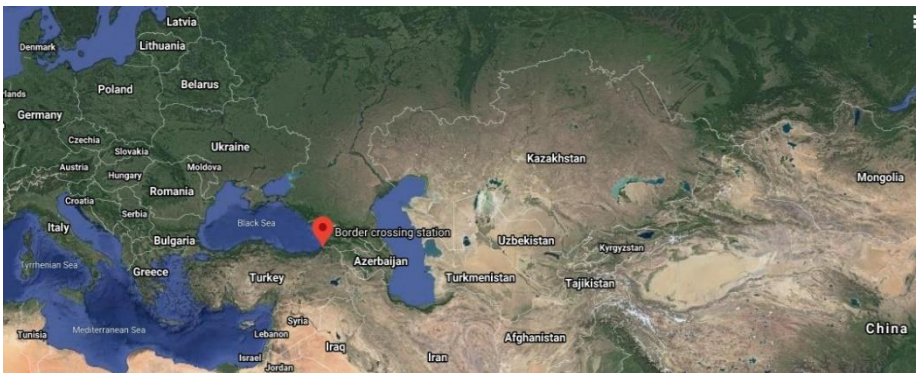


Figure 1. Location of the Sarp Border Gate

Source: Satellite photograph of Google Map (Access on Feb. 21, 2021)

Within the scope of modernization works to provide faster and higher quality service in line with the strategy of becoming the country where trade is the most comfortable and easy, construction works were

started on Nov. 28, 2016, and the official opening of the Sarp Customs Gate with its new facade was made on Mar. 01, 2019. (Kackar, 2021). Figure 2 demonstrates the photograph of the border and customs facilities. The field area was increased to 45,000 square meters as of the end of 2018 with the completed modernization by using cutting-edge technology. The facilities continue to serve both passengers and trucks with duty-free shops, and food and beverage areas where drivers and travelers can enjoy shopping safely in an enlarged area (GTIAS, 2021).



Figure 2. The Tangibles' Overview of the Sarp Border Gate

Source: https://www.gtias.com.tr/tr/tamamlanan-proje-detay/sarp_sinir_kapisi_1#
(Access on Feb. 21, 2021)

There are a total of 22 land border gates in Turkey. According to the number of vehicles that use these entry and exit gates, the Sarp border gate ranked the fourth busiest gate with 364,889 vehicles following the gates of the Kapıkule (Bulgaria), the Habur (Iraq), and the

Hamzabeyli (Bulgaria), respectively (Trade Ministry, 2021). Turkey as a transit country between Asia and Europe is also holding a strong position against smuggling. Investments on the borders are an essential issue not only for trading and tourism but also for security purposes.

1.2. The SERVQUAL Model and Tangibles

Parasuraman et al. (1988) defined Servqual which is called as the most popular service quality model. It is widely used to measure and evaluate service quality. In essence, this model is a survey used to measure customer expectations and determine their perceptions. The results achieved can serve as a guide for firms that want to create value and increase their performance. The model includes five variables namely tangibles, reliability, responsiveness, assurance, and empathy (Meidute-Kavaliauskiene et al., 2020).

Tangible dimension in the Servqual scale means the appearance of the establishment, equipment, staff uniforms, items, and materials used in the services. In addition to the others, especially technological advancements in the tangibles component seem to boost overall service quality which results in customer satisfaction in the logistics sector. In general, logistics service quality has a positive influence on customer satisfaction (Le et al., 2020). Investing in tangibles results in better working conditions with higher capacity, lower lead time, staff and customer satisfaction, and finally operational performance.

1.3. Logistics Performance

Logistics performance can impact a significant role in productivity so it is used to assess logistics improvements. Firms aim to measure logistics performance due to the reasons of reducing operational costs, revenue growth, and enhancing shareholder value (Banomyong et al., 2014). Bagchi et al. (2000) designates logistics performance as “the evaluation of the effectiveness of logistics activities from the point of view of efficiency (compliance with the consumer requirements), and economical operation (economical nature of the utilization of resources associated with a given service quality)”. Logistics performance is essential for logistics providers especially for customer satisfaction, service innovation, and cost savings (Karia and Wong, 2013). Traditionally, logistics performance includes two measures, namely “hard” and “soft”. Service (e.g., order cycle time and fill rates), cost, and return on assets or investment are classified as hard measures, while managers’ perceptions of customer satisfaction and loyalty are soft measures (Fugate et al., 2010).

Logistics performance is explained by efficiency and effectiveness in fulfilling logistics operations (Mentzer and Konrad, 1991). Firstly, efficiency is related to the logistics functions and takes into account the ratio of input levels to output levels (Van der Mullen and Spijkerman, 1985). It is also the ratio of utilized resources against derived results (Mentzer and Konrad 1991). It refers to how to manage the logistics functions cleverly. Efficiency is also defined as measuring how successful logistics resources are utilized. Communication, trust, culture, system compatibility, business

dealings, and standardization have an impact on cost efficiency and on-time delivery performance (Jazairy et al., 2017).

Secondly, effectiveness is defined as the ability to obtain resources and indicates the level of achieving a result (Ostroff and Schmitt 1993). Effectiveness is also the ratio between actual and expected outputs (Sink 1985). In logistics, effectiveness is defined as the capability to obtain the planned objectives in supplying customer requests in specified areas such as accomplishment time, stock availability, product guarantee, convenience (Langley and Holcomb 1992). Another logistics effectiveness definition is the degree of the fulfillment of the logistics function's goals (Mentzer and Konrad, 1991).

Both efficiency and effectiveness are main topics for the better performing organizations (Ford and Schellenberg, 1982). Superiority in logistics activities and capabilities is related to excellent organizational performance (Fugate et al., 2010). As a result, firms can be “effective, efficient, both or neither” (Ostroff and Schmitt, 1993). These definitions are about value creation which is an essential issue in contemporary organizations. Creating value can be obtained by customer service components like the ease of placing orders, timeliness, and consistency of delivery, and product availability.

Figure 3 schematically represents the model of the research proposed by the author. To my knowledge, this is the first model carried out in logistics research.

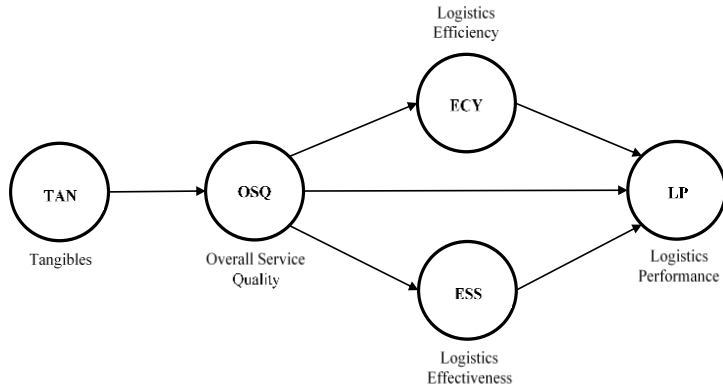


Figure 3. The Proposed Model Created by the Author

2. METHODOLOGY

According to the proposed model, tangibles affect overall service quality. Overall service quality affects logistics efficiency, logistics performance, and logistics effectiveness. Then, logistics efficiency and logistics effectiveness affect logistics performance. The model created by the author was tested using the methodology given below.

Based on the above given theoretical framework, the hypotheses of the research can be formulated as follows.

H1. Tangibles affect overall service quality

H2. Overall service quality affects logistics efficiency

H3. Logistics efficiency affects logistics performance

H4. Overall service quality affects logistics performance

H5. Overall service quality affects logistics effectiveness

H6. Logistics effectiveness affects logistics performance

The research scales with verified reliability and validity were adapted from the literature. First, tangible scale with 4 items and overall service quality scale with 4 items were adapted from Parasuraman et al. (1988), and Le et al. (2020). Second, the logistics efficiency scale with 6 items and logistics effectiveness scale with 5 items were adapted from Bobbitt (2004). Third, the logistics performance scale with 3 items was adapted from Fugate et al. (2010).

The prepared questionnaire form was designed in a format of five-point Likert for convenience. The questionnaire was first tested with 2 people for its ease of understanding. Then the final form of the questionnaire was shaped by evaluating the feedback. The questionnaire items are given in Appendix 1.

The population of the research is logistics firms that use the border service. The research samples were selected among the logistics firms operating in the Eastern Black Sea region by using the convenience sampling method. 42 people participated in the survey carried out face-to-face interviews. But 2 of them were excluded due to non-compliance, then analyzes were conducted with 40 questionnaires.

The SmartPLS program, which uses PLS (Partial Least Squares) based structural equation modeling, was employed in the analysis of the research data. The program was chosen since it can work with small sample size. One of the main advantages of this method is that it does not require multivariate homogeneity and normality requirements while working with a small sample size (Hair et al., 2014). Here, the

ten-time rule is specified for the minimum sample size (Toklu and Ustaahmetoglu, 2016). The adequacy of the sample size was confirmed in the study, as it satisfies this rule. SPSS v23 statistics program was employed for other analyzes.

3. RESULTS

Table 1 represents the demographics characteristics of the participants. Their status is as follows. 15% of the participants are female and 85% are male. 17.5% of them are between the ages of 21 and 30 years old, 35% of them are between the ages of 31 and 40 years old, 45% of them are between the ages of 41 and 50 years old, and 2.5% of them is older than 51 years old. 25% of them hold a maximum high school degree, 30% hold an undergraduate degree and 45% of them hold a graduate degree. 22.5% of them are in a top-level manager position, 40% of them are in a mid-level manager position and 37.5% of them are staff.

Table 1. Demographics Characteristics

Demographics		Frequency	%
Gender	Female	6	15.0
	Male	34	85.0
Age	21-30	7	17.5
	31-40	14	35.0
	41-50	18	45.0
	>51	1	2.5
Education status	Up to High School	9	25.0
	Undergraduate	12	30.0
	Graduate	18	45.0
Position in the firm	Top-level manager	9	22.5
	Mid-level manager	16	40.0
	Staff	15	37.5

3.1. The Measurement Model Results

The measurement model and structural model are tested together in PLS analysis. The measurement model tests the relationships between explicit variables and latent variables, and the structural model tests the relationships between latent structures. The path coefficients here indicate the predictive ability of the model. There is a need to test the Convergent and Discriminant validities in the construct validity (Toklu and Ozturk Kucuk, 2016). Item (question) reliability, composite reliability, and average variance extracted (AVE) are considered in convergent validity.

Reliability is sufficient if the item loadings of the model are above 0.500 value. To increase the reliability of the model, the threshold value was increased to 0.672, and items with loading below this value were excluded from the analysis. Besides, items with high VIF values were also removed from the analysis by checking the collinearity statistics. Cronbach's Alpha in the model was over 0.700 value. Composite reliabilities were also above 0.800 value. Since the AVE values of the variables were well above the 0.500 threshold value, the Convergent validity of the model was accepted as verified. Item reliability, Composite reliability, and AVE values in the model indicate that the structures confirm Convergent validity. Table 2 represents the results of the measurement model.

Table 2. Measurement Model Results

Latent Variable	Item	Loading	Cronbach's Alpha	Composite Reliability	AVE
TAN (Tangibles)	TAN1	0.782	0.772	0.853	0.593
	TAN2	0.785			
	TAN3	0.683			
	TAN4	0.824			
OSQ (Overall Service Quality)	OSQ1	0.831	0.820	0.893	0.736
	OSQ2	0.896			
	OSQ3	0.846			
ECY (Logistics Efficiency)	ECY2	0.763	0.837	0.885	0.607
	ECY3	0.675			
	ECY4	0.824			
	ECY5	0.724			
	ECY6	0.892			
ESS (Logistics Effectiveness)	ESS2	0.834	0.803	0.872	0.633
	ESS3	0.862			
	ESS4	0.672			
	ESS5	0.801			
LP (Logistics Performance)	LP1	0.742	0.764	0.866	0.684
	LP2	0.918			
	LP3	0.812			

Discriminant validity was verified with the help of Fornell and Larcker's (1981) criterion analysis (Toklu and Tuygun Toklu, 2015). Table 3 represents the analysis results.

Table 3. Fornell-Larcker Analysis

	ECY	ESS	LP	OSQ	TAN	Discriminant Validity
ECY	0.779					Yes
ESS	0.472	0.796				Yes
LP	0.522	0.597	0.827			Yes
OSQ	0.575	0.180	0.413	0.858		Yes
TAN	0.604	0.067	0.103	0.609	0.770	Yes

3.2. The Structural Model Results

Stdβ values indicate the importance of the relationships between constructs. The model's explanatory power is signaled by R^2 values. First of all, the variance in overall service quality is explained by tangibles with 37.1% ($R^2 = 0.371$; R^2 adj. = 0.355). Second, the variance on logistics efficiency is explained by overall service quality with 33.1% ($R^2 = 0.331$; R^2 adj. = 0.313). Third, the variance on logistics effectiveness is explained by overall service quality with 3.2% ($R^2 = 0.032$; R^2 adj. = 0.007). Fourth, the variance in logistics performance is explained by logistics effectiveness, logistics efficiency, and overall service quality with 46.7% ($R^2 = 0.467$; R^2 adj. = 0.423). These results indicate that the model has strong enough explanatory power.

T-tests were used in testing the significances of the hypothesis. First of all, the path between tangibles and overall service quality was found significant ($t = 3.671$; $p = 0.000$) which means H1 was supported. Second, the path between overall service quality and logistics efficiency was found significant ($t = 3.770$; $p = 0.000$) which means H2 was supported. Third, the path between logistics efficiency and logistics performance was found insignificant ($t = 0.901$; $p = 0.368$) which means H3 was not supported. Fourth, the path between overall service quality and logistics performance was found insignificant ($t = 1.470$; $p = 0.142$) which means H4 was not supported. Fifth, the path between overall service quality and logistics effectiveness was found insignificant ($t = 1.373$; $p = 0.170$) which

means H5 was not supported. Finally, the path between logistics effectiveness and logistics performance was found significant ($t = 3.534$; $p = 0.000$) which means H6 was supported. Table 4 summarizes the results obtained from T-Statistics.

Table 4. T Statistics

Hypothesis	Stdβ	Sample mean	Standard deviation	T Statistics	p value	Result
H1: TAN→OSQ	0.609	0.587	0.166	3.671	0.000	Supported
H2: OSQ→ECY	0.575	0.562	0.152	3.770	0.000	Supported
H3: ECY→LP	0.163	0.212	0.180	0.901	0.368	Not Supported
H4: OSQ→LP	0.233	0.225	0.159	1.470	0.142	Not Supported
H5: OSQ→ESS	0.180	0.209	0.131	1.373	0.170	Not Supported
H6: ESS→LP	0.479	0.459	0.135	3.534	0.000	Supported

Figure 4 schematically represents the rearranged structural model according to the results of the study.

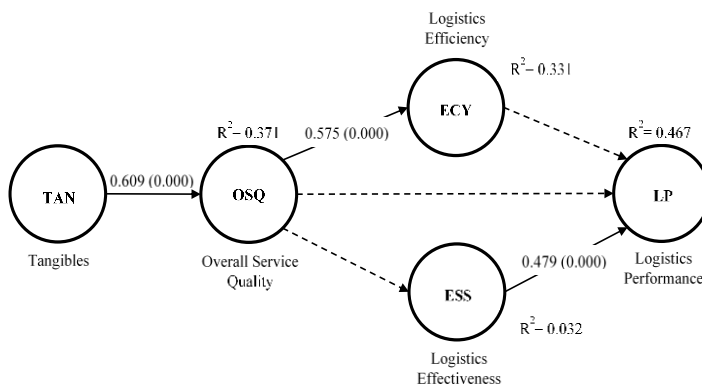


Figure 4. The Rearranged Structural Model

DISCUSSION

Logistics performance has an important topic in the development of international trade. Effective and efficient logistics operations provide a competitive advantage to firms operating in foreign trade. Turkey is a hub in terms of its geographic location advantage. The closeness to Europe on the one hand, and the Asian continent and the Middle East on the other provide a great opportunity for Turkey to become both a production and logistics base. Turkey has the potential to use intermodal logistics services, i.e., air, sea, train, and land transportation effectively and efficiently.

This study was carried out on the Sarp border gate, which is one of the customs gates used for land transportation, which is ranked the second position after the sea route in terms of vehicle traffics. The Sarp border gate between Turkey and Georgia began operations in 1989. It fulfills several important functions. The most important function is to connect Turkey to Georgia and it opens a link in reaching the Russian Federation and the Turkic republics. At the same time, it also functions as a transit route to Europe and the Middle East. The importance of the gate cannot be explained only by commercial truck transportation. Due to the intense human movements, it has an important place in the development of tourism, business, and cultural ties.

The motivation for this research is the formation of queues at the Sarp border gate, sometimes up to 30 km (between Sarp-Arhavi). The

modernization works, which were initiated to meet the needs, were completed at the end of 2018. The research has investigated the effects of the works carried out as a result of modernization on the performance of logistics firms. According to the model created for the research, first of all, the effect of tangibles was investigated on overall service quality, concerning the result of modernization. Afterward, the effect of this overall service quality on logistics efficiency and effectiveness was investigated. In the last part, the effects of logistics efficiency, effectiveness, and overall service quality on logistics performance were investigated. The research is significant because of being quantitative.

According to the findings, tangibles are effective on overall service quality. This is consistent with the literature (Le et al., 2020). It has been determined that the investments made on tangibles, together with overall service quality, facilitate the logistics operations. It has been found that overall service quality has an impact on logistics efficiency. This is consistent with the literature (Jazairy et al., 2017). However, the hypothesis that logistics efficiency affects logistics performance was not supported. There may be various reasons for this. The emergence of a very dynamic structure, the pandemic conditions, and the infrastructure on the Georgian side of the border may be effective in getting this result. Besides, the reasons behind this could be volatility in exchange rates, changes in import and export figures, and economic turbulence experienced in recent years in Turkey. These unfavorable phenomena also affect the sustainability of the business environment in reaching goals.

The hypothesis that overall service quality affects logistics effectiveness was not supported. The use of this gate is mostly for transit passes. Services such as customs clearance, storage, warehouse, and more may be effective at domestic customs. However, logistical effectiveness affects logistical performance. This is consistent with the literature (Fugate et al., 2010). Efficient and effective use of resources can be significant in achieving this result.

The hypothesis that overall service quality affects logistics performance was also not supported. The reasons may be the presence of the other variables. Overall service quality at the border alone is not sufficient to affect logistics performance. Since the logistics sector suffers from intense competition, many more variables could be expected to affect it.

The following results are determined when the variances are examined in the variables. Tangibles explain 37% of the variance in service quality, which can be called a strong effect. Therefore, it can be determined that the investments made are significant. Overall service quality explains 33.1% of the variance in logistics efficiency. This is called a higher rate. However, the same overall service quality can explain only 3.2% of the variance in logistics effectiveness. Although this may seem like a small rate, actually it is very important in the innovation efforts of organizations. Similarly, logistics efficiency, logistics effectiveness, and overall service quality together can explain 46.7% of the variance in logistics performance. This is accepted as a very strong rate. At the same time, these results also reveal the

importance of the subject. Serious performance improvements can be achieved with the efforts to be made.

An electronic appointment system was introduced by the trade ministry of Turkey to complete the transactions quickly at the border gates in 2020. Then, it was temporarily suspended due to some setbacks in the system. It is expected that waiting and delay at the borders can be decreased with the updates to be made in such smart systems. Although significant investments have been made for the modernization of the borders, it is stated that sometimes the long waiting times are influenced by the climatic conditions and the infrastructure inadequacy of the neighboring country. It is thought that the transactions would accelerate with the additional investments to be made by the joint work with neighboring countries.

There is no railway alternative at the Sarp border gate which is 27 km away from Batumi port in Georgia. Batumi has also a railway option, which is connected to the CIS (Commonwealth of Independent States) units. Turkey could reduce logistics costs and improve performance if the rail investments were made as politically discussed. The importance of the alternative routes in logistics is already proved with the Suez Canal container ship accident. However, the Kars Tbilisi Baku railway, which is already in use, is an important investment in this sense and aims to fill the gap in logistics enrichment options. It is obvious that with more effective use of the railway lines, access to CIS units and China will be realized much easier and cost-effective.

The research is limited by the variables of the proposed model by comparing the improvements in performance resulting from modernization at the Sarp border crossing concerning previous years only. The subject can be examined for different dimensions and different stakeholders, by taking into account different logistics criteria. Since many different variables affect each other behind the improvement in performance, the results obtained only to reveal a general situation. The research topic has many aspects such as international relations, political and economic. Different studies can be recommended to scholars to reveal the facts of each of them.

REFERENCES

- Bagchi, P.K. and Helge, V. (2000): Logistics Competence in Small and Medium-Sized Enterprises: The Norwegian Experience, *Supply Chain Forum*, 1 (1), 46-55.
- Banomyong, R., Huong, T.T.T. and Ha, P.T. (2014). A Study of Logistics Performance of Manufacturing and Import - Export Firms in Vietnam. *Conference: International Conference on Logistics and Transport (ICLT)*, Kuala Lumpur, Malaysia.
- Beysenbaev, R. and Dus, Y. (2020). Proposals for improving the Logistics Performance Index. *The Asian Journal of Shipping and Logistics*, 36 (1), 34-42.
- Bobbitt, L.M. (2004). *An Examination of the Logistics Leverage Process: Implications for Marketing Strategy and Competitive Advantage*. Unpublished Ph.D. Dissertation, The University of Tennessee. (in Fugate et al., 2010).
- Fernandes, D.W., Moori, R.G. and Filho, V.A.V. (2018). Logistic service quality as a mediator between logistics capabilities and customer satisfaction. *Revista de Gestão*, 25 (4), 358-372.
- Ford, J.D. and Schellenberg, D.A. (1982). Conceptual Issues of Linkage in the Assessment of Organizational Performance. *Academy of Management Review*, 7 (1), 49-58.
- Fornell, C. and Larcker, D.F. (1981). Evaluating structural models with unobservables variables and measurement error. *Journal of Marketing Research*, 18 (1), 39-50.
- Fugate, B.S., Mentzer, J.T. and Stank, T.P. (2010). Logistics Performance: Efficiency, Effectiveness, and Differentiation. *Journal of Business Logistics*, 31 (1), 43-62.
- GTIAS (2021). https://www.gtias.com.tr/tr/tamamlanan-proje-detay/sarp_sinir_kapisi_1# (Access on Mar 21, 2021)

- Gupta, A. and Singh, R.K. (2020). Managing operations by a logistics company for sustainable service quality: Indian perspective. *Management of Environmental Quality*, 31 (5), 1309-1327.
- Hair, J.F., Hult, G.T.M., Ringle, C.M. and Sarstedt, M. (2014). *A primer on partial least squares structural equation modeling (PLS-SEM)*. SAGE Publications.
- Hummels, D. and Schaur, G. (2013). Time as a trade barrier. *American Economic Review*, 103 (7), 2935-2959.
- Jayaram, J. and Tan, K.C. (2010). Supply chain integration with third-party logistics providers. *International Journal of Production Economics*, 125 (2), 262-271.
- Jazairy, A., Lenhardt, J. and Haartman, R.V. (2017). Improving logistics performance in cross-border 3PL relationships. *International Journal of Logistics Research and Applications*, 20 (5), 491-513.
- Kackar (2021). Sarp Customs. <https://kackar.ticaret.gov.tr/kurumsal/baglanti-idarelerimiz/sarp-gumruk-mudurlugu> (Access on Mar 7, 2021)
- Karia, N. and Wong, C.Y. (2013). The impact of logistics resources on the performance of Malaysian logistics service providers. *Journal. Production Planning and Control*, 24 (7), 589-606.
- Kim, S.W. (2009). An investigation on the direct and indirect effect of supply chain integration on firm performance. *International Journal of Production Economics*, 119 (2), 328-346.
- Langley, C. John, Jr., and Holcomb, M.C. (1992). Creating Logistics Customer Value. *Journal of Business Logistics*, 13 (2), 1-27.
- Le, D.N., Nguyen, H.T. and Truong, P.H. (2020). Port logistics service quality and customer satisfaction: Empirical evidence from Vietnam. *The Asian Journal of Shipping and Logistics*, 36 (2), 89-103.
- Liang, G.S., Chou, T.Y. and Kan, S.F. (2006). Applying fuzzy quality function deployment to identify service management requirements for an ocean freight forwarder. *Total Quality Management*, 17 (5), 539-554.
- Meidute-Kavaliauskiene, I., Vasiliene-Vasiliauskiene, V. and Vasilis Vasiliauskas, A. (2020). Identification of Sectoral Logistics Service Quality Gaps by Applying Servqual Method. *Transport*, 35 (4), 419-434.

- Mentzer, J. T. and Konrad, B.P. (1991). An Efficiency/Effectiveness Approach to Logistics Performance. *Journal of Business Logistics*, 12 (1), 33-62.
- Ostroff, C. and Schmitt, N. (1993). Configurations of Organizational Effectiveness and Efficiency. *Academy of Management Journal*, 36 (6), 1345-1361.
- Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1988). Servqual: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of retailing*, 64 (1), 12-40.
- Rajagopal, S., Krishnamoorthy, B. and Khanapuri, V.B. (2018). Competitive logistics capability for sustainable organisational performance: a study of the textile industry in India. *International Journal of Logistics Economics and Globalisation*, 7 (2), 105-124.
- Sink, D. S. (1985). *Productivity Management: Planning, Measurement, and Evaluation, Control, and Improvement*, New York: John Wiley & Sons. (in Fugate et al., 2010).
- Toklu, İ.T. and Ozturk Kucuk, H. (2017). The Impact of Brand Crisis on Consumers' Green Purchase Intention and Willingness to Pay More. *International Business Research*, 10 (1), 22-33.
- Toklu, İ.T. ve Tuygun Toklu, A. (2015). Zeytinyağının İçsel ve Dışsal İşaretlerine Tüketicilerin Tepkisi: Nicel Bir Araştırma. *International Review of Economics and Management*, 3 (1), 61-84.
- Toklu, İ.T. ve Ustaahmetoğlu, E. (2016). Tüketicilerin Organik Çaya Yönelik Tutumlarını ve Satın Alma Niyetlerini Etkileyen Faktörler: Bir Alan Araştırması. *Uluslararası Yönetim İktisat ve İşletme Dergisi*, 12 (29), 41-61.
- Trade Ministry (2021). Republic of Turkey Ministry of Trade) <https://ticaret.gov.tr/data/5d63d89d13b8762f7c43a738/22-Kara%20Kapilarina%20ve%20Arac%20Turlerine%20Gore%20Arac%20Giris%20Cikis%20Sayilari.pdf> (Access on Mar 7, 2021)
- Van der Meulen, P.R.H. and Spijkerman, G. (1985). The Logistics Input-Output Model and its Application. *International Journal of Physical Distribution and Materials Management*, 15 (3), 17-25.

Yang, C-S. and Lirn, T-C. (2017). Revisiting the resource-based view on logistics performance in the shipping industry. *International Journal of Physical Distribution & Logistics Management*, 47 (9), 884-905.

APPENDIX 1. RESEARCH QUESTIONNAIRE

Tangibles [Adapted from Parasuraman et al. (1988), and Le, Nguyen and Truong (2020)]

(1: Strongly Disagree – 5: Strongly Agree)

TAN1 The customs has modern and advanced machinery and equipment.

TAN2 The customs offices are large enough and create trust.

TAN3. The staff of the customs has well-dressed and neat uniforms.

TAN4. The machinery and equipment of the customs always meet the service requirements.

Overall Service Quality [Adapted from Parasuraman et al. (1988), and Le, Nguyen and Truong (2020)]

(1: Strongly Disagree – 5: Strongly Agree)

OSQ1. In general, the quality of services provided at the Sarp border is superior to those provided at the borders in other regions.

OSQ2. The quality of some services provided at the Sarp border is better than the services provided at the borders in other regions.

OSQ3. In general, the quality of the services provided at the Sarp border is of high standards among the services offered at the borders.

~~OSQ4. In general, the quality of the services provided at the Sarp border meets our service quality expectations.~~

Logistics Efficiency [(Adapted from Bobbitt (2004)]

How would you evaluate your work performance in your activities? (1: Bad – 5: Excellent)

~~ECY1. Percentage of service/shipments to customers from established locations to better serve customers~~

ECY2. The occupancy rate of each of your product lines, services, or logistics-related vehicles

ECY3. Percentage of orders or jobs executed/shipped on time.

ECY4. Percentage of shipments/jobs/services that need to be expedited.

ECY5. Inventory annual turnover.

ECY6. Average order cycle time (time in days between receipt of order/job/service and delivery of order/job/service).

Logistics Effectiveness [Adapted from Bobbitt (2004)]

How would you evaluate your business performance with the renewal of the Sarp border gate compared to the previous years? (1: Very bad – 5: Very good)

ESS1. Sales/Turnover

ESS2. Shipping costs

ESS3. Storage costs

ESS4. Inventory costs

ESS5. Total logistics costs

Logistics Performance [Adapted from Fugate, Mentzer and Stank (2010)]

(1: Strongly Disagree – 5: Strongly Agree)

LP1. Our overall logistics performance is well above the sector average.

LP2. Overall, our logistics performance is excellent.

LP3. We are in an extraordinary position in carrying out our operations.

Note that ~~Italis~~ were dropped from the analysis because of low factor loading.

CHAPTER 3

EFFECTS OF THOMAS COOK'S BANKRUPTCY ON TURKISH TOURISM¹

Prof. Dr. Adnan CELİK^{2*}, Omer Faruk DİKEN³, Esra UYSAL⁴

¹ This study was presented in “3rd International African Conference on Current Studies of Science, Technology & Social Sciences” (27-28 February, 2021, Abomey-Calavi, Benin).

^{2*}: Corresponding Author: Selcuk University, FEAS, Department of Business, Konya/Turkey. E-mail: adnancelik@selcuk.edu.tr, Tel: +90 507 4375165, ORCID: 0000-0002-8538-9937.

³: Selcuk University, ISS, Konya/Turkey. E-mail: omerdiken4224@gmail.com, Tel: + 90 539 7271752, ORCID: 0000-0001-5419-0194.

⁴: Selcuk University, ISS, Konya/Turkey. E-mail: esrauysal812@gmail.com, Tel: + 90 552 5886532, ORCID: 0000-0002-3931-1071.

INTRODUCTION

Transferring tourists from a certain location to another one, providing them shelter and meeting their eating and drinking needs are useful services in terms of tourism. Tour operators undertake important functions in popularizing tourism. The contribution of the tour operators to the country's foreign currency inputs is also undeniable. However, various problems may arise in these firms as a result of both internal administrative problems and environmental problems. In this respect, the British tour firm Thomas Cook case is significant. This firm, whose firm dates back to 1872, has become one of the leading firms in the world in the following years. However, the erroneous course of action it followed, especially in 2011, left the firm in a very difficult situation. In addition, the introduction of new actors into the market, the proliferation of institutions conducting online ticket sales, and the various problems listed below have not been that good for the firm. Thomas Cook declared bankruptcy in May 2019 as a result of the inadequacy of its efforts in the sales processes.

At a period of time, various things were said about the reasons for the bankruptcy of the firm which had 9 Billion Pounds turnover, approximately 19 million customers and approximately 22,000 employees operating in 16 countries. The answer for the question "What Went Wrong at the Vacation Firm?" is looked. There were many things in the answer list. The firm's business marriage in the past (2007) has been cited as a bad strategy. It was stated that the trade made over virtual networks could not be controlled. It was pointed out

that the holiday unplannedness and the changefulness in demand reduced the market share. It was emphasized that collection and debt management was not effective. Also, Britain's Brexit decision triggered the collapse (O'Connell, 2019: 1). The state of Thomas Cook, which brings many tourists to our country every year, has also adversely affected our tourism industry and caused other companies to be stuck in a difficult situation.

The aim of this study is to specify the general situation of the Turkish tour industry, the duties and practices of the tour operators and the problems experienced by the Turkish tourism industry due to this process are discussed under the title of "Problems Arising in Turkish Tourism Enterprises With the Bankruptcy of Thomas Cook". Because the tourism industry and of course the tour industry is very important for the Turkish economy. The information here is mostly based on the literature. There are some limitations in this regard. First of all, the records and documents of the relevant company could not be accessed directly. Afterwards, statistical research was not conducted in the victim environment. The obtained information was interpreted and suggestions were made to the relevant circles.

1. CONCEPTUAL FRAMEWORK

1.1. Tour Firms (Operators)

In general, tour operators can be observed in countries with a strengthening industry, which is engaged in tourist-related activities. They carry out the process according to the rules of travel agencies

from a legal perspective. They have started to differ from travel agencies in most countries economically and commercially (Hacioglu, 2000). Tour operators in our country could not be established because they require a lot of capital and marketing knowledge and organizational skills. Therefore, group travel agencies carry out this process (Kozak et al., 2000).

Tour operators are producers who compile the necessary inputs to change the location for travel purposes and deliver them to the public as a whole. They organize every tour for tourists, and they act as a bridge between the real producers and consumers by carrying out various services. In addition, in order to create an integrated holiday product for the tourists, they compile agreements in a holistic manner with accompanying events such as accommodation, transportation, entertainment, and they are also firms which deliver brochures advertising these services to the target audience. World Tourism Organization (WTO) describes it as “as well as being a process of transferring access, accommodation and other tourism related activities before the demand comes; carrying out these processes on the move or for accommodation purposes, arranging trips and delivering them to the public in return for a consideration.” (Hacioglu, 2000; Icoz, 2003: 199).

When it comes to travel related processes, the term tour operator is used instead of wholesaler concept. This process can be thought of as a tour wholesaler in relation with other operators. The operator concept here symbolizes the task of executing and running sub-items

associated with the tour. In other words, it carries out the function of taking the distribution of tour packages to the target audience. They can operate with their own facilities such as transportation and accommodation in order to deliver the activities they perform, or they can rent from other firms (WTO, 1999: 104). For instance, performing these processes in different countries may differ. While certain tour arrangements were carried out for the purpose of sejour in Northern Europe, arrangements were directed towards Circuit in Southern Europe (Dimitriou, 2003).

Tour operators, acting collectively with touristic organizations, collecting the travel processes in an integrated manner and carrying out the marketing function through the distribution of travel, can create touristic outputs according to the services that can be encountered during the holiday. They can also deliver these services to consumers by pricing them directly or by using travel agencies as an intermediary (Buck, 1988; 67-74; Hacıoglu, 2000; Holloway, 1994: 58; Sheldon, 1986: 349-365).

Services in the form of packages compiled in an integrated manner are more attractive to consumers. As, it may be more appropriate than the fee that can be paid to acquire all actors separately (Pekoz and Yarcın, 1998: 23). In this way, a comfortable, safe and affordable holiday opportunity is offered to consumers, and also this makes it possible to reduce tension and use leisure time with travel options (Icoz, 2003: 151; Budeanu, 2005: 94). In addition, it can prepare an environment for the dissemination of its activities through training trips,

promotions and the like for its own officers and travel agency employees. In general, operators performing a single target-oriented task can be classified according to some divisions (Tepelus, 2005: 102). These can be categorized as mass tourism operators, specialized tour operators, tour operators organizing domestic tours, and outsourcing (welcomer) tour operators (Goodal and Ashworth, 1993: 28-29). Particularly, the gain of tour operators who perform duties towards the masses in an integrated manner is higher than those who carry out alternative processes. However, the contribution of the operators involved in alternative tourism may be more in the context of the destination cost in terms of its effect in general perspective (Carey et al., 1997: 429).

1.2. Development Process of Turkish Tourism and the Contribution of Tour Operators

Turkish tourism has reached a remarkable place in the world with its success and progress. According to the World Tourism Organization data, in the context of hosting tourists in 2004, it ranked 12th with 2.2% market share, and 9th with 2.5% in temporary data in 2005. In terms of tourism returns, these rates were 2.6% at 8th rank in 2004, and according to temporary data in 2005, it hold its place. According to the data of the Ministry of Culture and Tourism, 198,841 people came to our country in 1963, this number was 724,784 in 1970, 1,288,060 in 1980, 5,389,308 in 1990, 10,428,153 in 2000 and this number reached to 21.124.886 in 2005. Package tours and tour operators have a serious contribution here. In this context, tour

operators have promoted our country to the best seller category in the Mediterranean (Cavlek, 2002: 486). This rapid progress has other reasons as well (Ulusoy, 2002: 164):

- The destinations in Mediterranean where consumers in Europe would like to visit reached to a saturation line.
- Curiosity about the newly observed coastal and sun-oriented locations in our country,
- Increasing structural investments since 1980, and transferring the competencies that companies want to produce to the market.

The fact that the accommodation firms in our country are new when compared to others in the Mediterranean increases the tendency in international context. Regarding, tourists coming in 1980-2005 and the income, it can be described that the situation in our country is higher than the indicators in the world. For instance, the increase in the number of incoming tourists between 1980-1990 is 59,1% and this amount was 76,8% in 2005 around the world, however indicators of Turkey for the same periods were 318,4% and 291,9%. On the other hand, the increase in profit for the same years are 150.6% and 157.7% in the world, while this indicator is 728.0% and 571% in Turkey. At this point, it can be argued that the progress of tourism in our country is more favorable than in the world. For the development of tourism, it is important to carry out integrated activities with international travel firms. For instance, according to the World Tourism Organization, in 2004 there were 24 tourists per 100 people in our country, while this number is 124 in Spain and 131 in Greece. It is thought that the

number of tourists and profit related to this issue in the world will increase. The efficiency of tour operators and agencies in our country is higher than the world average. When it comes to the way of visits by foreigners who came to our country in 2001; it is observed that 36.6% preferred individual, 39.6% preferred package tour and 23.8% preferred travel agencies(non-package tour). The use of travel agencies is 63.4%. Especially tour operators have contributed to the progress of touristic destinations to be visited in the last 30 years (Carey et al., 1997: 429; WTO, 1999; Minister of Culture and Tourism, 2006; Alaeddinoglu and Can, 2007).

2. THOMAS COOK FIRM

2.1. Firm's Position and Importance in the Sector

When it is said holiday the first thing that comes to mind is generally summer but this is no longer considered as the only choice that there are many holiday options for the parties in every season. As a result of the situations brought by the tour firms, it is possible to go anywhere with many different options. It was an unusual event that a British businessman named Thomas Cook took nearly 500 people on a tour by train from Leicester to Loughborough on July 5, 1842. This view of Thomas Cook, who is seen as the father of modern tourism, has increased his reputation until he is the most successful tour firm in England and he is respected, and he continued his world trips that last 40 thousand kilometers, which can take 222 days. Tourism expert Jurgen Schmude from Ludwig-Maximillian University in Munich describes this unusual situation that consists travelling by train as the

pioneer of tour-related processes in the modern context. Among the excursions conducted by Cook, cruises to Scotland, Ireland, Europe, Canada, the USA and the Nile River and similar ones can be mentioned. In this way, it has turned to people with advanced income of England and has achieved a high profit process (BBC, 2019/1; BBC, 2019/2).

Hasso Spode, who is engaged in tourism-related activities at the Technical University of Berlin, indicated that before Cook, train trips were carried out on a daily basis, but that this institution was the most effective, well away its rivals and became world wide famous in the 1900s. Jorn Mundt, on the other hand, told that Cook was one of the pioneers of tourism in a modern context, that it could compile, analyze and use the existing entrepreneurial processes in a good way. However, it has been explained by experts that until the 20th century, people in the world did not have the opportunity to travel a lot and have fun and that those who were performing their duties were not legally suitable to go on vacation. Schmude, who also worked in the field of tourism at Ludwig-Maximilian University in Munich, also described that since the mid-20th century, touristic activities have become widespread, and financial adequacy, access opportunities and similar situations are on the way to improvement. Cook, the founder of one of the tour firms with the best success scale, passed away in 1892. Until 1928, the firm, which operated in the form of a family business, held a holding position in the London-based stock exchange

whose share values were carried out until it went bankrupt (Bagimsiz Havacilar, 2016: 1).

2.2. Developments in the Thomas Cook Group

Thomas Cook had 29 hotels in Turkey in 2018 and with an increase at a level of 70% profit in our country he has reached 347 million pounds. According to the statement made by the Mediterranean Touristic Hoteliers and Operators Association Resort Magazine in 2018, a total of 1 million 155 thousand people were hosted in our country in terms of tourism (almost 3% of those who came to our country for touristic purposes belonged to Thomas Cook) and 620 thousand of them were from Germany and 435 thousand were from England. This is the reason why Cook said "we are falling in love with Turkey again". The firm back loaded its debt of 1,1 billion pound and escaped from a big trouble, but it paid an amount of 1.2 billion dollars in the form of interest. In other words, more than a quarter of the 11 million tour packages carried out were lost again. Fosun, a high-income firm in China, followed Cook's firm and bought its first shares from Cook's firm in 2015. In August, Cook made some decisions on behalf of restructuring. Here, it is indicated that Fosun firm would take over most of the shares in return for cash of £ 450 million, the debt to banks at an amount of 1.7 billion pounds would be written off, and the other shareholders would be removed. However, the firm declared its bankruptcy despite all these efforts. Italy and Turkey stated that they could pay the bail of 200 million pounds to British Government in order to maintain the existence of the firm.

However, the government reported that this incident consisted of a commercial situation related to the firm and that the customers affected by the incident were retained in the context of civil aviation insurance (Thomas Cook, 2019; AA, 2019).

Thomas Cook has been evaluated as an important firm for the UK. When it came to the brink of bankruptcy after the II. World War, it was expropriated in 1948 and served in this way until 1972. Even with the extraordinary debt faced by the firm, the division of 20 million pounds in bonuses to the executives in the last five years has been a sign that the situation is not getting better. In 2007, it was aimed to achieve 75 million savings by merging with the firm called MyTravel, but it was exposed to a loss of 1.5 billion pounds. In 2018, almost 60 percent of the British preferred abroad for sightseeing, but they turned to a different preference by heading for city tours rather than beach and sea. These developments resulted positively for Ryanair, EasyJet and Airbnb. Because the target audience of these firms is making transactions using online networks. However, those who carried out the package sales process in the office remained in a bad situation. Cook's firm had 560 offices (BBC, 2019/2).

One in 7 of those wishing to travel in the UK did not benefit from online networks, and the beneficiaries were those over the age of 65 with lower financial and social levels. Cook's firm had ignored current developments and made the mistake of being able to carry out it with its own method. Climatic conditions played a crucial role in this negative situation. The heat wave felt in Europe in May 2018 caused a

change in the preference of individuals who intend to travel. In addition, the loss of monetary value caused by Brexit has also caused individuals to postpone vacations. Tui and EasyJet, jointly run firms by the British and the Germans, which are Cook's strongest rivals, have benefited from Cook's state of necessity. Tui was not much affected by this complicated situation as he had small debts and owned hotels and ships. Our country came in second by passing Greece in terms of visitors from England. Tunisia is also making progress. According to researches, it is seen that the visitors from England preferred mostly Spain, then our country which is in the second place, then Greece as the third place, then the USA and Cyprus in 2019 summer. For Cook, the percentage of visits to our country in the context of vacation increased by 11 percent in 2019 compared to the previous one. In Greece, this indicator is 22%. Peter Fankhauser, the board chairman of the firm, described that our country is at a good level in terms of the amount paid (BBC, 2019/1).

2.3. Thomas Cook's Bankruptcy Process

The Thomas Cook firm had difficulty in meeting its debts as a result of the financial crises it faced, and the firm, which made a distinguished name for 178 years, run in debt up to 1.2 billion pounds in May 2019. In order to get out of this situation, he first asked the main partners and then the British Government for help. It was agreed that the sum of 900 billion pounds sterling under the control of the Chinese Fosun Group, which owns the largest shares of the firm, was put into effect. After the banks providing financial support asked for

another 200 million pounds of collateral, a problem occurred in the negotiations, and the Fosun Group's latest proposal, which includes banks and other institutions, was rejected by the senior executives in the firm. Following the rejection of the offer, the firm requested support from the British government. The government, on the other hand, rejected this offer in order not to set a precedent for other firms that might be in a difficult situation in the future. Thereupon, the firm went completely bankrupt. The British Civil Aviation Administration has put into effect the return activities for 150 thousand Thomas Cook customers located outside of its borders. In addition, 9 thousand individuals in the UK and 20 thousand individuals worldwide got fired (AA, 2019).

3. PROBLEMS ARISING IN TURKISH TOURISM ENTERPRISES WITH THE BANKRUPTCY OF THOMAS COOK

3.1. General Situation of Turkish Tour Sector

Tour operators can come to the forefront in the execution of access, accommodation, nutrition, sightseeing, organizing events and similar arrangements by determining a venue, thanks to their marketing capabilities. For this reason, they hold the largest share that can be acquired in the relevant field and can directly communicate their bargaining skills to consumers. For example, if a customer wants to arrange the service he has in an individual context, it is not possible for the operator to deliver the same price. In addition, tour operators also guarantee processes such as benefiting from advanced quality

accommodation services, utilizing the services of many aircraft and other access vehicles (Misirli, 2002: 27).

They determine their profits by pulling down the prices of these processes that they offer in an integrated manner. They describe the various options they have that best suit the target audience. These packaged arrangements they create may seem more attractive to potential target audiences (Gee et al., 1997).

Hundreds of tour operators around the world have specialized in travel. Some of them are (Body, 1989: 177; Ataberk, 2007): “Go-go Tours (USA), The World of Trade Wind Tours (USA), Brendan Tours (UK), Tauck Tours (USA), Pacific Delight Tours (USA), Westours (USA) Touropa, Hotelplan, Sunair, Sotair, Nouvelles Frontieres, Unitours, Mac Kenzie Travel, Cartan and Maupintour (USA), Kuoni (Sweden), China Travel Service (China), Japan Travel Bureau (Japan) Kinki Nippon Travel (Japan), Club Med (France), TUI (Germany), Deutschesreitsburo (Germany), LTU (Germany), Airtours (UK), First Choise (UK), Thomson (UK) and Thomas Cook (UK) ”.

Some of the tour operators that bring tourists to our country and the countries they bring tourists are: Oger Tours (Germany), TUI (Germany) Thomas Cook (England), First Choice (England), Pascha Tours (France), Club Med (France), Scotttravel Holidays (Scotland), Aristo Tourism (China), Sonarex (Netherlands), I'm Traveling (Czech Republic), Corendon (Netherlands, Germany, Belgium), Sultan Reizen (Netherlands, Germany, Belgium), Odeon Tours (Russia),

Sidre Tours (Russia), Mostravel (Russia), Turtess Travel (Ukraine), Caviros Tours (Greece) and Tarhan Travel (Iran) (Ataberk, 2007).

3.2. Duties and Practices of Tour Operators

Tour operators, in line with the general working principles, perform the following types of duties and operations; getting ready for business, creating a tourism product, selling tourism products, making reservations, carrying out administrative transactions, carrying out after-sales services, carrying out activities related to professional development (Hacioglu, 2000: 86; ISKUR, 2020: 56-57).

Tour operators also fulfill some of the following basic functions in tourism activities (Hacioglu, 2000: 86):

- They make an effort to make people benefit from accommodation and travel companies.
- They can reduce costs to make production businesses control the expenses in order to sell their outputs.
- They create knowledge store related to travel source of target audience.
- They try to reduce the bargaining expenses of the intermediaries.
- They reduce the cost of the product bought by customer mass.
- They endeavor to improve the usual competition.
- As a result of the competition in the market, it directs the holiday price and directs the target audience to buy tours in an integrated manner.

3.3. Problems Experienced by the Turkish Tourism Sector Due to This Process

Firms that are in a difficult situation in the field of tourism can be aircraft companies. However, the fact that Cook's firm remained in this situation had a shock effect in most countries dealing with tourism. This situation also caused the tourism firms in our country to encounter problems related to their receivables, even though the tourist service customers made their payments to this firm through Cook firm, the tourism firms in our country could not collect their related payments. Most of the more than 150 thousand British tourists in many countries including our country have had to give up holiday options. Cook's firm brings 2 million tourists to our country annually, and it has been described that the receivables of the hotels in our country whose bankruptcy can reach up to 350 million Euros (Thomas Cook, 2019).

The bankruptcy of Thomas Cook firm, which brought low-income tourists to our country, definitely caused various problems. Muğla, Marmaris, Dalaman, Fethiye, Manavgat, Alanya and many tourism regions have been adversely affected by this situation. Especially low-cost hotels were more affected. Helping the hotels, which cannot fulfill their receivables from the firm, to get rid of this difficult situation has become an agenda. It should also be remembered that the problem may have implications in the future. For this reason, it has become important to open up to new markets and customers in order not to encounter similar problems again (Demirciler, 2019: 1).

CONCLUSION AND SUGGESTIONS

However, the firm of Thomas Cook, erroneous processes, especially in 2011, ignoring the new regulations required by the period and not controlling the expenses well forced the institution to go into bankruptcy. When the firm officially requested its bankruptcy in 2019, Turkish tourism firms, along with various countries, were adversely affected. An important actor supplying tourists to our country has withdrawn from the market. This situation has caused problems especially for tourism regions that depend on a single customer source. During that period, the number of customers decreased, and various difficulties arose in collecting receivables.

In order to eliminate the aggrievement caused by Thomas Cook's bankruptcy and to design the future more positively, the following suggestions can be made to those concerned:

- Reducing the share paid to the Tourism Development Agency from the turnover temporarily.
- Exemption from tax on invoices issued for tourists brought by the relevant firm.
- Not collecting or postponing the corporate tax, VAT and SGK premiums of hotels in difficult situation.
- Granting long-term and low-interest loans to hotels that have difficulty in paying investment loans.
- Reduction of airport taxes in tourism areas.

- Securing the contracts of tourism enterprises and expanding the insurance coverage.
- Making it easier for foreign tour operators to enter the Turkish tourism sector and to integrate with local businesses.
- Having a new definition for the travel agencies in our country and changing especially the structure of group A travel agencies into tour operators.
- Promoting effective use of management information systems, virtual networks and social media.
- Investigating the ways to minimize costs with appropriate outsourcing.
- Having market diversity in order to eliminate single market dependency.

REFERENCES

- AA (2019). 178 yıllık Thomas Cook'un iflası. [https:// www.aa.com.tr/tr/info/infografik/15594](https://www.aa.com.tr/tr/info/infografik/15594) [29.12.2019]
- Alaeddinoglu, F. and Can, A. S. (2007). Tour operators and travel agencies in Turkish tourism sector, *Ticaret ve Turizm Egitim Fakültesi Dergisi*, Sayı. 2.
- Ataberk, E. (2007). Tur operatörlerinin paket tur organizasyonlarında hizmet kalitesi ile müşteri tatmini arasındaki ilişkileri belirleyen faktörler: İzmir ili örneği. *Yayımlanmamış Yüksek Lisans Tezi*, Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü, İzmir.
- Bagimsiz Havacılar (2016). Thomas Cook'un hikâyesi böyle başladı. Erişim: <https://www.bagimsizhavacilar.com/thomas-cookun-hikayesi-boyle-basladi/> [29.12.2019]
- BBC (2019/1). Thomas Cook'un iflası Türkiye turizm sektörü için ne anlama geliyor? Available at: <https://www.bbc.com/turkce/haberler-turkiye-49796755> [29.12.2019]
- BBC (2019/2). Thomas Cook neden battı? Available at: <https://www.bbc.com/turkce/haberler-dunya-49748209> [29.12.2019]
- Body, W. (1989). *Travel agent*. New York: Arco.
- Buck, M. (1988). The role of travel agent and tour operator. In: Goodall, B., and Ashworth, G. (eds), *Marketing in the tourism industry, the promotion of destination gerions*, London: Croom Helm.
- Budeanu, A. (2005). Impacts and responsibilities for sustainable tourism: A tour operator's perspective. *Journal of Cleaner Production*, (13): 89-97.
- Dimitriou, B. (2003). *E-tourism-information technology for strategic tourism management*, Pearson: Prentice Hall.
- Cavlek, N. (2002). Tour operators and destination safety. *Annals of Tourism Research*, 29(2): 478-496.
- Carey, S., Gountas, Y. and Gilbert, D. (1997). Tour operators and destination sustainability. *Tourism Management*, 18(7): 425-431.

- Demirciler, L. G. (2019). Thomas Cook'un iflasi küçük otelleri vurdu. Erişim: <https://www.ekonomist.com.tr/insaat/thomas-cookun-iflasi-kucuk-otelleri-vurdu.html> [29.12.2019]
- Gee, C. Y., Makens, J. C. and Choy, D. J. L. (1997). The travel industry, Third Edition, New York: John Wiley and Sons.
- Goodal, B. and Ashworth G. (1993). Marketing in the tourism industry. London: Rutledge.
- Hacioglu, N. (2000). Seyahat acentacılığı ve tur operatörlüğü. 5.Baskı, Bursa: Vipaş.
- Holloway, J. C. (1994). The business of tourism. Fourth Edition, London: Pitman Publishing.
- Icoz, O. (2003). Seyahat acentaları ve tur operatörlüğü yönetimi. Ankara: Turhan Kitabevi.
- ISKUR (2020). Meslek Kitapçığı. Erişim: https://media.iskur.gov.tr/17258/mbk_6.pdf [11.01.2020]
- Kozak, N., Kozak, M. A. K. and Kozak, M. (2000). Genel turizm, ilkeler, kavramlar. 4.Baskı, Ankara: Turhan Kitabevi.
- Minister of Culture and Tourism (2006). T.C. Kültür ve Turizm Bakanlığı Yatırım ve İşletmeler Genel Müdürlüğü turizm istatistikleri (2005). Ankara. Erişim: <http://www.kulturturizm.gov.tr> [29.12.2019]
- Misirli, I. (2002). Seyahat Acentacılığı ve Tur Operatörlüğü, Detay Yayınları, Ankara.
- O'Connell, D. (2019). Analysis: Thomas Cook: What went wrong at the holiday firm? Available at: <https://www.bbc.com/news/business-46452374> [29.10.2019]
- Sheldon, J. P. (1986). The tour operator industry: An analysis. Annals of Tourism Research, 1(3): 349-365.
- Tepelus, C. M. (2005). Aiming for sustainability in the tour operating business. Journal of Cleaner Production, (13): 99-107.

- Thomas Cook (2019). Thomas Cook'un iflası Türkiye turizm sektörü için ne anlama geliyor? Erişim: <https://t24.com.tr/haber/thomas-cook-un-iflasi-turkiye-turizm-sektoru-icin-ne-anlama-geliyor,840621> [29.12.2019]
- Ulusoy, B. (2002). Türkiye'nin dış turizmde 10 yıllık sayısal hedefler, planlama ve program gereksinimi. T.C. Turizm Bakanlığı II. Turizm Şurası, Ankara, 12-14 Nisan 2002, Bildiriler Kitabı, I. Cilt, 159-175.
- WTO (1999). International tourism: A global perspective, world tourism education and training series. Second Edition, World Tourism Organization (WTO) Education Network, Madrid.
- Pekoz, M. and Yarcın, S. (1998). Seyahat işletmeleri. 2.Baskı, İstanbul: Boğaziçi Üniversitesi Yayınları.

CHAPTER 4

**UNIVERSITIES IN A COMPETITIVE GLOBAL
MARKETPLACE: DIGITAL MARKETING VERSUS
TRADITIONAL MARKETING¹**

Asst. Prof. Dr. Altuğ OCAK²

¹ This study has been produced from my PhD thesis, titled "A Research on Digital Marketing Strategies in the Global Higher Education Market and the Role of Digital Marketing Channels Influence International Students' Decision In Choosing University Abroad", conducted under the supervision of Prof. Dr. Cemal YÜKSELEN, at Beykent University.

² Beykent University, Vocational School, Travel – Tourism and Entertainment Services, Istanbul, Turkey, altugocak@beykent.edu.tr,
ORCID ID: 0000-0002-8018-4158

INTRODUCTION

There are 5.6 million students, studied in a higher education program outside of their home country in 2018, 255% more than the number of international students in 1998 (OECD, 2020: 226). The growing number of students studying abroad, increases the attractiveness of the global higher education market, due to both social and economic benefits it brings to higher education institutions around the world. However, it is not always possible to reach prospective international students live in various corners of the world through traditional marketing methods, such as advertising on television or newspapers or attending educational fairs abroad. Moreover, young people, at the age of entering university, are no longer watching television or reading newspapers and study abroad fairs are not held in every country or every city. Right here, the importance of digital marketing activities comes out, because young people are using digital platforms as a source of information as well. Considering the competition between countries and universities, it is important to understand the information sources used by prospective international students along with the factors that influence their university selection decisions.

Globalization and rapid advances in communication technologies allow us to easily connect with people around the world and make us close to each other. The borders between countries are removed, single market economies are being formed as in the EU, prospective students, who can follow global developments more closely, can decide to study abroad easier and more accurate when they see

attractive opportunities present themselves. All these developments have a great impact on the higher education sector, and universities that can take advantage of the opportunities, keep up with the innovations brought by technology, bring an international dimension to their working methods, and create new strategies that will modernize their infrastructures in a technological sense, will gain strategic advantage. As a result of the rapid spread of the internet worldwide and the increase in the use of smartphones, tablets and computers, prospective students might use the internet as a tool to reach the information they seek about the host country and the university. For this reason, it is important to learn the sources of information used by the prospective students who wish to study abroad, and to know how effective these resources are in the student's decision, has strategic importance in shaping the marketing plans of higher education institutions.

The importance of the study is that it draws the attention of higher education institutions to digital marketing channels that have become strategically important in the marketing activities considering the rapid development of technology.

Considering its availability and cheapness, students who want to learn more about a higher education institution abroad can easily refer to the internet as the first resource. Our study aims to find out which traditional and digital resources students primarily use at the university preference stage and to what extent these resources affect

their preferences in order to support the universities' strategic marketing efforts in today's digital age.

1. GLOBAL HIGHER EDUCATION MARKET IN THE SERVICES SECTOR

While the agricultural sector is important in countries with less developed economies, the industrial sector is valuable in developing countries. In countries with developed economies, the services sector dominates the economy (Kurtulmuş, 2001: 21; Meroni and Sangiorgi, 2011: 11; Weisman, 2012: 21; Zengin and Erdal, 2000: 44). One of the most important contributions of the services sector to the economy is to increase employment rates.

Services were on the rise in North America and Western European countries after the Second World War and an increase in demand made these economies center around the service sector (McDonald, Payne and Frow, 2011: 1). As a result of this growth, the services industry accounted for approximately three-quarters of the US economy (Quinn and Guile, 1988: 1). Although the contribution of the services sector to the economy is much higher in developed countries, it provided developing countries' economies with significant benefits as well (Gilmore, 2003: 3). In developing countries, especially the tourism sector becomes more evident.

On the other hand, there is a positive relationship between the share of the service sector in the economy and modern urbanization (Cattaneo, Engman, Saez and Stern, 2010: 3). Liverpool, which is one of the best examples of the contributions of the services sector to urban

development in history, continued to be one of the most important port cities in the world for many years (Daniels, 1985: 18). As cities get more crowded, the demand for services increases, hence, services are most developed in big cities. Undoubtedly, one of the most needed services is education service.

Economic value added is directly related to having a well-educated workforce (Brown, Lauder, Ashton and Tholen, 2008: 2-4). So, it is impossible to disagree with Barack Obama's statement that "every American will need more than a high school diploma" (Craig, 2015: 11). In today's information age, the need for higher education institutions has increased more and the knowledge economy has become one of the important elements of the global competitive power of developed and developing countries.

1.1. Globalization

In terms of economy, globalization means the spread of trade across borders on a global scale (Lawn, 2013: 5). In other words, globalization is the extension of commercial or cultural cooperation between people beyond national borders (Boudreaux, 2008: 1). Developments in online and mobile technologies and the widespread use of these technologies make communication possible between people living in different countries and even on different continents in an instant (Hanefeld, 2015: 8). The decline in telecommunication expenditures, the widespread use of the internet worldwide, increasingly enable the globalization of information-intensive services (Gonzales, Jensen, Kim and Nordås, 2012: 178). The increase in the

mobility of people, the outsourcing of services and the increasing foreign direct investment in the service sector have enabled services to gain a global dimension (Kobayashi-Hillary and Sykes, 2007: 107).

The globalization of the services has led to the emergence of some new organizational structures that were not previously found in the manufacturing industry (Aharoni and Nachum, 2000: 14). For a long time, services were considered non-tradable products, unlike physical products (Cattaneo et al., 2010: 67). However, at present, exports of many services, especially education, are encouraged within the scope of foreign currency generating activities.

Globalization has brought important changes, opportunities and threats to the higher education sector and one of the most important effects of globalization is that students start to study abroad for higher education (Findlay and Tierney, 2010: 1-2).

As an important strategic response to globalization, the concept called internationalization has emerged within universities. The internationalization process supports the globalization process by making the educational services more attractive (Foskett and Maringe, 2010: 1-2; Schoole and Knight, 2013: 4-6). The dimensions of the new citizen model have been expanded and are called the "Global citizen model" (Kan, 2009: 895-904). Study abroad helps to become a global citizen, build a global workforce, gain global knowledge and skills. Therefore, governments wish to increase the number of students who study abroad to enable them to acquire global knowledge and skills (Kasravi, 2009: 179-180). Competition between countries is

now taking place between countries' labor markets with the effect of globalization. Staying strong is only possible by having a well-trained workforce that speaks at least one foreign language, especially English. At this stage, universities play a critical role in bringing well-trained manpower to the labor market, and both governments and businesses consider higher education as a tool to broaden students' perspectives and to develop the workforce.

1.2. Social, Cultural and Economic Returns of the Global Higher Education Market

The continued growth of higher education markets with increasing student demand has created new opportunities for their institutions (James-MacEachern and Yun, 2017: 344). In recent years, countries and institutions have noticed both the economic and social benefits of international students (James-MacEachern and Yun, 2017: 344). Universities were permitted some flexibility for accepting international students to increase foreign exchange inflow by the governments, but the reason is not only financial, but it also offers better learning of foreign languages and internationalization of universities' curricula. For many governments, the ability of their countries to increase their competitive level in the global economy and the internationalization of higher education is considered as an inseparable whole (Ziguras and McBurnie, 2014: 31-32). The economic contribution of foreign students to the economy of the host country consists not only of the annual tuition they pay to the university but also consists of travel expenses, the accommodation fee

and all other daily expenses (Istaiteyeh, 2011: 137-138). Furthermore, the internationalization of higher education and global higher education marketing plays an important role in fulfilling the duties undertaken by the university in terms of social responsibility, such as improving academic quality by attracting talented foreign students to the country and fulfilling the duties determined according to the vision of the country and institution (Van Rooijen, 2008: 6-10). Institutions with foreign students will have the opportunity to create brand awareness and reinforce the reputation of the institution both locally and internationally.

The international higher education market has become a billion-dollar industry for many countries, especially the US and Australian economies (Chen and Zimitat, 2006: 97). The increasing student mobility of foreign students towards the US since the twentieth century, was in the form of student mobility from the USA to Europe, contrary to the current situation. Americans, studying in Europe seemed highly regarded, the same was true for Canada and Australians (De Wit, 2002: 9). With its branded universities and active marketing efforts, it is seen that the USA will hold the leadership of the higher education market for many years. On the other hand, the inclusion of new players such as universities in Japan, China, Spain, Italy, the Netherlands and South Korea will require American universities to be more active and more competitive than before in order not to lose current market shares.

2. DIGITAL MARKETING

In parallel with the developments in the field of information technology, it is valuable for universities to provide prospective students with the information they are looking for on the internet (Mpinganjira, 2009: 364). Digital ads are replacing traditional commercials and many universities promote their facilities and programs with the help of digital technologies today (Tripathi, 2013: 15). The widespread use of the internet around the world makes it more common to search for information.

All students and parents require to have information that can be quite effective in choosing a university, and it is critical to provide them with this missing information on time (James-MacEachern and Yun, 2017: 347-348). Social media, university website, videos, e-mail correspondence and webinars play an important role in providing this information.

2.1. Social Media Platforms

In recent years, social media sites have been increasing in popularity, especially among young adults. This growth has led many organizations, including higher educational institutions, to consider social media sites as an opportunity for marketing activities (Leng, 2012: 165). In a study conducted with university candidate students in the Netherlands, it was found that a significant number of students used social media sites to obtain information about universities (Constantinides and Zinck Stagno, 2011: 17). The successful use of social media is a critical process that affects the future success of

organizations (Ryan, 2015: 1) For example, a Facebook page can be used as an interaction platform for university graduates, current and prospective students. However, the preferred social media platform should be suitable to the target market, for example, since Facebook is banned in China, RenRen should be used instead (Phang, 2013: 10).

4.14 billion people worldwide are social media users, equal to 53% of the total population of the world. The most used social media platform is Facebook with more than 2.5 billion people using it every month. Facebook is followed by YouTube and WhatsApp with 2 billion monthly active users each, Messenger with 1.3 billion monthly active users, WeChat with 1.206 billion monthly users and Instagram with 1.16 billion monthly active users (Global Social Media Overview, 2020).

2.2. The University Website

Nowadays, many more people can use the Internet more effectively and they expect the website to be good in terms of content, design, usage, etc. Therefore, institutions should go beyond these expectations of visitors with a more remarkable design and an easier-to-use website (Potts, 2007: 2-3). The website should contain all this information that people are looking for about the institution (Juon, Greiling and Buerkle, 2011: 94). 85% of internet users primarily use search engines for information seeking purposes, so the visibility of the website in search engines is very important to easy to find (Sweeney, 2006: 1-7). The website is the major channel as a source of information for both current and prospective students (Phang, 2013: 10). It is necessary that

the web site of the institution was prepared in English as well as in other popular languages so that student who does not speak a foreign language will be able to read the information easily. (Lee, 2017: 181).

2.3. YouTube Marketing

Hundreds of thousands of people visit YouTube every day to watch videos without a specific purpose, which provides a unique opportunity for institutions to promote their services (Bober, 2011: 31). Millions of consumers use YouTube widely and that's why YouTube offers privileged opportunities to institutions among other video marketing platforms (Neher, 2014: 252). The mass marketing techniques taught at the university are not applied to YouTube, because YouTube works as a video sharing site, not like a television channel (Jarboe, 2011: 26). Using video marketing techniques to introduce the facilities and programs can be effective (Phang, 2013: 10).

2.4. E-mail

E-mail is one of the most useful tools in reaching the target audience. It is inexpensive, can be delivered in a very short time and visual materials such as pictures can be sent (Micu et al., 2010: 194). Another advantage of e-mail is that it can be customized for each part of the target market for the right message to reach the right audience (Sherin, 2013). Prospective students will likely send an e-mail to one or several universities, the university must send a quick and informative response to make a good first impression among other universities (Phang, 2013). Although the university's website is

perceived as the first source of information, students can directly contact the institution via e-mail for further information (James-MacEachern and Yun, 2017: 343).

2.5. Webinars

The webinar is an online version of a meeting, presentation, lecture or workshop, and can be organized for up to hundreds of people in various locations (Collins, 2015: 7). It is one of the most convenient digital marketing tools for universities that they can use in promotional activities and appeal to hundreds of students at the same time.

A university advertisement can be seen on almost all digital platforms, especially during the university preference period. Establishing correct communication with candidates and families at the decision stage should be carried out successfully with the right channel management.

3. FACTORS ENCOURAGING STUDENTS TO STUDY ABROAD

The thought that study abroad will be better than study at home can be an important factor influencing the students' decisions (Mazzarol and Soutar Geoffrey, 2002: 85). The local factors that encourage students to study abroad can be described as push factors. These factors may have resulted from personal or environmental factors. Personal factors may be the character, preferences and motivation of the student, and environmental factors may be the conditions specific to the country or local area (Becker and Kolster, 2012: 11). Some of the factors that

encourage students to study abroad may be in the home or the host country or the students themselves (Mazzarol and Soutar Geoffrey, 2002: 82). The intention to study abroad is related to the socio-economic status of the student and the social and cultural background acquired during high school (Salisbury, Umbach, Paulsen and Pascarella, 2009: 122). Students who are interested in learning and are keen to discover new cultures have a higher intention to continue their education abroad (Salisbury et al., 2009: 134).

3.1. The Variety of Academic Programs

One of the reasons for choosing international education may be that the specific program, they wish to study, is not available in their own country, or it may be difficult to get into a local university (Mazzarol and Soutar Geoffrey, 2002: 88). This situation can be experienced mostly by students who want to study in departments with limited quotas such as medicine and dentistry.

3.2. The Opportunities Offered by Country and the University

In recent years, many governments have made their immigration policies easier for successful international students to be more attractive for brain drain and to contribute to the local labor market (OECD, 2014: 348). While the need for new skills increases with the knowledge economy, it becomes important to support the entry of the highly skilled workforce (brain drain) to the country to meet these needs.

For this reason, prospective students can easily access information about what the country has to offer (Mazzarol and Soutar Geoffrey, 2002: 84). Host country's climate, lifestyle can affect the attractiveness of the destination (Mazzarol and Soutar Geoffrey, 2002: 89). Moreover, another study has shown that the city where the university is located may be more important than the university (Chen, 2017: 130). Cities use a variety of channels to promote themselves to the masses, often advertising on websites in national and international media. A good way to try to positively influence people's perceptions of cities is to apply product branding efforts for the city, the same methods that businesses do for their products (Ashworth and Kavaratzis, 2009: 520-522). In this way, the promotional activities will make the country and city better known by students and their families.

Many host countries offer students a part-time job for a certain amount of time as part of their visa. Having the opportunity to work part-time in the host country may be one of the most important elements of studying abroad for prospective students who need financial support. Social connections, geographic proximity, the presence of family or friends in the host country can be important to students' choice of study location. If the prospective student's knowledge of the host country is positive, the probability of choosing that country will be high (Mazzarol and Soutar Geoffrey, 2002: 87-89).

The perception that both Canada and the United States have opportunities for people who want to achieve their goals is an important factor in country selection. The possibility to work in the host country and the possibility of gaining immigration status after university can make the host country extremely attractive. Lack of opportunities in the student's country and positive information about life in Canada and the United States make these countries popular for prospective students (Chen, 2017: 126).

Governments are supposed to begin promotional activities early through various forms of communication, as prospective students build their knowledge of other countries before the university selection phase, perhaps during their secondary school years (Chen and Zimitat, 2006: 97-98). The fact that America is dominant in the film industry, especially in youth series, can make young people have positive thoughts about this country.

3.3. The Brand of the Institution

The increasing number of foreign students are making their decision based on the quality of education of the relevant institution after filtering the information they collect from printed or online publications (OECD, 2020: 228). It is impossible to decide by touching or tasting the quality of education, but by experiencing it for a certain period, a decision can be made about the quality. Therefore, one of the biggest risks that await students in choosing a higher education institution is that they do not have clear information about the educational quality of the host institution.

Students perceive the brand of an institution considering many factors including job availability after graduation, the variety of courses offered by the university, the learning environment of the institution, sports and social facilities (Ali-Choudhury, Bennett and Savani, 2008: 27; Rauschnabel, Krey, Babin and Ivens, 2016: 3083). Prospective students perceive campuses and learning environments in western countries as attractive (Mazzarol and Soutar Geoffrey, 2002: 86). If the host country has a high international profile with good quality educational services, prospective students should be provided with access to this information. (Mazzarol and Soutar Geoffrey, 2002: 84). International students care about the quality of education the university offers. The university's recognition beyond the borders of the country in which it is located is very important in terms of attracting international students (Mpinganjira, 2009: 364). Students feel that graduating from a top university is important for their future career and life prospects (Chen, 2017: 128-129).

The goal of marketing efforts is to satisfy customers. Players at all levels, such as governments, universities and staff, must understand that their competitors are from all over the world, therefore improving the quality of education is essential to be able to reach internationally accepted standards (Mpinganjira, 2009: 364-365).

3.4. International Validity of the Diploma

Students will not choose to study in a host country where the educational standards are low or the diploma is not recognized in their home country (Mazzarol and Soutar Geoffrey, 2002: 84). Official

recognition of the diploma in the global market is important for students' employability. Because one of the factors that encourage students to study abroad is the perception that after graduation, employment opportunities will increase in their own country or abroad (Zhu and Reeves, 2019: 1003-1004). If the diploma of the university is not recognized in the target country, necessary work must be done for the recognition of the diploma, otherwise, it may be a mistake to wait for international students.

3.5. Tuition Fee and Living Expenses

Since a financial burden has been imposed on universities where foreign students are hosted in countries where higher education is free, many of these countries have started to charge foreign students tuition fees. The fact that New Zealand has increased the tuition fees for foreign students in higher education programs has not reduced foreign students' interest in this country. This shows that as long as the quality of the education is considered to be high and the investment made is considered to be recycled, the fee is not the most important factor for foreign students in their decisions (OECD, 2014: 346). Only globally branded universities can pursue a higher tuition fee strategy because students and their families are ready to pay a price according to the value they perceived. In an increasingly competitive global higher education market, creating value for universities now requires more effort.

The cost of studying abroad may affect the choice of the host country. For example, completing a master's degree requires only one year in the UK, three years in China, and two years in the USA or Australia. The shortest education period of the UK provides both a cost advantage and an age advantage after graduation (Zhu and Reeves, 2019: 1003). The socioeconomic status of a student's family is positively related to his / her intention to study abroad. In other words, low-income students are less likely to study abroad than high-income students (Salisbury et al., 2009: 133). Being able to work part-time may be more important than tuition, travel costs and living expenses. On the other hand, well-off students, may not need to work part-time and these students may even think that working part-time may harm their study performance at the university. On the other hand, others may seek opportunities to work in a relevant job to gain experience in the fields they study (Mazzarol and Soutar Geoffrey, 2002: 86).

3.6. Language Spoken in The Host Country

The language is spoken in the country and the language of instruction affect the student's choice of country for education. Countries where the language of instruction is one of the common languages such as English, French, German, Russian or Spanish, are the main countries preferred by foreign students. The dominance of English-speaking countries such as Australia, the United States, Canada, New Zealand and the United Kingdom among the most preferred countries is a result of English being a global language (OECD, 2020: 230). Moreover, in a previous study, all of the candidate students were

wishing to improve their English language skills while studying abroad (Chen, 2017: 125). Countries whose native language is English often require a TOEFL test score as an application requirement, but this test can be difficult for many students. For this reason, students whose knowledge of English is not good, can choose countries such as Korea that offer similar opportunities for international students and whose native language is not English (Lee, 2017: 181). For this reason, countries such as Japan and China, where the language of instruction is mostly in the local language, can increase the number of foreign students.

3.7. The Opinions of Other International Students Studying at the Host Country

Alumni networks, including international alumni, are valuable sources of referral for educational institutions and can be important as a way to promote international education (Mazzarol and Soutar Geoffrey, 2002: 86). Factors such as crime, security, racial discrimination in the host country may also be important in-country selection decisions for most students. Parallel to this, the high number of international students in the host country may prove that the host country has managed to attract a large number of students (Mazzarol and Soutar Geoffrey, 2002: 86). The presence of an established international student population in the host country may also create the perception that student admission is not difficult (Mazzarol and Soutar Geoffrey, 2002: 89). Students who are satisfied with their university and host country are likely to speak well about that country and institution

upon graduation, thereby helping to promote the country and its institutions (Mpinganjira, 2009: 364). Family and friends also influence students' university preference decisions. Moreover, having family or friends who have studied abroad may affect education decisions. As such, college graduates can be one of the most powerful marketing "tools" (Chen and Zimitat, 2006: 98).

3.8. Job Opportunities During Education and After Graduation

Students' planning to work in their host country after graduation is an important factor in country choices (Lee, 2017: 180). The intention to immigrate after graduation can be a factor in a student's decision to study abroad. Recognition of students' qualifications by future employers after graduation may be another important factor (Mazzarol and Soutar Geoffrey, 2002: 89).

4. METHOD

4.1. The Hypotheses

The hypotheses of the study are as follows;

H1: Digital channels are being used by prospective international students more than traditional channels.

H2: Digital channels, including the university's institutional website, email communications, university ranking websites, social networking sites of the university, online chats, online university catalogs and online videos, play an important role to motivate students to choose a study abroad destination.

H3: The variety of academic programs at host university influence international students' study destination decision abroad.

H4: The opportunities, offer by the host country and host university, influence international students' study destination decision abroad.

H5: The brand of the institution influence international students' study destination decision abroad.

H6: International validity of the diploma influence international students' study destination decision abroad.

H7: Tuition fees and living expenses influence international students' study destination decision abroad.

H8: Language is spoken in the host country influence international students' study destination decision abroad.

H9: The opinions of other foreign students studying at the host country or the host university, influence international students' study destination decision abroad.

H10: Job opportunities during education and after graduation, influence international students' study destination decision abroad.

4.2. Purpose of the Research

Our research has two purposes, the first one is to discover which sources of information the prospective students use during the research phase. Information sources were determined separately as traditional and digital information sources and the effects of each were tried to be determined. The second aim is to reveal the factors that affect the decisions of candidate students in the country and university selection.

4.3. Research Model

The conceptual model of the research shown in Figure 1:

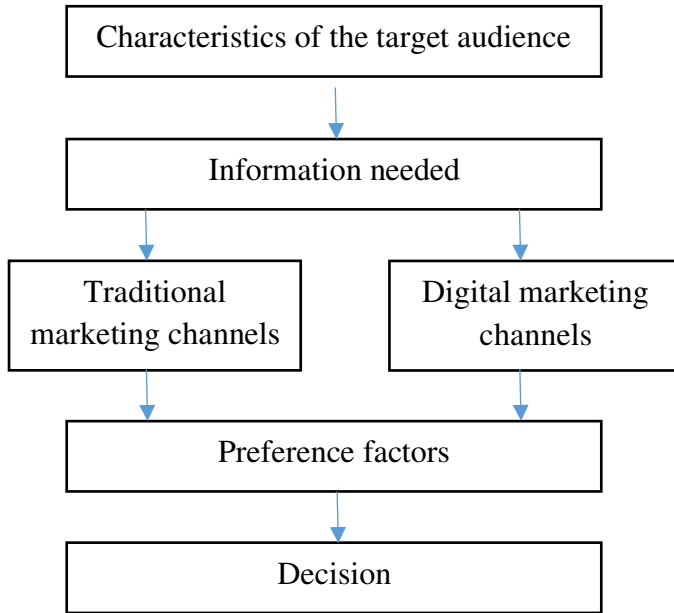


Figure 1. Research Model

4.4. Research Population and Sampling

The population of the research consists of people who are graduated or a student and wants to study at a higher education institution abroad. The sample size was determined as follows:

n: Number of individuals to be sampled

p: Proportion of students

q: 1-p

z: Security level (95% z = 1.96)

e: Tolerance ratio (± 0.05)

$$n = p \times q \times (z \div e)^2$$

$$n = 0.5 \times 0.5 \times (1.96 \div 0.05)^2 = 384 \text{ people}$$

Sampling units were selected from non-random sampling methods by easy sampling.

4.5. Data Collection Method and Tool

The survey method was used as the data collection method in the research. An interactive form was created by the “Type form” application, allowing students to complete the survey easily. The variables of the conceptual model were decided, after having examined the literature as follows:

Traditional information sources are study abroad fairs, phone calls, overseas seminars, university representatives, printed university catalogs, campus visits, advice from friends or family (Bodycott, 2009; Choudaha, Orosz and Chang, 2012; Kavakas, 2013; Noel-Levitz, 2013; Phang, 2013).

Digital information sources are university’s institutional website, email communications, university ranking websites, social networking sites of the university, online chats, online university catalogs, videos (Choudaha et al., 2012; Fierro, Cardona Arbelaez and Gavilanez, 2017; Mogaji, Maringe and Hinson, 2020; Noel-Levitz, 2014)

Information that students are looking for in their searches, are tuition fee and living expenses, available academic programs, entry

requirements, visa procedure, accommodation provided and costs, campus address and map, contact details of the campus (Choudaha et al., 2012; Hamid, Bukhari, Ravana Sri, Norman Azah and Ijab Mohamad, 2016; Huang and Bilal, 2017).

Factors that affect students' decision about university abroad are country/city image, availability of academic programs, opportunities offered by the host country to international students, opportunities offered by the university, institutional reputation, international validity of the diploma, tuition fee, language spoken in the host country, opinions of other international students, job opportunities (Aleles, 2015; Binsardi and Ekwulugo, 2003; Branco Oliveira and Soares, 2016; Cantwell, Luca and Lee, 2009; J. M. Chen, 2017; Chen, 2008; Hemsley-Brown and Oplatka, 2015; Lee, 2008; Li and Qi, 2019; Li and Bray, 2007; Mazzarol and Soutar Geoffrey, 2002; Wilkins, Balakrishnan and Huisman, 2012; Wilkins and Huisman, 2011).

4.6. Reliability Analysis

480 students from 65 different countries participated in the study. These data were analyzed by using SPSS Statistics for Windows. The reliability analysis was measured with Cronbach's Alpha and it was observed that the reliability was high in each variable dimension and as a whole, shown in Table 1.

Table 1. The Reliability Analysis

Factor	No of statements	Cronbach's Alpha
Digital and traditional marketing channels	14	0,805
The information needed	7	0,7914
Decision factors	10	0,744
Total	31	0,854

4.7. Demographic Characteristics of Participants

The findings of the demographic characteristics of 480 respondents participating in the questionnaire are shown in Table 2 below.

Table 2. Demographic Characteristics

Age	Frequency	Percent
Younger than 18 years old	61	12,9
18-24 years old	360	74,8
Older than 24 years	59	12,3
Total	480	100
Education	Frequency	Percent
High school students or graduates	94	19,7
University students	259	53,9
University graduates	127	26,4
Total	480	100
Region	Frequency	Percent
Americas, Africa and the Middle East	44	9,4
Europe	367	76,3
Asia	69	14,3
Total	480	100

The most frequently used social media platforms by participants are shown in Table 3 below.

Table 3. Most Used Social Media Platforms

The most used social media platforms	Frequency	Percent
Facebook	362	75,3
YouTube	275	57,2
Instagram	259	53,8
Twitter	144	29,9
LinkedIn	84	17,5
Pinterest	41	8,5
Others	105	21,8

4.8. Results

After having found the mean average of the traditional channels (MATC) and the mean average of the digital channels (MADC), these two groups were compared with the test of comparison of the arithmetic means of two dependent populations. According to the analysis results, there is a significant difference between the average usage levels of digital and traditional channels and it is concluded that digital channels are being used by prospective international students more than traditional channels as shown in Table 4 and Table 5. As a result of this founding, the H1 hypothesis is accepted.

Table 4. The Difference Between MATC and MADC

	Differences					P
	Difference	Standard deviation	Standard error	Difference Range at 95% Confidence Level		
				Low	High	
MATC	,38512	,79546	,3631	,31378	,45646	,000
MADC						

Table 5. Usage Level of Channels Central Tendency Measures

	Arithmetic Mean	n	Standard deviation	Standard error
MATC	3,2083	480	,77268	,03527
MADC	2,8232	480	,87293	,03984

The further results show that the university's institutional website, which is preferred by the vast majority of participants (85.9%) play the most important role to motivate students to choose a study abroad destination. Other digital channels in order of importance are online university catalog, social media pages, university ranking websites

and YouTube channel of the university. E-mail communication is not as important as other digital channels and online chat (Skype or Messenger etc.) does not play a role as shown in Table 6. Therefore, H2 hypothesis has been accepted for all digital channels except online chat and e-mail channels.

Table 6. Digital Channels Usage Level

Digital Channels	t	sd	p	Difference Range at 95% Confidence Level	
				Low	High
University's institutional website	14,933	480	,000	,72	,93
Social media pages	4,168	480	,000	,13	,37
E-mail communication	,969	480	,333	-,06	,19
Online chat	12,373	480	,000	-,90	-,66
University ranking websites	3,931	480	,000	,12	,37
Online university catalog	11,024	480	,000	,53	,76
YouTube channel of the university	2,870	480	,004	,06	,32

The most used traditional information source is the study abroad fair which is preferred by more than half of the participants. Information that students need to know, in order of importance are academic programs, entry requirements, tuition fee and living expenses, accommodation provided and costs, visa procedure, contact details and location of the campus, campus address and map.

Results confirm that all of the factors encouraging students to study abroad are significantly influence international students' study destination decision abroad, and confirms the hypotheses of H3, H4,

H5, H6, H7, H8, H9 and H10 have been accepted. According to the results, the most important factor influences international students' study destination decision abroad is the tuition fee. This factor is followed by the variety of academic programs, international validity of the diploma, the opportunities offered by the host country and the university, job opportunities, language spoken in the host country, the opinions of other international students and the brand of institution as shown in Table 7.

Table 7. Factors Influence International Students' Study Destination Decision Abroad.

Factors	t	sd	p	Difference Range at 95% Confidence Level	
				Low	High
				Tuition fee	117,639
International validity of the diploma	113,395	480	,000	4,31	4,46
Variety of academic programs	115,354	480	,000	4,29	4,44
Job opportunities	97,390	480	,000	4,16	4,33
Opportunities offered by the host country and the university	100,021	480	,000	4,15	4,32
Language spoken in the host country	84,970	480	,000	4,02	4,21
Opinions of other international students	83,949	480	,000	3,91	4,09
Brand of institution	73,267	480	,000	3,61	3,81

Research reveals that, the effect of the language spoken in the host country being close to the student's native language or being a popular language differs according to gender and it is seen that language spoken in the host country influence female students more than males. Furthermore, information about accommodation and contact details of

the campus influence female students more than males. This highlights the importance of the “safety” factor for female students.

Results indicated that students younger than 18 years old use the university ranking websites more than 18 to 24-year-olds. High school students use university YouTube channel more than university students or university graduates. Information about the accommodation provided by the host university influence female students more than males. Campus address and the map influence high school students more than university students or university graduates. Language spoken in the host country influence female students’ decision more than males. The availability of academic programs influence university graduates more than high school graduates.

DISCUSSION

The majority of the workforce is employed within the services sector and this is why the services sector helps to reduce employment problems. Higher education institutions are included in the service sector and create an economic synergy and contribute to the welfare of the society by creating well-trained manpower. An increasing number of students on a global scale prefer to study at a university abroad and this increase has created a global higher education market that is growing day by day. Countries that attract more foreign students to their universities, gain both economic and social benefits from this market. However, due to the increase in the number of universities and the insufficient supply of students from the local market, cross-

border student mobility has become an important source of income for universities.

The rapid spread of smart devices made the internet available for most of the day. Students, who intend to study at a higher education institution abroad, prefer using the internet as the first source of information. Our research supports that digital information sources are being used much more than traditional sources by prospective students and it has also been observed that the university website is the most used digital information channel. This result alerts international offices that focusing more on digital platforms in their promotional activities becomes more important in terms of reaching more potential students. Therefore, it is clear that a well-designed website that enables foreign students to easily access the information will play a vital role in the student's choice of university abroad. For this reason, universities need to start their digital marketing activities by building an effective website.

According to the findings of the research, students' most required information is the available academic programs at the host university. This situation shows that the program they want to study is of primary importance for students who determined the area to study and searching for whether this program is available at the host university. Therefore, the university's various programs, especially the most preferred ones, may increase the number of foreign student applications.

According to the results, the most important factor affecting the decision of prospective international students is the tuition fee. Considering the competition in the global higher education market, it reveals how careful universities should be in pricing policies. This might be one of the reasons why universities in Asian countries, particularly in China, Japan and South Korea have increased the market share with more competitive prices.

Another interesting result of our research is that information about the accommodation provided and costs, is more important for female students than males. This highlights the importance of the “safety” factor for female students and the importance of visibility of information about accommodation services offered by the university on its website.

The results show that the most used traditional information source is the study abroad fair which is preferred by more than half of the participants. Participating in many universities from different countries in study abroad fairs provides an opportunity to meet face-to-face with university officials, and this feature can make fairs attractive for prospective students. Considering this result, it would be correct behavior for universities to consider study abroad fairs organized in target markets in the first place among traditional marketing methods.

Another result of the research is that students younger than 18 years old use the university ranking websites significantly more than students between 18 and 24 years old. This result may also explain

that the undergraduate programs of the universities that are at the top of the university ranking websites can attract more students under the age of 18 years. To find a place at the top of these lists and attract the attention of prospective international students, relevant undergraduate programs' core missions should be more successful in teaching, research, citations, industry income and international outlook.

Going by the result of this study is that high school students use university YouTube channel significantly more than other students. For this reason, using videos via YouTube channel, especially in promoting associate or undergraduate programs, will be a very effective method to reach high school students. Campus address and the map is more important for high school students than others. This result reveals that the visibility of the easiest ways to travel to campus by public transport should not be forgotten on the website considering the size of high school students who are in the process of making university choices in the target market.

Another of the results of the study is that language spoken in the host country affect female students' decision more than males. This result shows that English, which is a common language throughout the world or the language spoken in the host country which is close to the student's native language, is an important factor in the preference of female students, which can bring English-speaking countries one step ahead of other countries. On the other hand, although English is not the main language in the host country, increasing the number of

programs offered in English at the host university is another important issue that needs to be reviewed.

Another interesting result is that the availability of academic programs affects university graduates' decisions more than high school graduates. A university graduate might be more confident in the program he/she wants to continue, compared to students who are planning to study at a university but have not determined the program to study yet. For this reason, it may be an advantage to introduce the current graduate programs while the student is studying in the undergraduate program.

International student mobility seems to be from developing countries, especially China and India to developed countries, especially the USA and the UK. In recent years, the efforts of universities in Asian countries, especially China, Japan and South Korea, have increased the competition in the market. It should not be taken as a coincidence that the majority of students' first choice is US universities, according to the findings of the research, factors such as the prestige of the institution, the language of education, quality and fee, immigration policies and employment opportunities are among the factors that affect students' decisions in the country selection, particularly the US being chosen as the host country.

To design a successful website, has strategic importance in digital marketing strategies, this is why higher education institutions should take care that the website should be is easy to use, should have attractive visual and written materials, and links to the university's

social media channels. If email marketing is preferred, it is necessary to pay attention to ensure that the sent mail can be read properly on different platforms such as desktop computers, laptops or smart devices. Higher education institutions should effectively use video sharing sites, especially YouTube to reach the target market much more effectively and cheaper than television. Meanwhile, shared videos on these channels should be submitted in different languages for students who do not speak a foreign language. On the other hand, the online meeting (webinar) channel might be used by higher education institutions to inform international students about transactions such as visa and accommodation before they arrive at the host country to create a positive student perception. Furthermore, online catalogs and brochures should be used more than printed ones, due to their advantages such as being cheap and easy to update. Higher education institutions should use all popular social media channels, instead of one or two media platforms. For example, although Instagram is very popular all over the world, it is prohibited in China, the country with the largest international student market.

It should be agreed that a visually well-designed website will certainly not be enough, it is a condition that the website contains the information that the student is looking for most and that this information should be easy to access. Otherwise, the student's inability to access the required information may mean that all digital marketing efforts are wasted.

Additionally, simplifying the official processes such as visa and residence permit, will increase the possibility of students to choose that country, therefore, governments should assist foreign students in simplifying these processes. However, giving international students the opportunity to obtain work permits during the study period is also important in terms of bringing talented graduates to the workforce.

CONCLUSION

The increase in the number of institutions seeking to generate more income by attracting more students from the global higher education market makes the market more competitive every day. For this reason, universities are required to develop service-oriented marketing strategies designed according to the expanded 7P by considering the service marketing triangle model, as well as the traditional 4P strategy, in order to reach foreign students, to promote their programs better and to be successful in the market.

The global higher education market offers many economic, social and cultural benefits for universities and communities. Digital marketing channels offer new opportunities for institutions and countries seeking a share of the global higher education market. As the research findings support, international students use digital channels more than traditional channels, and it clearly shows that higher education institutions aiming to increase the number of foreign students should prioritize digital marketing strategies. For this reason, higher education institutions that can successfully implement digital marketing strategies will be one step ahead of institutions that still

implement traditional marketing strategies. The increasing interest in digital resources with each passing day will expand the demand of international students for digital resources in the university research and decision-making process and the impact of these resources on the student's final decision.

Universities should design all digital promotion channels (website, mobile application, social media accounts, e-mail content, etc.) in a way that can be personalized according to prospective international students with different expectations as well as the most effective digital communication methods should be used for different target audience and should be applied with an integrated marketing communication approach. Universities now operate from a corporate business perspective. More importantly, every university is a large and complex organization, regardless of whether it is a public university or a foundation university. In order to control this complex structure, universities should try to control advertising, creative, web or digital processes with the internal team as much as possible, therefore a sister department should be established to corporate communication or public relations departments, which can also be named as digital marketing department.

A limitation of this research was that extra results could be obtained by inserting additional statements to the questionnaire that would take the opinions of the families, considering that the students participating in our survey did not decide on their own. Another limitation was that we could include country-based results with the participation of more

students from the biggest source countries for international students, such as People's Republic of China.

REFERENCES

- Aharoni, Y., & Nachum, L. (2000). *Globalization of services: Some implications for theory and practice* (Vol. 19): Routledge.
- Aleles, J. P. (2015). Japan's Global 30 Program: The push and pull factors of international student mobility. *International Journal of Learning, Teaching and Educational Research*, 13(2).
- Ali-Choudhury, R., Bennett, R., & Savani, S. (2008). University marketing directors' views on the components of a university brand. *International Review on Public and Nonprofit Marketing*, 6(1), 11. doi:10.1007/s12208-008-0021-6
- Ashworth, G., & Kavaratzis, M. (2009). Beyond the logo: Brand management for cities. *Journal of Brand Management*, 16(8), 520-531. doi:10.1057/palgrave.bm.2550133
- Becker, R., & Kolster, R. (2012). International student recruitment: Policies and developments in selected countries.
- Binsardi, A., & Ekwulugo, F. (2003). International marketing of British education: research on the students' perception and the UK market penetration. *Marketing Intelligence & Planning*, 21(5), 318-327. doi:10.1108/02634500310490265
- Bober, B. (2011). *Mobile Marketing for Local Businesses: Is Your Business Visible to 5 Billion Mobile Users?* : Barbara Bober.
- Bodycott, P. (2009). Choosing a higher education study abroad destination: What mainland Chinese parents and students rate as important. *Journal of Research in International Education*, 8(3), 349-373. doi:10.1177/1475240909345818
- Boudreaux, D. J. (2008). *Globalization*: Greenwood Press.
- Branco Oliveira, D., & Soares, A. M. (2016). Studying abroad: developing a model for the decision process of international students. *Journal of Higher Education Policy and Management*, 38(2), 126-139. doi:10.1080/1360080X.2016.1150234

- Brown, P., Lauder, H., Ashton, D., & Tholen, G. (2008). Education, globalisation and the knowledge economy, a commentary for the ESRC Teaching and Learning Research Programme (TLRP): TLRP.
- Cantwell, B., Luca, S. G., & Lee, J. J. (2009). Exploring the orientations of international students in Mexico: Differences by region of origin. *Higher education*, 57(3), 335-354.
- Cattaneo, O., Engman, M., Saez, S., & Stern, R. (2010). International trade in services: new trends and opportunities for developing countries: The World Bank.
- Chen, C. H., & Zimitat, C. (2006). Understanding Taiwanese students' decision-making factors regarding Australian international higher education. *International Journal of Educational Management*, 20(2), 91-100. doi:10.1108/09513540610646082
- Chen, J. M. (2017). Three Levels of Push-Pull Dynamics Among Chinese International Students' Decision to Study Abroad in the Canadian Context. *Journal of International Students*, 7(1), 113-135.
- Chen, L.-H. (2008). Internationalization or International Marketing? Two Frameworks for Understanding International Students' Choice of Canadian Universities. *Journal of marketing for higher education*, 18(1), 1-33. doi:10.1080/08841240802100113
- Choudaha, R., Orosz, K., & Chang, L. (2012). Not All International Students are the Same: Understanding Segments, Mapping Behavior. *World Education News & Reviews*, 25(7).
- Collins, S. (2015). *Webinars Pocketbook: Management Pocketbooks*.
- Constantinides, E., & Zinck Stagno, M. C. (2011). Potential of the social media as instruments of higher education marketing: A segmentation study. *Journal of marketing for higher education*, 21(1), 7-24.
- Craig, R. (2015). *College disrupted: The great unbundling of higher education*: St. Martin's Press.
- Daniels, P. W. (1985). *Service industries: a geographical appraisal*: Routledge.

- De Wit, H. (2002). *Internationalization of higher education in the United States of America and Europe: A historical, comparative, and conceptual analysis*: Greenwood Publishing Group.
- Fierro, I., Cardona Arbelaez, D. A., & Gavilanez, J. (2017). Digital marketing: a new tool for international education. *Pensamiento & Gestión*(42), 241-260.
- Findlay, C. C., & Tierney, W. G. (2010). *Globalisation and tertiary education in the Asia-Pacific: The changing nature of a dynamic market*: World Scientific.
- Foskett, N., & Maringe, F. (2010). *Globalization and internationalization in higher education: Theoretical, strategic and management perspectives*: Bloomsbury Publishing.
- Gilmore, A. (2003). *Services marketing and management*: Sage.
- Global Social Media Overview. (2020). Retrieved from <https://datareportal.com/social-media-users>
- Gonzales, F., Jensen, J. B., Kim, Y., & Nordås, H. K. (2012). Globalisation of services and jobs. *Policy Priorities for International Trade and Jobs*, 175.
- Hamid, S., Bukhari, S., Ravana Sri, D., Norman Azah, A., & Ijab Mohamad, T. (2016). Role of social media in information-seeking behaviour of international students: A systematic literature review. *Aslib Journal of Information Management*, 68(5), 643-666. doi:10.1108/AJIM-03-2016-0031
- Hanefeld, J. (2015). *Globalisation and health*: McGraw-Hill Education (UK).
- Hemsley-Brown, J., & Oplatka, I. (2015). University choice: what do we know, what don't we know and what do we still need to find out? *International Journal of Educational Management*, 29(3), 254-274. doi:10.1108/IJEM-10-2013-0150
- Huang, L.-M., & Bilal, D. (2017). "Not what I thought!" information seeking behaviors of international students during the application for graduate study in the USA. *Proceedings of the Association for Information Science and Technology*, 54(1), 709-711. doi:<https://doi.org/10.1002/pr2.2017.14505401125>

- Istaiteyeh, R. (2011). Economic development and highly skilled returnees: The impact of human capital circular migration on the economy of origin countries: The case of Jordan (Vol. 10): kassel university press GmbH.
- James-MacEachern, M., & Yun, D. (2017). Exploring factors influencing international students' decision to choose a higher education institution: A comparison between Chinese and other students. *International Journal of Educational Management*, 31(3), 343-363. doi:10.1108/IJEM-11-2015-0158
- Jarboe, G. (2011). *YouTube and video marketing: An hour a day*: John Wiley & Sons.
- Juon, C., Greiling, D. A., & Buerkle, C. (2011). *Internet Marketing, Start-to-finish*: Que Publishing.
- Kan, Ç. (2009). Değişen değerler ve küresel vatandaşlık eğitimi. *Kastamonu Eğitim Dergisi*, 17(3), 895-904.
- Kasravi, J. (2009). Factors influencing the decision to study abroad for students of color: moving beyond the barriers.
- Kavakas, D. (2013). Students as consumers: Identifying study abroad destination choice influences for marketing purposes. *American College of Thessaloniki*, 1-33.
- Kobayashi-Hillary, M., & Sykes, R. (2007). *Global services: Moving to a level playing field*: BCS, The Chartered Institute.
- Kurtulmuş, N. (2001). *Sanayi ötesi dönüşüm: küreselleşme ve insan kaynakları boyutuyla*: İz Yayıncılık.
- Lawn, P. (2013). *Globalisation, economic transition and the environment: forging a path to sustainable development*: Edward Elgar Publishing.
- Lee, J. J. (2008). Beyond borders: International student pathways to the United States. *Journal of Studies in International Education*, 12(3), 308-327.
- Lee, S. W. (2017). Circulating East to East: Understanding the Push–Pull Factors of Chinese Students Studying in Korea. *Journal of Studies in International Education*, 21(2), 170-190. doi:10.1177/1028315317697540

- Leng, H. K. (2012). The use of Facebook as a marketing tool by private educational institutions in Singapore. *International Journal of Technology and Educational Marketing (IJTEM)*, 2(1), 14-25.
- Li, F., & Qi, H. (2019). An investigation of push and pull motivations of Chinese tourism doctoral students studying overseas. *Journal of Hospitality, Leisure, Sport & Tourism Education*, 24, 90-99. doi:<https://doi.org/10.1016/j.jhlste.2019.01.002>
- Li, M., & Bray, M. (2007). Cross-border flows of students for higher education: Push-pull factors and motivations of mainland Chinese students in Hong Kong and Macau. *Higher education*, 53(6), 791-818.
- Mazzarol, T., & Soutar Geoffrey, N. (2002). "Push-pull" factors influencing international student destination choice. *International Journal of Educational Management*, 16(2), 82-90. doi:10.1108/09513540210418403
- McDonald, M., Payne, A., & Frow, P. (2011). *Marketing plans for services: A complete guide*: John Wiley & Sons.
- Meroni, A., & Sangiorgi, D. (2011). *Design for services*: Gower Publishing, Ltd.
- Micu, A., Micu, A., Lukacs, E., Susanu, I., Cristache, N., & Căpățână, A. (2010). Comparative analysis of the web marketing strategies implemented by the higher education institutions. Paper presented at the Recent Advances in Management, Marketing, Finances, Proceedings of The 4th WSEAS International Conference on Management, Marketing and Finances.
- Mogaji, E., Maringe, F., & Hinson, R. E. (2020). *Strategic Marketing of Higher Education in Africa*: Taylor & Francis.
- Mpinganjira, M. (2009). Comparative analysis of factors influencing the decision to study abroad. *African Journal of Business Management*, 3(8), 358-365.
- Neher, K. (2014). *Visual social marketing for dummies*: John Wiley & Sons.
- Noel-Levitz. (2013). 2013 marketing and student recruitment practices benchmark report for four-year and two-year institutions. Retrieved from Coralville, Iowa: www.noellevitz.com/BenchmarkReports
- Noel-Levitz. (2014). 2014 E-Recruiting Practices Report for Four-Year and Two-Year Institutions. Retrieved from Coralville, Iowa:

<https://www.noellevitz.com/papers-research-higher-education/2014/2014-e-recruiting-practices-reportfor-four-year-and-two-year-institutions>

OECD. (2014). Education at a Glance 2014.

OECD. (2020). Education at a Glance 2020.

Phang, S. L. (2013). Factors influencing international students' study destination decision abroad. (Master Master). University of Gothenburg, Sweden. Retrieved from <https://gupea.ub.gu.se/handle/2077/32136> (2012.087)

Potts, K. (2007). Web design and marketing solutions for business websites: Apress.

Quinn, J. B., & Guile, B. R. (1988). Managing innovation: Cases from the services industries: National Academies Press.

Rauschnabel, P. A., Krey, N., Babin, B. J., & Ivens, B. S. (2016). Brand management in higher education: The University Brand Personality Scale. *Journal of business research*, 69(8), 3077-3086. doi:<https://doi.org/10.1016/j.jbusres.2016.01.023>

Ryan, D. (2015). Understanding social media: how to create a plan for your business that works: Kogan Page Publishers.

Salisbury, M. H., Umbach, P. D., Paulsen, M. B., & Pascarella, E. T. (2009). Going global: Understanding the choice process of the intent to study abroad. *Research in higher education*, 50(2), 119-143.

Schoole, C., & Knight, J. (2013). Internationalisation of African higher education: Towards achieving the MDGs: Springer Science & Business Media.

Sherin, T. (2013). Best email marketing practices for colleges and higher education. Retrieved from <https://www.slideshare.net/sherinthomas1654/best-email-marketing-practices-for-colleges-and-higher-education?related=1>

Sweeney, S. (2006). 101 Ways to Promote Your Web Site: Filled with Proven Internet Marketing Tips, Tools, Techniques, and Resources to Increase Your Web Site Traffic: Maximum Press.

Tripathi, P. (2013). Marketing strategies for higher education institutions: technological considerations and practices: Technological considerations and practices: IGI Global.

- van Rooijen, M. (2008). *Marketing our institution internationally: European Association for International Education*.
- Weisman, E. (2012). *Trade in services and imperfect competition: application to international aviation (Vol. 2): Springer Science & Business Media*.
- Wilkins, S., Balakrishnan, M. S., & Huisman, J. (2012). Student Choice in Higher Education: Motivations for Choosing to Study at an International Branch Campus. *Journal of Studies in International Education*, 16(5), 413-433. doi:10.1177/1028315311429002
- Wilkins, S., & Huisman, J. (2011). International student destination choice: the influence of home campus experience on the decision to consider branch campuses. *Journal of marketing for higher education*, 21(1), 61-83. doi:10.1080/08841241.2011.573592
- Zengin, E., & Erdal, A. (2000). Hizmet sektöründe toplam kalite yönetimi. *Journal of Qafqaz University*, 3(1), 43-56.
- Zhu, L., & Reeves, P. (2019). Chinese students' decisions to undertake postgraduate study overseas. *International Journal of Educational Management*, 33(5), 999-1011. doi:10.1108/IJEM-11-2017-0339
- Ziguras, C., & McBurnie, G. (2014). *Governing cross-border higher education: Routledge*.

CHAPTER 5

**BAGGING AND BOOSTING CLASSIFIERS FOR CREDIT
RISK EVALUATION**

Asst. Prof. Dr. Serkan ARAS¹

¹ Dokuz Eylul University, Faculty of Economics and Administrative Sciences,
Econometrics Department, Izmir, Turkey. serkan.aras@deu.edu.tr
ORCID ID: 0000-0002-6808-3979

INTRODUCTION

With developing technology, face-to-face interactions with customers have ceded their place to digital communication during loan applications. This transition saves time and costs regarding credit allocation. However, it also leads to more exposure to risky situations because it is harder to understand customer profiles without cultivating a personal relationship. Therefore, classifying loan applicants as good credit or bad credit before deciding to approve or reject a loan is more important than ever, and it directly affects the revenue and losses of a financial institution.

After the seminal studies carried out by Beaver (1966) and Altman (1968), modelling credit risk has attracted the attention of many researchers, and scholars. For a long time, statistical methods, such as discriminant analysis and logistic regression, had dominated the field of credit risk scoring (Reichert, Cho, and Wagner, 1983; Thomas, 2000). However, they make more solid assumptions about data that are rarely valid in reality, such as independence between input variables and linear separability, and they are not able to generate flexible decision boundaries. In recent years, machine learning models, such as decision trees, support vector machines, and random forest have been successfully applied to credit scoring problems and have exhibited better performance than traditional statistical techniques (Addo, Guegan, and Hassani, 2018; Arora and Kaur, 2020).

Ensemble learning methods that rely on producing strategies to combine base models are a subgroup of machine learning techniques used for credit scoring problems (Chopra and Bhilare, 2018; Li and Chen, 2020). Among ensemble learning methods, bootstrap aggregation (bagging) and boosting methods stand out from others due to their outstanding performance in many fields. Bagging is a kind of ensemble learning method proposed by Breiman (1996) to reduce the variance of the predictions of any classifier by training a base classifier many times on different subsamples of the original dataset, produced as a result of sampling with replacement and combining the predictions based on these subsamples. Boosting is a sequential ensemble that tries to improve a weak classifier performance by giving more weight to instances that were incorrectly classified in the previous iteration (Freund and Schapire, 1996). It should be noted that bagging and boosting ensembles include homogenous classifiers. In other words, the base learners are the same during the entire training process.

This study aims to apply bagging and boosting (AdaBoost) ensemble learning techniques to the seven most widely used classifiers in credit risk evaluation, namely, naïve Bayes, k-nearest neighbours, logistic regression, ridge regression, support vector machines, decision trees and random forest. Even if some of them were previously used in the bagging and boosting techniques as weak learners, this study presents more comprehensive comparisons by using some weak learners, such as naïve Bayes and decision trees, but also some competent or strong

learners, such as support vector machines and random forest. Hence, it will be possible to examine the effect of bagging and boosting algorithms on each classifier mentioned. For this purpose, three real-world credit datasets are used, each of which consists of a different sample size, number of features and degree of imbalance.

1. CREDIT SCORING

Credit allocation is one of the main duties of financial institutions worldwide. According to the Fitch Ratings report², the US default rate increased substantially in 2020 due to the economic conditions caused by COVID-19 and reached its highest value since 2010. This remarkable increase in delinquencies may cause banks and financial institutions to lose a substantial amount of capital and revenue. Hence, they must predict accurately the probability that a borrower may belong to a high-risk group. This phenomenon is referred to as credit scoring or rating. Credit scoring models divide potential customers into two categories: those who fail to pay by the due date and those who pay back the debt on time.

It is almost impossible to get rid of loan default completely, but credit analysts always try to lower the rate of defaulters as much as possible. Even a one percent improvement in detecting defaulters in advance will bring substantial gains to the creditor (Hand and Henley, 1997). A credit risk assessment decision is generally based on a judgmental analysis performed by an expert in light of rule-based methods for

² <https://www.fitchratings.com/research/corporate-finance/us-default-rate-to-hit-5-5-highest-in-10-years-13-07-2020>

under-developed or even developing countries. The success of this type of decision process is heavily dependent on the experience of the lender regarding similar applicants. However, it has been proved by many studies that credit scoring models relying on statistical and machine learning techniques automate the decisions of a credit risk assessment and outperform traditional credit risk methods (Abdou and Pointon, 2011; Onay and Öztürk, 2018).

2. LITERATURE REVIEW

Wang et al. (2011) used three credit datasets to determine which ensemble learning method from among bagging, boosting, and stacking improved the predictions of four base learners most. The study revealed that bagging made a greater contribution to the performance of the base learners than other ensemble learning methods. Also, it was observed that the decision tree was the base learner most positively affected by ensemble learning but the performance of support vector machines (SVM) worsened. Dahiya et al. (2017) proposed a hybrid system based on feature selection and bagging techniques to decide whether to grant or reject the loan application of a borrower. The proposed method exhibited a superior performance compared to the base classifiers and the bagging classifiers in the analysis. Chopra and Bhilare (2018) investigated the effect of ensemble learning techniques, such as bagging, AdaBoost, and gradient boosting, on the prediction results by comparing with the decision tree classifier to predict whether a borrower would pay back his/her loan on time. To evaluate the results, the measures of accuracy,

precision, and recall were used. They observed that even if the precision value of the decision tree was higher, however, for the recall measure, the more important criterion for banking industries, the gradient boosting algorithm, was the best among other models.

Addo et al. (2018) made a comparative study between machine and deep learning models to determine the defaulters of businesses. The results indicated that tree-based models exhibited better predicting performance and were more robust in the variable selection compared to deep learning models. Bhatore et al. (2020) presented a very detailed literature review paper regarding credit risk evaluation. They witnessed extensive use of artificial neural networks and SVM models as popular classifiers in identifying creditworthy and non-creditworthy loan applicants. Alam et al. (2020) focused on the effect of different undersampling and oversampling techniques on widely used machine learning models using credit default datasets from Taiwan, South German, and Belgium. The study demonstrated that oversampling techniques led to more accurate predictions than undersampling techniques and that the gradient boosted decision tree model with the K-means SMOTE oversampling technique had the best model specifications for the datasets examined.

Li and Chen (2020) analysed the data from Lending Club in the U.S.A. to carry out a comprehensive comparison study between five baseline classifiers and five ensemble algorithms, namely, AdaBoost, LightGBM, RF, XGBoost, and Stacking. The study found that RF was the best according to all measures taken into consideration. The

performance of AdaBoost was not higher than the baseline classifiers, and logistic regression produced better evaluation metrics than other individual models. A recent study conducted by Gunnarsson et al. (2021) modelled various datasets of credit scoring to find out whether deep learning models are a better option than the conventional credit risk methods mostly used. The study showed that deep learning models were outperformed by the XGBoost model and their shallower counterparts, and that deep learning models needed too much computational time.

3. INDIVIDUAL CLASSIFIERS

The decision to grant a loan brings significant financial risks for a lender/creditor. To reduce the risk, the creditor generally applies certain modelling approaches so that more objective and accurate decisions can be made. For this study, seven standard credit scoring techniques were used. The details regarding these techniques are provided in the following paragraphs.

Naïve Bayes (NB) is one of the Bayesian learning methods and provides a simple approach to handle classification problems. Despite its simplicity, it can yield more accurate predictions than sophisticated and complex models (Islam, Wu, Ahmadi, and Sid-Ahmed, 2008). An important assumption made by the naïve Bayes classifier is that there is independence between individual attributes. This method is particularly suitable for problems with high dimension and a limited number of instances.

K-nearest neighbours (KNN) is a nonparametric method based on the similarity measure calculation between the instances within neighbourhoods. Its calculations are performed rapidly, and it does not need to make any assumption regarding the problem. Its performance is highly affected by the number of neighbours. The main idea behind the KNN algorithm is that observations with similar characteristics (or inputs) should be in the same class. It has been applied for credit risk problems as a benchmark model with some degree of success (Henley and Hand, 1996).

Ridge classifier is a variant of ridge regression with an objective function containing penalised terms and error terms. It governs the model complexity by a regularisation parameter $\alpha \geq 0$. Thanks to the regularisation parameter, it can avoid overfitting, which is the most common problem in machine learning. The selection of the α value depends on the problem. Higher values make the regularisation stronger and the shrinkage on the coefficient larger. This model is useful especially when features are highly correlated (McDonald, 2009). The ridge classifier transforms the binary class to $(-1, 1)$ and then performs the regression task. The sign of predictions is used to determine the predicted classes.

Logistic regression (LR) is traditionally the statistical model most used in credit risk analysis. Logistic regression is a classification model where the target variable is categorical and input variables consist of categoric or numeric values. It combines the input values linearly but relates to the target variable by a non-linear logistic

function. The performance of logistic regression depends on the assumption that there is no or low dependency between features (Bekhet and Eletter, 2014).

Support vector machines (SVM) take advantage of kernel functions in mapping the original feature space to a higher dimensional feature space. In this way, the patterns that cannot be separated linearly in the original space become more separable in the transformed high dimensional space. It attempts to determine the maximum classification margin between instances of any class and decision boundaries (Wu and Zhou, 2006). The parameters of kernel functions and regularisation terms are crucial components of the performances.

Decision trees (DT) and random forest (RF) are tree-based machine learning techniques that can be used in both classification and regression situations. Decision trees divide the dataset by branches and nodes until it reaches a leaf node at the bottom of the tree, which indicates the class label of the remaining instances. Each node corresponds to a feature and branches coming out that node carry specific conditions to divide samples further (Lee, Chiu, Chou and Lu, 2006). Decision trees are easy to understand, non-linear and non-continuous estimators, and applicable regardless of data type. Random forest includes many decision trees to prevent the overfitting problem found in decision trees and to improve their performance using simple ensemble methods effectively. The power of random forest relies on diversity among decision trees. For this purpose, it uses the bagging

method and constructs each tree with a randomly chosen subset of features (Breiman, 1996).

4. BAGGING

Among the many ensemble learning methods, bagging stands out due to its ability to make the classifier more stable and its tendency to generate more accurate predictions. The bagging method can be applied to any model but generally, it is used to integrate decision trees. Its power comes from its ability to construct randomly selected training sets from the original dataset with replacements, each of which is used to train the base model, thereby increasing diversity among the members of the ensemble as much as possible. Diversity is a key factor in achieving a good performance from ensemble learning (Zareapoor and Shamsolmoali, 2015). After fitting each base classifier to the subsamples, the final prediction is obtained by aggregating these classifiers through either majority voting (generally preferred) or other aggregating methods (Bauer and Kohavi, 1999).

Bagging can decrease the variance of the predictions without causing an increase in their bias and avoids overfitting because of model aggregation (Hastie, Tibshirani and Friedman, 2009). Each base model is fitted in parallel with the generated random subsample so that the constructed base learners are independent of each other. The working mechanism of this parallel ensemble is depicted in Figure 1. Different bagging approaches may be adapted by changing the bootstrap sampling method and the aggregation method, which are

two significant elements. Bootstrapped samples may include some instances more than once while many others are not included at all. The pseudo code of the bagging method is presented in Figure 2.

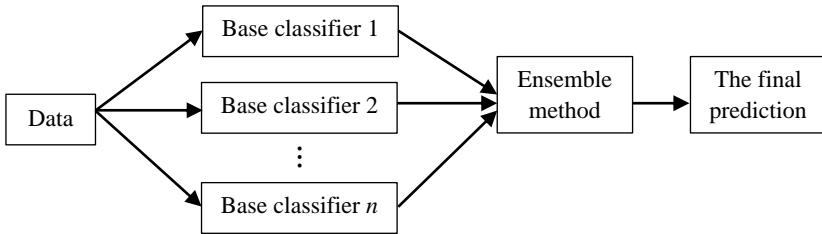


Figure 1. The Flowchart of Bagging Ensemble

Input: Training dataset $T = \{(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)\}$
 Base classifier C
 The number of bootstrap samples m
 For $i = 1, 2, \dots, m$:
 $T_i = \text{Bootstrap}(T)$ %Generate random sample with replacement
 $l_i = C(T_i)$ %Train a base learner l_i
 End
Output: $O(x) = \text{mode}(o_1(x), \dots, o_m(x))$ %The final prediction

Figure 2. The Pseudo Code of Bagging Algorithm

5. BOOSTING

Boosting can be applied to any learning method, but a weak learner model is preferable to improve the accuracy of predictions (Schapire, 1990). Base models in the boosting algorithm depend on each other. The subsequent base learner tries to fix the samples incorrectly classified by the preceding base learner. A working mechanism of this sequential ensemble is depicted in Figure 3. The main idea behind this ensemble is to concentrate on the errors of the previous base model by

making the weights of misclassified samples larger and to repeat this process until they are classified correctly and manage to obtain a better performance. The AdaBoost algorithm proposed by Freund and Schapire (1996) is a sort of boosting algorithm successfully used in many application areas (Chang, Li and Zeng, 2019; Jones, Johnstone and Wilson, 2015; Suganya and Rajan, 2020).

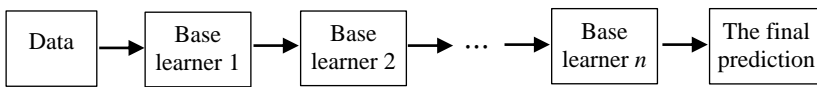


Figure 3. The Flowchart of Boosting Ensemble.

Given training dataset $T = \{(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)\}$, the AdaBoost algorithm gives equal weights, $D_1(i) = 1/n$, at the start. Assume that $D_t(i)$ shows the weight distribution at iteration t . After a weak learner $h_t(x)$ is constructed, the sum of the prediction error is calculated as follows:

$$\varepsilon_t = \sum_{i=1}^n D_t(i) \times I(h_t(x_i)) \quad (1)$$

where $I(h_t(x_i))$ denotes an indicator function, which is described in the following equation:

$$I(h_t) = \begin{cases} 1, & \text{if } h_t(x_i) \neq y_i \\ 0, & \text{if } h_t(x_i) = y_i \end{cases} \quad (2)$$

Now, the weight α_t for t th learning round of the weak learner must be computed using the equation below:

$$\alpha_t = \frac{1}{2} \ln \left(\frac{1-\varepsilon_t}{\varepsilon_t} \right) \quad (3)$$

This weight determines the size of the related weak learner in the weighted voting method to form the final prediction. Also, it should be noted that if the error value ε_t is small, then a large weight value α_t is attained. After the training of a weak learner is finished, the distribution weight of each instance is modified according to the following equation:

$$D_{t+1}(i) = \frac{D_t(i)}{Z_t} \times \begin{cases} \exp(-\alpha_t), & \text{if } h_t(x_i) = y_i \\ \exp(\alpha_t), & \text{if } h_t(x_i) \neq y_i \end{cases} \quad (4)$$

where Z_t is a normalisation factor, which is calculated as follows:

$$Z_t = \sum_{i=1}^n D_t(i) \exp \left(-\alpha_t \times y_i \times h_t(x_i) \right) \quad (5)$$

Using Equations (4)-(5), the weight of each sample becomes larger if its prediction is false, and it becomes smaller if its prediction is right. This enables the algorithm to focus on those samples that are hard to classify correctly. Finally, to produce the final prediction of the algorithm, the weighted voting method given in Equation (6) is computed by all base learner models.

$$H(x) = \text{sign} \left(\sum_{t=1}^T \alpha_t \times h_t(x) \right) \quad (6)$$

6. DATASETS

To investigate the effect of bagging and boosting algorithms on credit risk evaluation in this study, three real-world credit datasets were

used. These credit datasets of Australian, German, and Home Equity (HMEQ) loans are publicly accessible via the UCI machine learning repository³. Brief information regarding these datasets is provided in Table 1. As can be seen from this table, all the datasets have different characteristics in terms of the sample size and imbalanced ratio. The target variable in all datasets represents whether the credit applicant defaulted on the loan (1) or paid the loan (0).

Table 1. The Summary of The Datasets

Data	Instances	Features	The number of defaulters	The number of non-defaulters
Australian	690	14	307 (44.5%)	383 (55.5%)
German	1000	20	300 (30%)	700 (70%)
HMEQ	5960	12	1189 (19.95%)	4771 (80.05%)

The Australian dataset consists of 6 numeric and 8 categoric features. The size of the test set was taken as 125 in this dataset. The German dataset includes 7 numeric and 13 categoric inputs. For this dataset, 200 instances were randomly chosen for the test set. The HMEQ dataset contains 10 numeric and 2 categoric features and some missing values. To tackle missing values, the mode and mean values were used to replace the missing values of that feature for categorical and numeric variables, respectively. The size of the test set was 596 for the HMEQ dataset. Before starting on the model construction, all datasets were balanced through the random oversampling method. It is known that balancing data prior to modelling significantly affects the performance of machine learning models (Alam et al., 2020; Shen,

³ <http://archive.ics.uci.edu/ml/index.php>

Zhao, Li, Li and Meng, 2019). Based on previous studies, which found that oversampling leads to better performance than undersampling techniques (Batista, Prati and Monard, 2004; Estabrooks, Jo and Japkowicz, 2004), random oversampling, which randomly samples with replacement from the minority class, was used to balance the datasets in this study.

7. PERFORMANCE EVALUATION STATISTICS

There are many evaluation statistics used in credit scoring applications to assess the performance of different predictive models. The calculation of most evaluation statistics depends on the confusion matrix. The confusion matrix consists of four parts, namely, true positive (TP), true negative (TN), false positive (FP), and false negative (FN). Among the various evaluation measures, accuracy stands out from the rest as the most widely used. Accuracy, given in Equation (7), shows the proportion of correctly classified instances to all instances in the sample. However, accuracy suffers from imbalanced datasets due to the high influence of the majority class on it (Haixiang et al., 2017).

$$Accuracy = \frac{TP+TN}{TP+TN+FP+FN} \quad (7)$$

To assess the performances more correctly in a case of imbalanced datasets, balanced accuracy, presented in Equation (8), can be used. It computes the average of the correctly predicted proportions of each class.

$$\text{Balanced Accuracy} = \frac{1}{2} \left(\frac{TP}{TP+FN} + \frac{TN}{TN+FP} \right) \quad (8)$$

Recall and precision are the other traditional evaluation statistics. Precision is the percentage of how many positives were correctly predicted in all positive predictions by the classifier, while recall is the percentage of how many positives were correctly predicted in all positive instances.

$$\text{Recall} = \frac{TP}{TP+FN} \quad (9)$$

$$\text{Precision} = \frac{TP}{TP+FP} \quad (10)$$

The last two measures dealing with imbalanced datasets in this study are F-score and Matthews correlation coefficient (MCC). F-score is the harmonic mean of the recall and precision measure and takes a value between 0 and 1. The MCC takes a value between -1 and 1. A value of 1 signifies a perfect prediction, -1 represents an inverse prediction, and 0 indicates random prediction. The MCC can be regarded as a more trusted metric because it relies on all the categories defined in the confusion matrix (Chicco and Jurman, 2020). Their values are computed as follows:

$$F - score = \frac{2 \times \text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}} \quad (11)$$

$$MCC = \frac{(TP * TN) - (FP * FN)}{\sqrt{(TP + FP) * (TN + FN) * (TN + FP) * (TP + FN)}} \quad (12)$$

From the point of view of financial institutions, detecting future defaulters correctly is of great value to the credit risk team to prevent potential financial losses. The evaluation metric related to this property is the recall statistic. A high recall value means success in catching defaulters by the model used. However, there is a trade-off between the recall and precision values, especially when the size of the sample is limited (Buckland and Gey, 1994). Hence, the recall value is regarded as more important in this study when interpreting the results.

8. RESULTS AND ANALYSIS

Tuning hyper-parameters properly is the most crucial step in any machine learning model. They are fixed before training starts and not changed during the training process. Of the naïve Bayes methods, the Gaussian naïve Bayes was used in this study. This method is the only one that does not have any hyper-parameter. Avoiding overfitting is required to determine a good combination of values of hyper-parameters. To achieve this, the grid search method with 10-fold cross-validation was used in this study. The hyper-parameter of each model and their values are presented in Table 2.

Table 2. The Search Space for The Hyper-Parameters of The Models

Model	Search Space
SVM	$C \in [10000, 1000, 100, 10, 1, 0.1, 0.01, 0.001]$
	$\gamma \in [0.1, 0.01, 0.001, 0.0001]$
	Kernel \in [Radial basis function]
RF	The number of trees $\in [100, 300, 500]$
	The minimum number of samples required to split an internal node $\in [2, 5, 7, 10]$
	The minimum number of samples required to be at a leaf node $\in [1, 3, 5, 10, 15, 30, 50, 100]$
	Criterion \in [Gini impurity, Entropy]
KNN	The number of neighbours $\in [1, 3, 5, \dots, 195, 197, 199]$
	Distance metric \in [Manhattan, Minkowski]
	Weight function \in [Uniform, Distance]
Logistic Reg.	Penalty \in [L1-norm, L2-norm, Elastic-Net]
	$C \in [10000, 5000, 1000, 500, 100, 1, 0.1, 0.01, 0.001]$
Ridge	$\text{Alpha} \in [10000, 5000, 1000, 500, 100, 1, 0.1, 0.01]$
DT	The minimum number of samples required to split an internal node $\in [2, 5, 7, 10, 20, 30, 50]$
	The minimum number of samples required to be at a leaf node $\in [1, 3, 5, 10, 15, 30, 50, 100]$
	Criterion \in [Gini impurity, Entropy]
	Splitter \in [best, random]
AdaBoost	The number of estimators $\in [30, 50, 100, 200, 300]$
	Learning rate = [0.0005, 0.001, 0.005, 0.01, 0.05, 0.1, 0.15, 0.2]
Bagging	The number of estimators $\in [100, 200]$
	Maximum features $\in [0.5]$

Tables 3-5 include the prediction results for the German data of the statistical and machine learning techniques investigated, as well as a simple ensemble method called hard voting in the last row of these tables. Hard voting (majority voting) takes the votes from every single model into account and adds them to find out which class has the most

votes. In other words, the mode of predictions from all classifiers for an instance is the final prediction of the hard voting method. The columns in these tables correspond to the results of the individual classifiers, bagging and boosting results of individual classifiers in the row concerned. The best performance value in each row is represented by bold font. It should also be noted that the KNN algorithm has no property of assigning weights to the instances. For this reason, there is no way to apply the boosting algorithm for this technique. As can be seen from these tables, the bagging algorithm leads to a higher number of best performance values than single and boosting. Boosting and bagging do not improve the performance of RF according to all evaluation metrics but the bagging algorithm significantly improves the predictions of DT, a weak learner, for all measures. However, for other weak learners, the effect of ensemble learning methods is not noticeable. Lastly, as expected, hard voting generally has good performance values.

Table 3. The Accuracy and Balanced Accuracy Values for German Data

Models	<i>Accuracy</i>			<i>Balanced Accuracy</i>		
	Single	Bagging	Boosting	Single	Bagging	Boosting
NB	0.625	0.630	0.650	0.669	0.688	0.653
KNN	0.680	0.645	-	0.690	0.655	-
Logistic	0.660	0.665	0.650	0.698	0.707	0.702
SVM	0.750	0.765	0.755	0.575	0.635	0.573
Ridge	0.650	0.645	0.635	0.653	0.699	0.687
DT	0.685	0.785	0.715	0.612	0.703	0.644
RF	0.765	0.745	0.760	0.689	0.670	0.686
Hard Voting	0.700	0.685	0.780	0.683	0.667	0.722

Table 4. The Recall and Precision Values for German Data

Models	<i>Recall</i>			<i>Precision</i>		
	Single	Bagging	Boosting	Single	Bagging	Boosting
NB	0.768	0.821	0.661	0.410	0.418	0.420
KNN	0.714	0.679	-	0.455	0.418	-
Logistic	0.786	0.804	0.821	0.440	0.446	0.434
SVM	0.179	0.339	0.161	0.714	0.655	0.818
Ridge	0.661	0.821	0.804	0.420	0.430	0.421
DT	0.446	0.518	0.482	0.439	0.644	0.491
RF	0.518	0.500	0.518	0.592	0.549	0.580
Hard Voting	0.643	0.625	0.589	0.474	0.455	0.611

Table 5. The F-Score and MCC Values for German Data.

Models	<i>F-score</i>			<i>MCC</i>		
	Single	Bagging	Boosting	Single	Bagging	Boosting
NB	0.534	0.554	0.514	0.303	0.340	0.277
KNN	0.556	0.517	-	0.345	0.280	-
Logistic	0.564	0.573	0.568	0.356	0.372	0.364
SVM	0.286	0.447	0.269	0.265	0.344	0.289
Ridge	0.514	0.564	0.552	0.277	0.358	0.336
DT	0.442	0.574	0.486	0.223	0.437	0.289
RF	0.552	0.523	0.547	0.396	0.351	0.386
Hard Voting	0.545	0.526	0.600	0.338	0.308	0.448

The prediction results of the HMEQ data are presented in Tables 6-8. The bagging algorithm outperforms the boosting algorithm by producing a greater number of best models and usually improves the predictions of single models in the analysis. The prediction performances of RF and DT models among weak learners after the bagging algorithm are enhanced concerning all measures. But the model with the greatest performance increase as a result of applying the bagging algorithm is the DT model. Generally speaking, it can be said that the boosting algorithm does not make a positive contribution

to the predictions of single models. The reason for this may be that the boosting algorithm learns noises in the dataset.

Table 6. The Accuracy and Balanced Accuracy Values for HMEQ Data

Models	<i>Accuracy</i>			<i>Balanced Accuracy</i>		
	Single	Bagging	Boosting	Single	Bagging	Boosting
NB	0.795	0.795	0.765	0.679	0.676	0.699
KNN	0.953	0.955	-	0.892	0.896	-
Logistic	0.705	0.685	0.685	0.700	0.687	0.690
SVM	0.926	0.931	0.820	0.863	0.893	0.806
Ridge	0.765	0.659	0.703	0.699	0.671	0.696
DT	0.898	0.951	0.883	0.818	0.891	0.794
RF	0.930	0.946	0.930	0.877	0.891	0.877
Hard Voting	0.941	0.941	0.918	0.882	0.876	0.858

Table 7. The Recall and Precision Values for HMEQ Data

Models	<i>Recall</i>			<i>Precision</i>		
	Single	Bagging	Boosting	Single	Bagging	Boosting
NB	0.480	0.472	0.585	0.504	0.504	0.447
KNN	0.789	0.797	-	0.980	0.980	-
Logistic	0.691	0.691	0.699	0.381	0.362	0.363
SVM	0.756	0.829	0.780	0.869	0.836	0.545
Ridge	0.585	0.691	0.683	0.447	0.340	0.378
DT	0.683	0.789	0.642	0.792	0.970	0.752
RF	0.789	0.797	0.789	0.858	0.933	0.858
Hard Voting	0.780	0.764	0.756	0.923	0.940	0.830

Table 8. The F-Score and MCC Values for HMEQ Data

Models	<i>F-score</i>			<i>MCC</i>		
	Single	Bagging	Boosting	Single	Bagging	Boosting
NB	0.492	0.487	0.507	0.364	0.360	0.362
KNN	0.874	0.879	-	0.853	0.858	-
Logistic	0.491	0.475	0.478	0.334	0.310	0.314
SVM	0.809	0.833	0.642	0.766	0.789	0.542
Ridge	0.507	0.456	0.487	0.362	0.281	0.327
DT	0.734	0.870	0.693	0.674	0.847	0.624
RF	0.822	0.860	0.822	0.779	0.831	0.779
Hard Voting	0.846	0.843	0.791	0.814	0.814	0.742

Tables 9-11 contains the prediction results of the Australian data. For this dataset, the positive effect of the bagging algorithm on the performance values is observed again. The performances of more simple or traditional models, such as KNN, logistic and ridge regression, are remarkable for all evaluation statistics. The predictions of RF deteriorate after bagging and boosting operations. Different from other datasets, the boosting effect is more evident and it causes the DT model to reach its highest performance values under all measures considered. For other models, the performance changes are mixed.

Table 9. The Accuracy and Balanced Accuracy Values for Australian Data

Models	<i>Accuracy</i>			<i>Balanced Accuracy</i>		
	Single	Bagging	Boosting	Single	Bagging	Boosting
NB	0.696	0.704	0.808	0.675	0.682	0.799
KNN	0.928	0.928	-	0.926	0.926	-
Logistic	0.904	0.912	0.888	0.906	0.912	0.889
SVM	0.880	0.896	0.904	0.885	0.900	0.906
Ridge	0.920	0.920	0.888	0.920	0.922	0.889
DT	0.880	0.888	0.896	0.874	0.889	0.894
RF	0.896	0.872	0.888	0.894	0.868	0.885
Hard Voting	0.904	0.912	0.912	0.903	0.911	0.910

Table 10. The Recall and Precision Values for Australian Data

Models	<i>Recall</i>			<i>Precision</i>		
	Single	Bagging	Boosting	Single	Bagging	Boosting
NB	0.379	0.379	0.672	0.917	0.957	0.886
KNN	0.897	0.897	-	0.945	0.945	-
Logistic	0.931	0.914	0.897	0.871	0.898	0.867
SVM	0.948	0.948	0.931	0.821	0.846	0.871
Ridge	0.914	0.948	0.897	0.914	0.887	0.867
DT	0.793	0.897	0.862	0.939	0.867	0.909
RF	0.862	0.810	0.845	0.909	0.904	0.907
Hard Voting	0.897	0.897	0.879	0.897	0.912	0.927

Table 11. The F-Score and MCC Values for Australian Data

Models	<i>F-score</i>			<i>MCC</i>		
	Single	Bagging	Boosting	Single	Bagging	Boosting
NB	0.537	0.543	0.765	0.442	0.469	0.624
KNN	0.920	0.920	-	0.856	0.856	-
Logistic	0.900	0.906	0.881	0.810	0.823	0.776
SVM	0.880	0.894	0.900	0.769	0.798	0.810
Ridge	0.914	0.917	0.881	0.839	0.842	0.776
DT	0.860	0.881	0.885	0.764	0.776	0.791
RF	0.885	0.855	0.875	0.791	0.744	0.775
Hard Voting	0.897	0.904	0.903	0.807	0.823	0.823

CONCLUSION

Nowadays, credit application evaluations are more significant than ever before because of the increase in the number of defaulters and transaction volumes. With a digitalising world, all business activities have had to adapt to this. The conventional way of assessing the credit risk of a customer by judgmental analysis has been superseded by more advanced approaches, such as machine learning techniques. In this study, seven commonly used machine learning techniques were applied to assess the credit risk for three real-world datasets. Furthermore, the effect of popular ensemble learning algorithms on the performances of single models were investigated. The difference of this study from other studies in literature was to analyse more comprehensively the effect of boosting and bagging algorithms by taking the ignored NB, KNN, and Ridge models into account.

In line with the results obtained by Wang et al. (2011) and Marqués et al. (2012), ensemble learning methods increased the performance of the DT model the most compared to other models in this study. Contrary to the previous studies reporting that the prediction

performance of the KNN algorithm was not one of the superior models in credit risk scoring (Marqués et al., 2012; Pandey, Jagadev, Mohapatra and Dehuri, 2018; Shen, Zhao, Kou and Alsaadi, 2021), this study found that the KNN algorithm had a very promising prediction performance. The reason for this result may be the tuning hyper-parameters correctly by with a wide search. It was observed that the bagging algorithm as an ensemble learning method was the most effective at improving the accuracy of the predictions. The boosting algorithm takes a lot of time to produce its outputs and the performance of the obtained predictions was not satisfactory. This finding supports the results of the studies carried out by Alam et al. (2020) and Lin and Chen (2020). The reason for this may be the tendency of the boosting algorithm to learn peculiar characteristics of data. Among the weak learner models, the DT model was the most positively affected one. Especially, some performance improvements were detected by using other weak learners in building bagging and boosting algorithms, but these improvements were not clear as the one obtained by the DT model. The performance of the DT model improved significantly by using ensemble learning methods in the study.

REFERENCES

- Abdou, H. A., & Pointon, J. (2011). Credit Scoring, Statistical Techniques And Evaluation Criteria: A Review of The Literature. *Intelligent Systems in Accounting, Finance and Management*, 18(2–3), 59–88. <https://doi.org/10.1002/isaf.325>
- Addo, P., Guegan, D., & Hassani, B. (2018). Credit Risk Analysis Using Machine and Deep Learning Models. *Risks*, 6(2), 38. <https://doi.org/10.3390/risks6020038>
- Alam, T. M., Shaukat, K., Hameed, I. A., Luo, S., Sarwar, M. U., Shabbir, S., ... Khushi, M. (2020). An Investigation of Credit Card Default Prediction in the Imbalanced Datasets. *IEEE Access*, 8, 201173–201198. <https://doi.org/10.1109/access.2020.3033784>
- Altman, E. I. (1968). Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy. *The Journal of Finance*, 23(4), 589–609. <https://doi.org/10.2307/2978933>
- Arora, N. & Kaur, P. D. (2020). A Bolasso based consistent feature selection enabled random forest classification algorithm: An application to credit risk assessment. *Applied Soft Computing Journal*, 86, 105936. <https://doi.org/10.1016/j.asoc.2019.105936>
- Batista, G. E. A. P. A., Prati, R. C., & Monard, M. C. (2004). A study of the behavior of several methods for balancing machine learning training data. *ACM SIGKDD Explorations Newsletter*, 6(1), 20–29. <https://doi.org/10.1145/1007730.1007735>
- Bauer, E., & Kohavi, R. (1999). Empirical comparison of voting classification algorithms: bagging, boosting, and variants. *Machine Learning*, 36(1), 105–139. <https://doi.org/10.1023/a:1007515423169>
- Beaver, W. H. (1966). Financial Ratios As Predictors of Failure. *Journal of Accounting Research*, 4, 71. <https://doi.org/10.2307/2490171>
- Bekhet, H. A., & Eletter, S. F. K. (2014). Credit risk assessment model for Jordanian commercial banks: Neural scoring approach. *Review of Development*

- Finance*, 4(1), 20–28. <https://doi.org/10.1016/j.rdf.2014.03.002>
- Bhatore, S., Mohan, L., & Reddy, Y. R. (2020). Machine learning techniques for credit risk evaluation: a systematic literature review. *Journal of Banking and Financial Technology*, 4(1), 111–138. <https://doi.org/10.1007/s42786-020-00020-3>
- Breiman, L. (1996). Bagging predictors. *Machine Learning*, 24(2), 123–140. <https://doi.org/10.1007/bf00058655>
- Chang, V., Li, T., & Zeng, Z. (2019). Towards an improved Adaboost algorithmic method for computational financial analysis. *Journal of Parallel and Distributed Computing*, 134, 219–232. <https://doi.org/10.1016/j.jpdc.2019.07.014>
- Chicco, D., & Jurman, G. (2020). The advantages of the Matthews correlation coefficient (MCC) over F1 score and accuracy in binary classification evaluation. *BMC Genomics*, 21(1), 1–13. <https://doi.org/10.1186/s12864-019-6413-7>
- Chopra, A., & Bhilare, P. (2018). Application of Ensemble Models in Credit Scoring Models. *Business Perspectives and Research*, 6(2), 129–141. <https://doi.org/10.1177/2278533718765531>
- Dahiya, S., Handa, S. S., & Singh, N. P. (2017). A feature selection enabled hybrid-bagging algorithm for credit risk evaluation. *Expert Systems*, 34(6), e12217. <https://doi.org/10.1111/exsy.12217>
- Estabrooks, A., Jo, T., & Japkowicz, N. (2004). A Multiple Resampling Method for Learning from Imbalanced Data Sets. *Computational Intelligence*, 20(1), 18–36. <https://doi.org/10.1111/j.0824-7935.2004.t01-1-00228.x>
- Freund, Y., & Schapire, R. E. (1996). Experiments with a new boosting algorithm. *In Proceedings of the 13th International Conference Om Machine Learning*, 148–156. Bari, Italy. Retrieved from <https://ci.nii.ac.jp/naid/10024687385>
- Gunnarsson, B. R., Broucke, S. vanden, Baesens, B., Óskarsdóttir, M., & Lemahieu, W. (2021). Deep Learning for Credit Scoring: Do or Don't? *European Journal of Operational Research*. <https://doi.org/10.1016/j.ejor.2021.03.006>
- Haixiang, G., Yijing, L., Shang, J., Mingyun, G., Yuanyue, H., & Bing, G. (2017,

- May 1). Learning from class-imbalanced data: Review of methods and applications. *Expert Systems with Applications*, Vol. 73, pp. 220–239. Elsevier Ltd. <https://doi.org/10.1016/j.eswa.2016.12.035>
- Hand, D. J., & Henley, W. E. (1997). Statistical Classification Methods in Consumer Credit Scoring: a Review. *Journal of the Royal Statistical Society: Series A (Statistics in Society)*, 160(3), 523–541. <https://doi.org/10.1111/j.1467-985X.1997.00078.x>
- Hastie, T., Tibshirani, R., & Friedman, J. (2009). The elements of statistical learning-Data mining, inference and prediction. In *Springer*. Springer. Retrieved from <https://ci.nii.ac.jp/naid/10019959912>
- Henley, W. E., & Hand, D. J. (1996). A k-Nearest-Neighbour Classifier for Assessing Consumer Credit Risk. *The Statistician*, 45(1), 77. <https://doi.org/10.2307/2348414>
- Islam, M. J., Wu, Q. M. J., Ahmadi, M., & Sid-Ahmed, M. A. (2008). Investigating the Performance of Naive- Bayes Classifiers and K- Nearest Neighbor Classifiers. *2007 International Conference on Convergence Information Technology (ICCIT 2007)*, 1541–1546. Gwangju, South Korea: Institute of Electrical and Electronics Engineers (IEEE). <https://doi.org/10.1109/iccit.2007.148>
- Jones, S., Johnstone, D., & Wilson, R. (2015). An empirical evaluation of the performance of binary classifiers in the prediction of credit ratings changes. *Journal of Banking and Finance*, 56, 72–85. <https://doi.org/10.1016/j.jbankfin.2015.02.006>
- Lee, T. S., Chiu, C. C., Chou, Y. C., & Lu, C. J. (2006). Mining the customer credit using classification and regression tree and multivariate adaptive regression splines. *Computational Statistics and Data Analysis*, 50(4), 1113–1130. <https://doi.org/10.1016/j.csda.2004.11.006>
- Li, Y., & Chen, W. (2020). A Comparative Performance Assessment of Ensemble Learning for Credit Scoring. *Mathematics*, 8(10), 1756. <https://doi.org/10.3390/math8101756>
- Marqués, A. I., García, V., & Sánchez, J. S. (2012). Exploring the behaviour of base

- classifiers in credit scoring ensembles. *Expert Systems with Applications*, 39(11), 10244–10250. <https://doi.org/10.1016/j.eswa.2012.02.092>
- McDonald, G. C. (2009). Ridge regression. *Wiley Interdisciplinary Reviews: Computational Statistics*, 1(1), 93–100. <https://doi.org/10.1002/wics.14>
- Onay, C., & Öztürk, E. (2018). A review of credit scoring research in the age of Big Data. *Journal of Financial Regulation and Compliance*, 26(3), 382–405. <https://doi.org/10.1108/JFRC-06-2017-0054>
- Pandey, T. N., Jagadev, A. K., Mohapatra, S. K., & Dehuri, S. (2018). Credit risk analysis using machine learning classifiers. *2017 International Conference on Energy, Communication, Data Analytics and Soft Computing, ICECDS 2017*, 1850–1854. Chennai, India: Institute of Electrical and Electronics Engineers Inc. <https://doi.org/10.1109/ICECDS.2017.8389769>
- Reichert, A. K., Cho, C. C., & Wagner, G. M. (1983). An examination of the conceptual issues involved in developing credit-scoring models. *Journal of Business and Economic Statistics*, 1(2), 101–141. <https://doi.org/10.1080/07350015.1983.10509329>
- Schapire, R. E. (1990). The Strength of Weak Learnability. *Machine Learning*, 5(2), 197–227. <https://doi.org/10.1023/A:1022648800760>
- Shen, F., Zhao, X., Kou, G., & Alsaadi, F. E. (2021). A new deep learning ensemble credit risk evaluation model with an improved synthetic minority oversampling technique. *Applied Soft Computing*, 98, 106852. <https://doi.org/10.1016/j.asoc.2020.106852>
- Shen, F., Zhao, X., Li, Z., Li, K., & Meng, Z. (2019). A novel ensemble classification model based on neural networks and a classifier optimisation technique for imbalanced credit risk evaluation. *Physica A: Statistical Mechanics and Its Applications*, 526, 121073. <https://doi.org/10.1016/j.physa.2019.121073>
- Suganya, E., & Rajan, C. (2020). An AdaBoost-modified classifier using stochastic diffusion search model for data optimization in Internet of Things. *Soft Computing*, 24(14), 10455–10465. <https://doi.org/10.1007/s00500-019-04554-7>

- Thomas, L. C. (2000). A survey of credit and behavioural scoring: Forecasting financial risk of lending to consumers. *International Journal of Forecasting*, 16(2), 149–172. [https://doi.org/10.1016/S0169-2070\(00\)00034-0](https://doi.org/10.1016/S0169-2070(00)00034-0)
- Wang, G., Hao, J., Ma, J., & Jiang, H. (2011). A comparative assessment of ensemble learning for credit scoring. *Expert Systems with Applications*, 38(1), 223–230. <https://doi.org/10.1016/j.eswa.2010.06.048>
- Wu, Q., & Zhou, D.-X. (2006). Analysis of support vector machine classification. *Journal of Computational Analysis and Applications*, 8(2), 99–119. Retrieved from [https://scholars.cityu.edu.hk/en/publications/publication\(887ac9ad-8dee-460d-8b91-da729176e513\).html](https://scholars.cityu.edu.hk/en/publications/publication(887ac9ad-8dee-460d-8b91-da729176e513).html)
- Zareapoor, M., & Shamsolmoali, P. (2015). Application of credit card fraud detection: Based on bagging ensemble classifier. *Procedia Computer Science*, 48, 679–685. Elsevier B.V. <https://doi.org/10.1016/j.procs.2015.04.201>

CHAPTER 6

METHODS DEVELOPING CUSTOMER SERVICE IN SUPPLY CHAIN MANAGEMENT

PH.D. Gonca Reyhan AKKARTAL ¹

¹ Medipol University, Faculty of business and management sciences, logistics management department İstanbul, Turkey. gonca.akkartal@medipol.edu.tr .
ORCID: 0000-0001-5116-8434

INTRODUCTION

Fast growing logistics industry, logistics functions such as procurement, warehousing and inventory management, order processing, transportation, manufacturing, packing and packaging ,customs clearance and materials handling are the results of organizing the supply chain. As an holistic and integrated approach, all the functions must be connected sufficiently. A firm's processes such as manufacturing is also starts with procurement, additionally in order to manufacture high quality products, firms need to procure high quality raw materials.

Prajogo and Olhager in their study emphasized that today's global competition age, the company's competition about their internal activities is not enough so they need to concentrate on integration with their suppliers, and customers in all of the value chain process (Olhager & Prajogo, 2011) .

For developing and serving some strategies and products, firms need to construct well defined customer relations for gaining a competitive advantage in the market. Furthermore core competencies of the firm should facilitate all of the logistics functions as well.

A customer driven activity such as manufacturing depends on well trained workforce and well defined customer service need to be organized by the firms.. To implement optimised customer relations, firms need to focus on supplier relations. This strategy, strengthen critical managerial performance and also competitive advantage. There is also a positive correlation between supplier relations and

customer services. To get feedback from the customers develop the manufacturing aspects of the firm, consequently the firm will be able to configure its supplier relations according to the customers expectations. In other words supplier relations are also affect the customer service by satisfying their requirements.

Choosing and developing the products also depends on customer assessment. Urbaniak claimed that One of the important element of supplier assessment is to maintain high quality products in technically” (Urbaniak, 2019). On the other hand supplier relation assessment is an important indicator for developing a sufficient manufacturing processes.

The aim of this study is to It has been investigated what should be done to increase the customer service level in parallel with the changes occurring in today's supply chain processes. For this purpose, the developments and innovations that should be applied for the direct progress of the products until the products reach the final producer were discussed. In addition, the importance of this study is to offer solutions to companies in order to increase the level of customer service in their supply chain.

1. DEVELOPING CUSTOMER SERVICE IN SUPPLY CHAIN

1.1. Information Systems

Key functions of developing customer service also depend on generating well defined information systems. Since the supply chain contains three flows, information, product and funds. Without one of these flows, supply chain can not be managed. In other words, in order

to manage under the overall logistical functions, funds, product and information should be exist.

“Recently, many companies are competing against each other to be the first to offer new product in the market, even when offering new products brings additional challenges for their operations. At the same time, information technology is chosen as the most effective solution to help company facing supply chain problems that arise due to increasing flow of materials and information in the supply chain” (Huddiniah & Er, 2019).

With the help of information technology, data sharing can be performed easily. In addition feedbacks from customers from internet or other applications defines the need of customers. Consequently, integrating with technological applications provides firms to satisfy their customer requirements. Furthermore achieving the operational performance in the supply chain, information technologies facilitate logistics functions. Nakasumi in his\ her study claimed that being able to share the data between the suppliers, customers and retailers facilitates an important ability for market visibility (Nakasumi, 2017) .

Firms can easily achieve their customer service with monitoring all the processes in the supply chain. Science transportation, warehousing and inventory management functions of logistics can be facilitated with information systems. As an example GPS and GPRS systems obtains optimising the routing of transportatin so that transportation cost will be decreased with these systems by routing and scheduling Managing the customer service in supply chain with order processing, need to apply information systems for The firms inverntory management. Therefore RFID and Bar Code systems used

in warehouses can facilitate to control the inventory level. Optimised controlled inventory level, facilitates the order processing

The more capabilities use in warehousing system can also provide sufficient product flow, As a result of this ability, the firms can manage their customer service without a limited variety.

1.2. Product Variety

Another key function of developing the customer service is to manage product variety. It is so important to recognize that the product variety increases customers interest. Furthermore the companies that balance their product variety in their inventory, gains a competitive advantage in the market.

Additionally, one of the major objective of the firms in covid-19 period is to create a sustainable product variety in order to satisfy their customer's expectations. Therefore Thonemann and Bradley in their study, demonstrates that recently the firms have recognized that the trade-off exists between the supply chain performance and product variety (Thonemann & Bradley, 2002).

Demand of the customer is also a variable structure and it may be a complex and difficult for the firms to require these conditions. Establishing a clear performance also helps firms to organize their inventory level according to their planned product variety.

Replenishment also plays a critical role for product variety. According to some calculations, company's will be able to calculate

their inventory level for satisfying the customer orders. Consequently the firms will be able to manage their customer service with optimal inventory control.

“Inventory control is an essential activity in business management. The function of inventory control starts from the very beginning i.e., from the processing of raw materials into complete products manufacturing, movement of products from warehouses to wholesalers, wholesalers to retailers and retailers to customers. In every stage, control or management of inventory is most vital. Various inventory control models have been developed based on inventory control theories. Basically, it helps in bringing maximum profits to the companies or minimizes their costs” (Khan et al., 2019).

It may seem that product variety is cost increasing issue according to firms. Contrastly, the main problem is how to design the product variety by preventing out of stock and overstock in inventory management. The availability of the products depend on the optimizing the reorder point of the stocks. As a result the main problem is to manage the inventory level of the firm. Subsequently it will be easy for the firms to fulfill the customer's orders. Finally, the firm achieve maksimum customer service level in the market.

1.3. Logistics Functions Integration

The integration of main logistics functions such as warehousing, transportation and distribution ,order procesing, inventory management materials handling and etc must be integrated with an holistic approach. It may seem that all the process in upstream and down strean of the supply chain connected with each other. In

other words logistics activities indicates the firm's performance. In order to fulfill the customer service requirements, logistics processes must be obtained sufficiently.

“Customers consider their purchases in its complexity and all the logistic services should be designed to meet with customers' preferences as much as possible” (Lizbetinovia, Kampf, & Tislerova, 2017).

Designing logistics functions creates a competitive advantage for the firms. Moreover, there's a strong relationship between customer service and integrated logistics functions. Therefore the logistics functions are always focus on increasing the capacity of the company. Additionally with well integrated and strong structure of logistics functions facilitates the response time decreases. Consequently, customer service is the result of sufficient product flow.

Developing logistics functions is related to network design. Furthermore, it must be recognised that one of the major functions of logistics such as transportation needs to have network in order to execute the operation.

“One of the goals of transportation system construction and management is to improve individuals' accessibility or the ease of reaching desired activities, destinations and services. However, many transportation network design models instead focus on maximizing individuals' mobility or the ease of movement within the network” (Tong, Zhou, & Miller, 2015).

Supporting the logistics processes is also provides a vital role in order to execute the customer service properly. Indeed human resources functions and information systems are directly related to supporting the integration of logistics processes.

There are also some risk for integrating the logistics functions such as high infrastructure costs, interruption of any process of logistics functions, uncertainty of the conditions etc.

“In order to remain competitive in the market, firms are forced to expand their product offerings and offer high levels of customization, bringing about high uncertainty in their supply chain. Firms that face high environmental uncertainty are increasingly facing higher risks in terms of supply disruptions, production and delivery delays that ultimately result in poor operational performance” (Sreedevi & Saranga, 2017).

On the other hand, it will be cost effective the integration of logistics activities in a long term for the firm.

1.4. Supplier Relations

Firms need to define their processes according to their customer service. Therefore the manufacturing aspect of the goods or services is directly result of beneficial outcomes Additionally the firms need to construct good relations with their suppliers in order to define value added process and high quality outputs.

“Collaborative practices between firms and their suppliers are becoming increasing important in the light of short product life cycles, intense global competition, the need for sustainability, and the ever-increasing demands of customers. Although Supplier Relationship Management (SRM) and its purported benefits have been widely studied in the literature, most of the studies have focused on examining its direct relationship with firm performance” (Gyampah, Boakye, & Famiyeh, 2019).

There is a certain that the performance of the firms are the result of supplier relations. Indeed, the firms structure the suppliers products

according to their customer's expectations. Furthermore, supplier relations create a flexibility and agility with a based efficiency.

With the helps of well defined supplier relations, it will be easy to be agile of the variety of customer expectations. For instance according to some conditions of customers such as, economical conditions, rapidly changing trends affects costumers requirements. As a result, in order to be responsive of these changing conditions, firms need to follow rapid changing conditions and change their outputs structure according to customers requirements.

To achieving the sufficient supplier relations, the firms will be able to construct their customers' demand planning. Consequently, develops customer service in supply chain.

1.5. Outsourcing

As a definition, outsourcing meams that concentrating of their core competency in order to fulfill their customer demands. Sometimes it will be more benefiicial for the firms to concentrate product customizaion in the market.

“In order to stay responsive to evolving customer demands and to meet the need for greater product customizations, many manufacturing enterprises are recognizing the need to quickly reconfigure their manufacturing systems and supply chains” (Tian & Guo, 2019).

There are lots of outsourcing firms to provide logistics functions with best solutions offering additional activities for the firms. In fact, it is important to consider that professional service providers obtain flexible solutions in order to be responsive in the global market.

Outsourcing (third party logistics) also provides many advantages for the firms such as reducing delays and costs, increasing efficiency and effectiveness, increase competitive advantage, and as a result,also increase sufficient customer service in supply chain.

“Business organisations today are increasingly looking for effective logistics and supply chain management that can provide competitive advantages. Outsourcing logistics can effectively reduce logistics cost, extra burden of services and delay risk in delivery” (Giri & Sarker, 2017).

Outsourcing also facilitates quick response of demand uncertainty. For instance, with changing customer expectations and orders, logistics functions outsourcing such as delivery service can reduce transportation costs, reduce delivery time, improve efficiency and effectiveness and also improve customer service. To achieve the strategic customer service level, outsourcing can helps firms to improve their capacity level.

“Outsourcing can enhance performance if firms accurately assess their capabilities and the importance of CRM processes” (Graf, Schlegelmilch, Mudambi, & Tallman, 2013).

It will be easy to use the new applications of the firms with outsourcing. In addition implementing advanced technics ia usually high infrastructure costs. Additionally it is more beneficial for the firms to outsource their operations.

“Nowadays LSPs face an increasingly competitive environment in which a strategy to focus on existing customers by satisfying and sustaining them has been proved to be more successful than trying to get the small share of customers that have not yet outsourced any logistics activities. To be able to

keep and grow the customers, LSPs have to overcome a number of barriers, align with customers and innovate” (Cichosz, Goldsby, Knemeyer, & Taylor, 2017).

1.6. Inventory Management

Inventory management is one of the main functions of logistics. Managing the inventory with optimised capacity, the firm will be able to execute the efficient and effective product flow. Furthermore, one of the major objective of inventory is to mismatch demand and supply. With the helps of inventory management, firms can facilitate the balance between customer demand and supply. As a result, holding an inventory cost will be decreased, order cycle will be decreased and also customer service level will be optimised for the retailers and manufacturers.

“Inventory is one of the most important costs in retailing which holds a significant share of the overall retailing cost structure. Even though inventory cost is variable in nature, due to its carrying cost nature inventory becomes an even more important aspect of retailing which has a direct impact on overall store and retailing profitability. Multi-category and multi-branded retail stores catering to multiple life-stage needs of a consumer comprise of many products/categories which are designed to serve the specific needs of consumers” (Ganesh, Aithal, & Kirubadevi, 2020).

Decisions that are related to inventory management also includes the capital investment. Therefore the firms needs to design their warehousing and inventory level with respect to their capital. To be able to manage the inventory level with preventing out of stock and overstock, facilitates the firms to replenish the orders with optimised capacity. This reflection improves the customer orders process in

effectively and efficiently. Consequently good inventory management, maximize the responsiveness, controls the demand uncertainty, improve efficiency and effectiveness of the logistics processes, controls the procurement function and also improves customer service as well.

CONCLUSION

With the emergence of Covid-19 in the world, logistics, the importance of logistics in human life has increased more. This situation has also been reflected in the supply chain processes. As a result of this, the level of customer service should be increased in order to meet the increasing customer expectations in the supply chain. Especially in the value chain, it is necessary to respond instantly to changing customer demands in the process from the supply of raw materials to the end customer.

In addition, the importance of logistics applications worldwide has increased many times over. As a result of this condition, Developments had to be made to increase the level of customer service in the supply chain. Companies seek solution methods to increase the level of customer service in conditions of increased uncertainty.

In order to develop the customer service in supply chain, the methods such as information systems, product variety, integration of logistics functions, supplier relations, outsourcing and inventory management. Additionally, to increase customer satisfaction and service level in the supply chain, information technologies, in other words digital

technologies, should be used first. However, in order to increase the level of customer service, it is necessary to respond to instantly changing customer expectations. For this, product variety is very important. In addition, enabling the logistics functions to be carried out in an integrated manner shortens the order cycle time, as a result, the level of customer service increases.

Improving supplier relationships and keeping them at a good level means meeting customer expectations better. It turns into a more sustainable structure by improving supplier relations. This reflects positively on the customer service level. Another recommendation is outsourcing. Thanks to outsourcing, companies focus on their core competencies and thus provide more customer satisfaction from the processes they have handed over to the professional.

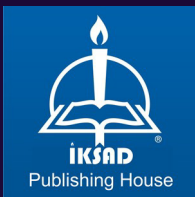
Managing inventory well is another keyword that ensures customer satisfaction. Thanks to an optimally managed inventory, highly variable customer orders are met at the most optimal level. One of the most important reasons for this is that companies that use inventory at the best level minimize their warehouse costs. As a result, they use their capital to meet fluctuating customer demands. The aim of this study is to offer solutions for the innovations and changes that companies should add to the value chain in order to increase the level of customer service in the supply chain, whose importance is increasing day by day. Additionally, impacts directly effects the supply chain must be considered.

As a result, to be able to improve the service level in the supply chain, firms need to concentrate the internal and external impacts of their processes. Moreover, the success of supply chain is a key indicator to improve customer service.

REFERENCES

- Cichosz, M., Goldsby, T. J., Knemeyer, A. M., & Taylor, D. F. (2017). Innovations in logistics outsourcing relationship- in the search of customer satisfaction. *Scientific Journal of Logistics log forum*, 13, 209-219.
- Ganesh, H. R., Aithal, P. S., & Kirubadevi, P. (2020, June). Ingetrated inventory management control faremwork. *International Journal of Management, Technology, and Social Sciences*, 5, 147-157.
- Giri, B., & Sarker, B. (2017). Improving performance by coordinating a supply chain with third party logistics outsourcing under production disruption. *Computers & Industrial Engineering*, 103, 168-177.
- Graf, M., Schlegelmilch, B. B., Mudambi, S. M., & Tallman, S. (2013). Outsourcing of customer relationshipmanagement: implications for customer satisfaction. *Journal of Strategic Marketing*, 21, 68-81.
- Gyampah, K. A., Boakye, G. K., & Famiyeh, S. (2019). Supplier relationship management and firm performance in developing economies: A moderated mediation analysis of flexibility capability and ownership structure. *International Journal of Production Economics*, 208, 160-170.
- Huddinia, E. R., & Er, M. (2019, November 4). Product Variety, Supply Chain Complexity and the Needs for Information Technology: A Framework Based on Literature Review. *Operations And Supply Chain Management*, 12, 245 - 255.
- Khan, A. M., Shaikh, A. A., Panda, G. C., Konstantaras, I., & Taleizadeh, A. A. (2019, Haziran). Inventory system with expiration date: Pricing and replenishment decisions. *Computers&Industrial Engineering*, 132, 232-247.
- Lizbetinovia, L., Kampf, R., & Tislerova, K. (2017, July). Management of Customer Service in Terms of Logistics Information Systems. *De Gruyter Open*, 7, 26-30.
- Nakasumi, M. (2017, July 24-27). Information Sharing for Supply Chain Management Based on Block Chain Technology. *2017 IEEE 19th Conference on Business Informatics*, 140-149.

- Olhager, J., & Prajogo, D. (2011, October 1). Supply chain integration and performance: The effects of long-term relationships, information technology and sharing, and logistics integration. *Int. J Production Economics*, 514-522.
- Sreedevi, R., & Saranga, H. (2017). Uncertainty and supply chain risk: The moderating role of supply chain flexibility in risk mitigation. *International Journal of Production Economics*, 193, 332-342.
- Thonemann, U. W., & Bradley, J. R. (2002, August 28). The effect of product variety on supply-chain performance. *European Journal of Operational Research*, 548-569.
- Tian, Q., & Guo, W. (2019). Reconfiguration of manufacturing supply chains considering outsourcing decisions and supply chain risks. *Journal of Manufacturing Systems*, 52, 217-226.
- Tong, L., Zhou, X., & Miller, H. J. (2015). Transportation network design for maximizing space-time accessibility. *Transportation Research Part B: Methodological*, 81(2), 555-576.
- Urbaniak, M. (2019). Risk factors affecting supplier relations with suppliers. *Log Forum*, 15, 255-263.



ISBN: 978-625-7636-63-6