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CONTENT

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OPTIMAL POLICY INSTRUMENT SELECTION IN MONETARY POLICY: ENDOGENEITY OF MONEY SUPPLY

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ABSTRACT

Purpose- Nowadays, the central bank's primary objective is price stability which is defined as low and stable inflation. The central bank has to fulfill some institutional and operational conditions to achieve this goal. One of the operational conditions is the selection of the appropriate policy instrument to implement the monetary policy. The central bank can choose interest rate or monetary base as policy instrument. The main question of this paper is whether the monetary base the optimal instrument. The choice of monetary base as a policy instrument is dependent on the exogeneity of money supply, which means that the money supply is controllable by monetary base.
Methodology- This paper investigates endogeneity of money supply of Turkey for a sample period of 1990-2016 using Johansen cointegration test.
Findings- As a research method, the Johansen cointegration test and VECM is used to show long-run relationships and causality between variables and Granger causality test is used to examine short-run causality between the variables.
Conclusion- It is seen that CBRT has very limited control over money supply, thus monetary base may not be optimal policy instrument to ensure price stability.

Keywords: Endogenous Money Supply, Johansen Cointegration Test, Monetary Base, Monetary Policy Instrument
JEL Codes: C32, E51, E58

1. INTRODUCTION

The primary objective of the central bank is price stability, which is defined as low and stable inflation. Price stability: avoids excessive investment in the financial sector, stabilizes the real tax revenue, and reduces the uncertainty of the future price level (Sheshinski and Weiss, 1977; Fischer and Modigliani, 1978). Although there is a trade-off between inflation (wage inflation) and unemployment due to the supply curve that is flat in the short run, the long-run expectation shifts the supply curve to an upright position and the exchange relationship between inflation and unemployment is lifted (Phillips, 1958; Mankiw, 2001; Friedman, 1977). Price stability is consistent with long-run objectives such as high employment, stability in financial markets and stability in foreign exchange markets. Some problems facing the central bank in achieving price stability are the problems of time inconsistency and political pressure (Kydland and Prescott, 1977; Barro, Gordon, 1983; Alesina and Summers, 1993). The central bank has to meet certain conditions to minimize problems and ensure price stability. Institutionally the central bank should have goal/operational independence, accountability to officials, transparency in the policy-making process and open communication (Fischer, 1995; Geraats, 2002). Operationally the central bank should have to choose a clear primary objective and a policy instrument.

The central bank uses three criteria when choosing policy instruments (monetary base or interest rate): the instrument should be observable and measurable, controllable, and should have predictable influence on the targets (Poole, 1970, Friedman, 1990). The policy instrument should be quickly observable and accurately measurable so that the central bank's political stance can be reflected quickly. In order for the policy instrument to be able to see useful functions, the central bank must have effective control over the instrument. It is shown in the textbooks that monetary base is determined only by central bank, while post-Keynesians and institutionalists argue that monetary base is determined endogenously by the market rather than by the central bank (Moore, 1979; Niggle, 1991). On the other hand, the central bank can tightly determine short-run nominal interest rates with the channel system (Woodford, 2001). In terms of the usefulness of the policy instrument, the last key feature is that instrument should have a predictable effect on the target. According to monetarists who argue that monetary base should be used as policy instruments, there is causality from monetary base to money supply and from money supply to inflation (Friedman and Schwartz, 1975). According to some economists, the causality relation may be reversed (Tobin, 1970; Moore, 1979). If the causality relation is reversed, the usefulness of monetary base as policy instruments will not work for central banks. On the other hand, the effects of the interest rate on the final target are explained by the traditional interest rate channel, the exchange rate channel and the cash flow channel (Keynes, 1936; Taylor, 2001; Bernanke and Gertler, 1995).

In this study, it was questioned whether the monetary base was the optimal policy instrument. The choice of the monetary base as the optimal instrument depends on whether the central bank can exogenously control the money supply and whether the money supply has an estimated effect on the final target. If neither of these two conditions occurs, the monetary base won't be optimal policy instrument anymore.

2. LITERATURE REVIEW

2.1. View of Economic Schools

According to monetarists, the rule-based monetary targeting strategy must be applied, and the monetary base is the optimal policy instrument to implement the monetary targeting strategy. They argued two basic arguments to defend these views. According to their first argument, all the cyclical fluctuations are due to instability in the rate of money growth. Because when the cyclical fluctuations in the US history are examined, the money supply falls before production. Due to the timing event previous event should be the cause of the lateral event, according to the ``post hoc ergo propter hoc`` principle (M. Friedman and A. Schwartz, 1963). According to the second argument, the money supply is exogenously controlled by the central bank. According to Philip Cagan's monetary base multiplier model, the cause-effect relationship is from the monetary base to the money supply, from the money supply to the prices. Increase in money supply leads directly to inflation. In the monetary multiplier model, money supply is determined by the monetary base, required reserves/deposits ratio, excess reserves/deposits ratio and currency/deposits ratio. If excess reserves/deposit ratio and currency/deposits ratio can be estimated, money supply can be determined exogenously by the central bank. For these reasons, the central bank should choose the monetary base as the policy instrument instead of choosing the interest rate as the policy instrument (Friedman, 1968 and 1960; Friedman and Schwartz, 1963; McCallum; 1988). The causality relation that monetarists advocate can be shown as follows:

Δ Monetary Base→ Δ Money Supply→ Δ Prices

Economists who oppose monetarists have stated that high correlations will not always bring causality and that even inverse causality can be encountered. They have argued that there may be causation from total production to money supply. Another criticism is that the deductions of monetarists according to timing event are wrong. The ''post hoc, ergo propter hoc'' principle finds validity only if the first event is exogenous. However, monetary quantities are not determined exogenously as in the monetary base multiplier model of monetarists. Monetary aggregates can be defined by the market through demand for bank credits, financial innovations, and budget deficit financing (Tobin, 1970; Moore, 1983; Lavoie, 1984).

The first school to oppose monetarists' view of exogenous money supply is post-Keynesians. Post-Keynesians have argued that the money supply has been determined endogenously by the credit demands. According to Moore (1979, 1983, and 1989) and Lavoie (1984 and 1985), economic actors demand credit in the production and investment process. To explain, the companies spend their expenditures at the beginning and middle of production to continue their production. Their revenues are obtained at the end of the production process by selling goods and services. Credits function as a buffer-stock to fulfill the resulting cost increase. Credit demands are generally accepted by commercial banks. These credits accepted by the banks, lead to the expansion of the money supply by creating new deposits. In addition, commercial banks apply to the central bank as they are obliged to keep a certain amount of the loans as reserves. Since the central bank is in the position of the last lender, it meets the reserve requirements of commercial banks from the discount window. In this way, the credit demands determine the money supply and monetary base. The causality relation is from the total production to money supply, rather than from money supply to total production. As a result the central bank cannot control the money supply

and monetary base, although it can determine the interest rate. The causal relationship of horizontalist post-Keynesians can be illustrated as follows:

ΔCredit Demand→ ΔMoney Supply→ ΔMonetary Base (central bank)

Some of the post-Keynesians have argued against horizontalist view, and have come up with a model of structuralist view. According to Minsky and his followers, the central bank may not always meet the needs of commercial banks' reserve requirements. Nevertheless, commercial banks can meet their reserve requirements through new forms of liability management methods and financial innovations. In such a case, the money supply is determined by both credit demands and monetary base. Thus the power of central bank in determining interest rate is decreases (Pollin, 1991). Those who advocate structuralist view defend the following concept of causality:

ΔCredit Demand and ΔMonetary Base→ ΔMoney Supply→ ΔMonetary Base (financial innovations)

Other economists who oppose monetarists' view of exogenous money supply are the new-Keynesians. According to the new-Keynesians, monetary fluctuations are not the reason for the total output, but on the contrary the result (Fontana, Vera, 2003). In addition, according to the new-Keynesians, another source of the endogenous money supply is the central bank endogeneity. This kind of endogeneity depends on the policy implementation of the central bank. The central bank chooses an instrument, depending on whether the shocks originate from the money or goods market. According to Poole`s (1970) study, monetary targeting is the optimal strategy when shocks originate from the source goods market. When comparing interest rate targeting and money supply targeting results, total production fluctuates less if money supply targeting is applied. Interest rate targeting is the optimal strategy when shocks originate from the money market. In recent years, money market shocks have increased due to new management approaches in financial markets, financial innovations and instabilities in money demand. For this reason, central banks used the interest rate as an instrument in response to money market shocks and the money supply became endogenous. According to the new-Keynesian the causality is realized as follows:

ΔAggregate Demand → ΔMoney Supply

Another school that advocates money supply endogeneity is institutionalists. According to this school, the endogeneity and exogeneity of money supply change according to the development of the monetary/financial system of the economy. In the first stage, the economy has commodity money or strict gold backing rules. In this system, money supply is exogenous. In the second stage, small and non-organized banks are emerging and there is no legal requirement on the reserves. At this stage the money supply is endogenous. In the third stage, the central bank now imposes a legal obligation on the reserves and therefore the supply of money is exogenous. In the fourth stage, the banks find new techniques to relieve the need for reserves in the financial system. Also they can demand credit from international markets and the money supply becomes endogenous. Finally, the central bank fulfills the function of the last lender to ensure the stability of the financial markets and meets all the reserve needs, so the money supply becomes endogenous (Niggle, 1991). The concept of endogenous money supply that institutional economists advocate for developed economies is similar to post-Keynesians:

ΔCredit Demand→ ΔMoney Supply→ ΔMonetary Base (central bank, financial innovations)

2.2. Empirical Studies

Moore (1983) tested the endogeneity of the money supply for the USA for the period of 1964-1979. Study has indicated that banks demand for loans to finance working capital of companies. Credit demands affect the money supply, thus money supply is endogenous in USA. Kaldor (1985) then tested the endogeneity of money supply for the UK for a sample period of 1966-1979 by using the OLS method. The result was that the money supply was determined endogenously by demand for bank lending. Panagopoulos and Spiliotis (1998) tested the endogeneity of money supply for Greece. The result was that the money supply was determined endogenously by demand for loans. Vera (2001) tested the endogeneity of the money supply over the 1987-1998 period of the Spanish economy through the Granger causality test. According to the test, there is a one-way causality to the money supply and monetary base from the bank lending. Lavoie (2005) tested the endogeneity of money supply for the Canadian economy. According to his findings, the central bank accommodates to the fluctuations in money demand, and the monetary policy is carried out by the overnight interest rates. The money supply for the Canadian economy is therefore endogenous. Ahmad and Ahmed (2006) tested the endogeneity of money supply for the Pakistan economy for the period of 1980-2003. According to findings, money supply is determined endogenously in the short-run. But central bank base money has significant effects on money supply in the long-run. Howells and Hussain (1998) tested the endogeneity of money supply using the Johansen cointegration test and Granger-causality test. According to these tests, the money supply was found to be endogenous. Nayan, Kadir, Abdullah and Ahmad (2013) used panel data analysis to examine the endogeneity of money supply of 177 countries' economies for the period of 1970-2011. The money supply was found endogenous, as the central banks of these countries` started implementing interest rate targeting strategy. A number of studies have also been carried out on the endogeneity of the money supply for the Turkish economy. Aybar and Harris

(1998) show that money supply is structurally endogenous in the period 1987-1997. Işık (2000), in her doctoral thesis, examined the money supply endogeneity for the period of 1987-1999 by using VAR method and Granger-causality test. According to results, the money supply was found endogenous. Karabulut (2005) applied the Granger causality to test money supply endogeneity, and found causality between credit demands and M1. Çifter and Özün (2007) used cointegration test between credit demands and M2, credit demands and M2Y in their studies. They found that there is a relationship between credit demands and M2, and there is no relationship between credit demands and M2Y. Özgür (2011) applied cointegration test for the period of 1987-2009, and found a relation between credit demands and money supply.

3. DATA AND METHODOLOGY

LNM2, LNRM, LNPSL and LNWPI were used as variables in the study. Reserve Money (RM) was used for the definition of the base money of the CBRT; Domestic Private Sector Loans (PSL) was used for the definition of credit demands of private sector; (M2) was used for the definition of liquidity in the market; and Domestic Wholesale Prices Index (WPI) was used for the definition of the general level of prices. The base year of (WPI) is 2003. The study covers periods of 1990q1-2016q4. Frequencies of time series are quarterly and each time series covers 108 observations. While (RM), (PSL) and (M2) time series are taken from CBRT Electronic Data Delivery System, (WPI) time series are taken from TurkStat. To find the relation of flexibility between variables, the logarithm of the variables is taken.

In order to find the appropriate model, it was first tested whether the variables contain unit root. Since the economic model generally has higher autoregressive processes, the ADF unit root test is applied. When this test is applied, the appropriate number of lags included in the model is determined with the help of the Akaike and Schwarz information criteria. In addition to the ADF unit root test, the Phillips-Perron unit root test was also applied. The results are shown in Table 1.

Table 1: Unit Root Test Results for LNM2, LNRM, LNPSL and LNWPI Series

	ADF		Phillips-Perron	
	Level	1st Difference	Level	1st Difference
LNM2	-0.917935 (1)	**-7.255241* (0)**	-0.688034 (6)	**-7.288101* (3)**
LNRM	-0.265434 (1)	**-11.96945* (0)**	-0.507381 (0)	**-11.96945* (0)**
LNYİK	-1.816585 (8)	**-7.456321* (0)**	-0.888141 (7)	**-7.872306* (7)**
LNWPI	-1.110194 (1)	**-7.374668* (0)**	-0.722053 (6)	**-7.440612* (4)**
MacKinnon (1996) one sided p-values.				

* Significant at 5% level.

According to the results of the unit root test, it is observed that when the first difference of the series is taken, they become stationary. Time series are integrated I (1) in the first degree. Although all series are not stationary at normal levels, there may be a long-run relationship between the variables due to being integrated at the first difference level. Thus Johansen approach (1988, 1995) was applied as a method of cointegration analysis.

4. FINDINGS AND DISCUSSIONS

The Johansen cointegration test accepts all variables in the model as endogenous. For this reason, estimates should be made with the help of vector and matrix. The VAR model was estimated, and the values of the lag length criteria were found. Three of these criteria (LR, FPE, AIC) showed that 3 lags of variables should be taken. According to these three criteria, the appropriate model is VAR (3) and the appropriate error correction model is VECM (2). The results of the information criteria are shown in Table 2.

Table 2: Appropriate Lag Selection for VAR Model

Lag	LogL	LR	FPE	AIC	SC	HQ
1	614.7472	NA	1.80e-10	-11.08791	-10.69056*	-10.92680
2	646.4606	58.72859	1.35e-10	-11.37890	-10.58419	-11.05668*
3	665.3696	**33.61593***	**1.28e-10***	**-11.43277***	-10.24071	-10.94943
4	677.8362	21.23938	1.37e-10	-11.36734	-9.777925	-10.72289
5	691.2442	21.85007	1.45e-10	-11.31934	-9.332573	-10.51378

6	703.2152	18.62154	1.58e-10	-11.24473	-8.860609	-10.27805
7	720.7954	26.04477	1.57e-10	-11.27399	-8.492519	-10.14620
8	731.4000	14.92499	1.77e-10	-11.17407	-7.995251	-9.885177

The appropriate model for deterministic components has been chosen according to the Pantula principle (1989). The Pantula principle deals with the prediction of three models and gives results starting from the most constrained hypothesis. Trace statistics and critical values are compared. Since the equation must be used in terms of the differences of the internal variables, it is transformed into the VECM (2) model.

Table 3: Pantula Principle Test Results

r	m-r	Model 2		Model 3		Model 4	
0 (none)	4	69.717*	→	62.454*	→	78.631*	→
1 (at most 1)	3	→	**30.835!**	28.394		43.694*	

Significance of trace statistic is determined according to Osterwald-Lenum (1992). `!` Shows the point at which the null hypothesis cannot be rejected first. * Significant at 5% level.

The rank of the Π matrix is calculated by the λmax and λtrace statistics in the Model 2 frame and the results are given in Table 4 below.

Table 4: Johansen (1988, 1995) Cointegration Test Results

λ_{trace} statistics			
Hypotheses	**Eigenvalue (λ_i)**	**λ_{trace}**	**Critical Value % 5**
$H_0 : r = 0, H_1 : r = 1$	0.302333	**69.71746***	54.07904
$H_0 : r \leq 1, H_1 : r = 2$	0.149899	30.83596	35.19275
$H_0 : r \leq 2, H_1 : r = 3$	0.077049	13.29674	20.26184
λ_{max} statistics			
Hypotheses	**Eigenvalue (λ_i)**	**λ_{max}**	**Critical Value % 5**
$H_0 : r = 0, H_1 : r \geq 1$	0.302333	**38.88150***	28.58808
$H_0 : r \leq 1, H_1 : r \geq 2$	0.149899	17.53922	22.29962
$H_0 : r \leq 2, H_1 : r \geq 3$	0.077049	8.659337	15.89210

* Significant at 5% level.

Critical values are MacKinnon-Haug-Michelis (1999) p-values. When the above values are compared with these values, it is seen that the null hypotheses of the maximum eigenvalue and trace test statistics are rejected according to the level of 5% significance level. Variables in the model are cointegrated. Since the matrix of Π is equal to the rank one, there is one cointegrating relationship between our variables. While the trace statistics calculated for the three models, it was decided according to their significance level. The value in the second row of Model 2 is 30,835, where the null hypothesis cannot be rejected first. It is determined that the appropriate model is Model 2 and the rank of the Π matrix is equal to one. In model 2, there is no trend in the long-run cointegration model; there is no intercept and trend in the short-run VECM model. The VECM (2) model is written with Π = αβ 'components as shown below:

$$\begin{pmatrix} \Delta lnm2_t \\ \Delta lnrm_t \\ \Delta lnpsl_t \\ \Delta lnwpi_t \end{pmatrix} = \mathbb{F}1 \begin{pmatrix} \Delta lnm2_{t-1} \\ \Delta lnrm_{t-1} \\ \Delta lnpsl_{t-1} \\ \Delta lnwpi_{t-1} \end{pmatrix} + \mathbb{F}2 \begin{pmatrix} \Delta lnm2_{t-2} \\ \Delta lnrm_{t-2} \\ \Delta lnpsl_{t-2} \\ \Delta lnwpi_{t-2} \end{pmatrix} + \begin{pmatrix} a_{11} \\ a_{21} \\ a_{31} \end{pmatrix} (\beta_{11} \quad \beta_{12} \quad \beta_{13} \quad \beta_{14} \quad \beta_{15}) \begin{pmatrix} lnm2_{t-1} \\ lnrm_{t-1} \\ lnpsl_{t-1} \\ lnwpi_{t-1} \end{pmatrix} + \varepsilon_t$$

Weak exogeneity test was applied. In order to make LNM2, LNRM, LNPSL and LNWPI variables weakly exogenous: it is necessary that LNM2 variable in the first equation, LNRM variable in the second equation, LNPSL variable in the third equation and LNWPI variable in the fourth equation be a function of their own lagged values respectively. Thus, if the matrix α is zero, then the variables are weakly exogenous because the effect of the parameters of the cointegration vector will be reduced from the corresponding equation. The results of the weak exogeneity test are given in Table 5.

Table 5: Weak Exogeneity Test Results

Variables	Null Hypothesis	LR (rank=1)	Prob.
LNM2	$H_0 : a_{11} = 0$	20.84298*	0.000005
LNRM	$H_0 : a_{21} = 0$	7.664555*	0.005632
LNPSL	$H_0 : a_{31} = 0$	4.579045*	0.032365
LNWPI	$H_0 : a_{41} = 0$	0.941251	0.331956

* Significant at 5% level.

The next step is to test whether the cointegration vector is in cointegration space. For this purpose, necessary constraints have been applied on the parameters of the cointegrating vector. The null hypothesis has been rejected according to the tests carried out, with the result that the cointegrating vector between the variables is in the cointegration space. The results are given in Table 5.

Table 6: Cointegration Space Test Results

Variables	Null Hypothesis	LR (rank=1)	Prob.
LNM2	$H_0 : \beta_{11} = 1, \beta_{12} = 0, \beta_{13} = 0, \beta_{14} = 0$	22.56643*	0.000050
LNRM	$H_0 : \beta_{11} = 0, \beta_{12} = 1, \beta_{13} = 0, \beta_{14} = 0$	21.22445*	0.000095
LNPSL	$H_0 : \beta_{11} = 0, \beta_{12} = 0, \beta_{13} = 1, \beta_{14} = 0$	22.04299*	0.000064
LNWPI	$H_0 : \beta_{11} = 0, \beta_{12} = 0, \beta_{13} = 0, \beta_{14} = 1$	24.01905*	0.000025

* Significant at 5% level.

According to the above results, it has been found that there is a long-run relationship between LNM2, LNRM, LNPSL and LNWPI and that this relationship can be presented with a single cointegrating vector. Since the variables LNM2, LNRM and LNPSL are endogenous and LNWPI is exogenous, three equations are established. The long-run relationship is normalized by multiplying the coefficient of the endogenous variable by the opposite sign. Normalized coefficients show long-run relationship as well as long-run elasticity.

Table 7: Normalized Cointegrating Coefficients (long-run elasticity)

	M2	RM	PSL	WPI	INTERCEPT
			M2 MODEL		
Normalized Coefficients	1.000000	0.279170*	-0.539322*	-0.842256*	-10.22356*
Standard Error		(0.10169)	(0.06014)	(0.05423)	(0.65853)
			RM MODEL		
Normalized Coefficients	3.582049*	1.000000	-1.931878*	-3.017003*	-36.62130*
Standard Error	(0.80324)		(0.33460)	(0.60105)	(6.91172)
			PSL MODEL		
Normalized Coefficients	-1.854180*	-0.517631*	1.000000	1.561695*	18.95632*
Standard Error	(0.25806)	(0.18177)		(0.16912)	(1.88036)

* Significant at 5% level.

When M2 model was examined, all variables were statistically significant. A 1% increase in the RM decreases the M2 by 0.27%, a 1% increase in the PSL increases the M2 by 0.53%, a 1% increase in the WPI increases the M2 by 0.84%. In this model there is an inflexible case between variables. While RM has a negative effect on M2, PSL and WPI have a positive effect on M2.

When the RM model was examined, all variables were statistically significant. A 1% increase in M2 decreases RM by 3.57%, a 1% increase in PSL increases 1.93% RM, a 1% increase in WPI increases RM by 3.01%. In this model there is a situation that is flexible among the variables. While M2 has a negative effect on PSL and WPI have a positive effect on RM.

All of the variables were statistically significant when the PSL model was examined. A 1% increase in M2 increases the PSL by 1.85%, a 1% increase in RM increases PSL by 0.51%, a 1% increase in WPI reduces PSL by 1.56%. In this model, while M2 and WPI variables were found flexible, RM was found inflexible. While WPI has a negative effect on PSL, M2 and RM have a positive effect on PSL.

Table 8: Vector Error-Correction Model Prediction Results: VECM (2)

	M2	RM	PSL	WPI
VECM Coefficients	-0.274590*	-0.270279*	-0.132094*	-0.050872
Standard Error	(0.04678)	(0.08984)	(0.05594)	(0.04446)

* Significant at 5% level.

In the vector error correction model, it is proved that shocks that can occur in the long-run equilibrium can be corrected. The coefficients in the error correction model were negative and statistically significant as expected. These coefficients indicate the rate at which the short-run deviations resulting from the non-stationary series are adjusted in the next period. The short-run imbalance that occurs in M2 is adjusted approximately in eleven month, the short-run imbalance that occurs in RM is adjusted in eleven months, and the short-run imbalance that occurs in PSL is adjusted in about twenty-two months to the long-run equilibrium level.

Finally the Granger-causality test was applied to investigate the short-run causality relationship. The results are given in Table 7.

Table 9: Granger-Causality Test Results

Dependent variable: D(LNM2)			Dependent variable: D(LNRM)		
Excluded	Chi-sq	Prob.	Excluded	Chi-sq	Prob.
D(LNRM)	3.583082	0.1667	D(LNM2)	0.154375	0.9257
D(LNPSL)	7.860545*	0.0196	D(LNPSL)	0.879232	0.6443
D(LNWPI)	0.830862	0.6601	D(LNWPI)	2.418571	0.2984
ALL	11.81036**	0.0663	ALL	5.833208	0.4421
Dependent variable: D(LNPSL)			**Dependent variable: D(LNWPI)**		
Excluded	Chi-sq	Prob.	Excluded	Chi-sq	Prob.
D(LNM2)	8.302649*	0.0157	D(LNM2)	16.78757*	0.0002
D(LNRM)	6.735262*	0.0345	D(LNRM)	4.850561**	0.0885
D(LNWPI)	7.585983*	0.0225	D(LNPSL)	4.577005	0.1014
ALL	25.42203*	0.0003	ALL	39.93129	0.0000

* Significant at 5% level.

The short-run causality relationship between variables is based on the Granger causality test:

LNPSL→LNM2 →LNWPI,

LNM2, LNRM, LNWPI→LNPSL.

According to test results, the first important finding is that money supply is endogenously determined in Turkish economy. There is a mutual causality among money supply, reserve money and credit demands in the long-run. Money supply is not only exogenously determined by the reserve money as monetarists advocate and it is not only determined by the credit demands endogenously as horizontalist post-Keynesians advocate. In the long-run, the money supply is determined both by the reserve money and the credit demands, as the structuralist post-Keynesians advocate. Meanwhile the money supply is only determined endogenously by the credit demands in the short run as the horizontalist post-Keynesian defend.

The second important finding is that the causality between money supply and inflation. According to findings there is one-way causality from inflation to money supply in the long-run, while there is reverse causation in the short-run. Total production is the reason of monetary aggregates in the long-run.

5. CONCLUSION

In this study, it was questioned whether the monetary base is an optimal instrument for monetary policy applications. The endogeneity of the money supply and the relationship between money supply and inflation in the Turkish economy for a sample period of 1990-2016 has been examined. The Johansen cointegration test and the Granger causality test were applied as an appropriate econometric approach to carry out this study. According to findings CBRT cannot control the money supply and monetary base, although it can determine the interest rate in the short-run. CBRT implements accommodative monetary policy in the short-run. In the long-run money supply doesn`t have predictable effect on inflation, thus CBRT cannot use monetary aggregates in the conduct of monetary policy. Fluctuations of money supply is not reason of inflation, but on the contrary result of inflation. According to these results, monetary base may not be the optimal policy instruments to ensure price stability. Both short-run and long-run results suggest that the CBRT has very limited control over the money supply.

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WHY COMPANIES GO POSITIVE MARKETING INNOVATIONS: A NEW THEORETICAL PROTOTYPE FOR 4PS OF INNOVATION

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ABSTRACT

Purpose- Addressing to the particular gap in the innovative marketing literature, which is little is known about what the positive marketing is, its nature and benefits, and how it works on the levels of innovation (i.e. product, process, position, paradigm), this study aims to: define and establish the characteristics of a positive marketing practice; distinguish positive marketing practices from other pro-social marketing concepts; discuss the role of positive marketing on the innovation types.

Methodology- This paper explains the differences between positive marketing and other pro-social marketing concepts and provides a conceptual model describing positive marketing practices for the four types of innovation. The article also elaborates on how positive marketing works using contemporary examples.

Findings- This paper provides 1) a deeper understanding of what positive marketing is, 2) a comprehensive literature review on positive marketing research, 3) an insight for understanding how firms engage in positive marketing activities in their innovation strategies.

Conclusion- This article makes two conceptual advances toward a theory of positive marketing in the innovation context. The article: 1) recognizes what constitute positive marketing practices in contrast to other innovative marketing concepts, 2) elaborates on how positive marketing practices work on the four levels of innovation. Also, implications for practice are discussed.

Keywords: Positive marketing, innovation, types of innovation, innovative marketing.
JEL Codes: M30, M31, O30, L19.

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1. INTRODUCTION

Changing customer demands and expectations, shortening technology and product life cycles, increasing competitive pressures force firms to develop and then implement marketing strategies in general and "positive marketing practices" in particular to become more successful in their innovation activities (Stoeckl and Luedicke, 2015). In this respect, researchers have paid increasing attention to the concept of "positive marketing", which refers to any marketing activity that creates value for the firm, its customers, the society at large (Gopaldas, 2015), in the innovative marketing literature (Mittelstaedt et. al., 2015).   Given the importance of positive marketing practices to firms' innovations and performance, such as strengthening the loyalty of customers and society and leveraging firms' competitive advantages by maximizing the mutual benefit for consumers, firms and society (Bublitz and Peracchio, 2015), researchers have highlighted a variety of positive marketing practices to enhance firms' innovations, including material-meaning innovation (a reconfiguration of a product/service with more environment-friendly and humanitarian materials) and practice innovation (an original assemblage of existing/new materials, meanings, competencies) (Gopaldas, 2015). Nevertheless, what a positive marketing

practice is comprised of is still missing in the literature (Lerman and Shefrin, 2015). Also, while the role of positive marketing practices on two patterns of innovation (i.e. material-meaning and practice) has been mentioned in the literature (Gopaldas, 2015), their role was not argued on the four levels of innovation (i.e. product, process, position, paradigm). Accordingly, this article will make two conceptual advances toward a theory of positive marketing in the innovation context. First, the article will recognize what constitute positive marketing practices in contrast to other innovative marketing concepts. Second, the article will elaborate on how positive marketing practices work on the four levels of innovation. We will present a conceptual model that aids researchers and marketers in describing positive marketing practices for the four types of innovation.

2. DEFINITION OF POSITIVE MARKETING

Since Fordham University's inaugural conference for positive marketing in November 2011, the term "positive marketing", which is defined as marketing "in which individual consumers, firms and society as a whole exchange value such that individually and collectively they are better off than they were prior to exchange" (Center For Positive Marketing, 2012), is given a great deal of attention in the marketing theory literature (Mittelstaedt et. al., 2015; Krush et. al., 2015). Students of marketing theory indicate that positive marketing is associated with all equilibrium marketing activities which create positive effect for the combination of beneficial, value expressive, and emotional benefits related to transactions and consumption (see, Lerman and Shefrin, 2015). For instance, Tesla Motors' business model is a contemporary example of a positive marketing innovation. "Tesla Motors, the American producer of electric cars, pursues a radical environmental vision and strategy to replace fossil fuels as a primary energy source for mobility. To do so, Tesla develops unique business case drivers, such as an increasingly competitive cost structure and pricing model, a unique reputation as a technology leader, and particularly innovative capacities. In this sense, Tesla's business model deviates fundamentally from the traditional car-manufacturing model. Partnerships with competitors such as Daimler and Toyota, or complementors such as Panasonic, are remarkable features of Tesla's business model, as is the installation of an independent supercharger network that could be used for free. It is also based on a whole business eco-system ranging from battery manufacturing to supplying green power at charger stations across the USA and in a growing number of countries worldwide" (http://nbs.net/wp-content/uploads/NBS-SA_Main_Report-161128.pdf). Such business model contributes to the transformation of national mobility infrastructures (societal value), develops offerings for the full spectrum of customers, not only luxury-oriented customer segments (customer value), thus, grows market share (Firm value).

Marketing scholars also note that positive marketing differs from other pro-social marketing concepts, which are cause marketing, green marketing, and social marketing (Gopaldas, 2015) (See Figure 1.). Cause marketing uses customer purchases as a tool for engaging in corporate philanthropy. For example, "Starbucks has teamed up with (RED) to raise funding for the Global Fund to Fight AIDS on World AIDS Day. As part of the campaign, Starbucks committed to donating 10 cents for every handcrafted beverage sold in participating U.S. and Canada stores, and raised a whopping $12 million in donations. The red cup ensures that consumers take note of the commitment, resulting in an increase in brand loyalty" (https://causegood.com/blog/cause-marketing-examples/). In contrast to cause marketing, positive marketing seeks to enhance societal value through core activities of the firm (Gopaldas, 2015). As mentioned above, "Tesla Motors' mission is to accelerate the world's transition to sustainable energy". Thereby, Tesla Motors is characterized not only as an "automaker", but also as a "technology and design company with a focus on energy innovation" (https://www.tesla.com/about).

Green marketing and positive marketing are similar in the way that they intend to deliver societal value but while green marketing only focuses on delivering environmental value through nature-centered initiatives such as reducing electricity use and employing eco-friendly company vehicles, positive marketing may seek to create social value through people-centered initiatives as well, such as improving labor conditions (Gopaldas, 2015). While Johnson and Johnson is the second-largest corporate user of solar power in the United States, and has been working consistently over the past 20 years to reduce production wastes, United Colours of Benetton has been constantly highlighting racial diversity through its campaigns in which multiethnic models participate in promoting its apparels. Further, social marketing seeks to build societal value for public welfare, either by environmental innovations or people-centered initiatives. However, "social marketing is a not-for-profit practice in the public sector while positive marketing is a for-profit practice in the private sector" (Gopaldas, 2015). For example, in order to emphasize the importance of wearing seat belts, police departments run social marketing campaigns using slogans such as "Buckle up for life" and "Click it or ticket", communicating the benefits of wearing a seat belt, which is lifesaving, and also the negative implications of violating the law, which is a traffic ticket.

Figure 1: Distinguishing Positive Marketing from Other Pro-Social Marketing Concepts
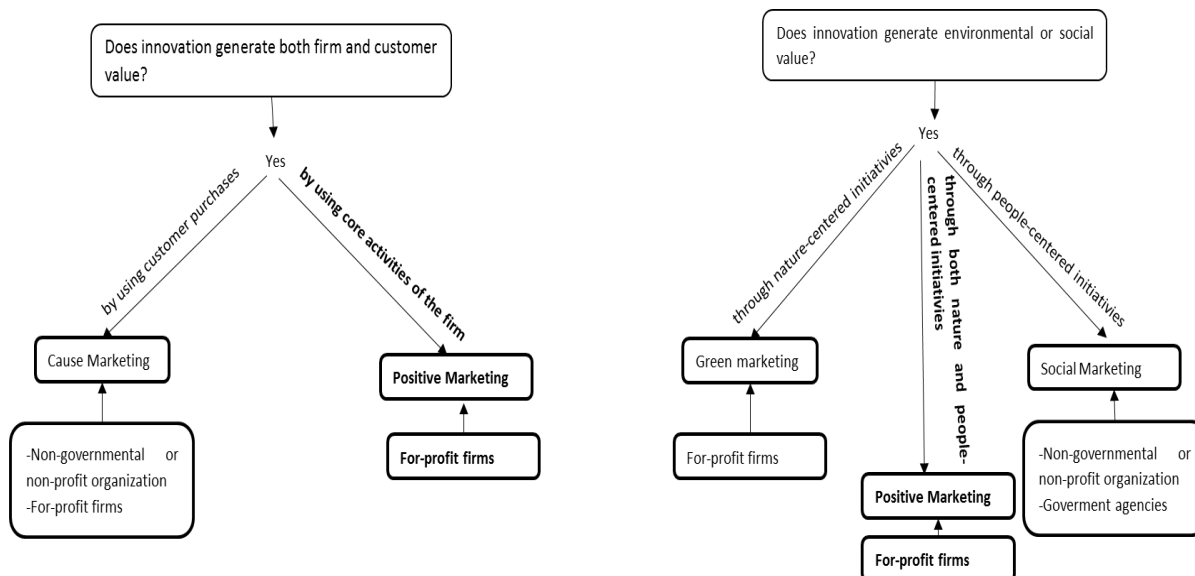
3. MARKETING CRITICISMS AND POSITIVE MARKETING

The positive marketing movement has been inspired by the persisting negative reputation of the marketing profession. Moral demands for legitimate marketing practices and the way these moral demands are articulated have evolved overtime leading to a range of marketing criticisms from the realm of consumer, the local community, the society, and natural and human resources (Stoekl and Luedicke, 2015). In consumer realm, criticisms for marketing focus on deceptive pricing, product, and promotion policies, and also intrusion into consumers' private life through disclosure of information and aggressive advertising in digital platforms. Firms are criticized for charging astronomical prices for products and pretend to make significant discounts by decreasing the prices to the usual levels then. Deceptive product policies involve offering dysfunctional or physically harmful products, such as fast foods, tobacco and alcoholic beverages, as well as hazardous products, of which dangers are known, such as car ties burning at high speed or vehicle fuel systems that carry the risk of exploding in times of crash. Criticisms for deceptive promotion policies stem from building fallacious perceptions about human appearance inconsistent with real life facts. Additionally, aggressive advertising practices through different communication channels, such as e-mails, phone calls, web page pop-ups, without asking for consumer solicitude, and data collection and storage on consumers' buying preferences and browsing information are criticized for violating private life of consumers. These criticisms awake a heightened concern for trust and privacy issues. Also, consumers respond to these marketing practices by sharing their negative experiences with brands in online platforms and shifting their purchasing preferences (Stoekl and Luedicke, 2015).

From the community perspective, criticisms against marketing include erosion of cultural contexts, aggressive promotion in public spheres, and restriction of cultural propagation and innovation. The commercialization of cultural aspects, involving local ideas, styles, and materials, in seek for profit is a major criticism against marketing practices. Second marketing criticism in community realm is "excessive promotional noise" in public domain. While aggressive use of public advertising channels, such as billboards, leads consumers to have a negative sense of aesthetic, placement of non-local brands advertisements in community's advertising channels causes commercial interests of local communities to be sacrificed at the expense of non-local commercial interests. Another source of promotional noise in public sphere is restaurant and store chains of global brands located in community, leading the fall down of local businesses and putting in danger the "originality of local commercial offerings, tastes and brand meanings". Although investors and sponsors are appreciated for facilitating production of cultural products in fine arts, literature, and music, property rights restrictions they impose on cultural products are considered as a barrier on cultural innovation since they put limitations on spreading cultural products. Also, restrictive property rights limit the control of local community on its own communication process through the "privatization of language" and "limitation of non-commercial and brand-critical contents in media consumption". Intrusive advertising is a focus of concern, also in online communities. These marketing criticisms lead to moral demands for "commerce-free community spaces" and protection of cultural and subcultural aspects in a community (Stoekl and Luedicke, 2015).

Marketing criticisms in society realm stem from the marketing practices causing degeneration in the society, changing the nature of the social interrelations among people, consumers' perceptions about themselves, and consumers' physical body conditions. Marketing practices, which associate the level of consumption with the degree of happiness and inspire "hardworking, high-earning, hedonistic life-styles", transform consumers into isolated persons overly consuming and devoid of social skills, dissolving the unity in a society. Also, marketing practices, inducing consumers to overly purchase, put high financial burden on individuals and the society. Overconsumption brings additional profits to the firms but results in external costs to the society. Food industry, in particular, is criticized for promoting "unhealthy and excessive" food consumption level, resulting a heightened level of obesity in the society (Stoekl and Luedicke, 2015).

Regarding the exploitation of human and natural resources, marketing criticisms are directed to the "unethical and unsustainable use" of these resources in production processes disguised under the "glossy" brand images. Marketers are criticized for promoting "quick and easy buy-use-dump consumption cycles", resulting in high external costs to society in terms of recycling and disposing of used products. Another criticism stems from firms' "window-dressing practices", that is firms' deceptive communication by promising socially or environmentally commitment to the public although these claims are not realized. Not only these practices weaken the credibility of the positive marketing practices in public eye, but also awaken moral demand for fair and sustainable use of human and natural resources, also considering the needs of future generations (Stoekl and Luedicke, 2015).

Positive marketing is offered as a response to moral demands in each of these four realm. From the consumer perspective, disclosure of information on product, pricing policies, and production processes from both the company itself and its suppliers, openness to external control, and cooperation in innovation process with stakeholders help a company to build customer trust in its brand and marketers. For example, LEGO Group, strengthen trust in their brand by working in collaboration with their customers. Rather than suing the customers who hacked the software of their robotic product Mindstorms and changed the original code of the product by developing new applications, they gave them the opportunity to collaborate in innovation process of this product. This not only adds to the innovativeness of the company, but also enhances the credibility of the brand name in customer eye. Also, understanding and supporting "non-commercial interests" of consumer communities enable companies to enhance positive relations with these communities as a response to criticisms underlying aggressive promoting practices and exploitation of cultural epicenters. Volcom, a sport brand selling clothing for board sport members, sponsors the events of this community in order to communicate that it is not a "commercial freeloader", but it also appreciates the non-commercial interests of the community. Enhancing product flexibility by offering value-added services and having a socio-cultural focus is suggested as a response to moral demand for a healthy level of consumption. For example, Zipcar provides easy access for temporary cars on a usage and membership basis, not only satisfying the customers' utilitarian needs but also satisfying them pro-socially. Patagonia, a sport equipment brand, builds an awareness for "conscious consumption" by communicating its customers to consider the ecological impacts of their purchases. Finally, building consumer awareness about their responsibility in environment protection, maintaining industry partnership and consumer cooperation, and engaging in new "triple (economic, ecological, and social) bottom-line" strategies respond to moral demand for sustainable and ethical use of natural and human resources. For example, some hotels convince their customers to reduce their towel and linen use by promising to donate savings from reduced usage of these products to charities (Stoekl and Luedicke, 2015).

4. REVIEW OF RESEARCH FRAMEWORKS ON POSITIVE MARKETING

Researchers in the field investigate the need for positive marketing from different frameworks. From the perspective of neoclassical analysis, Lerman and Shefrin (2015) associate positive marketing activities with "all equilibrium marketing activities". According to them, market imperfections lead to a quest for engaging in positive marketing activities. In perfect competition, the ideal market form, resources are allocated in both an effective and an efficient way. In imperfectly functioning markets, profit motives may disrupt efficient social allocation. Therefore, firms seek to implement "win-win" strategies, through which they are able to meet customer demand efficiently, while they make profits at the same time. Also, in the framework of behavioral economics, positive marketing helps consumers in their decision making (Lerman and Shefrin, 2015).

Gopaldas (2015) explains the motivation behind promoting positive marketing activities by two main factors that are underexplored by the pressure theory of corporate social innovation. These factors are "activist executives" who have a tendency to engage in positive marketing activities for their personal interest rather than for an intend to satisfy external pressures, and "network customers" who are well informed about the experiences of other consumers and stakeholders with a particular brand, through communication channels, such as employee blogs, product reviews, and social media tools, and put a pressure on firms to deliver benefits to individual consumers as well as other stakeholders. The example of activist executives is Patagonia's founder CEO Yvon Chouinard, who made extraordinary efforts in order to green every activity within the company's value chain. Despite his continuous efforts to make his company "truly sustainable" with no environmental impact were already more than required by external pressures, and brought him and his company public

appreciation, he did not become satisfied and he continued his efforts to realize a "self-directed goal" of zero environmental impact. PepsiCo's CEO Indra Nooyi is another example of activist executives. PespiCo has become a positive marketing leader just after Nooyi's appointment to the company, despite the PepsiCo's numerous social initiatives had been constantly carried on until that time. Chouinard and Nooyi are activist executives because they have made unusual efforts, beyond the external pressures they face and the progress of organizational initiatives have gone in parallel with their "personal conviction" progress. On the other hand, the example of network customers are consumers who generate product reviews on Amazon website enabling other customers to be informed about Amazon's deceptively communicated product attributes. Also, activist customers who are in network on social media platforms, such as Change.org, Facebook, and Reddit may force companies to make changes in their business processes to deliver value to both individuals and the society (Gopaldas, 2015).

Mittelstaed et al. (2015) adopt a macro marketing perspective and investigate whether the two contradictionary schools of thought in macro marketing - developmental school and critical school - can be adapted in positive marketing discipline. Whereas developmental school considers marketing as "a part of solution to the human condition", critical school sees marketing as "a source of human suffering". Developmental school sees marketing as a tool for improving human life and enhancing economic development. On the other hand, critical school identifies five aspects of marketing - technological, political, economic, organizational, and competitive - as challenges to development, preventing from creating mutual value for consumers, firms, and society. Both perspectives, contributing to the development of each other, are seen valuable in positive marketing research.

From the theory of practice perspective, Gopaldas (2015) explains how positive marketing builds value for the firm, customer, and the society. He suggests that positive marketing has two main patterns, which are, material-meaning innovation and practice innovation. Material-meaning innovation, which refers to offering differentiated products, involves new materials and meanings but does not lead to new customer competencies whereas practice innovation, associated with new market space, requires new materials, new meanings, and also new competencies for customers. Material meaning innovation can be implemented by reducing the amount of material used, using a more environmentally material, or using a more humanitarian material. For example, Aquafina's Eco-Fina bottle, which includes 50% less plastic in production, helps Pespi Co to build a pro-social brand image, as well as reduces plastic waste in the environment and provides consumers the opportunity to contribute in plastic waste reduction. Similarly, hair color products of Palette by Nature, including natural ingredients, enable the brand to differentiate its products using more environmental-friendly materials and to create value for customers in terms of prevention of skin disorders. These two examples of material-meaning innovation lead to new materials and new pro-social meanings in consumer perceptions but do not require changes in the ways that consumers behave. An example to practice innovation is MaxBack, a service for purchasing old and damaged electronic devices from consumers to fix up and resell in secondary markets. General Motor's hybrid gas-electric vehicle, the Volt, which provides a superior performance in terms of distance driven and can be recharged by electricity is also a practice innovation. Both of these practice innovations create new market spaces for the firms pursuing them. They also create values for both consumers and the society. Consumers benefit from MaxBack service in terms of reduction in their costs while MaxBack creates value for the society in terms of electronic waste reduction. Similarly, while consumers enjoy low fuel costs and superior performance of the General Motor's hybrid vehicle, the Volt, the society benefits from energy saving and use of a cleaner energy that Volt provides. Also, in addition to leading to changes in materials used and meanings associated with, these innovations also entail in changes in behaviors of consumers, requiring new competencies.

5. POSITIVE MARKETING FOR 4PS OF INNOVATION

The effect of innovation on improving firm performance and maintaining competitive advantage is an empirically supported and a widely accepted phenomenon in innovation and new product development literature. However, there is no single typology on innovation universally accepted by the researchers. In the literature, there is a wide range of typologies identifying innovation types based on the outcome of the innovation process (Baregheh et al., 2014; Rowley et al., 2011; Baregheh et. al, 2016). Among these typologies, Knight (1967) proposes four types of innovation, which are product or service innovation, production-process innovation, organizational structure innovation and people innovation. Binary model innovation typologies suggested in 1970s and 1980s categorize innovation as product/process, administrative/technical and radical/incremental. Oke et al. (2007) offer three types of innovation - process, product and service – distinguishing product innovation and service innovation. Within the framework of this study, we focus on the taxonomy proposed by Tidd et al. (2005), which examines innovation in four Ps: product, process, position and paradigm. This taxonomy has no strict boundaries for each type of innovation and does not consider either type of innovation as a substitute for the others. All innovation strategies can be adopted simultaneously (Francis and Bessant, 2005). We will explore each of these four types of innovation individually in the subsequent sections.

5.1. Product Innovation

Product innovation, which is perhaps the most common innovation strategy pursued by firms to sustain competitive advantage, is considered as the changes in products and/or services provided. A wide range of studies provide empirical evidence on the effect of new product development on retaining market share and enhancing firm profitability. Increasing competition and shortening product life-cycles force firms to engage in new competitive strategies requiring changes in "quality, customization, and design" of their products, rather than pursuing a mere price-cutting strategy (Şener and Sarıdoğan, 2011). All new/improved products (a new design of an established car model or a high-performance electric car, improved performance light bulbs or LED-based lightings) are in the target of product innovation.

Firms also have to give timely responses to their constantly changing environment due to changes in customer needs and preferences, development in technology and changes in legislation in order to sustain competitive advantage through providing new products (Tidd et al., 2005). Service firms also engage in product innovation. Singapore Airlines' providing slumberettes and jack point machines in planes is an example of product innovation made by service firms (Francis and Bessant, 2005).

Product innovation is the most visible application field for positive marketing. Through product innovations, firms provide with markets differentiated products, and thus, 1) satisfy customer demands and expectations (customer value), 2) earn profits enjoying the competitive advantage of being preferred by the customers or come to be known as innovative firms (firm value), and 3) serve to social life (social value). For example, Toto brand is recognized as a product innovator for its differentiated toilets with low-volume flushing systems in its customers' eyes, (firm value), preferred by customers due to reduced water costs and improved flushing performance (customer value), and also, appreciated for contributing to reduction in water usage in the society (social value) (Gopaldas, 2015).

5.2. Process Innovation

While product innovation is mostly recognized in the leading position in innovation, process innovation, which is defined as the "changes in the ways products and services are created and delivered", is also a powerful source of competitive advantage (Tidd et al., 2015). A process innovation can take place in either eliminating "waste", in the form of unnecessary activities in production and delivery processes or exploring new processes to improve performance (Francis and Bessant, 2005).

Process innovation is "being able to make something no one else can, or to do so in ways which are better than anyone else", that is faster, at a lower cost or more customized. Examples to firms engaging in successful process innovations are car manufacturers, such as Toyota, Honda and Nissan, developing production systems leading to superior quality and productivity. Southwest Airlines, the most effective firm in the US, succeeded to become a low-cost leader by improving its processes such as reducing airport turnaround times. Citi Bank is also an example of a process innovator in terms of providing ATM services before its competitors and becoming a technology leader in the banking sector (Tidd et al., 2015).

From the positive marketing perspective, process innovation is closely related to material-meaning innovation, which is proposed by Gopaldas (2015). In producing products and services, firms benefit from the value of positive marketing when they use 1) less materials, 2) more environmentally-friendly materials and 3) more humanitarian materials. Patagonia, an outdoor clothing manufacturer, enjoys the benefits of a number of environmental innovations in its value chain. In production facilities, for example, it uses solar power to reduce electricity consumption. It also uses environmentally-friendly materials, such as organic cotton, to produce its apparels. These process innovations Patagonia engage in provide with the brand the opportunity to build a pro-social brand image, gaining the support of customers, employees, and activist groups (firm value). Customers see themselves as a member of an environmentalist brand community by purchasing the brand's products (customer value). Finally, the society benefits from energy saving and waste reduction (social value) (Gopaldas, 2015).

5.3. Position Innovation

Position innovation, defined as the "changes in the context in which the products/services are introduced", does not require major changes in product attributes but rather focuses on changes in the way how customers understand or perceive the product and services offered. Changing the perception of Lucozade, introduced in the UK as a glucose-based drink associated with helping recovery from illnesses to as a performance-enhancing drink for exercise is an example of position innovation (Tidd et al., 2015).

Positional innovation can transform an existing market or build a completely new market. Haagen Daz, an ice cream brand originally developed for children, changed its target market from children to adults via changes in firm processes such as formulation, packaging, advertising and distribution channels. This example emphasizes the importance of "product identity" as other "tangible product attributes" in managing a positional innovation. Also, it shows that positional

innovation can embrace other innovation types, leading to changes in product attributes and also changes in production and delivery processes (Francis and Bessant, 2005).

The objective of positive marketing is to provide multiple benefits for firms, customers, and the society. Similarly, firms intend to have positive and attracting brand associations. Based on this, positive marketing provides with firms unique market positioning. Thus, firms like Tesla, Apple, and 3M enjoy being recognized as innovative firms. On the other hand, firms may prefer to engage in position innovation in circumstances in which target market is already satisfied, the number of competitors in the market increases, and the product loses its popularity. For example, when Aspirin was firstly introduced to the market as a pain reliever, a large number of similar pain reliever products emerged and Aspirin lost its influence in the market. After its blood-diluent effect was discovered, it was positioned as a blood diluent product enabling the brand to appeal a new market consisting of cardiac patients. In the context of positive marketing, new product position must create firm, customer, and social value. For example, yogurt, which has been associated as a meal accompaniment for long years, is recently positioned as a healthy alternative for dessert lovers with fruit flavors included or as a supplementary food to protect health with prebiotic ingredients included. This new positioning enables the yogurt producers to differentiate their products from competitors (firm value) and satisfy customer needs providing with a different range of product alternatives with different tastes, and appealing to new customer groups consisting of health seekers (customer value), and also promoting the consumption of healthy foods in the society (social value).

5.4. Paradigm Innovation

While position innovation seeks to change products or services to adapt to a new market or a new customer segment, paradigm innovation, associated with "changes in the underlying mental models which frame what the organization does", requires a radical change in markets or customer perceptions (Rowley, et al., 2011). "Shift to low-cost airlines, the provision of online insurance and other financial services, and the repositioning of drinks like coffee and fruit juice as premium 'designer' products" are examples of paradigm innovation (Tidd et al., 2015). Similar to innovation in position, paradigm innovation must not be considered in isolation with other innovation types, either. It can consist of product and process innovations. For example, Henry Ford, changed the underlying model in transportation by shifting from a craft-based production system, targeting at few wealthy customers to mass-production, addressing all people with different income levels. This shift includes both product and process innovations, such as changes in component design, machinery and layout etc. (Tidd et al., 2015).

As in other innovation types, firms can create multiple values for themselves, their customers, and the society through paradigm innovation. This can be either in the form of new products, processes, re-positioning an existing product, or with a combination of these. PlumpyNut, a peanut flavored, ready-to-use therapeutic product, originally developed in French to treat acute malnutrition in Southern countries is an example of paradigm innovation, including a new delivery process and re-positioning. This product allows children suffering from malnutrition to be treated outside the medical centers, through the monitor of communities' health systems. By enabling the children to be fed at home easily, it radically changed the perception that malnourished children must be hospitalized and fed under medical supervision (http://www.nutriset.fr/en/innovation/plumpynut-cmam-example.html). It is also an example of positive marketing since it creates multiple values for the producer itself (pro-social brand image), its customers (low-cost and easily accessible treatment with a good-taste, ready-to-use product) and the society (saving millions of children's lives, even in countries where access to medical service is limited).

6. CONCLUSION

This conceptual study makes several contributions to positive marketing literature, which has been recently attracting a number of researchers in the area of marketing. First, by explaining the differences between positive marketing and other pro-social marketing concepts, which are green, cause, and social, with examples for each, it provides a deeper understanding of what positive marketing is. For a marketing activity to become positive marketing, it must create multiple values simultaneously for the firm, its customers, and the society. Second, the study proposes a detailed discussion of criticisms against marketing practices and moral demands emerged which provide basis for the rise of the concept of positive marketing. Criticisms are considered in four domains, which are the customer, the local community, the society, and the human and natural resources. Then, it is discussed how positive marketing addresses to criticisms in each domain. Third, the study provides a comprehensive literature review on positive marketing research through different studies from different frameworks, including the neoclassical analysis, macro marketing, and practice theory, explaining the need for and motivation behind the positive marketing concept. Perhaps the most important contribution of this study is to integrate positive marketing practices with four types of innovation, which are product, process, position, and paradigm. Each innovation type is explained with examples and then they are related with positive marketing activities. The study provides an insight for understanding how firms engage in positive marketing activities, that is, how they create multiple and simultaneous values for themselves, their customers, and the society, in their innovation strategies.

Based on this article, the implication for marketing managers is that marketers should improve positive marketing innovations. In this respect, marketing managers should enhance the positive marketing practices in the organization. For that, management should foster a positive marketing culture, awareness of the mutual benefit for consumers, firms and society, in the organization. For instance, managers should elevate the creativity and imagination of employees and encourage them to create new values for firm, customer and society. Managers should cultivate positive marketing activities by paying special attention to the prosocial behaviors in the organization. Here, managers should focus on human needs, societal problems, firm benefits. Specifically, managers should also help people become more aware of how they translate values into innovation activities. In addition, management should send the message that a mutual benefit for firm, customer and society is important in the firm's priorities.

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EFFICIENCY OF THE MINMAX PORTFOLIO ON THE EUROPEAN CAPITAL MARKET - CAN WE BEAT THE MARKET?

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ABSTRACT

Purpose- This paper presents game theory approach for solving problem of the optimal investment portfolio selection.
Methodology- Model was formed on the basis of historical returns on stocks presented as a matrix of payments. The goal is seeking the minimum between the largest potential losses, and therefore it is called minmax model. The main objective is to answer whether the minimax model tool performs better than the stock market index, and to verify the relationship between the established Markowitz mean-variance (MV) efficient portfolios and minmax optimum portfolio. We use data from the European capital market and Euro Stoxx 50 index as a reference index in the period 2004-2015, which we divided into two parts. We compared and analyzed the performance of the portfolios created through minimax model with the performance of market index and MV model in the actual investment period and it proved to be dominant and more successful.
Findings- Results speak in favor of minmax portfolio model as effective passive investment strategy. It is possible to maximize returns over even longer periods of up to year without changing portfolio investments, i.e. without frequent trading and not just to gain market return, but to beat the market by this technical investing.
Conclusion- Minmax model could be used for asset allocation in portfolio investments and that there is a real possibility to beat the market using minimax model.

Keywords: Portfolio optimization, game theory, linear programming, efficiency, indices
JEL Codes: C61, C72**,** G11, G32

1. INTRODUCTION

The problem of portfolio optimization is one of the central problems in finance. The main objective is to create a portfolio with the highest return on investment at an acceptable level of risk. By the middle of the last century, the portfolio choice was based on subjective criteria or investors preferences and intuition. This is followed by a modern stage of portfolio theory in which emphasis was placed on the assessment of the portfolio risks and investor's aversion to risk. Markowitz (1952) explains the portfolio space as space defined by the return and risk where return is measured as mean return of investment and risk is measure as square root of variance of returns. A model based on Markowitz measures of return and risk is called mean-variance model. Although we have a lot of research papers in this area, there are still open questions of risk measurement, determining the link between risk and return and the effectiveness of passive investment portfolio strategies. In this paper we propose an optimal portfolio selection based on game theory, where the investment is presented as a non-cooperative normal-form game a two-player zero-sum; on one side is an investor that is trying to achieve as large as possible expected return, and on the other side we have the market that generates various yields and that imposes limitations to the investor. In order to solve this matrix game we have formed linear programming model with

the aim to minimize the maximum possible loss. As a measure of risk in the model we use the maximum losses recorded through a matrix of payments. Our empirical tests are made with stocks from the European capital market. This market is liquid and efficient, what enables us to make general conclusions about the functionality of the model. The main objective of this paper is to answer the question whether the minimax model tool allows achieving better performances than the market share index on the European capital market, and what is the relationship between minmax portfolio and efficient portfolio in terms of Markowitz definitions. The paper compares the actual realization of minmax optimal portfolio, selected MV-efficient portfolios and the share index EURO STOXX 50 in two periods: 2004-2008 (the period before the crisis and during the crisis) and 2009-2014 (market recovery).

The paper is divided into five parts. Section 2, literature review provides an overview of theoretical background of the most important models for the optimization of the portfolio with regard to risk. Section 3 explains the methodology used for the analysis and the data. The results of minmax model and performance analysis are given in Section 4. Finally, brief summary and concluding remarks are given in Section 5.

2. LITERATURE REVIEW

Basics of modern portfolio theory were set by Harry M. Markowitz (1952) using mean-variance (MV) model. Model is based on average return, and variance/standard deviation as a measure of risk. Risk of portfolio is now the central element of the portfolio theory, and relationship of stock returns in the portfolio, described through covariance, becomes of crucial importance. In the essence of Markowitz's theory is the idea that, for the given level of risk, rational investor picks the portfolio which brings the highest returns, or vice versa, for the given level of return, selects the portfolio with the lowest risk. Only portfolios which fulfill the above stated criteria can be chosen, and all the others are considered as inefficient. Despite the great theoretical accuracy, MV model is not the best choice for selection of portfolio due to difficulties with formulating and solving it.

The most important criticism of MV model is related to the use of standard deviation as a measure of risk and the complexity of quadratic programming arising from it. Because of that, after Markowitz, a number of authors have tried to simplify the problem of portfolio optimization and bring it down to the problem of linear programming. All those models are based upon the same principle – minimizing the risk, no matter how it is defined. Thus, they are named *mean-risk* models (Sharma and Mehra 2013), and they observe the risk in the following two ways: as a dispersion of realized returns from expected returns or as a possibility of gaining the largest loss. The first one includes standard deviation, absolute mean and other similar measures, and the others include minimax model, Value at Risk (VaR), Conditional Value at Risk (CVaR) and similar.

William Sharpe (1971) has created a one-factor model as a linear approximation of MV model. The main idea was that return of any stock in time *t* is described as a linear function of some index which represents the effect of the whole market (proxy for market portfolio) and a good enough approximation of its movement. Soon, the model in which one factor affects returns was widened and a multifactor model was introduced (Chen, Roll and Ross, 1986). Factor models explain the effects of diversification. Konno and Yamazaki (1991) use mean-absolute deviation (MAD) of returns as a measure of risk. This way, they substitute variance, which represents a quadratic deviation, with the absolute one, thus transforming quadratic utility function into linear one. With assumption of normal distribution, as with Markowitz's model, minimization of mean-absolute deviation will show similar results as when using variance as a measure of risk. Optimal portfolio is the one which minimizes mean-average deviation of returns for the given level of return, and the constraints are equal to the constraints of the MV model. MAD model ignores the covariance, which decreases the possibility of diversification. In the periods of financial crises, correlation coefficients converge to 1 and the benefits of diversification diminish (Campbell, Koedijk, Kofman, 2002, Konno and Yamazaki, 1991), so in the events of the whole market declines, they state that correlations between stocks become irrelevant, and that MAD model is justified.

Young (1998) presented minimax model which has the goal of maximizing minimal returns during all observed periods with the constraint of minimum accepted average return in that period. In this model, minimum returns are used as a measure of risk. With goal function set up like this, the problem of quadratic utility function, which exists with MV model, is now solved. For normal distribution, results will be similar to the ones calculated using the MV model. Sharma and Mehra (2013) combine both types of risk measurement in the model of portfolio optimization. They have set up the model with the goal of minimizing variations around the expected value, but at the same time, setting up the constraint which conditions the realization of the better result from the worst possible for each period. Instead of using variance, they use half of the mean-average deviation as a measure of dispersion. Thus, minimax model is used for formulating security measures and half of the mean-average deviation as a stability measure. Benati and Rizzi (2007) have based their model on the Markowitz's, but they have substituted variance as a measure of risk with the value at risk (VaR). Authors have presented that the posed problem can be solved using CPLEX in rational time if the number of observed periods and the number of assets are not too large. Angelelli, Mansini and Speranza (2008) have created two more models which include transaction costs, minimum number of transactions and cardinal constraints. The first one is based on maximization of the worst conditional value of

risk (CVaR), and the other on minimization of mean-average deviation. First model (CVaR) has shown to be more successful in terms of the level of returns and their stability. However, it is much more complicated and it requires more time to get the solution. Ferreira, Filho and Sousa (2009) use the decision theory for optimization of portfolio. Expected losses are the measure of risk, and they conduct their analysis using Bayes theorem. Model is brought down to the game theory, and considering that there is no variance as a measure of risk, they use linear utility function.

3. DATA AND METHODOLOGY

3. 1. Theoretical Framework

Optimal portfolio selection decision can be explained with influence diagram. In order to comprehend the elements that have influence on the investors' choice and success of his decisions we have formed influence diagram presented in Figure 1.

Figure 1: Influence Diagram
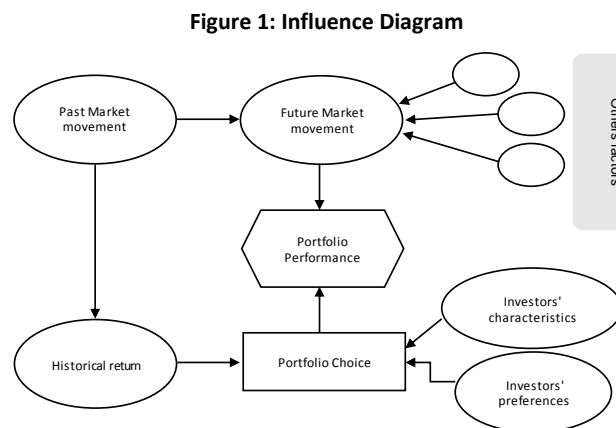
From the diagram we see that attempt to measure and evaluate the risk factors presented in the chances of nodes actually define different models for optimal portfolio. Game theory approach assumes that historical return present payment matrix with investor as first player and market as a second player. Strategies that an investor has available are investments in stocks of various issuers, while repeating the behavior of the past represents a strategy for market. For example, each stock represents one possible strategy for investors, and each month in observed period represents one market strategy.

Payoff matrix (1) contains historical returns of selected stocks increasing by 1, in order to provide positive expected game value[1], where A_i presents observed m different stocks (strategies for investors) and B_j presents n different market states.

$$
\begin{array}{c}
\begin{matrix} \mathbf{B_1} & \mathbf{B_2} & \cdots & \mathbf{B_j} & \cdots & \mathbf{B_n} \end{matrix} \\
\begin{matrix} A_1 \\ A_2 \\ \cdots \\ A_i \\ \cdots \\ A_m \end{matrix}
\begin{bmatrix}
a_{11} & a_{12} & \ldots & a_{1j} & \cdots & a_{1n} \\
a_{21} & a_{22} & \cdots & a_{2j} & \cdots & a_{2n} \\
\cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\
a_{i1} & a_{i2} & \cdots & a_{ij} & \cdots & a_{in} \\
\cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\
a_{m1} & a_{m2} & \cdots & a_{mj} & \cdots & a_{mn}
\end{bmatrix} \equiv \begin{bmatrix} a_{ij} \end{bmatrix}
\end{array}
\tag{1}
$$

Solving matrix game means determining the investments vector $p = [p_i]_{m \times 1}$, where p_i present probability for selection strategy i. This vector is solution of linear programming model (2) to (4).

$$
\min(g) = \sum_{i=1}^{m} y_i \ za \ g = \frac{1}{V} \tag{2}
$$

$$
\sum_{i=1}^{m} a_{ij} \cdot y_i \geq 1, \ j = \overline{1,n} \tag{3}
$$

$$
y_i \geq 0, \quad i = \overline{1,m} \tag{4}
$$

---

[1] Condition for the use of linear programming in zero sum games is the assumption of positive payment matrix.

Decision variable in the model is y_i, where $y_i = \frac{p_i}{V}$. Value a_{ij} - return on a security i in the period j. Value of the game present the lowest expected value of the portfolio formed from the model assuming that historical data reflect well expectations. This value is $V - 1$ and is calculated from reciprocal value of goal function g in the model. Young (1998), on a similar basis, develop their minmax model that adds a limitation of the lowest acceptable yield, explains the possibility of introducing transaction costs and tax in the model. This model can be expanded by adding conditions of maximum investment in a single action.

The classical Markowitz portfolio model is used to determine the efficient risk-return combination, i.e. efficient frontier (EF)[2]. This model includes historical return, preferences of investors and their characteristics (three chance nodes from Figure 1). Efficient frontier is convex curve and lies between the portfolio with minimal standard deviation and the portfolio with maximum rate of return (mean). Model includes portfolio expected return $\overline{R}_p$ and portfolio variances σ_p^2 where investments satisfy the investment constraints: $\sum_{i=1}^{n} x_i = 1$ and no negativity conditions. If the investor considers investing in a portfolio, with a pre-determined value of expected return on investment E, we have additional constraint $\sum_{i=1}^{n} \bar{R}_i x_i = E$ (model $5 - 7$).

$$\min \sigma_P^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} x_i x_j Cov(R_i, R_j) \tag{5}$$

$$\sum_{i=1}^{n} \bar{R}_i x_i = E \tag{6}$$

$$\sum_{i=1}^{n} x_i = 1; \; x_i \geq 0, \quad i = \overline{1, n} \tag{7}$$

As a result, model present the investment vectors that provide the absolutely minimum portfolio return variance σ_{min}^2 with the pre-set return E. By choosing randomly expected return of investment in the range $\bar{R}_{min} \leq E \leq \bar{R}_{max}$[3] we can determine the efficient set of the observed security (Arnaut-Berilo, Zaimović, 2012). Square root of portfolio variance is used as measure of portfolio risk and it includes correlations between equity return. Markowitz argued that low or negative correlations will eliminate portfolio risk, measured by σ_P^2. Models (2-4) and (5-7) have the same goal, to choose the best Portfolio according the available data. Model (2-4) is a linear programming model and the model (5-7) is quadratic programming model. These models differ in measures of risk and it is shown that at a time when returns follow a normal distribution, these two measures of risk will give approximately the same results (Young (1998)). If returns are not normally distributed mean variance model, by theoretical assumptions, cannot be applied. For minimax model there is no assumption about normal data distributions. Note that the minimax model is sensitive to extreme values of the historical returns.

3. 2. Data

We use stock returns data from European capital market, observed in 11-year period, from 2004 till 2014. The sample is consisted of stocks from stock market index Euro Stoxx 50, and those are stocks from 13 different sectors and 7 different countries. Two stocks from this index were omitted from our sample: Inditex and Unibail-Rodamco[4]. The sample is in line with the composition of the index at the beginning of 2016. We assume that Euro Stoxx 50 index is a good approximation of movement of the whole market and it will be used as a benchmark index for the comparison of portfolio performances of our model. The EURO STOXX 50 Index as a Europe's leading blue-chip index for the Eurozone provides a blue-chip representation of supersector leaders in the Eurozone. The index covers 50 stocks from 11 Eurozone countries. It is designed in a way that it best describes the overall market movements, and therefore can be considered an adequate substitute for the market portfolio. In fact, the Euro Stoxx 50 is derived from the 19 sectoral indices of the Eurozone and includes stocks whose market value makes about 60% of their countries total market capitalization (Stoxx Limited, 2016.).

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[2] The mean-variance combination of a portfolio is efficient if there are no other combinations with the same return, and a lower variance, or the same variance and higher return.

[3] If the following is true $E > \bar{R}_{max}$ the model would be unsolvable, and if $E < \bar{R}_{min}$ then the solution to the system (5- 7) would not be an element of the efficient set, where $\bar{R}_{min}$ and $\bar{R}_{max}$ corresponds to the efficient portfolio with the lowest variance and maximum return, respectively.

[4] In certain periods of time, Inditex did not have the sufficient level of trade. Unibail-Rodamco was founded in 2007, so there is a problem of short trading history.

Expected daily return for each stock was calculated based on historical changes in stock prices. Prices were sourced from electronic platform of trading system Xetra. Average daily return in a particular month is simply the arithmetic mean of all daily returns in that month. The selected benchmark index is not corrected for dividends, as well as the analyzed models.We divide the observed period into two sub-periods; from January 2004 until December 2008 and from January 2009 until December 2014. The first period covers time before and during the recent financial crises. The second period is a time of market recovery from the crisis. Due to the fact that we observe average daily returns on a month level, in the first period we have 60 periods and in the second one we have 72 periods. Real performances of optimal portfolios for both periods were measured in the verification periods. Thus, for the first portfolio, the year 2009 will be considered as a real investment period, while for the second one that will be the year 2015.

4. FINDINGS AND DISCUSSIONS

4. 1. Forming Portfolios

By applying minimax model on stock returns in period from 2004 to 2008 we obtained portfolio denoted with P1. Optimal structure of the portfolio P1 is presented in Figure 2. Value V is -0.0691%and it represents minimal portfolio return during that period. No matter what scenario really happens, loss would not be larger than the 0.0691% on invested. From the viewpoint of minimax model this is the total risk that investor is willing to take. It is important to note that this conclusion hold true only if historical data is a good representative of the future.

Figure 2: The Structure of the Portfolio P1
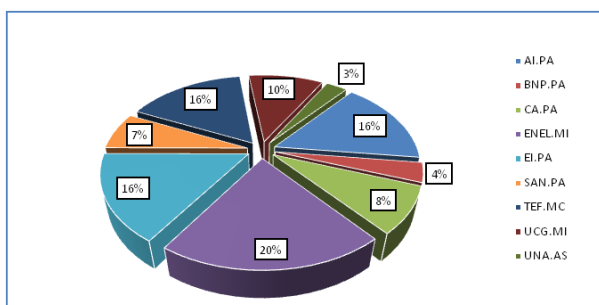
Optimal portfolio P1 is consisted of nine stocks. Although we did not set up any constraints, neither one of the stocks weights more than 20% of portfolio. This number of stocks, with relatively equal weights of all stocks in the portfolio, makes it theoretically acceptable for investment. Four stocks in this portfolio have negative expected returns. Based on that, we can see that this model does not entirely prioritize stocks with high positive returns, like MV model does. Portfolio includes stocks of companies from 6 different sectors and 4 different countries. Created portfolio, in mean-variance space and for the period 2004- 2008, would have the following characteristics: average portfolio daily return is 0.0458% and its' standard deviation is 1.0341%. To make it easier to compare, we will correct monthly data for annual by multiplying it with number of trading days in one year, so the expected annual portfolio return is R̂=11.44% and its' standard deviation is ô=16.35%.

Figure 3: The Structure of the Portfolio P2
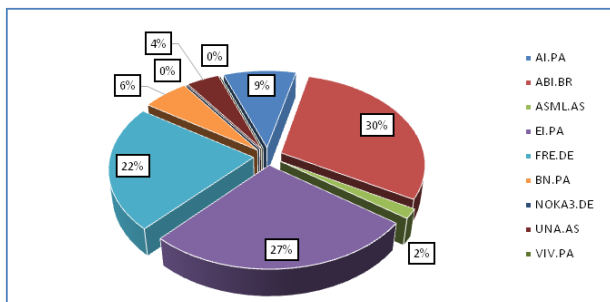
We created the second portfolio (P2) based on stock returns in period 2009 – 2014. Value of the goal function is -0.08427%. From the viewpoint of minimax model, maximum loss is larger in this case than with the first portfolio. Thus, we can conclude that this portfolio has larger risk from the viewpoint of minimax model, i.e. maximum possible loss. In this case, accidently we also have nine stocks in the portfolio. However, just three stocks make up 79% of the portfolio and weights of two stocks are so low they can be ignored. Unlike the first portfolio, most of stocks in P2 have positive returns. Even though P2 evidently has larger concentration of investment in lower number of stocks compared to P1 portfolio, portfolio P2 can

be considered acceptable for investment. It contains stocks of companies from 4 different industrial sectors and 5 different countries. Portfolio structured like this has the following characteristics in MV space: Expected daily return is 0.0891% and standard deviation 0.7539%. Again, we will annualize these two parameters, so the expected annual return is 22.28% and standard deviation is 11.92%.

We have tested mean-variance efficiency of portfolios P1 and P2. Figures 4 and 5 present efficient frontiers created according to MV model based of annualized historical daily stock returns in periods 2004-2008 and 2009-2014 respectively. From the graphs we can see that both portfolios are inefficient in MV space.

Next we have pointed out best performing MV efficient portfolio in both periods for further comparison and analysis. Selected portfolios have the lowest ratio of return and risk (i.e. highest variation coefficient), and on graphs they are shown as tangent of EF from the origin. In Figure 3 that portfolio is denoted as portfolio M1. Expected return of this portfolio is 15.95% with standard deviation of 12.62%, and it consists of 14 stocks. However, 5 of them have so low weights in the portfolio that they can be ignored, i.e. sum of their weights is lower than 0.0002%. None of the stocks weights is larger than 20%. In terms of sectors, portfolio consists of 10 different sectors, but weights of 4 of them can be ignored. We can conclude that there are no sectors that dominate the portfolio. Same as with portfolio P1, 9 stocks from portfolio M1 have significantly high weights. Considering that weights of those 9 stocks are quiet similar in both portfolios, and that there is similar sector diversification, better standard deviation of portfolio M1 results from lower correlation coefficients between stocks in portfolio M1, i.e. from Markowitz diversification.

Figure 4: Efficient Frontier for Period 2004-2008
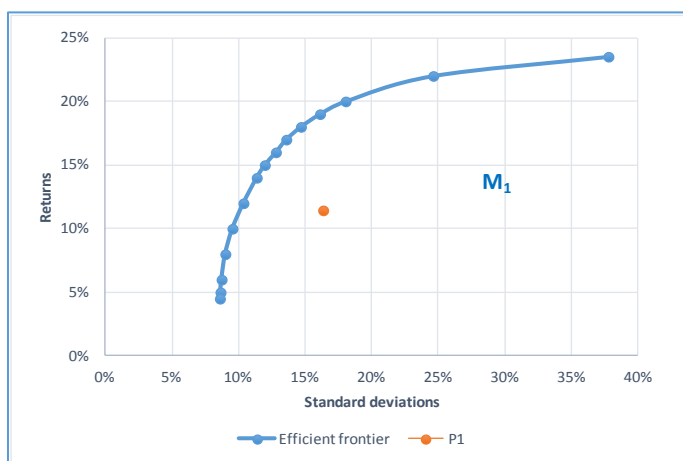
At the same time, mean return of Euro Stoxx 50 index measured as a annualized mean of index daily value changes was (-0.31%), for the same period, i.e. 2004 – 2008. We will use this return as market index expected return for 2009. Considering that this is annualized daily return, we can conclude that very low negative return occurs.

All stocks that have statistically high weights in portfolio M1 had positive average daily returns in the observed period (2004-2008), even though, in this period, the number of stocks with negative returns was higher. That comes from the fact that MV model prioritizes stocks with high expected returns and low or negative correlation coefficients. The possibility of investing in stocks with negative expected returns and stocks with high correlation coefficients in MV model is lowered.

The same methodology was repeated for the next sub-period, from 2009 until 2014. We can see that the efficient frontier lies higher, i.e. expected returns are higher for the given level of standard deviation in this period compared to the previous one. That is the consequence of the aforementioned differences in stages of market movements in two sub-periods, where period from 2009 is characterized by overall market growth and positive returns for most of the stocks.

Portfolio which has expected return 26.08% and standard deviation 11% (M2) has the highest coefficient of variation on the efficient frontier. According to MV model, this is very stable portfolio which has the possibility of earning positive return 99.11%.[5] However, the key assumption that should be fulfilled for this to hold true is the un-changeability of standard deviation, but earlier in the text we have noted that this cannot be confirmed.

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[5] Possibility is determined using function of possibility density for normal distribution.

According to minimax model, optimal portfolio P2 is inefficient, same as in the first case. However, it is much closer to the efficient frontier than in the first case. To compare, the possibility of this portfolio to earn positive returns is 96.92%. Thus, almost half of the portfolios on the efficient frontier have lower coefficient of variation.

Expected return of Euro Stoxx 50 index is 6.66%. If compared to period from 2004 to 2009, we can see that in this period index has shown a slight growth. The possibility for minimax optimal portfolio to earn higher return than index is 90.50%.

Optimal portfolio M2 consists of 14 stocks with particular investment weights of less than 20%. Four stocks have weights lower than 1%, and four more stocks weights are between 1.50% and 3.25%. We conclude that remaining six stocks make up 89.55% of the portfolio. In total, 14 stocks in the portfolio are from 9 different industries. Number of stocks and industries which have significant weights in both portfolios (P2 and M2) is very similar.

Figure 5: Efficient Frontier for Period 2009-2014
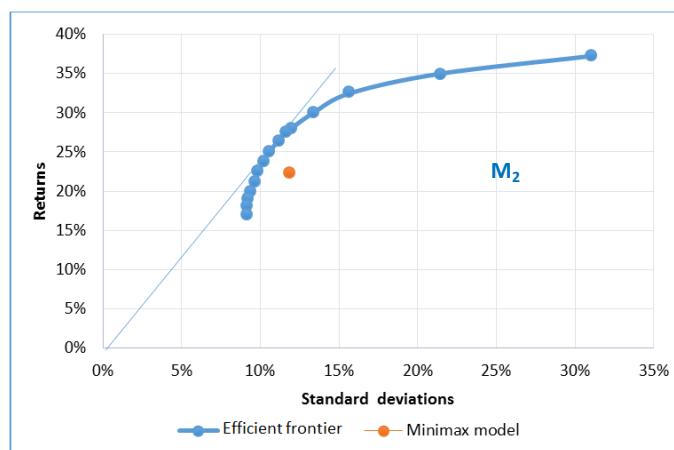
Table 1 shows aggregated results of selected portfolios in estimated periods.

Table 1: Expected Returns and Standard Deviations for P1; P2; M1 and M2

2004-2008	*No. of stocks*	*E(R̂)*	*σ̂*	*kᵥ*
Minimax model – P1	9	11.44%	16.35%	1.43
MV model – M1	14	15.55%	12.62%	0.79
2009-2014	*No. of stocks*	*E(R̂)*	*σ̂*	*kᵥ*
Minimax model – P2	9	22.28%	11.92%	0.53
MV model – M2	14	26.08%	11%	0.42

Now we are able to compare structure and performances of optimal portfolios obtained using minimax model with the performances of the Euro Stoxx 50 index, as well as with results of MV model. This way, we will directly test the main hypothesis that by using minimax model we can create portfolio that beats the market stock index.

4. 2. Portfolios' Real Performance in Verification Period

This part present real success of minimax portfolio, portfolio obtained using MV model and market index by analyzing their results in one-year verification periods for each sub-period: in year 2009 and in 2015. We compared average daily returns during that period, as well as buy and hold investment strategy, where the success is measured as a relative difference between value of the portfolio at the end and at the beginning of the stated years.

We find that all stocks in the minimax portfolio P1 realized positive returns during 2009. Minimax portfolio earned average daily return of 0.1149%, which is three times higher than expected return. When we annualize daily returns we get 28.73%. If one investor implements the buy and hold strategy and creates portfolio P1 at the beginning of 2009 and sells all the stocks from the portfolio P1 at the end of that same year, one-year holding period return (calculated as relative change in price at the end of the year compared to the beginning of the year) would be 24.66%. It should be noted that this level of annual return can not be compared to annualized return which we calculated earlier. In the first case we calculated relative

daily changes and just corrected them for number of days in a year to be at the annual level. The last number represents real earnings which would be obtained by holding that portfolio during year 2009.

In year 2015, minimax portfolio P2 realized average daily return of 0.1070%, or 26.75% annualized. This return is again above the expected level, but it is not as high above as in the first case. Actual one-year holding period return for portfolio P2 in 2015 is 29.25%, and is even higher than annualized one.

We have analyzed performances of selected MV portfolios M1 and M2, and Euro Stoxx 50 index in same periods, 2009 and 2015. Annualized average daily returns were denoted with R and actual realized returns based on buy and hold strategy with $\hat{R}$. Table 2 brings those returns.

Table 2: The portfolio Performance in the Tested Periods

2009	*R*	$\hat{R}$
Minimax model – P1	24.66%	28.72%
MV model – M1	0.32%	-3.93%
Euro Stoxx 50	16.89%	22.48%
2015	*R*	$\hat{R}$
Minimax model – P2	29.25%	26.75%
MV model – M2	23.52%	23.46%
Euro Stoxx 50	4.08%	6.31%

In the first verification period, minimax model portfolio was more successful than the optimal portfolio created using MV model. However, this outperformance of minimax model compared to MV model is the result of low performance of MV optimal portfolio in 2009. Also, when compared with Euro Stoxx 50 performance, original P1 model is more successful.

Considering that different investors can select different portfolios from the efficient frontier using MV model, we also measured performances of other portfolios from the efficient frontier, testing MV model sensitivity. Considering that it is impossible to assess absolutely every point from the efficient frontier, we have tested 15 different efficient portfolios. We find that neither one of the tested portfolios has achieved better performance than portfolio P1. In addition, the best performance in year 2009 was achieved by portfolio with lowest variance. It consists of 28 stocks and it has earned a real return of 22.11%. This portfolio is more similar to the minimax model than the portfolio with the highest coefficient of variation, M1. These findings enable us to conclude that regardless investors' preferences toward risk, shaped in investors' indifference curve, application of MV model in portfolio selection will result in lower returns compared to application of minmax model. The overall conclusion is that the domination of minimax model over the MV model is neither the result of coincidence nor bad portfolio choice from the efficient frontier.

When we compare the results of applied models in the second verification period, we find evidence that minmax portfolio has the best performance, beating the stock market index once again. During the year 2015, Euro Stock50 index real relative change was lower than expected, i.e. amounting 4.08% versus 6.31%. MV portfolio realized lower returns than expected as well. On the other hand, minimax portfolio has outperformed the expected value and realized annualized return of 26.75%. If we consider 2015 real return only, differences are even greater, for the benefit of portfolio P2.

In order to test sensitivity of our results to the change of MV efficient portfolios, we obtained 15 randomly selected efficient portfolios and find that none of them surpasses performance of portfolio minmax P2 in 2015. Portfolios lying in the middle part of the efficient frontier have obtained better performance, and MV efficient portfolio with expected return of 25% and standard deviation of 10.59% has shown overall dominancy over all efficient portfolios. Its' return in 2015 was 23.77%. We can see that this portfolio is very similar, and is very close to the portfolio with highest coefficient of variation. The same as with that one, this portfolio consists of 14 same stocks, only their weights were slightly different. However, minimax portfolio P2 still surpasses all MV model portfolios.

In Figures 5 and 6 we can see real monthly returns derived from passive buy and hold strategy on Euro Stoxx 50 index, perceived as proxy for market return, and created minmax portfolios P1 (figure 6) and P2 (figure 7) during verification periods.

Figure 6: Returns Movements on Euro Stoxx 50 and Minmax Portfolio P1 in 2009
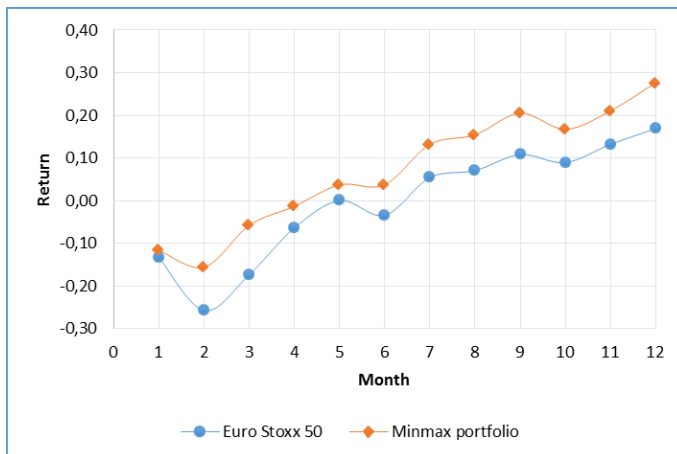
Minmax model P1 performs better than the market not just on a yearly level, but in every single month its real returns are higher than the market return. We notice high correlation between minmax portfolio and index returns in the verification period due to the same input data (returns of 48 stocks) just structured differently (minmax portfolio is a subset of Euro Stoxx 50 index with different investment weights). It is obvious that minmax model extracts from the sample the best performing stocks not just temporarily but for longer periods of up to a year, like here.

Figure 7: Returns Movements on Euro Stoxx 50 and Minmax Portfolio P2 in 2015
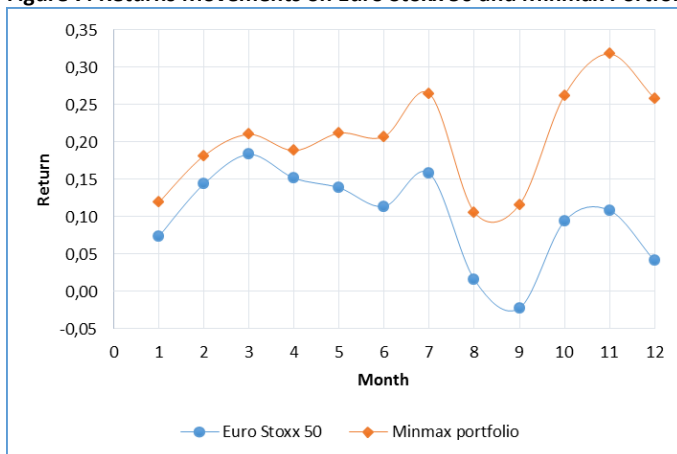
In second verification period, the domination of minimax portfolio over stock index was proven once more, again in every single month. Compared to the year 2009 return variations are now much larger.

5. CONCLUSION

Game theory enables us to use linear programming in solving portfolio optimization problem. The former model is based on the logic of minimization of maximum losses, so it was named minmax model. Upgrade of the basic model from game theory can be found with Young (1998). Compared to MV model, minimax model represents completely new approach to selection process because it changes some of the basic assumptions of Markowitz model. The most important change is the measurement of risk. Even though Markowitz's understanding of standard deviation as measure of risk is still the dominant one, new points of view and alternative measures which represent this phenomenon have been created for decades. Minimax model perceives risk as a fear of minimum return, i.e. highest possible loss which can be obtained by an investor.

We have applied the minmax model and analyzed its performance in European capital market. Selection of optimal portfolio was based upon sample of 48 stocks which are differentiated through sectors and countries and which create benchmark index of Eurozone – Euro Stoxx 50. We have tracked their daily returns during two periods, from 2004 until 2008, and from 2009 until 2014. Based on that data, we have created two portfolios for both periods: minimax (P1 and P2) and MV (M1 and M2). We have compared performances of those portfolios during real (verification) investment periods, i.e. during year 2009 for the first estimated period and in year 2015 for the second estimated period. Using minimax model

created portfolios in both verification periods surpassed MV efficient portfolios, but also the overall market performance, i.e. minmax optimal portfolios realized higher real returns than the market index. Our results speak in favor of minmax portfolio model as effective passive investment strategy. It is possible to maximize returns over even longer periods of up to year without changing portfolio investments, i.e. without frequent trading and not just to gain market return, but to beat the market by this technical investing. We also advocate creation of investment funds tracking the minmax model portfolios, which would simplify the process of investing according to this model. We conclude that minmax model could be used for asset allocation in portfolio investments and that there is a real possibility to beat the market using minimax model.

Also, our research raises a question about adequate measure of portfolio risk – highest possible loss seems to be better measure of risk than standard deviation. Crucial advantage of this minmax measure of risk is that it does not require any specific distribution of returns. The discussion about portfolio risk continues.

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EMOTIONAL AND LEARNING CAPABILITY AND THEIR IMPACT ON TEAM PERFORMANCE AND PRODUCT INNOVATIVENESS IN R&D TEAMS

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ABSTRACT

Purpose -   The main purpose of this study is to reveal the certain effects of emotional intelligence together with the learning capability, in product innovativeness which is the result of R&D process and known as IQ-dominant field, since innovation and new product development are extremely critical for economies to increase the amount of value-added goods and services. We propose that emotional capability of an organization influences product innovativeness via team performance, which is affected by learning capability.

Methodology -   This study used field survey data from a sample of 813 participants from 187 R&D teams in 160 firms. The collected data from questionnaires were analyzed with SPSS and AMOS software programs.

Findings- Research findings indicated that firm learning capability mediated the relationship between firm emotional capability and team performance. In addition, findings also showed that team performance, which is influenced by emotional capability and learning capability, has an impact on firm product innovativeness.

Conclusion- When considering the business management requirements of the twenty-first century, it is no longer enough to have employees with high level intelligence quotient (IQ) or merely improved technical and reasoning competence for a competent and productive work with customer satisfaction. In the meantime, it is necessary to have employees who are aware of their feelings and also who can control them and understand the other people's feelings, namely employees who have emotionally and socially high capacity.

Keywords: Emotional capability, learning capability, team performance, product innovativeness, R&D.
JEL Codes: O30, M10, D83

1. INTRODUCTION

R&D activities are the main source of business and technological innovation. Today, the firms particularly that embracing new technologies attach great importance to R&D in order to survive in a harsh environment. The importance attached to R&D by countries and firms is a strong indicator of development and competitiveness level. The OECD's Frascati Manual describes R&D as "creative work undertaken on a systematic basis to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications." In line with this definition, it is considered that R&D team members should have a specific set of features such as analytical thinking, problem-solving skills, creativity, high motivation, patience, passion for creating new things, different perspectives, continuous self-development, monitoring relevant literature, competitors and new technologies. On the other hand, R&D team members must be able to assess and aware of lack of aforementioned requirements, constantly and develop themselves, accordingly. When some of these features are carefully investigated, it is realized that some terms are in line with the concept of emotional intelligence in respect of the dimensions of it as well. Emotional intelligence was described as "understanding one's own feelings, empathy for the feelings of others and the regulation of emotion in a way that enhances living"

(Goleman, 1995). The concept has begun to discuss in business world, more frequently with Goleman's article "What makes a leader?" in Harvard Business Review in 2004. The mentioned article proposes that although some degree of analytical and technical skill is a minimum requirement for success, emotional intelligence could be the key feature that distinguishes superior performers from those who are only adequate (Goleman, 2004).

In the organizations with highly emotional intelligent employees, it is observed that the relationships and communication become much more efficient, the performance is improved thanks to team spirit, the workplace turns out to be happier and more peaceful, and as a result the organizations gain profit. The organizations using emotional intelligence skills offer a set of core abilities that provide organizational success: developing leaders, personal productivity, motivation, customer satisfaction, creativity, innovation and time management (Druskat et al., 2006). Since innovation and new product development are extremely critical for both organizations and economies to increase the amount of value-added goods and services, one of the major aim of this study is to reveal the certain effects of emotional intelligence together with the learning capability, in product innovativeness which is the result of R&D process and known as IQ-dominant field. Although many research studies have addressed the impact of emotional capability of an organization on firm performance, product innovativeness and job performance in diverse industries so far, team performance has not been considered as one of the key variable of possible outcomes in various proposed models. To address this deficiency, this study seeks to understand how emotional capability of an organization influences product innovativeness via team performance, which is affected by learning capability.

2. LITERATURE REVIEW

2.1. Emotional and Learning Capability of an Organization

The concept of organizational capabilities has been evolved within the resource-based view of the firm since 1980's (Wernerfelt, 1984; Barney, 1991; Hunt and Morgan, 1996). Organizational capabilities could be defined as an organization's capacity to use its tangible or intangible assets to achieve a specific task or an activity to improve the performance (Ulrich and Lake, 1991). The organizational capability approach has been explained with core competencies of an organization framework since it was introduced to the literature for last decade. Core competencies are considered as one of the main elements of innovativeness of the organization. According to Prahalad and Hamel (1990), the core competencies of company are the integration of various resources and skills that differentiate a firm in competitive environment. Core competencies are likely to broaden the scope of innovation in the organization. Exploiting existing core competencies lead to create new products and new ways of doing things. Today, it is widely accepted that organizational performance is highly related to the intangible assets of organizations (Schiller, 2012).

Emotional intelligence has attracted considerable attention since the influential book, "Emotional Intelligence; Why it can matter more than IQ" written by Daniel Goleman in 1995. However, the term was first coined by US psychologists Peter Salovey and John Mayer in 1990 and defined as the ability to monitor one's own and other's feelings and emotions, to discriminate among them and to use this information to guide one's thinking and actions" (Møller, 1999). When considering the business management requirements of the twenty-first century, it is no longer enough to have employees with high level intelligence quotient (IQ) or merely improved technical and reasoning competence for a competent and productive work with customer satisfaction. In the meantime, it is necessary to have employees who are aware of their feelings and also who can control them and understand the other people's feelings, namely employees who have emotionally and socially high capacity.

At the organizational level, emotional capability is defined as the ability of an organization to acknowledge, recognize, monitor, discriminate and attend to its members' emotions. It is manifested in the organizations' norms and routines related to feeling and emotions and reflects organizational behaviors that express or evoke certain specific emotional states. These behaviors are called emotional dynamics. These dynamics are helpful for working on the emotional capability of an organization (Huy, 1999). Emotional capability view has been found an attractive concept since it gives alternative and complementary explanation in terms of determining the success factors in organizational level. Emotional dynamics contributing to a company's overall efficiency include the dynamics of encouragement, displaying freedom, playfulness, empathy/experiencing, identification and reconciliation (Huy, 1999). In this study, the questions which were used as the parameters for measuring emotional intelligence were taken from the article of Akgun et. al (2007). In that article, there were survey questions to measure four emotional dynamics since two constructs from emotional capability overlap of the constructs measuring learning capability. So, for this kind of study, dynamics of displaying freedom, dynamics of identification, dynamics of empathy/experiencing and dynamics of reconciliation have been researched.

The dynamics of displaying freedom is the organization's ability to facilitate the variety of different emotions that legitimately can be displayed (and felt) in the organization during a radical change process. The capabilities of a company to manage the individual or collective feelings of their employees lead to the improvement of some features of the company, as follows: (1) producing various information and opinions between different disciplines; (2) taking lessons from the

experiences and using these lessons as time goes by; (3) finding their own solutions for improvement and development; (4) training their employees in order to benefit more from their talents; (5) collecting data on technology, information and market conditions and using this data in accordance with their own dynamics; (6) creating collective awareness about operations with a common vision (Akgun et al., 2009). The dynamics of identification refers to the collective behavior whereby organization members express their deep attachment to salient organization characteristics. These organization characteristics can be core values, beliefs, myths, leaders, or any other element that is meaningful to particular individuals or groups. Members in a community stay together because there are mutual benefits; among the most important of these are the emotional bonds that develop over time in accordance with shared organization characteristics. Identification aggregates personal feelings toward the organization and converts these feelings to the behaviors such as defense of the organization's name and mention about the reputation of the organization even outside work boundaries (Huy, 1999). At the organizational level, empathy and emotional experiencing is defined as the quality of an organization's efforts to identify the variety of emotions aroused during radical change, to accept and internalize them, and to act on a deep level of understanding. Demonstrating care and concern for one another can build a basis for trust and also leads to better work performance. Especially the empathy makes the cooperation and solidarity in the organization increase. It helps to understand opposite ideas and accept them. Thanks to the empathy between the individuals, the organization becomes more prospering. Also, it builds an environment for trust among employees and so helps them work with higher performances (Akgun et al., 2007).

Emotional reconciliation refers to bringing together two opposing views people support strongly. Genuine efforts expended toward achieving a new synthesis and understanding increase receptivity to proposals for change. Reconciling is explained as the conceptualization of change. The proposed change can be framed and accepted by the recipients as an addition or an expansion of existing values. In that case, accepting the change becomes easier. The more continuity exists between the past and the future, the less the change is perceived as radical (Huy, 1999). The dynamics of emotional reconciliation affects the learning capability of an organization. The groups and organizations are comprised of individuals with different feelings. When these individuals reconcile on their different views, then there can be more effective arguments among them. This leads to solving routine and complex problems; also a lot of new ideas appear. Thanks to these efforts, the decisions are made in a more qualified way. This is very vital and important for the performance of the organization (Akgun et al., 2007).

Learning capability of a firm has been one of the most mentioned concepts facilitating innovation and organizational performance in the literature since long time ago (Goh and Richards, 1997; Sinkula et al., 1997; Bapuji and Crossan, 2004; Alegre and Chiva, 2008). Learning capability is the organizational and managerial characteristics allow an organization to learn (Dibella et al.,1996; Goh and Richards, 1997). Information is an important source for the companies. Translating organizational learning into a capability refers to collecting and sharing data and being integrated. A learning organization can be defined as "having the capability to creating, collecting and transferring information and also to shape their behaviors in terms of this new knowledge (Apfelthaler et al., 2002).

Learning capability, which is a multidimensional concept, involves four elements; commitment to learning, shared vision, open-mindedness and intra-organizational knowledge sharing, as identified by (Jerez-Gomez et al.,2005). Commitment to learning expresses that to what extent an organization considers learning as important source. The more an organization values learning, the more likely it has a long term strategic advantage. Shared vision means creating a common ground for learning. This is an organization-wide acceptance that what and why to learn. Open-mindedness is an organization's tendency to criticize routines and accept new ways of doing. It covers an ability to unlearn and adapt rapidly changing conditions. Intra-organizational knowledge sharing is related to spread of learning within an organization. This dimension also includes storing and directing information in order to use it in future actions (Jerez-Gomez et al., 2005).

In the previous studies, it is also stated that the emotions could define the limits of learning (Vince, 2001) and innovation (Green, Amian Smith, 2004). In this regard, the emotional capacity of an organization is related to its ability to learn and this ability to learn is positively related to product creativity. As a result, the product creativity affects the success of the organization (Akgun et al., 2007).

H1: Emotional capability of an organization is positively associated with its learning capability.

2.2. Team Performance and Product Innovativeness

Innovativeness is defined organization's tendency to concentrate on and encourage new ideas, new way of doing things or new processes that may help to bring out new products, services or technological processes (Lumpkin and Dess, 1996). This study deals with specifically product innovativeness which means a newness of a product in terms of market presence at a certain period.

Organizational learning is mostly realized through the observation of the environment and the interaction with it. In terms of innovation, the uncertainty about customers' needs, the technological turbulence and the uncertainty about competition

are important environmental factors. As a result, an organization who wants to learn could improve its innovation capability in three ways. Firstly, they should be very determined about innovation and they should use the main technologies. This will help them to formulate a technological advance and to be capable of forming a market (Roger et al., 2002). In the second place, thanks to this advancement, organization may hardly lose the opportunities of increasing market needs. Because, it already has the capability of understanding customers' needs (Urban and Hauser, 1993). Thirdly, a learning organization has a higher innovation capability compared to its competitors. The characteristic of such an organization is to follow the movements of their rivals in the market very closely. They can understand the weaker and stronger specialties of their competitors and they can learn not only from their success but also their failure (Roger et al., 2002). Sinkula (1997) found a positive correlation between a learning organization and the outputs of an organization.

Team learning, which is explained by Peter Senge, is a crucial to form a learning organization. Team learning is the activities by the organization to use and configure the data for the advantage in competition. It includes gathering and sharing information about customers' needs, changes in the market and behaviors of the competitors; developing new technologies in order to produce alternative products in the fields of competitors. The learning affects the information collected, how they are interpreted, how they are assessed and shared (Roger et al., 2002). Innovation involves asserting new ideas, new processes, new products and services. Therefore, learning is closely linked to the organizational innovation.

The concept of a learning organization provides a new paradigm. The traditional views about an organization consider it as an automatic learning mechanism and as a place in which individuals gain new information and/or experiences. This shows that the successful organizations can learn. Consequently, if an employee quits the organization, the information belongs to him/her stays in the organization. As time goes by, the team members formulate new capabilities to change what can they do and how they can understand. Accordingly, the individuals in a team learn altogether (for example, the quality circles). The mechanisms integrated to the quality management provide an effective learning. The organization turns out to be a laboratory environment in which people of different levels try and test new practical applications and techniques consistently (Holt et al., 2000). The organizations who are adapted to quality management can realize their learning disciplines in a better way. These disciplines include personal management, intellectual models, mutual vision, team learning and systemic thinking. However, neither of them can be applied without cooperation between team members. Accordingly, the successful organizations give importance to the motivation and improvement of all their workers in all positions and make them feel as a part of the processes (Holt et al., 2000).

The concept of performance is defined as the amount of the product or services produced in a determined time in terms of the organizations (Lebas, 1995). Regarding the employee, performance is the individual "productivity" and "activity" for reaching a goal, namely the degree of realization of the goals and aims (Pugh, 1990). The concept of performance may be defined differently by various approaches. Performance is the degree of reaching out a goal in an organization by the individuals or institutions (Pugh, 1990). With its lexical meaning, "performance" refers to the degree of using the capacity. Performance is the output level of an activity. This level shows us the degree of realizing the objective or the duty (Schermerhorn et al., 1985). Campell defines the performance as the behaviors suitable for the objectives of the organization and according to Campell performance can be measured with the contributions of the employee to the organizational objectives (Suliman, 2001).

With this definition, it is possible to see that the degree of the performance is related to the personal features of the employee, their intellectual abilities, their wish to integrate with organizational objectives and their beliefs and values (Tutar and Altınöz, 2010). The common ground of different definitions for the employee performance is that the performance emerges in accordance with the relationship of individual expectations and organizational objective. Employee performance is the quantitative and qualitative measurement of the activities of an employee, a group or an organization. There should be some psychological conditions in the organizational environment so that the employees can reach their quantitative and qualitative objectives. To achieve this, the wage and career development of the employees should be provided. Moreover, it is important to provide a suitable organizational environment for the employee to improve himself/herself and be a part of the decisions (Gupta, 1982).

In the background of the emotional capability theory, Huy (1999) emphasizes that emotional dynamics allow organization to realize change and react to a paradigm shift in a timely manner. Emotional capability like other capabilities can be established and matured within an organization over time. Since emotional capability has been associated with the radical change at the organizational level, emotional capability of an organization is closely related to exploit radical change which is the desired condition for product innovativeness of an organization. Radical change is defined as discontinuous change in the basic philosophy of the shared identity of members of the organization and can be effected by human beings in organization.

H2: Emotional capability is positively associated with team performance via learning capability.

H3: Team performance, which is influenced by emotional and learning capability, is positively associated with product innovativeness.

Figure 1: Conceptual Model
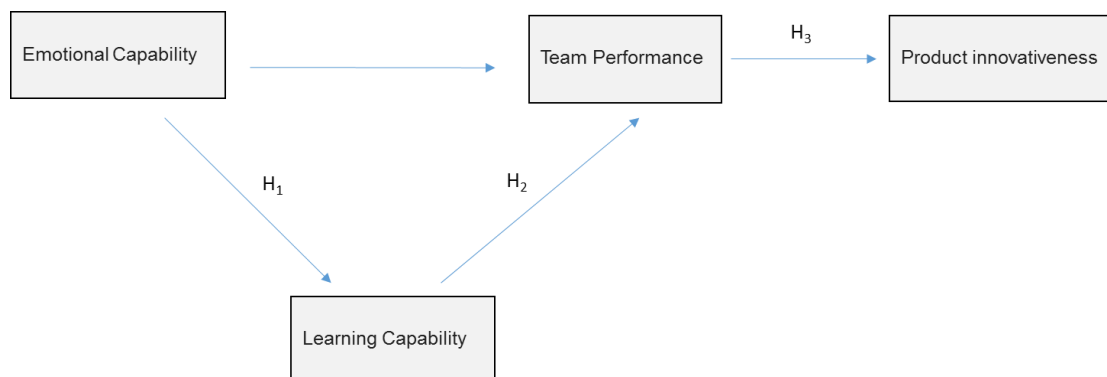
3. DATA AND METHODOLOGY

The research plan is formed as: establishing research model, researching for the measurement in the literature, constructing the best fitting measurement compound from the alternatives, reaching the participants and informing them for the survey, gathering the data and analyzing to test the hypotheses with SPSS and AMOS package programs.

3.1. Measurement Instrument and Sample

In order to measure research variables a questionnaire was prepared depending on the scales used in previous studies in the literature. In this study, we used 17 items (3 items for display freedom, 4 items for identification, 5 items for experiencing and 5 items for reconciliation) emotional capability scale used by Akgun et al (2007). Learning capability scale adapted from Chen (2005). This scale includes 9 items. Product innovativeness 8 items scale adapted from Chiang et al. (2014) and Baker ande Sinkula (2005). Team performance scale includes 6 items adapted from Kirkman and Rosen (1999). For each construct, items ranging (Likert-style) from 1 (strongly disagree) to 5 (strongly agree) with 3 as a middle point.

A survey was adopted to gather data via a self-administered questionnaire from manufacturing firms having R&D teams in Turkey/Marmara region. To avoid industry bias, data was collected from several industries. Discarding 32 partially completed questionnaires, the final sample consisted of 813 questionnaires filled by 187 R&D teams in 160 firms. Information on the sample is provided in Table 1. The participating companies are mostly IT and Electronic firms and they have commonly above 1000 employees. Additionally, the age of sample firms is between 5 and 10 years by a majority.

Table 1. Research Sample

Firm Size	Below 50	46	31,1%		Automotive	14	8,8%
	50-500	40	27,0%		Chemistry and Healty	15	9,4%
	Above 1000	62	41,9%	**Industry**	Electronic	22	13,8%
					Food	7	3,8%
Firm Age	Below 10	38	23,8%		IT	65	40,9%
	10-50	83	51,9%		Others	37	23,3%
	Above 50	39	24,4%		**Total**		**160**

4. FINDINGS

4.1. Validity and Reliability of the Measurements

In order to understand the underlying dimensions of the measured constructs used in the research, exploratory factor analysis was performed by using principal component analyses extraction method and promax rotation. The reason of choosing promax rotation is that it is recommended to use this method in social sciences (Hair et al. 2010). Kaiser-Meyer-Olkin (KMO) sample adequacy test and Bartlett sphericity tests were applied to test whether the data set is suitable for factor analysis. If KMO value is greater than 0.5 and "p" value is less than 0.05 in Barlett test we can say that data set is adequate for factor analysis (Field, 2009). According to analyses results KMO value is 0,948 and Barlett test result is

significant at 0.001 levels. That means our data set is adequate for factor analysis. At the principal component analyses, sub limit of factor loadings of each items was taken as 0.45 by taking into consideration to the size of the sample (Hair et al 2010). According to the PCA, each variable loaded to the foreseen factor component and factor loadings were between 0.486 and 0.868. Besides, it was observed that factor loadings are generally over the 0.500 value. Cronbach's Alphas are higher than the standard 0.7 cut-off point (Field, 2009), supporting the reliability and internal consistency of the six constructs. A confirmatory factor analysis was carried out to examine the unidimensionality, convergent and discriminant validity of the constructs. The measurement model fit indices fell within the recommended parameters (X2/df = 2,451, GFI=0,916, TLI=0,945, CFI=0,951, PNFI=0,827, RMSEA=0,042) as suggested by Hu and Bentler (1999) and Schumacker and Lomax (2012). All items loaded on their respective constructs, and all loadings were significant at the .001 level. These results indicate unidimensionality among the research constructs (Anderson and Gerbing, 1988).

Table 2: Exploratory and Confirmatory Factor Analyses

Construct	Items	Faktor Loading		Valididty and Reliability Values
		EFA	CFA	
Freedom and	dynof.freedom_1	0,797	0,716	Cronbach α; 0,851
Identification	dynof.freedom_3	0,769	0,732	SCR; 0,840
(EC)	dynof.ide_1	0,792	0,736	AVE; 0,512
	dynof.ide_2	0,513	0,697	
	dynof.ide_3	0,866	0,696	
	dynof.ide_4	0,566	dropped	
Experiencing	dynof.exp_1	0,765	0,763	Cronbach α; 0,849
(EC)	dynof.exp_2	0,806	0,785	SCR; 0,850
	dynof.exp_3	0,793	0,768	AVE; 0,587
	dynof.exp_4	0,723	0,748	
Reconciliation	dynof.rec_1	0,486	0,692	Cronbach α; 0,848
(EC)	dynof.rec_2	0,728	0,756	SCR; 0,845
	dynof.rec_3	0,775	0,774	AVE; 0,522
	dynof.rec_4	0,678	0,680	
	dynof.rec_5	0,817	0,706	
Learning Capability	learn.cap_1	0,742	0,728	Cronbach α; 0,907
	learn.cap_2	0,808	0,738	SCR; 0,904
	learn.cap_3	0,785	0,722	AVE; 0,512
	learn.cap_4	0,747	0,725	
	learn.cap_5	0,735	0,731	
	learn.cap_6	0,797	0,716	
	learn.cap_7	0,652	0,669	
	learn.cap_8	0,635	0,702	
	learn.cap_9	0,686	0,705	
Team Performance	team.perf_2	0,590	dropped	Cronbach α; 0,874
	team.perf_3	0,868	0,790	SCR; 0,859
	team.perf_4	0,879	0,811	AVE; 0,605
	team.perf_5	0,772	0,812	
	team.perf_6	0,793	0,693	
Product Innovativeness	prod.inno_1	0,688	0,676	Cronbach α; 0,895
	prod.inno_2	0,774	0,632	SCR; 0,892
	prod.inno_3	0,805	0,709	AVE; 0,509
	prod.inno_4	0,733	0,769	
	prod.inno_5	0,758	0,723	
	prod.inno_6	0,759	0,723	
	prod.inno_7	0,760	0,723	
	prod.inno_8	0,761	0,722	

(i) Principal Component Analysis with Promax Rotation
(ii) KMO =0,948, Bartlett Test; p<0.001
(iii) Total Variance Explained (%); 61,929
(iv) All CFA trait is statistically significant with the lowest t value being 17,387 at p < 0.001
X^2/df = 2,451, GFI=0,916, TLI=0,945, CFI=0,951, PNFI=0,827, RMSEA=0,042

The composite factor reliability (CR) values, which assess the internal consistency of a measure, exceeded the .60 threshold. In addition, the average variance extracted (AVE) estimates exceeded the .50 threshold, in support of convergent validity (Bagozzi and Yi,1988). Finally, Discriminant validity was established using CFA and chi-square difference test. In this method, each covariance trait between factor constructs fixes 1.0. A significant difference in chi-square values level for fixed and free solutions at the 0,05 indicates the difference of the two constructs (Bagozzi et al., 1991). According to the chi-square difference tests, it has been observed discriminant validity among research constructs (Table 3).

Table 3: Correlations and Chi-Square Differences for Discriminant Validity

Constructs	Experiencing	Learning Capability	Product Innovativeness	Freedom and Identification	Team Performance	Reconciliation
Experiencing	1	308,916	401,039	214,247	256,927	217,312
Learning Capability	0,597	1	361,056	281,933	273,788	295,761
Product Innovativeness	0,455	0,765	1	295,761	305,573	368,851
Freedom and Identification	0,624	0,706	0,672	1	214,247	78,449
Team Performance	0,470	0,616	0,618	0,623	1	236,124
Reconciliation	0,750	0,718	0,609	0,737	0,605	1

Correlation values are shown at the bottom of the diagonal and $\Delta\chi2(1)$ values are shown at the top.
All correlations are statistically significant at p<0,001

Correlation analysis indicates that there is a positive and significant relationship between factor constructs. This shows that research variables correlate each other sufficiently and they can be reviewed adequately. Also, multicollinearity does not exist in the research variables because correlation levels are less than 0.7 (Hair et al. 2010).

4.2. Hypotheses Testing

Structural equation modelling was used to test the hypotheses in this study. The use of structural equation modeling is due to the fact that SEM is a advantageous method that allows to examine causal relations (Hox and Bechger 1998). As shown in Table 4, the results demonstrate that emotional capability has a positive association with learning capability (B=0,805 p<0,001), supporting H1.

We examined the mediating effect of learning capability by following the analysis strategy of Baron and Kenny (1986) and Preacher and Hayes (2008). The results show that emotional capability has a positive association with learning capability, and learning capability has a positive association with team performance (B=0,270 p<0,001). As a result of the indirect effect of emotional capability on team performance in 5000 bootstrap sample with 95% confidence interval (Preacher and Hayes 2008), it has been concluded that learning capability has a mediator effect between emotional capability and team performance association. Related mediator effect could be defined as partially due to the fact that the existing relation between emotional capability and team performance association has been decreasing but not disappearing. Eventually, H2 was supported. Lastly, team performance has a positive association with product innovativeness (B=0,684 p<0,001) and also supporting hypothesis H3.

Table 4: Structural Equation Modelling

Relation Type	IVs	DVs		
		Learning Capability	Team Performance	Product Innovativeness
Direct Relations	Emotional Capability	0,805*** (14,901)	0,507*** (7,042)	
	Learning Capability		0,270*** (4,136)	
	Team Performance			0,684*** (14,791)
	Firm Size		0,027 (0,661)	0,012 (0,289)
	Firm Age		-0,017 (0,409)	-0,039 (-0,897)
Indirect Relations	Emotional Capability		0,218***	

Model Fit; X2/df = 2,772, GFI=0,900, TLI=0,928, CFI=0,934, PNFI=0,821, RMSEA=0,047
*Standardized coefficient are reported with t-values in parentheses, ***p<0.001*
Indirect Effect; CI Lower: 0,101 CI Upper: 0,334 in 5000 Bootstrap Samples, %95 Confidence Interval

5. CONCLUSION

There are numerous studies showing the benefits of having emotionally intelligent workers in the literature. The headworkers in a company got emotional intelligence training on the subjects like listening more efficiently and helping the workers in solving problems. After this training, the accidents in the company decreased by 50%, excuses became five times less frequent and also productivity increased worth for 250.000 USD. In another factory, after the same training, the production rates increased by 17%; yet there was no increase in the productivity of the teams under supervisors who were

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not trained about emotional intelligence (Cherniss, 2001). In a research among 44 organizations of the Fortune 500 list, it has been stated that the sales representatives with higher emotional intelligence were able to double the total average income; and according to another study, the technical program developers who have higher emotional intelligence by 10% were able to develop software three times faster than low-level emotional intelligent ones (Poskey, 2006).

Innovation allows the organizations to improve in accordance with the environmental improvements. It is a strategic key to respond to the hardships of an environment with uncertainties. Innovation refers to the adaptation or production of new ideas or behaviors for an organization. It is widely known in the literature that innovation is a competitive instrument for a long-term success and survival continuity for the organizations. According to Nonaka and Yamanouchi (1989), organizations adapt themselves into the changing conditions of technology and diversity of the market; they may even update or renew themselves via innovation. Technological learning provides an information background which can be innovated. Most of the studies on the innovation capabilities of the organizations are about innovation diffusion. According to these studies, an organization must be innovative so that it can survive in a changing environment. Innovation, as considered by some people, is the degree of someone to adapt a relatively new concept earlier than the others in the social environment. However, this term is focused on the individual, not on the organization. In addition to this, there are some opinions with a collective perspective which define the innovation of a company as an organizational reflection of openness to new ideas (Roger et al., 2002).

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TAX DECLARATION RATES VIA AUDITS: A PREDICTION USING MARKOV MODEL

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ABSTRACT

Purpose- This article predicts tax declaration rates by Markov chain model.
Methodology- Four Markov models are constructed for the declaration rates of three tax revenues. Declaration probabilities for the year 2017 are estimated by constructing probability matrices of transitions between classes described for every model. Declaration rates are predicted by the product of the initial probability matrix and transition probability matrix. Limiting matrices of predictions are found. The best Markov model was found by estimating the sum of mean square errors for every model.
Findings- Main results of this study are i) transitions of tax declarations are declining in higher states and improving in lower states, ii) in its best model corporate tax declaration rate is predicted to be between 47% and 64.5% in 2017 with a probability of 78% and would be stable in the same interval at a probability of 60% in 2038, iii) in the long run income tax would decrease ₺20,3 billion with a probability of 42% and Value Added Tax would decrease ₺26,2 billion with a probability of 40% and iv) expected declaration rates of income tax, corporate tax and value added tax in 2017 are 52.3%, 61.6% and 62.8%, respectively.
Conclusion- Income tax and Value Added Tax payoffs may substantially decrease from 2015 to 2038 and 2023 respectively. This may cause a revenue deficiency to Turkish Revenue Administration. Therefore İncome tax and Value Added Tax audits should be increased. Even though tax revenues increase over time, the declaration rates show a decreasing to stationary or increasing to stationary behavior.

Keywords : Tax declaration rates, tax auditing, tax administration, transition probabilities, Markov analysis
JEL Codes: C51, H21, M42

1. INTRODUCTION

There is no study in the literature about tax declaration rates in connection with Markov modelling. Markov modelling of time series data does not provide sharp predictions. However it certainly provides accurate predictions and stationary probabilities for finite states. In a similar study thirteen tax revenues are predicted using Markov model in the paper by Kıral and Mavruk (2016).

The tax declaration is a decision under uncertainty Allingham and Sandmo (1972). The uncertainty of taxpayers decision on tax declaration has a great importance for tax administration revenues. Therefore tax declaration rates are important indicators of tax revenues. Every year tax administration audits a number of taxpayers and as a result of the audits a base difference is found between actual income and declared income when tax is underdeclared or evaded. Tax administration can determine evaded tax only on a small sample of taxpayers being audited. Therefore an increase in audit rate would always increase declared income. In this study tax declaration rates are calculated and predicted for three tax items such as income tax, corporate tax and value added tax since approximately 64% of tax revenues in 2015 are from these three taxes.

The objective of this paper is to find the best model predicting tax declaration rates using four Markov Models for each tax. The best of the four has the least sum of the mean square errors. Predictions of tax declaration rates are expected to be stationary and to have a limiting matrix. The rest of this study is organized as follows. In section 2 related literature is given. In section 3 methods for constructing transition probabilities, Markov models and predictive probability matrices, and for finding better model of Markov models and statistical significance of the models are given. In section 4 data of this study

along with description of the symbols is provided. In section 5 calculations for the three taxes are given. In section 6 a comparison of 2017 predictions of the three taxes, in section 7 a better model for each tax item, in section 8 a comparison of initial probability matrices and limiting matrices, and in section 9 statistical significance of the models are given. In section 10 results of this study are given and discussed, and the study ends with conclusion remarks in section 11.

2. LITERATURE REVIEW

Allingham and Sandmo (1972) analyzes income tax evasion by theoretical analysis approach. They analyze taxpayers decision under uncertainty on evading tax in static and dynamic cases. In static case they find the conditions for maximizing taxpayer utility function. They reach the first result that there exists an interior maximum solution. They concluded that an increase in audit rate and fine rate would always increase declared income, and an increase in tax rate would increase tax evasion. Baasch et. al (2010) used Markov models to quantify transitions between successional stages. They presented a solution for converting multivariate ecological time series into transition matrices and demonstrate the applicability of this approach for a data set that resulted from monitoring the succession of sandy dry grassland in a post-mining landscape. They analyzed five transition matrices, four one-step matrices referring to specific periods of transition (1995–1998, 1998–2001, 2001–2004, 2004–2007), and one matrix for the whole study period (stationary model, 1995–2007).

Büyüktatlı et. al (2013) used initial allocations of investment program with actual spending percentages from the years of 1998-2009 of Turkish Atomic Energy Institute (TAEK) to predict annual allowances from Ministry of Energy and Natural Resources. An estimated percentage of realization of investment program for 2011 and results are interpreted with Markov analysis. Cavers and Vasudevan (2015) directed graph representation of a Markov chain model to study global earthquake sequencing leads to a time series of state-to-state transition probabilities that includes the spatio-temporally linked recurrent events in the recordbreaking sense. A state refers to a configuration comprised of zones with either the occurrence or non-occurrence of an earthquake in each zone in a pre-determined time interval.

Grimshaw and Alexander (2011) used a Markov chain model to forecast outstanding balance of loans in each delinquency state. For that they used a markov chain X_n as the delinquency state of a loan in month n and a Markov Chain model for loan accounts that are 'current' this month having a probability of moving next month into 'current', 'delinquent' or 'paid-off' states. They forecasted 'one month ahead' portfolio delinquency balance for a portfolio of loans where each loan is n_i months from origination this month i=1,...,N. Lazri et.al (2015) adopted a Markovian approach to discern the probabilistic behaviour of the time series of the drought. A transition probability matrix was constructed from drought distribution maps. Markov transition probability formula for four states and a simulation model with an initial probability vector was used to calculate the drought distribution area in the future.

Lukić et. al. (2013) used the stochastic method based on a Markov chain model to predict the annual precipitation in the territory of South Serbia for the period 2009-2013. For this purpose, the precipitation data rainfall recorded on the four synoptic stations were used for the period 1980-2010. Kıral and Mavruk (2016) used one step Markov chain model to predict tax revenues in Turkey for the period 2000-2014. Four Markov models were used for each tax and best predictive model was found by the sum of mean square errors. Usher (1979) discussed that complex non-random or Markovian processes are likely to characterize ecological successions, the transition probability matrix elements not being constant but being functions either of the abundance, or of the rate of change of abundance, of a recipient class.

3. DATA AND METHODOLOGY

3.1. Methodology

A stochastic process X = {X_n: $n \geq 0$} on a countable set S is a Markov Chain if, for any $i,j \in S$ and $n \geq 0$,

$$P\{X_{n+1} = j | X_0,...,X_n\}= P\{X_{n+1} = j | X_n\} \tag{1}$$

$$P\{X_{n+1} = j | X_n = i\}= p_{ij}. \tag{2}$$

The p_{ij} is the probability that the Markov chain jumps from state i to state j. These transition probabilities satisfy

$$\sum_{j \in S} p_{ij} = 1 \quad \forall i \in S$$

and the matrix P =(p_{ij}) is the transition matrix of the chain. Condition (1), called the Markov property, says that, at any time n, the next state X_{n+1} is conditionally independent of the past $X_0,...,X_{n-1}$ given the present state X_n. In other words, the next state is dependent on the past and present only through the present state. Condition (2) simply says the transition probabilities do not depend on the time parameter n; the Markov chain is therefore "time-homogeneous". (Serfozo, 2009, p.2). Four Markov models are constructed for each tax and best one for each tax is found. For the four models raw data of tax declaration rates are categorized into five, four, three and two categories by a grouped frequency distribution for each

model. Transition probability matrix is constructed and multiplied by the initial probability matrix to predict next year's probability matrix. Continuing on this procedure stationary probability matrix is found.

3.1.1. Construction of Transition Probabilities

Transition probability matrices are estimated for 2000-2015 for income tax, corporate tax and value added tax declaration rates. The estimator of the transition probabilities is the relative frequency of the actual transitions from phase *i* to phase *j*, i.e. the observed transitions have to be divided by the sum of the transitions to all other phases (Lipták, 2011, *p*.141).

In this paper,

$$p_{ij} = n_{ij} / \sum_j n_{ij} \text{ for } i, j = \text{A, B, C, D, E}$$

where n_{ij} is the number of observed transitions from *i* to *j*, $\sum_j n_{ij}$ is the sum of observed transitions from *i* to *j*.

Frequency distribution of the declaration rate intervals must be mutually exclusive (nonoverlapping) and class width must be equal for each interval (Bluman, 2014, *p*.45-46). Transition probabilities from X_i to X_j, *i, j* = 0,1,2,...,*m*, can be constructed at time *n* as the following matrix 0,1,2,...,*m*, can be constructed at time *n* as the following matrix

$$P_n = \begin{bmatrix} P_{11} & P_{12} & \cdots & P_{1m} \\ P_{21} & P_{22} & \cdots & P_{2m} \\ \vdots & \vdots & \vdots & \vdots \\ P_{m1} & P_{m2} & \cdots & P_{mm} \end{bmatrix} \tag{3}$$

3.1.2. Prediction

Declaration rates can be estimated for every year in the period of the study and can be predicted for the years after the last year in the period of the study. Given that data at time *n* is in state X_0 and that the data will be in one of states $X_n \in$ {1,2,...,*m*} at time *n*, then the data at time *n*+1 can be predicted. Given that transition probability matrix up to the year *n* is P_n and initial probability matrix for the year *n* is Q_n for *n* = 0, 1, 2,..., next year's probability distribution matrix can be estimated by

$$Q_{n+1} = Q_n P_n \tag{4}$$

Initial probability matrices for four Markov models are 1x*j* row matrices. For after the last year in the period declaration rates can be predicted by

$$\hat{Q}_{n+1} = \hat{Q}_n P_n \tag{5}$$

Prediction matrices have a limiting (stationary) matrix $\hat{Q}$, which can be written as

$$\lim_{n \to \infty} \hat{Q}_{n+1} = \hat{Q}. \tag{6}$$

3.1.3. Best of Four Markov Models

For every year of the sample and for every Markov model, mean square error (mse) is calculated by

$$\frac{1}{m} \sum_{i=1}^{m} (r_i - \hat{r}_i)^2 \tag{7}$$

where *m*: the number of states and *m* = 2,3,4,5, r_i: realized declaration rate in state *i* in the year *n*+1 and

$\hat{r}_i$: estimated declaration rate in state *i* in the year *n*+1.

Estimated matrix at time *n*+1 can be found by

$$Q_{n+1} = Q_n P_n = \begin{bmatrix} \hat{r}_1 & \hat{r}_2 & \hat{r}_3 & \cdots & \hat{r}_m \end{bmatrix}$$

where $Q_n = \begin{bmatrix} r_1 & r_2 & \cdots r_m \end{bmatrix}$: the initial probability matrix at time *n* for *m* states.

The sum of all mse (smse) for each model is calculated by

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$$\sum_{n+2}^{k} \frac{1}{m} \sum_{i=1}^{m} (r_i - \hat{r}_i)^2 \tag{8}$$

where *n* is the first year and *k* is the last year in the data.

The least sum MSE gives the best Markov model.

3.1.4. Statistical Significance of the Models

Variations between observed and expected frequencies can be tested by constructing a contingency table of frequency distribution of transitions between the states at 0.05 significance level with a degree of freedom.

To validate Markov model, for every year, the value of the χ^2 statistic is computed based on the null hypothesis, H_0: model is valid. At 0.05 level of significance and with the degrees of freedom, the χ^2 critical value and χ^2 test value are estimated. The null hypothesis is not rejected whenever χ^2 test value is less than the critical value. Test values are calculated by

$$\chi^2 = \sum_i (r_i - \hat{r}_i)^2 / \hat{r}_i \tag{9}$$

where *i*: the number of categories and *i*=1,…,*m*, r_i: actual probability, $\hat{r}_i$: expected probability

3.2. Data

According to Turkish Revenue Administration (TRA) Activity Report 2015, total tax revenue is 464,886,790,000 ₺, income tax collected is 105,393,946,000 ₺, corporate tax collected is 37,009,483,000 ₺, collected Value Added Tax (VAT) Included is 79,188,287,000 ₺ and collected VAT on imports is 74,387,089,000 ₺. (http://www.gib.gov.tr/fileadmin/user_upload/VI/GBG/Tablo_22.xls.htm accessed 08.08.2016). This data shows that the total of the three taxes is approximately 64% of the total tax revenue. Raw data of this study is extracted from inspection results in TRA Activity Reports for the years 2000-2015 (http://www.gib.gov.tr/kurumsal/ stratejik-yonetim/faaliyet-raporlari). Data is available as inspected tax base and base difference. Inspected tax base is the declared tax base or declared income. The quotient of declared income and actual income gives tax declaration rates in Table 2. Missing data for the years 2002 and 2010 are completed by regression in SPSS missing value analysis. Inspection results for the years 2000-2015 are used to construct Tables 3, 4 and 5 for tax declaration rates of income tax, corporate tax and VAT respectively. 2015 inspection results in Table 2 are used to find 2015 tax declaration rates (*X/B*) in Tables 3, 4 and 5.

3.2.1. Income Tax Declaration Rates

Income tax base inspected (declared amount) and base difference (difference between actual income and declared tax base) and declaration rates for the years 2000-2015 are given in Table 3. In the last sixteen years the highest rate in income tax declaration was 98.9% in 2011 and the lowest realized was 4.2% in 2006. Significant ups and downs are observed in the rate data over the given period.

3.2.2. Corporate Tax Declaration Rates

Corporate tax income declarations, base difference and declaration rates for years 2000-2015 are given in Table 4. In the last sixteen years the highest declared tax rate was 99.6% in 2011 and the lowest was 11.8% in 2007. Corporate tax declaration rates has significant ups and downs over the given period.

3.2.3. Value Added Tax Declaration Rates

VAT declarations, base difference and declaration rates for years 2000-2015 are given in Table 5. In the last sixteen years the highest declared tax rate was 96.5% in 2011 and the lowest was 23.7% in 2009. VAT declaration rates has significant jumps and falls over the given period.

Table 1 shows the descriptions of some symbols used in this article.

Table 1: Description of Symbols

Symbols	Description
M1	Markov model 1
M2	Markov model 2
M3	Markov model 3
M4	Markov model 4
Code	A state of declaration rate
A	Highest state of a declaration rate
P_n	Transition probability matrix for the

	year n
SY	Stationary year of tax declaration
df	Degree of freedom
$\hat{Q}$	Stationary probability matrix
Q_n	Initial probability matrix
$\chi^2_{0,05}$	Ki-square test value at 0.05 level of significance

Table 2: 2015 Tax Audit Results According To Turkish Tax Administration Audits

Tax Type	# of Tax Payers Audited	Declared Income X (000₺)	Base Difference B-X (000₺)	Tax Difference (000₺)	Calculated Tax (000₺)	Rate Declared X/B
Income	1,779	52,051	48,157	11,232	13,153	0.519
Corporate	491	38,046	27,709	5,190	5,529	0.579
VAT	2,104	1,229,173	464,869	41,539	57,313	0.726
Special	38	3,353	754	290	359	0.816
Bank Ins.	13	851	529	11	34	0.617
Stamp	44	59,354	110,599	1,871	1,888	0.349
Advance	1,066	32,711	81,930	8,874	9,069	0.285
Others	4,367	120,152	157,605	4,861	4,966	0.433
Total	9,902	1,535,689	892,152	73,868	92,310	0.6325

Source: TRA, Activity Reports, http://www.gib.gov.tr/kurumsal/stratejik-yonetim/faaliyet-raporlari (5.1.2016) (TRA 2000-2015).

Table 3: Income Tax Declaration Rates

Year	Declared Income X (₺) (1)	Base Difference $B - X$ (₺) (2)	Declaration Rate (%) (1) / (1)+(2)
2000	21,448,826	131,855,163	14
2001	16,029,993	112,399,579	12.5
2002	16,029,993[*]	131,855,163[*]	10.8
2003	53,664,347	98,700,897	35.2
2004	95,385,634	117,625,705	44.8
2005	82,221,251	187,773,866	30.5
2006	36,155,770	834,488,383	4.2
2007	73,393,391	553,781,491	11.7
2008	165,504,453	432,502,457	27.7
2009	52,452,224	217,014,074	19.5
2010	16,029,993[*]	18,476,344[*]	46.5
2011	1,586,197,618	18,430,305	98.9
2012	96,143,976	25,582,141	79
2013	19,523,920	18,476,344	51.4
2014	34,742,733	26,826,589	56.4
2015	52,050,730	48,157,004	51.9

Source: Own Elaboration, [*] Estimated by SPSS Missing Value Analysis- Regression

Table 4: Corporate Tax Declaration Rates

Year	Declared Income X (₺)	Base Difference $B - X$ (₺)	Declaration Rate (%)
2000	29,443,990	170,079,633	14.8
2001	71,369,019	144,037,269	33.1
2002	71,369,019[*]	312,024,421[*]	18.6
2003	91,985,678	312,024,421	29.5
2004	827,247,790	1,300,020,818	38.9
2005	516,441,597	1,292,700,622	28.5
2006	381,244,134	877,826,392	30.2
2007	222,611,118	1,658,821,068	11.8
2008	474,464,700	2,141,819,149	18.1
2009	2,246,755,090	5,217,618,792	30.1
2010	9,888,342[*]	10,625,315[*]	51.2
2011	4,251,799,781	18,600,315	99.6
2012	15,694,708	10,625,304	59.6
2013	9,888,342	9,435,351	51.2
2014	39,222,657	12,231,106	76.2
2015	38,045,708	27,709,318	57.9

Source: Own Elaboration, [*] Estimated by SPSS Missing Value Analysis- Regression

Table 5: VAT Declaration Rates

Year	Declared Income X (₺)	Base Difference B-X (₺)	Declaration Rate (%)
2000	243,428,422	105,167,009	69.8
2001	127,302,400	172,138,684	42.5
2002	243,428,422[*]	334,385,008[*]	42.1
2003	662,220,809	246,897,979	72.8
2004	1,385,551,886	1,530,445,020	47.5
2005	1,049,336,007	1,482,289,093	41.4
2006	1,746,829,450	507,541,737	77.5
2007	1,786,847,392	668,431,089	72.8
2008	399,139,277	481,729,811	45.3
2009	2,218,678,268	7,132,560,056	23.7
2010	1,385,551,886[*]	246,897,979[*]	84.9
2011	9,136,386,241	334,385,008	96.5
2012	3,746,260,371	274,356,674	93.2
2013	800,703,515	221,229,335	78.4
2014	2,246,873,937	255,122,508	89.8
2015	1,229,173,026	464,869,057	72.6

Source: Own Elaboration, [*] Estimated by SPSS Missing Value Analysis – Regression

4. FINDINGS AND DISCUSSIONS

Transition probability matrices with respect to Markov models, predictions and stationarity are calculated for the three taxes.

4.1. Income Tax

Income tax declaration rates from largest to smallest are classified as A, B, C, D, E in model 1, as A, B, C, D in model 2, as A, B, C in model 3 and as A and B in model 4. Income tax declaration rates, codes and transitions for all Markov models are shown in Table 7 for the years 2000-2015.

4.1.1.   Markov Models and Transition Probability Matrices

Classification of income tax declaration rates and transition probability matrices are given in Table 6. This table shows that declaration rates are over 52% in three categories of model 1, in two categories of model 2, in two categories of model 3 and in one category of model 4.

4.1.2.   Prediction

Given that 2015 income tax declaration rate which is 51.9% is in state C and that income tax will be in one of states A, B, C, D or E in 2016, income tax declaration rates for 2017 and later years are predicted by (5) and the predictions are given in Table 8.

4.1.3.   Stationarity

Limiting matrices are estimated in Excel by formula (6) for all models. According to four models, all probabilities become stationary in 2038, 2017, 2039 and 2036 respectively.

4.1.4. Statistical Significance of The Model

In model 1 of income tax, variations between observed and expected frequencies can be tested by constructing a contingency table of frequency distribution of transitions between the states at 0.05 significance level with 16 df. Since chi square test value 23.87 is less than critical value 26.296, H_0 is not rejected. This shows that there is no significant variations. The values in paranthesis in the Table 9 are expected frequencies which are found from (row sum x column sum)/total. Table 9 shows that transitions in higher realization states are declining and those in lower states rates are improving in model 1.

4.1.5. Technology

All calculations in this study are done using Excel and TI-36XPro. Prediction matrices and limiting matrices are estimated using Excel. The sum of mean square errors, classes of Markov models and all other simple calculations are done using TI-36XPro.

Table 6: Income Tax Markov Models and Transition Probability Matrices

Model 1		Transition Matrix					Model 2		Transition Matrix			
Classes (%)		A	B	C	D	E	Classes (%)		A	B	C	D
$80.2 \leq r$	A	0	1	0	0	0	$75.3 \leq r$	A	1/2	0	1/2	0
$61.2 \leq r \leq 80.1$	B	0	0	1	0	0	$51.6 \leq r \leq 75.2$	B	0	1	0	0
$42.2 \leq r \leq 61.1$	C	1/4	0	1/2	1/4	0	$27.9 \leq r \leq 51.5$	C	1/5	1/5	2/5	1/5
$23.2 \leq r \leq 42.1$	D	0	0	1/3	0	2/3	$r \leq 27.8$	D	0	0	2/7	5/7
$r \leq 23.1$	E	0	0	1/6	1/3	1/2						
Model 3		Transition Matrix					Model 4		Transition Matrix			
Classes (%)		A	B	C			Classes (%)		A	B		
$67.4 \leq r$	A	1/2	1/2	0			$51.6 \leq r$	A	3/4	1/4		
$35.8 \leq r \leq 67.3$	B	1/4	1/2	1/4			$r \leq 51.5$	B	1/11	10/11		
$r \leq 35.7$	C	0	2/9	7/9								

Source: Own Elaboration

Table 7: Classification of Income Tax Declaration Rates Based On Inspections By Audit Officers and Transitions Between States

Year	Declaration Rate X/B (%)	M1 Code	M1	M2 Code	M2	M3 Code	M3	M4 Code	M4
2000	14	E		D		C		B	
2001	12.5	E	EE	D	DD	C	CC	B	BB
2002	10.8	E	EE	D	DD	C	CC	B	BB
2003	35.2	D	ED	C	DC	C	CC	B	BB
2004	44.8	C	DC	C	CC	B	CB	B	BB
2005	30.5	D	CD	C	CC	C	BC	B	BB
2006	4.2	E	DE	D	CD	C	CC	B	BB
2007	11.7	E	EE	D	DD	C	CC	B	BB
2008	27.7	D	ED	D	DD	C	CC	B	BB
2009	19.5	E	DE	D	DD	C	CC	B	BB
2010	46.5	C	EC	C	DC	B	CB	B	BB
2011	98.9	A	CA	A	CA	A	BA	A	BA
2012	79	B	AB	A	AA	A	AA	A	AA
2013	51.4	C	BC	C	AC	B	AB	B	AB
2014	56.4	C	CC	B	CB	B	BB	A	AA
2015	51.9	C	CC	B	BB	B	BB	A	AA

Source: Own Elaboration

Table 8: Income Tax Declaration Rates Predictions for 2017

Declaration Interval (%)	M1	Declaration Interval (%)	M2	Declaration Interval (%)	M3	Declaration Interval (%)	M4
$r \leq 23.1$	0.17	$r < 27.8$	0	$r \leq 35.7$	0.32	$r \leq 51.5$	0.52
$23.2 \leq r \leq 42.1$	0.125	$27.9 \leq r \leq 51.5$	0	$35.8 \leq r \leq 67.3$	0.43	$51.6 \leq r$	0.48
$42.2 \leq r \leq 61.1$	0.33	$51.6 \leq r \leq 75.2$	1	$67.4 \leq r$	0.25		
$61.2 \leq r \leq 80.1$	0.25	$75.3 \leq r$	0				
$80.2 \leq r$	0.125						

Source: Own Elaboration

Table 9: Contingency Table of Observed and Expected Income Tax Declaration Rates of Model 1

	A	B	C	D	E	Total
A	0 (0.07)	1 (0.07)	0 (0.33)	0 (0.33)	0 (0.33)	1
B	0 (0.07)	0 (0.07)	1 (0.33)	0 (0.33)	0 (0.33)	1
C	1 (0.27)	0 (0.27)	2 (1.33)	1 (0.80)	0 (1.33)	4
D	0 (0.20)	0 (0.20)	1 (1)	0 (0.60)	2 (1)	3
E	0 (0.40)	0 (0.40)	1 (2)	2 (1.20)	3 (2)	6
Total	1	1	5	3	5	15

Source: Own Elaboration

4.2. Corporate Tax

Corporate tax declaration rates, codes and transitions for four Markov models are shown for the years 2000-2015 in Table 11.

4.2.1. Markov Models and Transition Probability Matrices

Table 10 shows that in three categories of model 1, in two categories of model 2 and model 3, in one category of model 4, declaration rates are over 58% between 2000 and 2015. Classification of corporate tax declaration rates and transition probability matrices are given in Table 10.

4.2.2. Prediction

Given that 2015 corporate tax declaration rate 57.9% is in state C and that corporate tax will be in one of states A, B, C, D or E in 2016, corporate tax declaration rates for 2017 and later years are predicted by (5) and the predictions for 2017 are given in Table 12.

4.2.3. Stationarity

Limiting matrices are estimated in Excel by formula (6) for all models of corporate tax. According to four models, all probabilities become stationary in 2038, 2041, 2037 and 2030 respectively.

4.2.4. Statistical Significance of The Model

In model 1 of corporate tax declarations, variations between observed and expected frequencies can be tested by constructing a contingency table of frequency distribution of transitions between the states at 0,05 significance level with 16 df. Since chi square test value 22,85 is less than critical value 26,296, H_0 is not rejected. This shows that there is no significant variations. The values in paranthesis in the Table 13 are expected frequencies which are found from (row sum X column sum)/total. Table 13 shows that transitions in higher realization states are declining and in lower states except D are improving in model 1.

Table 10: Corporate Tax Declaration Rates Markov Models and Transition Probability Matrices

Model 1		Transition Matrix					Model 2		Transition Matrix			
Classes (%)		A	B	C	D	E	Classes (%)		A	B	C	D
$82.2 \leq r$	A	0	0	1	0	0	$77.8 \leq r$	A	0	1	0	0
$64.6 \leq r \leq 82.1$	B	0	0	1	0	0	$55.8 \leq r \leq 77.7$	B	0	1/2	1/2	0
$47 \leq r \leq 64.5$	C	1/3	1/3	1/3	0	0	$33.8 \leq r \leq 55.7$	C	1/3	1/3	0	1/3
$29.4 \leq r \leq 46.9$	D	0	0	1/5	1/5	3/5	$r \leq 33.7$	D	0	0	2/9	7/9
$r \leq 29.3$	E	0	0	0	4/5	1/5						

Model 3		Transition Matrix			Model 4		Transition Matrix	
Classes (%)		A	B	C	Classes (%)		A	B
$70.4 \leq r$	A	0	1	0	$55.8 \leq r$	A	2/3	1/3
$41.1 \leq r \leq 70.3$	B	2/3	1/3	0	$r \leq 55.7$	B	1/6	5/6
$r \leq 41$	C	0	1/10	9/10				

Source: Own Elaboration

Table 11: Classification of Corporate Tax Declaration Rates Based On Inspections By Audit Officers and Transitions Between States

Year	Declaration Rates (%)	M1 Code	M1	M2 Code	M2	M3 Code	M3	M4 Code	M4
2000	14.8	E		D		C		B	
2001	33.1	D	ED	D	DD	C	CC	B	BB
2002	18.6	E	DE	D	DD	C	CC	B	BB
2003	29.5	D	ED	D	DD	C	CC	B	BB
2004	38.9	D	DD	C	DC	C	CC	B	BB
2005	28.5	E	DE	D	CD	C	CC	B	BB
2006	30.2	D	ED	D	DD	C	CC	B	BB
2007	11.8	E	DE	D	DD	C	CC	B	BB
2008	18.1	E	EE	D	DD	C	CC	B	BB
2009	30.1	D	ED	D	DD	C	CC	B	BB
2010	51.2	C	DC	C	DC	B	CB	B	BB
2011	99.6	A	CA	A	CA	A	BA	A	BA
2012	59.6	C	AC	B	AB	B	AB	A	AA
2013	51.2	C	CC	C	BC	B	BB	B	AB
2014	76.2	B	CB	B	CB	A	BA	A	BA
2015	57.9	C	BC	B	BB	B	AB	A	AA

Source: Own Elaboration

Table 12: Corporate Tax Declaration Rate Predictions for 2017

Declaration Interval (%)	M1	Declaration Interval (%)	M2	Declaration Interval (%)	M3	Declaration Interval (%)	M4
$r \leq 29.3$	0	$r < 33.7$	0.21	$r \leq 41$	0	$r \leq 55.7$	0.58
$29.4 \leq r \leq 46.9$	0	$33.8 \leq r \leq 55.7$	0.25	$41.1 \leq r \leq 70.3$	0.48	$55.8 \leq r$	0.42
$47 \leq r \leq 64.5$	0.78	$55.8 \leq r \leq 77.7$	0.46	$70.4 \leq r$	0.52		
$64.6 \leq r \leq 82.1$	0.11	$77.8 \leq r$	0.08				
$82.2 \leq r$	0.11						

Source: Own Elaboration

Table 13: Contingency Table of Observed and Expected Corporate Tax Declaration Rates of Model 1

	A	B	C	D	E	Total
A	0 (0.07)	0 (0.07)	1 (0.27)	0 (0.33)	0 (0.27)	1
B	0 (0.07)	0 (0.07)	1 (0.27)	0 (0.33)	0 (0.27)	1
C	1 (0.20)	1 (0.20)	1 (0.80)	0 (1)	0 (0.80)	3
D	0 (0.33)	0 (0.33)	1 (1.33)	1 (1.67)	3 (1.33)	5
E	0 (0.33)	0 (0.33)	0 (1.33)	4 (1.67)	1 (1.33)	5
Total	1	1	4	5	4	15

Source: Own Elaboration

4.3. Value Added Tax

For the years 2000-2015, VAT declaration rates, codes and transitions for four Markov models are shown in Table 15.

4.3.1. Markov Models and Transition Probability Matrices

Classification of VAT declaration rates and transition probability matrices are given in Table 14. This table shows that in two categories of model 1 and model 2, in one category of model 3 and model 4, declaration rates are over 72.6% between 2000 and 2015.

4.3.2. Prediction

Given that 2015 VAT declaration rate 72,6% is in state B and that income tax will be in one of states A, B, C, D or E in 2016, income tax declaration rates for 2017 and later years are predicted by (5). The predictions for 2017 are given in Table 16.

4.3.3. Stationarity

Limiting matrices are estimated in Excel by formula (6) for all models of VAT tax. According to four models, all probabilities become stationary in 2027, 2023, 2019 and 2021 respectively.

4.3.4. Statistical Significance of the Model

In model 2 of VAT, variations between observed and expected frequencies can be tested by constructing a contingency table of frequency distribution of transitions between the states at 0.05 significance level with 9 df. Since chi square test value 12.478 is less than critical value 16.919, H_0 is not rejected. This shows that there is no significant variations. The values in the paranthesis in Table 17 are expected frequencies which are found from (row sum X column sum)/total. Table 17 shows that transitions in higher declaration states are declining and in lower states are improving in model 2.

Table 14: VAT - Markov Models and Transition Probability Matrices

Model 1		Transition Matrix					Model 2		Transition Matrix			
Classes (%)		A	B	C	D	E	Classes (%)		A	B	C	D
$82.1 \le r$	A	1/2	1/2	0	0	0	$78.6 \le r$	A	1/2	1/2	0	0
$67.5 \le r \le 82$	B	1/5	1/5	0	3/5	0	$60.3 \le r \le 78.5$	B	1/5	1/5	3/5	0
$52.9 \le r \le 67.4$	C	0	0	0	0	0	$42 \le r \le 60.2$	C	0	1/4	1/4	1/2
$38.3 \le r \le 52.8$	D	1/5	1/5	0	2/5	1/5	$r \le 41.9$	D	1/2	1/2	0	0
$r \le 38.2$	E	1	0	0	0	0						
Model 3		**Transition Matrix**					**Model 4**		**Transition Matrix**			
Classes (%)		A	B	C			Classes (%)		A		B	
$72.3 \le r$	A	3/4	0	1/4			$60.2 \le r$	A	2/3		1/3	
$48 \le r \le 72.2$	B	0	0	1			$r \le 60.1$	B	1/2		1/2	
$r \le 47.9$	C	1/2	0	1/2								

Source: Own Elaboration

Table 15: Classification of VAT Declaration Rates Based On Inspections By Audit Officers and Transitions Between States

Year	Declaration Rate (%)	M1 Code	M1	M2 Code	M2	M3 Code	M3	M4 Code	M4
2000	69.8	B		B		B		A	
2001	42.5	D	BD	C	BC	C	BC	B	AB
2002	42.1	D	DD	C	CC	C	CC	B	BB
2003	72.8	B	DA	B	CB	A	CA	A	BA
2004	47.5	D	BD	C	BC	C	AC	B	AB
2005	41.4	D	DD	D	CD	C	CC	B	BB
2006	77.5	B	DB	B	DB	A	CA	A	BA
2007	72.8	B	BB	B	BB	A	AA	A	AA
2008	45.3	D	BD	C	BC	C	AC	B	AB
2009	23.7	E	DE	D	CD	C	CC	B	BB
2010	85.9	A	EA	A	DA	A	CA	A	BA
2011	96.5	A	AA	A	AA	A	AA	A	AA
2012	93.2	A	AA	A	AA	A	AA	A	AA
2013	78.4	B	AB	B	AB	A	AA	A	AA
2014	89.8	A	BA	A	BA	A	AA	A	AA
2015	72.6	B	AB	B	AB	A	AA	A	AA

Source: Own Elaboration

Table 16: VAT Declaration Rate Predictions for 2017

Declaration Interval (%)	M1	Declaration Interval (%)	M2	Declaration Interval (%)	M3	Declaration Interval (%)	M4
$r \leq 38.2$	0.12	$r \leq 41.9$	0.30	$r \leq 47.9$	0.33	$r \leq 60.1$	0.39
$38.3 \leq r \leq 52.8$	0.36	$42 \leq r \leq 60.2$	0.27	$48 \leq r \leq 72.2$	0	$60.2 \leq r$	0.61
$52.9 \leq r \leq 67.4$	0	$60.3 \leq r \leq 78.3$	0.29	$72.3 \leq r$	0.67		
$67.5 \leq r \leq 82$	0.26	$78.6 \leq r$	0.14				
$82.1 \leq r$	0.26						

Source: Own Elaboration

Table 17: Contingency Table of Observed and Expected VAT Declaration Rates of Model 1

	A	B	C	D	Total
A	2 (1.07)	2 (1.33)	0 (1.07)	0 (0.53)	4
B	1 (1.33)	1 (1.67)	3 (1.33)	0 (0.67)	5
C	0 (1.07)	1 (1.33)	1 (1.07)	2 (0.53)	4
D	1 (0.53)	1 (0.67)	0 (0.53)	0 (0.27)	2
Total	4	5	4	2	15

Source: Own Elaboration

- **Comparison of Predictions of Tax Declarations for 2017**

Given that 2015 tax declaration rate is in state A, B, C, D or E and will be in one of these states in 2016, declaration rate matrices are predicted for 2017 and later years by formula (5). Predictions for the three tax declaration rates are combined in Table 18.

- **A Better Model For Tax Revenues**

Sum of mean square errors for a better model of each tax is given in Table 19. Error values in bold indicates the better model.

- **Comparison of Initial Probability Matrices and Stationarity of Tax Declarations**

Stationary matrices for tax declarations are found for every model and are given in Table 20. Q_0 is initial probability matrix for the 2015 declaration rates of tax revenues and *SY* is the stationarity year when probability matrix becomes stable.

- **Statistical Significance of Markov Model**

In the present study, the validity of model is checked for the years 2011 and 2015. The degrees of freedom (df), χ^2 critical values, test values and hypothesis are given in Table 20. The null hypothesis is not rejected since χ^2 test value is less than the critical value. The values of the χ^2 test are less than χ^2 critical values for the years 2011 and 2015, which implies that the estimated declaration rates of tax revenues and the actual declaration rates of tax revenues are not significantly different. Table 21 results show that Markov model is valid.

Table 18: 2017 Prediction of Tax Declaration Rates Based on Inspections by Audit Officers

		A	B	C	D	E		A	B	C	D	E
Income Tax	M1	0.125	0.25	0.33	0.125	0.17	**Corporate Tax**	0.11	0.11	0.78	0	0
	M2	0	1	0	0			0.08	0.46	0.25	0.21	
	M3	0.25	0.43	0.32				0.52	0.48	0		
	M4	0.48	0.52					0.42	0.58			
VAT	M1	0.23	0.29	0	0.36	0.12						
	M2	0.14	0.29	0.27	0.30							
	M3	0.67	0	0.33								
	M4	0.61	0.39									

Source: Own Elaboration

Table 19: Tax Declarations SMSE

Tax Revenues	Sum of Mean Square Errors (SMSE)			
	Model 1	Model 2	Model 3	Model 4
Income tax	**3.44**	3.68	4.15	7.59
Corporate tax	**3.45**	4.71	5.02	6.56
Vat	3.86	**3.32**	3.66	4.47

Source: Own Elaboration

Table 20: Stationary Matrices of Tax Declarations

	Markov Model 1			Markov Model 2		
Tax Revenues	Q_n	$\lim_{n\to\infty}\hat{Q}_{n+1}=\hat{Q}$	SY	Q_n	$\lim_{n\to\infty}\hat{Q}_{n+1}=\hat{Q}$	SY
Income tax	0 0 1 0 0	.10 .10 .39 .18 .24	2038	0 1 0 0	0 1 0 0	2017
Corporate tax	0 0 1 0 0	.20 .20 .60 0 0	2038	0 1 0 0	.08 .32 .24 .36	2041
Vat	0 1 0 0 0	.35 .29 0 .29 .06	2031	0 1 0 0	.27 .33 .27 .13	2023
	Markov Model 3			Markov Model 4		
	Q_n	$\lim_{n\to\infty}\hat{Q}_{n+1}=\hat{Q}$	SY	Q_n	$\lim_{n\to\infty}\hat{Q}_{n+1}=\hat{Q}$	SY
Income tax	0 1 0	.19 .38 .43	2039	1 0	0,27 0,73	2036
Corporate tax	0 1 0	.40 .60 0	2037	1 0	0,33 0,67	2030
Vat	1 0 0	.67 0 .33	2020	1 0	0,60 0,40	2021

Source: Own Elaboration

Table 21: Validity of Tax Declarations

		2011				2015		
Tax Revenues	Df	$X^2_{0,05}$ Critical Value	$X^2_{0,05}$ Test Value	H_0: Valid	df	$X^2_{0,05}$ Critical Value	$X^2_{0,05}$ Test Value	H_0: Valid
Income tax	1	3.841	1	Accept	2	5.991	2	Accept
Corporate tax	1	3.841	2	Accept	1	3.841	1	Accept
Vat	2	3.841	3	Accept	2	5.991	1	Accept

Source: Own Elaboration

Table 22: Tax Declaration Predictions For 2017 According to State B of Better Models

Tax Declarations	Better Markov Model	Declaration Rate r (%)	Probability (%)	1 – Probability (%)
Income tax	1	B or higher $61.2 \le r$	37.5	62.5
Corporate tax	1	B or higher $64.6 \le r$	22	78
Vat	2	B or higher $60.3 \le r$	43	57

Source: Own Elaboration

Table 23: Comparison of 2017 Predictions To Stationary Matrices According to Better Models

Tax Revenues	Better Markov Model	2017 Prediction	Stationary Matrix	$E(\hat{Q}_{17})$	SY
Income tax	1	.125 .25 .33 .125 .17	.10 .10 .39 .18 .24	52,3	2038
Corporate tax	1	.11 .11 .78 0 0	.20 .20 .60 0 0	61,6	2038
Vat	2	.14 .29 .27 .30	.27 .33 .27 .13	62,8	2023

Source: Own Elaboration

Original data shows that the highest base differences for income tax and VAT are 834,488,383 ₺ and 7,132,560,056 ₺ which occur at the lowest declaration rates 4.2% in 2006 and 23.7% in 2009 respectively. The highest base difference for corporate tax is 5,217,618,792 ₺ which occurs at the declaration rate 30.1% in 2009. According to contingency tables 9, 13 and 17 transitions of income tax, corporate tax and VAT declaration rates are declining in higher states and improving in lower states. 2017 predictions of declaration rates with respect to state B of the better models are given in Table 22.

According to model 1 of income tax declaration rates, the probabilities of five states will be stable in 2038. Income tax declaration rates more likely will be less than 61.2% in 2017. However, in the long run income tax declaration rates would be in states D or E (less than 2015 realization rate) with a probability of approximately 42%. A decrease of at least 19.2% which is approximately 20,267,260,000 ₺ from 2015 to 2038. This may cause a revenue deficiency to TRA. Probability of income tax declaration rate greater than 80.2% is declining from 12.5% in 2017 to a stable 10%, that of between 61.2% and 80.1% is declining from 25% in 2017 to a stable 10% and that of $42.2 \leq r \leq 61.1$ is improving from 33% to a stable 39%. Similarly, other tax revenues predictions are compared in Table 23.

A similar discussion for VAT can be given. VAT declaration rates more likely will be less than 60.3% in 2017. However, in the long run VAT declaration rates would be in states C or D (less than 2015 realization rate) with a probability of approximately 40%. A decrease of at least 17.1% which is approximately 26,248,500,000 ₺ from 2015 to 2023. This may also cause a revenue deficiency to TRA. Therefore income tax and VAT audits should be increased by TRA. This was proposed as the only measure to be taken by TRA in "Payment Strategies in Corporate Tax: A Mathematical Analysis" study by Mavruk and Kıral (2017). However a stability or improvement is expected in corporate tax declarations from 2015 to 2038.

Income tax declaration rate was realized in state C in 2015. We predict that it improves to state B in 2017 with a probability of 25% which declines to a stable 10% probability in 2038. Corporate tax declaration rate was also realized in state C in 2015. It improves to state B in 2017 with a probability of 11% which improves to a stable 20% probability in 2038. VAT declaration rate was realized in state B in 2015. It would stay in the same state in 2017 with a probability of 29% which improves to a stable 33% probability in 2023.

The probability of income tax declaration rate greater than or equal to 0.612 would be stable at 10% by the year 2038, the probability of corporate tax declaration rate greater than or equal to 0.646 would be stable at 20% by the year 2038 and the probability of VAT declaration rate greater than or equal to 0.603 would be stable at 27% by the year 2023. Expected declaration rates of income tax, corporate tax and VAT in 2017 are estimated to be 52.3%, 61.6% and 62.8%, respectively.

5. CONCLUSION

Tax declaration rates are predicted with respect to the results of audits provided by TRA based on 2000-2015 data. In the original data base differences has the highest values at the lowest declaration rates for two taxes. Therefore, the more tax declared by the taxpayer, the more tax revenues will be collected by the tax administration. Transition matrices show that transitions of tax declarations are declining in higher states and improving in lower states. According to prediction results all tax declaration rates more likely will be in state C or lower in 2017 according to better Markov models, and more likely will be stationary in state C or lower except VAT. Income tax and VAT payoffs may substantially decrease from 2015 to 2038 and 2023 respectively. This may also cause a revenue deficiency to TRA. Therefore income tax and VAT audits should be increased by TRA. Even though tax revenues increase over time, the declaration rates show a decreasing to stationary or increasing to stationary behavior. Observed and expected declaration rates were not significantly different from each other according to Markov model 1 of income and corporate tax and Markov model 2 of VAT. Validity of the models were checked for the years 2011 and 2015 and models are found to be valid. Declaration rate predictions can be used by the TRA to take some measures against tax evasion and for tax policy revision. Central government can take the advantages of this study in the planning and improvement of tax collection process. For future studies tax payoff rates can be analyzed and predicted. This study can also be used to predict tax declaration rates of other tax revenues.

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DETERMINATION OF THE SEAFOOD EXPORT COMPETITIVENESS: THE COMPARATIVE ANALYSIS OF TOP TEN COUNTRIES HAVING LION SHARE FROM SEAFOOD EXPORT

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ABSTRACT

Purpose- The main aim of this paper is to examine the countries' sectoral competitiveness on seafood export. By this study, it is tried to find out whether the countries having great share of seafood export also have got competitiveness in export or not.
Methodology- Therefore, top ten countries that have the biggest share in the seafood export worldwide are chosen and the Standard International Trade Classification (SITC) Revision 3 product groups are used to analyse by Revealed Comparative Advantage (RCA) method.
Findings- The findings of the analysis have surprisingly showed that Vietnam, Denmark and Chile which have lower-shares of global seafood export also have specialization and comparative advantage on seafood export while the USA with higher-share has competitiveness disadvantage with no specialization.
Conclusion- The countries with high-export numbers have not as competitive as it was expected in the seafood trade.

Keywords: Competitiveness, revealed comparative advantage (RCA), seafood, export-import ratio, the net export index
JEL Codes: F10, F14, F68

1. INTRODUCTION

With the globalisation of world economy, competitiveness has become a significant term. Economic might and comparative advantage of a country compare to other countries by macroeconomic indicators such as gross domestic products (GDP), GDP per capita and exports. As a result of this, micro dimensions have been ignored while comparing countries' economic performance. When we have a look at competitiveness in global level, however, it has been mostly worked by micro level that is based on indicators obtained from firms or industries than macro variables. Accordingly, if a country wants to be one of the leading countries in international export, that country should benefit from product-based and sector based comparative analysis and need to choose the right policy in right time. From their analysis of 27 countries, Sener and Saridogan (2011:825) find that countries "science-technology-innovation based economic policies and strategies have great superiority and sustainable competitive advantage in not only global competitiveness but also economic growth and development leading to wealth and welfare of the country." Thus, in this paper, top ten countries[1] with the biggest share in the world-seafood-export have been chosen to demonstrate their competitiveness for 20 years, from 1995 to 2014. In this context, "03- Fishes and Other Sea Products" classification including three digits (034, 035, 036, 037) is used in accordance

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[1]Those countries' export data can be found in Appendix 1

with Standard International Trade Classification (SITC).[2] The data we used for the analyses are drawn from the United Nations Commodity Trade Statistics (UN COMTRADE Database). In the article, the following indicators are calculated by: (1) The export index of revealed comparative advantage (Balassa's RCA); (2) The Net Export Index (NX=NEI); (3) The Export-Import Ratio; (4) The index of trade openness index (ITO).

2. DATA AND METHODOLOGY

Among many other indexes that measure structural competitiveness between countries, Revealed Comparative Advantages (RCA) index, which is developed by Balassa in 1965, has been the most prominent one. Balassa's index tries to reveal whether a country has comparative advantage in certain goods or not. In this context, the index can be defined as to divide the exports of a good within the country's total exports to the same goods' share in the total exports of the world. In other words, it compares the country's domestic specialization in a specific good with the world's specialization (Beningo and Sloboda, 2006:6). For instance, in the famous book written by Michael Porter in 1990, The Competitive Advantage of Nations, he used the Balassa Index to find a country's powerful sector; exceeding 1 means strong in the sector and exceeding 2 is stronger (Hinloopen and Marrewijk, 2001:1).

The RCA index it is "compares the export share of a given sector in a country with the export share of that sector in the world market as follows":

$$\text{RCA}^j_{kt} = \frac{X^j_{kt} / X^j_t}{X^w_{kt} / X^w_t}$$

The numerator represents the percentage share of a given sector in national exports, where the exports of sector k from country j; are the total exports of country j at time t. The denominator represents the percentage share of a given sector in the total world exports where are the world exports of sector k, and are the total world exports at time t. Therefore, if the RCA index results equal to 1 for a certain sector in a given country, it means the sector's export share is alike with the world's average. To say the country has relative comparative advantage in the sector, RCA must be above 1 (1<RCA<∞); if RCA is below 1 (0<RCA<1), it means the country has a relative weakness in the sector (Mykhnenko, 2005:27).

Balassa's RCA index can be detailed in four classifications to illustrate how strong a country in terms of having comparative advantage in a sector as follows (Hinloopen and Marrewijk, 2001:13 - Erkan and Saricoban, 2014:121):

Classification 1 → 0 < RCA ≤ 1; There is no comparative advantage.

Classification 2→ 1 < RCA ≤ 2; There is a weak comparative advantage.

Classification 3→ 2 < RCA ≤ 4; There is moderate comparative advantage.

Classification 4→ 4 < RCA; There is a strong comparative advantage.

lnRCAjkt = ln

If logarithms are applied to the RCA index, there are two results come out; lnRCA > 0 means there is a comparative advantages and lnRCA < 0 means there is a comparative disadvantage (Faustino, 2008:7).

2.1. The Net Export Index (NX=NEI)

The Net Export Index, also named as Normalized Trade Balance (NTB), is used to demonstrate comparative advantage in production by given difference between exports and imports (Xinhua, 2008:35). The Net Export Index considers intra-industry trade and import. The index that is also known as an alternative Relative Comparative Advantage Index is only calculated in order to evaluate a country's own performance.

When net exports divided by the total amount of exports and imports of a certain industry, the result gives net export index (Balassa and Noland, 1989b:175).

$$\text{NX}^j_{kt} = \frac{X^j_{kt} - M^j_{kt}}{X^j_{kt} + M^j_{kt}}$$

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[2] This classification of product groups can be found in the Appendix 2.

Where while the product export is showed by X and commodity imports is showed by M, subscript k represents industry at the time t and superscript j refers to country. Moreover, NX value is ranged from -1 to +1; when NTB equals to -1, the country has no competitiveness and solely imports the commodity and if NX is near +1, it means the country has high international competitiveness in the product (Xinhua, 2008: 35). To sum up, negative value of NTB means imports are more significant for the country while positive value of it demonstrate exports' importance.

2.2. The Export-Import Ratio

In some studies, it is criticized that the indexes which aimed to determine competitiveness is including only export data in their works. However, competitiveness is not only merely about countries' exports but also about their imports, thus, while someone measuring competitiveness of a country should use an approach which takes both export and import into account (Bowen, 1983: 464-472). The export-import ratio can be calculated by dividing a country's export-import ration of a certain sector to/by the world's. The export-import ratio which is also experimented with a simple by Balassa in 1965 can be calculated as follows:

$$RCA^j_k = \frac{X^j_{kt} / X^j_t}{M^j_{kt} / M^j_t}$$

"Where and refer respectively to exports and imports of industry k and country j; and refer respectively to world exports and world imports of industry j." The index developed by Balassa (1977) explains a country's economic performance on a given good (sector) and its competitiveness. When RCAjkt < 1, it means the country has comparative disadvantage of the good "k"; if RCAjkt > 1, the country has comparative advantage of it (Balassa, 1977: 327-344).

The same index can be explained with logarithm as follows:

$$lnRCA^j_{kt} = ln \frac{X^j_{kt} / X^j_t}{M^j_{kt} / M^j_t}$$

In this case, positive index gives comparative advantage while negative refers to comparative disadvantage. To sum up with a chart:

$\underline{lnRCA^j_{kt} > 0,50}$	→	Competitiveness is strong.
$\underline{lnRCA^j_{kt} < -0,50}$	→	Competitiveness is weak.
$\underline{0.50 > lnRCA^j_{kt} > -0,50}$	→	Competitiveness is marginal.

2.3. The Index of Trade Openness (ITO)

The trade openness index, which can be stated as the trade-to-GDP ratio, is generally compared the significance of international transactions to domestic transactions. Therefore, the index is defined as the simple average of every country's total trade, i.e. the average mean of total amount of exports and imports of goods and services, relative to GDP. This indicator is also known as trade openness, even though "openness" may not be accurate term to use to name the situation since a country could have a low ratio, but it may be result of factors such as the economy size or geopolitical state of the country not arise from high barriers to foreign trade such as tariffs or non-tariffs (OECDiLibrary, 2015).

Moreover, the trade openness index is as important as indices of RCA since it is also demonstrated the competitiveness of countries, that can be formulated as follows:

ITO = (X + M / GDP) × 100   → Takes values between 0 and + ∞.

When the sum of exports and imports divided by GDP, the result gives the trade-to-GDP-ratio which shows the openness of a country and its level of integration into the global economy. Additionally, the index exposes the weight of total trade within the country's economy, the domestic productions share and its harmony in the foreign markets in terms of country's exports; and the level of dependence on the domestic demand on the supply of foreign goods and services for its imports. (Department for Business Innovation&Skills, 2013).

To see how integrated a country into the world economy; it is useful to look at the aggregate value of international trade of goods and services. Hence, it is usually seen that small countries are more integrated than big ones as their exports are generally being in a limited number of sectors so they need to import much more goods and services to meet domestic

demand. However, size is not the only criteria to decide how integrated a country is. There are more determinants such as "geography, history, culture, trade policy, structure of the economy (in particular the weight of non-tradable services) and integration in global production chains, where measured trade may include a significant proportion of re-exports and intra-firm trade linked to the presence of multinational firms" (OECDiLibrary, 2015).

3. EMPIRICAL ANALYSIS

3.1. The Index of Trade Openness (ITO)

The Index of Trade Openness illustrates the ratio of the sum of exports and imports of a country's GDP. While bigger ratio means the country is becoming more open to the external world and becomes more dependent to foreign trade, the smaller ratio shows country less open and it's not rely on foreign trade that much. In the table 1, the countries' trade openness index is shown. Once look at the table in detail, countries' ITO has been differed year by year. Having looked at the bigger picture, it can be realized that Netherlands, Thailand and Vietnam are outstanding among others in terms of dependency on foreign trade.

Table 1: The Index of Trade Openness

	1995	1998	2001	2004	2008	2011	2014
USA	18	18	18	19	24	24	23
China	38	32	38	59	56	49	42
Denmark	50	53	58	56	64	61	61
Netherlands	75	75	97	93	111	115	123
Spain	33	40	43	41	43	44	48
Canada	59	66	66	58	56	50	52
Norway	49	51	53	50	57	50	47
Chile	43	40	48	57	71	62	58
Thailand	75	84	105	110	122	123	113
Vietnam	-	77	89	118	145	150	160

Source: It is derived by using COMTRADE & IMF data.

3.2. The Export Index of Revealed Comparative Advantage (RCA, LNRCA)

Balassa's RCA, which is also named as the export index of revealed comparative advantage, is calculated for (selected) countries and four product groups that are classified in Standard International Trade Classification (SITC). Therefore, in the Table 2, it is shown that the RCA and lnRCA results from the calculation which is derived by trimmed mean[3] for the course of 20 years from 1994 to 2014.

Table 2: RCA (Balassa's) Values of Selected Countries

	USA		China		Denmark		Netherlands		Spain	
	1995-2014		1995-2014		1995-2014		1995-2014		1995-2014	
	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA
034	0,76	-0,27	1,29	0,26	4,88	1,58	1,09	0,09	2,00	0,69
035	0,19	-1,65	0,80	-0,22	10,14	2,32	0,58	-0,54	1,16	0,15
036	0,46	-0,78	1,10	0,10	2,71	1,00	0,64	-0,45	1,70	0,53
037	0,27	-1,29	2,80	1,03	5,31	1,67	0,84	-0,17	1,92	0,65
	Canada		Norway		Chile		Thailand		Vietnam	
	1995-2014		1995-2014		1995-2014		1995-2014		1997-2014*	
	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA
034	1,00	0,00	13,75	2,62	15,10	2,71	1,42	0,35	6,16	1,82

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[3] Trimmed mean: It is obtained by taking out the smallest and the biggest RCAs from the twenty RCAs that is attained form 20 years' data and then the sum of rest -eighteen RCAs- divided by eighteen to get trimmed mean of RCA for the period of 1994-2013.

035	1,48	0,39	22,95	3,13	4,80	1,57	1,30	0,26	4,63	1,53
036	2,42	0,88	0,36	-1,02	1,89	0,64	7,86	2,06	23,15	3,14
037	0,79	-0,23	1,36	0,31	5,30	1,67	16,80	2,82	5,85	1,77

Source: It is derived by using COMTRADE & IMF data.
*1995-96 foreign trade data of Vietnam were not available.

Table 3: The Evaluation of RCA Values

	USA	China	Denmark	Netherlands	Spain
	1995-2014	1995-2014	1995-2014	1995-2014	1995-2014
	Advantage	Advantage	Advantage	Advantage	Advantage
034	no	weak	strong	weak	weak
035	no	no	strong	no	weak
036	no	weak	moderate	no	weak
037	no	moderate	strong	no	weak

	Canada	Norway	Chile	Thailand	Vietnam
	1995-2014	1995-2014	1995-2014	1995-2014	1997-2014
	Advantage	Advantage	Advantage	Advantage	Advantage
034	no	strong	strong	weak	strong
035	weak	strong	strong	weak	strong
036	moderate	no	weak	strong	strong
037	no	weak	strong	strong	strong

Source: It is derived by using data from Table 2.

We compose the table 3 to summarize the findings of table 2 and to follow the meaning of RCA values easily. In this context, we also can use the chart below to show what RCA values mean to us:

Classification 1 → 0 < RCA ≤ 1;   There is no comparative advantage. (NO)

Classification 2→ 1 < RCA ≤ 2;   There is a weak comparative advantage. (WEAK)

Classification 3→ 2 < RCA ≤ 4;   There is a moderate comparative advantage. (MODERATE)

Classification 4→ 4 < RCA;   There is a strong comparative advantage. (STRONG)

In addition, it can be stated that a positive lnRCA illustrates comparative advantages while a negative lnRCA reflects comparative disadvantages. As it is clearly seen from the table 3, the most striking result is the USA, which is the biggest 4th of the sea-food exporters list (APP 1), has no comparative advantages for any product class of four. Thus, the result shows that although the USA has a big share of the seafood export, it has no comparative advantages as well as specialisation on the production of these goods.

Second salient point is Vietnam's high RCA values. Especially in the group of 036, the country shows high specialisation as much as having comparative advantages. Furthermore, Vietnam has strong comparative advantages for all of four groups since it has bigger RCA than 4 for each good group. This result indicates something important; Vietnam is specialised in seafood exports. Another interesting outcome is while China is holding the biggest share of the seafood exports (shown in APP 1); it has no comparative advantages on these groups. As a matter of fact, it is quite intriguing to see there is a comparative disadvantage on the group of 035 and obviously there is no specialisation on the production of these goods as well. Besides that, there are weak comparative advantages on the groups of 034 and 036 whilst group of 037 has a moderate comparative advantage. For Chile, even though being the 9th on the list, it is seemed that the country has strong comparative advantages on three groups (034, 035, 037) and a weak comparative advantage on the last one (036). In general terms, Chile has comparative advantages and it is specialised on the seafood exports. Moving on to Norway gives us another interesting result. As it can be seen in the APP 1 Norway is the second largest economy exporting seafood internationally and expected to have strong comparative advantages and to specialise on the export of all groups. Norway,

however, has strong comparative advantages on only two, a weak comparative advantage on one of them and disadvantage on the last one, which are 034 and 035, 037 and 036 respectively. It means the country has comparative advantages on the groups of 034, 035 and 037 and specialise on them while it has no advantages on 036-good-group.

Denmark has strong comparative advantages for three groups (034, 035, and 037) and moderate on one (036). It shows Denmark has comparative advantage in general and specialises on the production of these goods. Spain has weak comparative advantages on all and Thailand has weak comparative advantages on 034 and 035 and strong on the other two. For Canada, it is seen that the country has weak comparative advantage on 035, moderate on 036 while has comparative disadvantages on 034 and 037.

The following graphs are composed by using lnRCA values from table 2 to compare countries' competitiveness.

Graph 1: Comparing lnRCA values of group 034
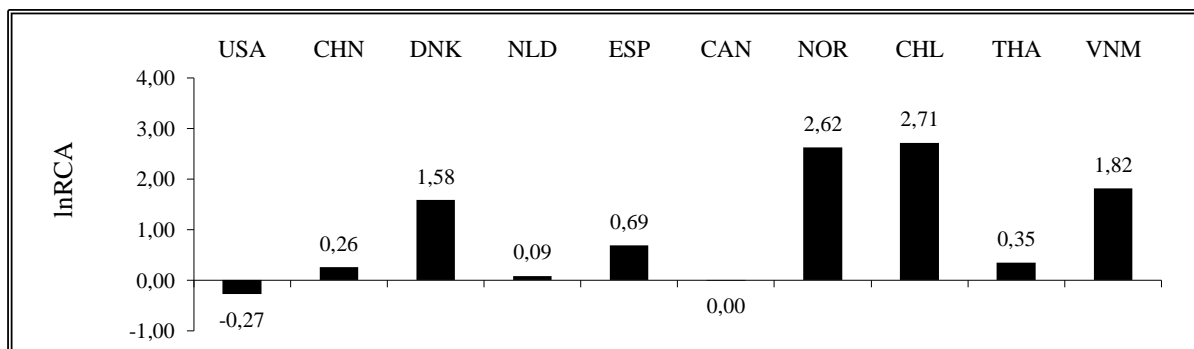
Once the graph 1 examined, it is seen that all countries have comparative advantages in the seafood exports but the USA and Canada. Chile, by 2,71 RCA value, is the most competitive country among chosen countries.

Graph 2: Comparing lnRCA values of group 035
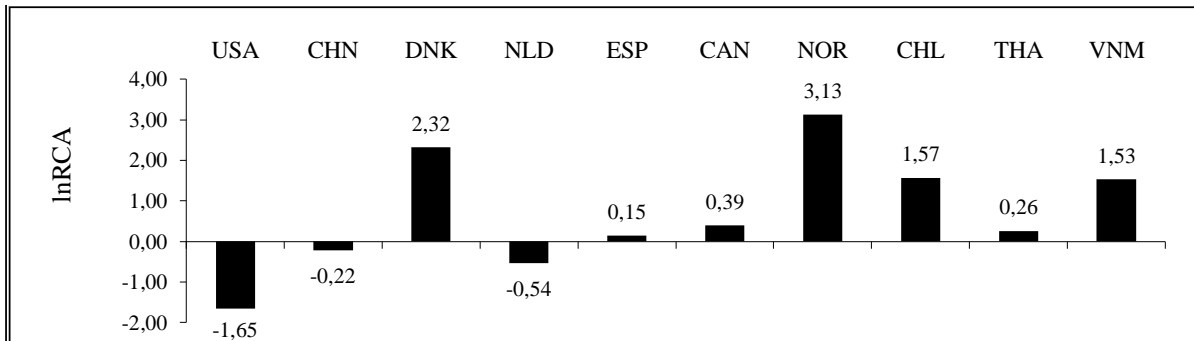
For graph 2, it can be seen that Norway with 3,13 RCA is the most competitive country among all countries shown for group 035 and it is followed by Denmark by 2,32 RCA and Chile by 1,57 RCA. Nonetheless, the USA, China and Netherland have comparative disadvantages.

Graph 3: Comparing lnRCA values of group 036
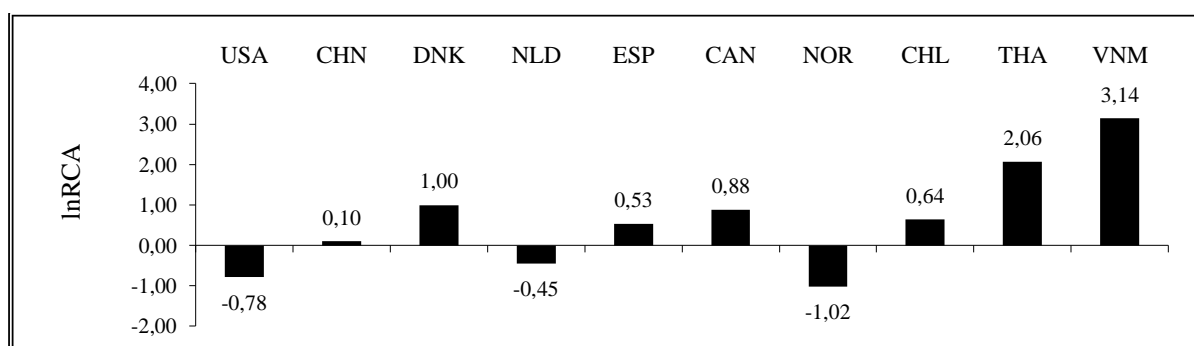
In the graph 3, Vietnam has been the most competitive, the second is Thailand and the third is Denmark by 3,14 RCA, 2,06 RCA and 1,00 RCA respectively. However, the USA, Norway and Netherland have comparative disadvantages.

Graph 4: Comparing lnRCA values of group 037
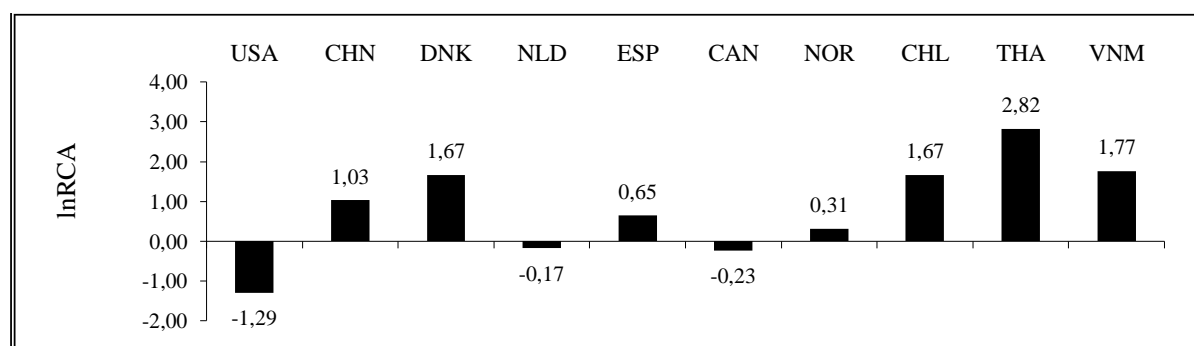
The last group 037 is demonstrated in the graph 4, which shows us the most competitive countries and countries with comparative disadvantages. For the former; not surprisingly Thailand (2,82 RCA) is the most competitive one while Vietnam (1,77) is the second and Chile (1,67) and Denmark (1,67) are the third. For the latter, the USA like in the other three groups has disadvantages, Canada and Netherland as well.

3.3. The Export-Import Ratio Index

Among others, it has also been argued that including imports as well as exports into the measurements would give better results to evaluate a country's competitiveness (Bowen, 1983:464-472). In this context, the export-import index which is developed by Balassa (1965) has been used with the purpose of detecting a country's specialisation on whether export or import.

Being specialised (or having comparative advantage) means revealed comparative advantage (RCA) is bigger than 1 (RCA>1) and lnRCA is positive. Otherwise, it refers that there is no specialisation (or having comparative disadvantages). In the light of export and import data of the countries, their values of specialisation and competitiveness is summarised in the table 4 and 5 below.

   If RCA>1, there is specialisation (Advantage).

   If RCA<1, there is no specialisation (Disadvantage).

   If LnRCA > 0, there is specialisation.

   If LnRCA <0, there is no specialisation.

Table 4: The Export-Import Ratio Index

	USA		China		Denmark		Netherlands		Spain	
	1995-2014		1995-2014		1995-2014		1995-2014		1995-2014	
	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA
34	0,89	-0,12	1,55	0,44	1,24	0,22	1,30	0,27	0,74	-0,30
35	0,59	-0,52	7,57	2,02	3,93	1,37	0,85	-0,16	0,43	-0,85
36	0,28	-1,27	2,29	0,83	1,44	0,37	1,29	0,25	0,39	-0,94
37	0,26	-1,35	100,34	4,61	1,62	0,48	1,23	0,21	1,59	0,46
	Canada		Norway		Chile		Thailand		Vietnam	
	1995-2014		1995-2014		1995-2014		1995-2014		1997-2014*	
	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA	RCA	lnRCA
34	1,65	0,50	9,08	2,21	304,56	5,72	0,48	-0,73	22,85	3,13
35	3,06	1,12	47,86	3,87	412,77	6,02	12,28	2,51	44,03	3,78
36	2,43	0,89	0,66	-0,42	14,80	2,69	7,90	2,07	38,43	3,65
37	1,01	0,01	1,44	0,36	6,88	1,93	100,73	4,61	127,64	4,85

Source: It is derived by using COMTRADE data.

*1995-96 foreign trade data of Vietnam is not available.

Table 5: The Export-Import Ratio Index' Interpretation

	USA	China	Denmark	Netherlands	Spain
	1995-2014	1995-2014	1995-2014	1995-2014	1995-2014
	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.
34	Disadvantage	Advantage	Advantage	Advantage	Disadvantage
35	Disadvantage	Advantage	Advantage	Disadvantage	Disadvantage
36	Disadvantage	Advantage	Advantage	Advantage	Disadvantage
37	Disadvantage	Advantage	Advantage	Advantage	Advantage
	Canada	Norway	Chile	Thailand	Vietnam
	1995-2014	1995-2014	1995-2014	1995-2014	1997-2014
	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.
34	Advantage	Advantage	Advantage	Disadvantage	Advantage
35	Advantage	Advantage	Advantage	Advantage	Advantage
36	Advantage	Disadvantage	Advantage	Advantage	Advantage
37	Advantage	Advantage	Advantage	Advantage	Advantage

In the table 5, it is seen that the results are very parallel to the outcomes of Balassa Index shown in table 3 and 4. For instance, the USA still has disadvantages in four product class according to this index too and there is no specialisation. For Vietnam, the result of this index is again backed up by Balassa index and has advantages and specialised in four product class. However, China seems specialised in all four unlike it is in Balassa Index' result. That means; China has been specialised by exporting more seafood than its imports. Similarly, Denmark, Chile, and Canada have specialised on four product class as well.

3.4. The Net Export Index (NEI)

The Net Export Index takes intra-industry trade and imports into account. Net Export Index, also known as an alternative revealed comparative advantage index, is used in order to calculate only the country's own performance. It can be noted that the value of NEI is between -1 and +1. Different values' meaning could be shown as follows;

> If NEI is -1, it means the country only imports the commodity,
>
> If NEI is near +1, it has high international competitiveness in the product,
>
> If RCA>1 There is specialisation (Advantage).
>
> If RCA<1 There is no specialisation (Disadvantage).

Table 6: The Net Export Index (NEI)

	USA	China	Denmark	Netherlands	Spain
	1995-2014	1995-2014	1995-2014	1995-2014	1995-2014
	RCA	RCA	RCA	RCA	RCA
34	-0,29	0,27	0,16	0,18	-0,28
35	-0,47	0,67	0,62	-0,07	-0,51
36	-0,70	0,42	0,23	0,17	-0,54
37	-0,72	0,98	0,28	0,14	0,08

	Canada	Norway	Chile	Thailand	Vietnam
	1995-2014	1995-2014	1995-2014	1995-2014	1997-2014*
	RCA	RCA	RCA	RCA	RCA
34	0,28	0,85	0,99	-0,36	0,84
35	0,52	0,97	0,99	0,84	0,93
36	0,44	0,02	0,87	0,76	0,90
37	0,04	0,25	0,72	0,97	0,98

Source: It is derived by using COMTRADE data.
*1995-96 foreign trade data of Vietnam were not available.

Table 7: The Net Export Index (NEI) Summarize

	USA	China	Denmark	Netherlands	Spain
	1995-2014	1995-2014	1995-2014	1995-2014	1995-2014
	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.
34	Disadvantage	Advantage	Advantage	Advantage	Disadvantage
35	Disadvantage	Advantage	Advantage	Disadvantage	Disadvantage
36	Disadvantage	Advantage	Advantage	Advantage	Disadvantage
37	Disadvantage	Advantage	Advantage	Advantage	Advantage
	Canada	Norway	Chile	Thailand	Vietnam
	1995-2014	1995-2014	1995-2014	1995-2014	1997-2014
	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.	Adv./Disadv.
34	Advantage	Advantage	Advantage	Disadvantage	Advantage
35	Advantage	Advantage	Advantage	Advantage	Advantage
36	Advantage	Advantage	Advantage	Advantage	Advantage
37	Advantage	Advantage	Advantage	Advantage	Advantage

_____

According to table 7, in intra-industry trade, China, Denmark, Canada, Norway, Chile, and Vietnam have comparative advantages in all the four products class (034, 035, 036, and 037) and they are specialised in them, and Vietnam especially attracts attention with its high RCA values. Additionally, the table also shows that the Netherland's specialisation on three products class which are 034, 036, and 037 while Spain has no specialisation on any of the classes, namely 034, 035, and 036. Also, USA has disadvantages on all of four according to intra-industry index.

4. CONCLUSION

In this research, it is tried to put forward competitiveness of countries by sector-based. For this purpose, the first ten countries that have the biggest shares in the world export list of seafood export are chosen and collected their exports data for 20 years' course from 1995 to 2014 (APP 1). In this context, the seafood export competitiveness it is measured by using various RCA indexes, namely Balassa Index, Export-Import Ratio Index and Net Export Index.

According to Balassa Index results, the USA has comparative disadvantages in all product class and Netherland has comparative disadvantages in three products but 034. As it can be seen in APP 1, however, these two countries are in the top ten list of the seafood export. On the other hand, specifically Vietnam, Chile and Denmark are having the strong comparative advantages. These findings are quite important in terms of showing what sector should be chosen by a country to invest its resources.

In respect to Export-Import Index, it is detected that China, Denmark, Canada, Chile, and Vietnam have specialised on all the production classes and have comparative advantages. By contrast, the USA and Spain (except 037) have no specialisation as well as there are comparative disadvantages.

By the Net Export Index, which solely measures a country's own performance and determines the country's intra-industry situation, it can be argued from the results that China, Denmark, Canada, Norway, Chile and Vietnam have comparative advantage in all four groups. It means these countries have been specialised in intra-industry exports. Especially, Vietnam's high RCA values seem remarkable. From this point, it can be implied that Vietnam has a strong competitiveness in four product class worldwide and they should make their export and/or investment policies for seafood industry accordingly.

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Appendix 1: Top 10 Countries Who Have the Lion Share of Seafood Trade Worldwide (1995-2014)* (US Dollars)

	China	Norway	Thailand	USA	Canada	Vietnam	Spain	Denmark	Chile	Netherlands
1995	2.852.600.808	3.045.420.032	4.447.131.648	3.298.058.240	2.304.568.864	-	1.178.413.056	2.193.243.392	1.021.745.216	1.473.630.080
1996	2.855.305.322	3.321.606.912	4.114.883.977	3.058.563.073	2.284.246.337	-	1.430.057.344	2.122.920.192	1.042.893.440	1.395.760.256
1997	2.935.534.641	3.311.567.872	4.211.043.482	2.739.400.171	2.279.003.152	771.544.000	1.535.130.880	2.093.489.920	1.216.212.224	1.233.346.944
1998	2.651.557.426	3.511.527.424	4.023.908.087	2.271.994.730	2.253.835.333	788.275.968	1.527.018.112	2.103.076.864	1.244.682.112	1.221.620.480
1999	2.957.792.141	3.643.554.816	4.095.722.343	2.857.647.780	2.621.003.982	968.324.992	1.678.603.749	2.065.536.864	1.404.306.157	1.427.659.574
2000	3.651.901.077	3.434.568.448	4.325.671.806	2.955.875.775	2.804.762.391	1.475.163.000	1.640.209.284	1.870.904.566	1.546.246.893	1.343.211.619
2001	3.996.460.907	3.285.374.715	4.034.027.549	3.206.700.411	2.790.814.723	1.803.579.480	1.856.352.405	2.015.738.290	1.629.931.160	1.407.750.077
2002	4.480.132.667	3.441.134.139	3.644.227.770	3.134.511.107	3.073.395.349	2.030.531.437	1.936.173.066	2.066.622.772	1.542.966.665	1.448.854.375
2003	5.236.829.866	3.514.118.218	3.902.784.484	3.283.013.689	3.278.459.352	2.196.018.518	2.267.881.602	2.336.542.910	1.800.342.095	1.808.941.166
2004	6.631.302.206	4.033.383.209	4.017.447.512	3.724.256.487	3.466.139.137	2.400.342.689	2.569.471.491	2.461.355.607	2.158.617.905	2.077.148.291
2005	7.511.297.583	4.833.075.347	4.434.848.183	4.089.340.191	3.583.241.973	2.743.040.446	2.572.423.045	2.687.562.235	2.518.232.913	2.215.459.478
2006	8.949.361.320	5.375.758.143	5.176.244.756	4.267.624.039	3.626.512.707	3.350.422.002	2.812.355.203	2.888.075.688	3.032.361.104	2.370.244.177
2007	9.230.099.673	6.084.729.186	5.595.522.952	4.300.040.123	3.654.873.274	3.756.931.005	3.255.068.467	3.054.752.823	3.120.757.631	2.697.800.244
2008	10.088.078.714	6.717.130.439	6.464.377.730	4.285.949.475	3.669.986.857	4.500.892.974	3.462.115.443	3.224.381.181	3.379.632.634	2.847.162.803
2009	10.222.517.272	6.909.418.849	6.190.130.970	4.007.011.042	3.209.474.199	4.245.242.056	3.100.898.705	2.645.133.306	2.981.199.597	2.616.587.131
2010	13.198.079.977	8.665.804.814	6.981.034.526	4.467.746.594	3.802.904.002	5.015.346.739	3.236.610.836	2.703.718.813	2.820.639.104	2.731.676.438
2011	16.969.048.505	9.257.493.413	8.088.316.962	5.578.715.135	4.131.297.579	6.110.711.725	3.909.905.546	2.997.768.389	3.938.465.995	3.489.526.025
2012	18.122.340.989	8.732.316.208	8.046.017.614	5.507.793.935	4.176.541.244	6.087.840.568	3.766.820.872	2.872.557.642	3.798.006.811	3.370.645.947
2013	19.433.091.016	10.182.109.819	6.927.166.660	5.632.471.692	4.324.757.680	6.665.702.274	3.792.837.949	3.280.925.794	4.446.138.439	3.426.239.048
2014	20.867.103.371	10.603.378.692	6.418.786.837	5.780.256.305	4.478.007.776	6.418.786.837	3.892.922.712	3.366.376.287	5.294.841.092	3.795.058.496
Total	**172.840.435.481**	**111.903.470.695**	**105.139.295.848**	**78.446.969.994**	**65.813.825.911**	**61.328.696.710**	**51.421.269.767**	**51.050.683.535**	**49.938.219.187**	**44.398.322.649**

Source: It derived by using Comtrade data.

*SITC Rev 3, Product Groups in 03- (Fish, crustaceans, molluscs and aquatic invertebrates, and preparations thereof)

Appendix 2: According to SITC Rev: 3, Product Groups in 03- (Fish, crustaceans, molluscs and aquatic invertebrates, and preparations)

034	Fish, fresh (live or dead), chilled or frozen
035	Fish, dried, salted or in brine; smoked fish (whether or not cooked before or during the smoking process); (whether cooked or not before or during the smoking process); flours, meals and pellets of fish, fit for human consumption
036	Crustaceans, molluscs and aquatic invertebrates, whether in shell or not, fresh (live or dead), chilled, frozen, dried, salted or in brine; crustaceans, in shell, cooked by steaming or boiling in water, whether or not chilled, frozen, dried, salted or in brine; flours, meals and pellets of crustaceans or of aquatic invertebrates, fit for human consumption
037	Fish, crustaceans, molluscs and other aquatic invertebrates, prepared or preserved, n.e.s.

Source: United Nations Statistics Division

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ROLE OF KNOWLEDGE MANAGEMENT IN ACHIEVING ORGANIZATIONAL PERFORMANCE: PROPOSED FRAMEWORK THROUGH LITERATURE SURVEY

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ABSTRACT

Purpose- Keeping in view the increasing demand of knowledge management, Researchers has recognized the need for structures for appraising the influence of knowledge management (KM) on organizational performance (OP). Despite of the wide performances of KM, at present there is no uniform structure for evaluating the OP. The basic intent of this study / research is to plan the appropriate methodologies to evaluate the impact of KM to enhance OP.

Methodology- At the end of this paper, the author proposes a theoretical model based on comprehensive and inclusive researches in the extent of KM and OP.

Findings- Through a wide-ranging organization of KM practices, the probable model discovers the influence of each KM practice on enlightening the level of OP.

Conclusion- The suggested model can play an important part in the management of the processes of KM execution in order to explore as it affects on OP.

Keywords: Knowledge management (KM), organizational performance (OP), leadership, organizational culture.
JEL Codes: L25, O32, M11

1. INTRODUCTION

Knowledge has turned into a vital factor of creation notwithstanding the conventional factors land, work and capital which is the main factor of maintainable aggressiveness for associations (Jasimuddin, 2008; Sher and Lee, 2004; Drucker, 1992). The old establishment of industrialized economies has now moved from natural resources to intellectual resources (Lee and Choi, 2003). The thinkers and Management Researchers have announced a time of KM in which associations are progressively consider the knowledge as a profitable and vital asset (Zaied et al., 2012; Choi et al., 2006; Bollinger and Smith, 2001; Zack, 1999; Teece, 2000). Nonaka et al., (2014) emphasize on the supportable creativity in associations to accomplish maintainable assertiveness in the Organizational environment through consistent production of new knowledge (Nonaka et al., 2014; Krogh et al., 2012; Nonaka and Takeuchi, 1995; Nonaka, 1994; 1991). Schulz and Jobe (2001) additionally stated that KM center systems are more powerful than others. Dish and Yang, (2010) and Choi et al., (2008) have considered the positive relationship between KM techniques and Organizational Performance (OP) prompting to organizational performance in Korean and Chinese viewpoints separately. Jasimuddin (2008) and Zack (1999) have additionally set the comparable connections between KM techniques and OP. In accordance with the past studies the

essential target of this study is to portray the immediate impact of KM center system (characterized by Choi et al., 2008) on organizational performance. In accordance with framework approach this study plans to investigate the immediate relationship between KM systems and organizational. Notwithstanding this the knowledge base of an organization is for the most part seen as the principal factor and this has been affirmed by the scientists like Tubigi, M. An., and Alshawi, S. N. (2012). Organizational Performance (OP) includes three particular ranges of firm results: (1) Financial performance; (2) Market performance; and (3) Shareholder return (total shareholder return, financial esteem included, and so on.). As per the predominant examines, it has likewise been caught as one of the variable because of which km additionally influences. The organizations have now begun actualizing venture asset arranging (ERP). The author of this paper concentrated on (ERP) because of the enhanced enthusiasm on the connection among ERP and OP. The possibility of "organizational culture "has in like manner been seen as a basic variable having influence on KM and OP. This thought is generally conveyed as "knowledge sharing culture" King, w. R. (2007). In an investigation finished by Ernest and young foundation on four hundred and thirty one European and American firms, Cross, R., and Baird, l. (2000) specified that oc is the transcendent square in knowledge trade. In study coordinated by (Mccann and Buckner,2004), social obstacles one of the middle factors which ruins the execution of KM qualities. Instructing of a gainful and effective culture underscores on knowledge sharing, trust in interfaces and creative ability (Lawson, 2003). On the basis of the detailed and comprehensive literature survey on the topic, the author proposes a framework describing the impact of Knowledge Management (KM) practices on Organizational Performance (OP).

GAP ANALYSIS

Since, the noteworthiness of knowledge in business associations has turned into a point of convergence for analysts, academicians and experts now days (Wu and Lin, 2009) and particularly in the most recent decade, knowledge creation hypothesis has pulled in consideration towards this vital resource (Nonaka et al., 2006). The organizations having abilities to investigate new knowledge reliably or having versatile fitness, they have dynamic upper hand (Mitchell and Boyle, 2010). Since, knowledge in business associations is a wellspring of upper hand in this way understanding and dealing with the elements of knowledge is exceptionally basic aspect (Heinrich and Lim, 2005). The positive relationship between knowledge management strategies and organizational performance and performance has been posited by several researchers in the literature. For instance, Yang (2010) and Choi et al., (2008) empirically established a positive association between knowledge management strategies and organizational performance in Korean and Chinese business organizations respectively. Bratianu and Orzea (2010), accentuating the Nonaka and Takeuchi's (1995) model, argued that the knowledge creation does not have an absolute result but it is based on organizational context. Gupta et al., (2006) on the other hand emphasized on an effective interplay between exploration and exploitation of organizational knowledge for sustainable competitive advantage. Since it has been established theoretically in the literature that knowledge can be acquired from outside and can be managed through effective and sophisticated IT systems but it can never be testified empirically. Therefore, why not this argument is investigated by hypothesizing the direct relationship between KM strategies and organizational performance? The importance of this research is to contribute towards body of knowledge in relation to the impact of KM on Effectiveness through literature survey on Concepts of KM, its several dimensions, Elements of OP, Prominent OP Improvement Models and relationship of KM processes and OP. This paper proposes a framework after having gone through the literature on the subject and the author assumes that if implemented in the Organizations can enhance the Organizational performance excellence.

1. To propose a model of KM Organization and its components.
2. Impact of KM on OP.

The importance of this research is to contribute towards body of knowledge in relation to the impact of KM on Effectiveness through literature survey on the following topics:

- Concepts of KM.
- Several Dimensions of KM.
- Elements of OP.
- Prominent OP Improvement Models
- Relationship of KM processes and OP.

2. LITERATURE REVIEW

The fundamental concern for researchers in the field of KM is endeavoring to scrutinize the means in which the performance of the organization is affected. Marqués and Simón (2006) conducted an experiential research on 222 Spanish firms in which the authors found out the link amongst KM and OP. Likewise, the research conducted by McKeen, Zack and Singh (2009) shows a significant impact of KM on Organizational Performance (OP). The study revealed that KM has positive relationship with OP.

Knowledge is considered the most important resource for organizations working in dynamically -competitive environments Eisenhardt, K. M., and Martin, J. A. (2000). . In a high-rivalry environment, an association's capacity to acclimatize individuals' knowledge and develop new knowledge decides its focused power (Smith, Collins, and Clark, 2005). That knowledge creation exercises manufacture aggressive power has been very much shown by researchers who have examined an extensive variety of associations Tompson, H. B., and Tompson, G. H. J. (2013).

Knowledge Management: Considering the plan made by experts, 1980 decade was named Quality Development decade, 1990 was named Re-designing decade and at last, 2000 is known as KM decade. KM has been climbed as determinant of change Darroch, J. (2005). The knowledge, learning and development are interrelated builds. At the end of the day, learning happens when knowledge is utilized as a part of the association and at last this learning comes about into creativeness and improvement (Darroch and McNaughton, 2003). Two people's knowledge which get the same data is not indistinguishable. (Because of the expanding significance of knowledge in the time of knowledge economy, associations definitely must be mindful about ideas like creativity, development entrepreneurship, increasing practical, upper hand. KM is a course of action of methods for cognizance and relating knowledge enter resources in an organization. It is an organized methodology which recommends modus operandi for acknowledgment, appraisal, arranging putting away and applying knowledge with a specific end goal to address the issues and points of the organization. Seidler-de Alwis, R., and Hartmann, E. (2008). KM is a practice by which associations can recognize, select, arrange, circulate and transmit essential data and encounters which would be utilized as a part of exercises like issue determination, dynamic learning, urgent programming and principal organization. (Gupta, 2000). However it can be affirmed that today KM aptitudes could be used for entering creativeness as a piece of relationships. In present day economy, knowledge is the wellspring of reasonable, cutting edge enhancements and other standard factors like land, workforce and money are staying at ensuing levels of criticalness (Druker,1993).

Knowledge Management Cycle: The methods of KM cycle are as follows:
1) Knowledge creation: Organizations have cognizant exertion from both inside and outside to look at and depict fitting learning resources. It is conceivable to make new knowledge by finding new ways which work force have found for doing assignments, or find new learning from outside sources. (Elliot Temple, 2010)
2) Knowledge capture: New knowledge is known as basic and fitting course to satisfy contemporary and future needs. Keeping knowledge is a sensible way which sort out the way towards getting, expelling and appropriating knowledge. (Cook, S.D.N. and Brown, J. S. Crossing over, 1999)
3) Knowledge organization: New knowledge is made and refined by segregating it keeping in mind the end goal to give a broad once-over of pleasing parts of knowledge in relationship with various things and organizations. Knowledge is organized inside an affiliation and lines, properly it could be searched for, researched and spared. (Nonaka, I., Umemoto, K., and Senoo, D, 1996)
4) Knowledge storage: Modern knowledge is spared in a way that individuals is an organization have enlistment to it. Information base organization and information sparing improvement can help to the procedure. (Nonaka, I., 1994)
5) Knowledge dissemination: Based on the particular needs of the clients, in an effective sensible manner knowledge ought to be appropriated. Moreover it is presented to pertinent instruments to make it sensible for all clients. (Anderson, J. R., 1983)
6) Knowledge Application: Knowledge is utilized as a part of a setting in which clients can learn other than make new information. In learning process there must be examination and major evaluation of contemplations courses of action and information. (Polanyi M., 1962)

Organizational Performance (OP) can be judged by an extensive variety of forms constituency, realizing an extensive variety of explanations of "productive performance". Each of these perspectives of OP can be engaged to be novel. Further, every organization has a unique course of action of conditions, making performance estimation basically situational (Cameron and Whetton, 1983). Both of these issues are unjustifiable for researchers, since theory building incorporates putting forth and testing expressions that brighten or predict a particular marvel (all around addressed as an estimation of a destitute variable in a model) that remaining parts steady over a wide extent of specific events (Van de Ven, 1989: Weick, 1989). While it is possible to develop a multi characteristic model of OP, amassing a model that locations different forms community gets the opportunity to be dangerous, since each social affair may have restricting targets. As needs be, a bound together perspective of general OP is critical to execute this investigation. As necessities be, this proposal takes a gander at organizational performance from a lone body electorate perspective, that of the standard stockholder of income driven affiliations. Starting here of view, powerful OP can be compared to productive regard creation for essential stockholders. In coming segments, I fight that this perspective commonly contrasts regard creation and organizational cash related performance; as requirements be, this paper addresses the estimation of organizational financial performance.

Weick, 1989). Since learning is instantly getting to be noteworthy divide of the OP (Choi and Lee, 2002), it is as needs be energetic that KPIs and estimation strategies are set up so as to allow Practitioners to appreciate the improvement of organizational information. (Decarolis and Deeds; Davenport, 1999) found one of the premier inconveniences that prime concern is trying to watch the methods in which it influences OP.

The researchers conducted by (Hasan and Al-Hawari (2003) and Claycomb, Droge and Germain (2002) and Skyrme, 2001) also prove that there is direct relationship between KM and OP. During 2005, Darroch conducted an experiential study to sustenance the part of KM performs within organizations and this study was conducted after analysis of data gathered from CEOs of the companies with fifty or more workers; the study benevolences KM as a synchronizing instrument. This research suggests that an organization having KM capability will utilize resources more proficiently and vice vrsa. Accordingly, it is also Organizations having KM capability are able to achieve intelligently competitive advantage Palacios Marqués, D., and José Garrigós Simón, F. (2006). Researches conducted by Mahmoudsalehi, M. (Tehran, Iran) categorizes the influence of organizational structure (OS) on KM and identifies the prominence of this variable in creation, sharing and utilization of knowledge. The study conducted by Khalil, Safari (2012) suggests that Organizational Structure (OS) has direct relationship with KM. If the features of OS were less integrated, less formal, more complex and more cohesive, the levels of KM would be boosted. Baer and Frese's (2003) think about recommended that atmosphere for start goes about as a positive mediator between process advancement and OP. Damanpour, Walker and Avellaneda's (2009) focus on investigation of the consequences of gathering of advancement sorts and found the beneficial outcome of innovativeness on OP. From this time forward, contemplated that aggregate choice of advancement sorts after some time has a positive association with Organizational Performance. The relationship amongst ingenuity and forthcoming enactment has been examined by Bowen, Rostami and Steel (2010). Now with the passage of time the number of organizations have launched KM initiatives. The practitioners are visualizing following questions in their mindsets:

1. Is it categorically meaningful to capitalize in KM?
2. Will the execution of KM be an achievement story?
3. Will our KM system become efficient?

In the viewpoint of practitioners emphasis should first on the improvement of knowledge performance, e.g. process improvement, innovations, product development, learning and individual growth and consequently look for the influence of knowledge associated activities on OP. According to the prevailing researches, IT has also been apprehended as one of the variable due to which KM also affects. The firms have now started implementing Enterprise resource planning (ERP). The author of this paper focused on (ERP) due to the improved interest on the correlation amongst ERP and OP. Dehning and Richardson (2002) aimed at classifying the correlation amid ERP and OP. According to this study, the execution of (ERP) has a progressive influence on OP; the impact of which is smaller in instantly after implementation and strengthened with the passage of time. Similar study was also conducted by Velcu (2007) who observed the influence of realizing ERP system on OP and this research was conducted in eight firms in Finland. The role of leadership variable also cannot be ignored and is found to be an extremely important variable in organizational diagnostic models developed by Saeed, B. B., and Wang, W. (2013).The impact of Leadership on OP is possibly the extremely important. Weiner and Mahoney (1981) studied the leadership in one hundred and ninety three industrial firms. As per this research, managerial practices have substantial influence on OP. López-Nicolás, C., and Meroño-Cerdán, Á. L. (2011) has suggested that leadership is a significant and considerable component for the success of an organization. The concept of "Organizational culture (OC)" has also been considered an important variable having impact on KM and OP. This concept is mostly expressed as "knowledge sharing culture"King, W. R. (2007). In a research carried out by Ernest and Young Institute on four hundred and thirty one European and American firms, Cross, R., and Baird, L. (2000)specified that OC is the foremost hindrance in knowledge transfer. In study conducted by (McCann and Buckner,2004), cultural obstacles one of the core variables which hinders the implementation of KM values. Inculcation of an efficient and effective culture emphasizes on knowledge sharing, trust in interfaces and creativeness (Lawson, 2003). KM Scientists exploring the role of leadership on knowledge creation have concentrated on concerns such as distinguishing the role of leadership in KM (Bryant, 2003); scrutizing the extent to which leadership plays towards creativity inside the organizations (Shin and Zhou, 2003;Chow, and Wu, 2003;Pieterse, Knippenberg, Gumusluoglu and Ilsev, 2009;Schippers, and Stam, 2010;Tse and Mitchell, 2010).

3. DATA AND METHODOLOGY

Knowledge Management (KM) is a perception which fist of all used approximately two decades ago, roughly in 1990. Davenport (1994) presented the still broadly cited description: "KM is the procedure of capturing, distributing, and effectively using knowledge." The global of KM is to generate significance and to effect, enhance and upgrade the organizational proficiencies and knowledge resources to meet the goals set by the Knowledge Management Organizations (KMO). Implementing KM has numerous extents including Organizational Culture, Organizational structure, Leadership and

Infrastructure Technology. Over the last two decades, KM has developed from evolving thought to progressively conjoint task in organizations. This paper shows that KM is absolutely related with OP after having going through the literature surveys as mentioned earlier. The authors found that KM practices have strong impact on numerous transitional practices of OP and that those transitional processes are in turn connected with financial performance. The efficiency towards the achievement of overall goals and set targets for the organization depends on by what means well the improved, critical knowledge is functional in the organization.

Organizational Performance (OP) includes three particular ranges of firm results:
1. Financial performance (benefits, return on assets, rate of gainfulness, etc.);
2. Market performance (bargains, bit of the general business, etc.); and
3. Shareholder return (indicate shareholder return, financial regard included, etc.)

The investigation of an Organization's performance when contrasted with the set objectives and targets/goals. Inside corporate organizations, financial performance, advertise performance and shareholder esteem performance assume an indispensable part in the achievement of any association. Conspicuous change Systems may incorporate a portion of the methodologies for a planned, complete way to deal with expanding OP.

Organizations have a crucial part in our regular daily existences and thusly, productive organizations address a key component for making nations. In this way, various financial experts consider OP like an instrument in picking the cash related, societal and radical advancement. Within corporate organizations, financial performance, market performance and shareholder value performance play a vital role in the success of any organization. Prominent improvement Systems may include some of the approaches for a premeditated, comprehensive approach to increasing OP.

Various leveled hypotheses that took after reinforced the probability of an organization that completes its execution targets considering the objectives compelled by the classified resources Gavrea, C., Ilies, L., and Stegerean, R. (2011). In this setting, improvement got the prospects to be one of the various indicators of performance. The researchers Gavrea, C., Ilies, L., and Stegerean, R. (2011) give a plan of definitions to speak to the possibility of OP. To report an OP level, it is important to have the capacity to measure the outcomes.

Organizational Structure (OS) is another critical variable which influences KM practices. Solid and sound culture develops and underpins the KM practices and the other way around. To execute KM in an enhanced way, a few organizations put the positions like Chief Knowledge Officer (CKO), Knowledge Engineer (KE), Knowledge Analyst (KA), Knowledge Manager, and Knowledge Steward to administrate KM. OS ought to bolster the strategies, mission, and visualization and ought to rouse groups to share data and produce new learning keeping in mind the end goal to accomplish the craved results. In this setting there must be a solid concentrate on individual and organizational upgrade. Organizational structure is the progression or shape and picks within structure of the associations winning in the relationship, it delineates the divisions or units of the key and branch got a handle on differing activities and exercises required to complete the objectives of the association Haan, S. An., and Kloub, M. A. (2013) It joins the explore of the association and style of oblige and fundamental activity style, so that the strategy for the hierarchical structure and workforce in the association need to affect their capacity to take an interest and imagination Al Awamlah, H. S. (2013), Strategy of shared relations between the parts and segments of the affiliation, this idea demonstrates to the demand of drive with the genuine goal of adequately objectives Haan, S. An., and Kloub, M. A. (2013). We live in a rapidly transformative time, group of organizations and the gathering of knowledge, development, and data modernization dependably represented by progression associated with the past. The response organizations add up to requirement for these natural elements, etc., at the level of organizational change that addresses the goals, approaches and conditions hierarchical, and especially their structures to be able to accomplish a concordance between soundness a change (Alateat,2006). The agents investigated the OS in its idea and estimations, sorts and segments influencing it and considered by Haan, S. A., and Kloub, M. A. (2013) as a person from the association in when he considers researchers to be an after effect of the OP and OS apparatus or a way to exhibit the segments and connections vertical and even, and how to play out the elements of the organization. Haan, S. A., and Kloub, M. A. (2013) specified that a portion of the early expert like March and Simon who portray the Organizational structure that the affiliation structure is a style work blueprint and spread to agents with ultimate objective of conclusion of particular targets (Aqili ,1994). Faulconbridge, J. R., Beaverstock, J. V., Muzio, D., and Taylor, P. J. (2007) specified that the human alone is equipped for building knowledge era and reused notwithstanding the improvement of data innovation and robotization, documentation and capacity of data, ability and speculation and shares them to make and produce knowledge vital procedure of the association. In this manner the way toward planning the organizational structure get to be powerful instrument to encourage KM and advantage from the legitimization of basic leadership by changing over tacit knowledge to explicit knowledge to develop the organizational knowledge base (Althahr,2009).

Effective Organizational Culture: The Relationship among Culture and KM can affect learning organization in various ways. The explanation for social learning organization is that presupposed particular estimations of an affiliation can achieve incredible and moreover unfavorable conduct and likewise coming about knowledge administration handling. For instance constructive goal and inspiration for trading knowledge, strength of a decent substance is an association and proportional trust between, individual would influence knowledge administration decidedly. The result of champion among the latest studies showed this is not considerable in all alliance. (Ruler and Marks ,2008).

The Effect of Organizational Culture on KM: Culture requires frameworks for current knowledge era and declaration. Tilchin, O., and Essawi, M. (2013) in their studies highlighted the noticeable quality of a compelling organizational Culture for the transmission and origination of knowledge. The discernment behind social KM is that assumed estimations of KMO can be the result in empowering and also contradicted execution which thusly influences KM handling decidedly or unfavorably. Solid aspiration and energy for knowledge trade would bring about influencing the KM decidedly though hesitance for exchanging knowledge are amongst impacts which influence KM unfavorably and in this way will influence the OP in adversative way. Notwithstanding this KM and business procedures are adjusted to each other emphatically to upgrade OP. The sound and solid Quality situated culture bolsters the selection of best practices like Balanced Scorecard, Benchmarking, Reengineering, Continuous Improvement and Strategic Planning towards accomplishing execution perfection in the association.

Leadership and KM: The leadership variable is in like manner routinely found in organizational diagnostic models Gavrea, C., Ilies, L., and Stegerean, R. (2011) The effect of this variable on organizational execution is likely the most clear of the models' segments being the point of different studies. We can demonstrate here the study drove in 1981 by Weiner and Mahoney (1981) who considered the power in 193 storing up affiliations. According to this study, management improves altogether influence two OP portions: profit and share cost.

KM and a sound key leadership assumes an extremely dynamic part in accomplishing magnificence in OP. Without Strategic Leadership, KM is bound to fail. Pioneers practice a noteworthy impact on their associations' KM highlights. Pioneers' execution can decide how much knowledge is looked for, refined, drew in and shared. Organizational qualities, organizational leadership, and Organizational Knowledge progressions assume fundamental parts in overpowering human deterrents identified with knowledge creation, exchange and sharing.

Technology infrastructure needs to have the applicable competencies to support business practices with knowledge dissemination. Infrastructure Technology is a facilitator in conception, apprehending, transfer and integration of knowledge. Information Technology has been discovered in the study with respect to a solitary variable, particularly how much organization have realized an organized Enterprise Resource Planning (ERP) system. We focused on this variable in view of the extended excitement on the relationship between the ERP structure and progressive execution. ERP is a standard programming pack that gives facilitated trade planning and access to information that navigates various progressive units and different business limits (Wu and Wang, 2006).

One study went for perceiving the relationship between the ERP and OP has a place with Velcu, O. (2007). As demonstrated by these creators, the execution of the ERP system emphatically influences OP, the measure of its impact is more diminutive rapidly after utilization, being reinforced after some time. Components of the Knowledge Management Organization (KMO) include an appropriate Organizational structure, Technology Infrastructure, effective Organizational Culture and effective Leadership. All these components when clubbed together may create OP throughout the organization.

Figure 1: Model of Knowledge Management (KM) and Organizational Performance (OP)

4. CONCLUSION

Leadership, Effective Organizational Culture, Technology Infrastructure and Organizational Culture are the critical success factors of a Knowledge Management Organization (KMO) and these can contribute towards achieving OP throughout the Organization. Nonetheless, this study intends to explore the theoretical standing of system-oriented approach by examining the direct relation of KM and OP. Organizational performance has a significant positive relationship with the OP which supports the logic that innovation comes from creativity which is the source of sustainable competitiveness for business organizations (Nonaka et al., 2014). Thus, the present study gives new insights to the researchers, practitioners and strategists. It is predictable that this framework can perform a role in management of the practices of KM implementation in order to explore impact on OP. On the basis of the detailed and comprehensive literature survey on the topic, the author proposes a framework describing the impact of Knowledge Management (KM) practices on Organizational Performance (OP) as follows.

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DO BOARD CHARACTERISTICS HAVE AN IMPACT ON CODE OF CONDUCT HANDBOOK IN A COMPANY: AN EVIDENCE FROM TURKEY

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ABSTRACT

Purpose- The purpose of this study is to determine whether the board members' characteristics have an impact on the Code of Conduct Handbook for the companies listed in Borsa Istanbul X100.

Methodology- This study is conducted on the information provided by 66 companies listed in Borsa Istanbul X100 and Logistic Regression Model is used for the analysis.

Findings- Total number of board members and number of independent members in the board have a positive impact on the Code of Conduct Handbook in a company.

Conclusion- Only the total number of board members and number of independent members in the board have an impact on the Code of Conduct Handbook in a company. Ratio of female members, ratio of majority of the shares belonging to individuals or corporations', ratio of board members who are also shareholder of the company to total board members have no impact.

Keywords: Ethics, code of ethics, business ethics, code of conduct, board of directors
JEL Codes: M4, M14, G30

1. INTRODUCTION

Epictetus, a Greek Stoic philosopher who lived in early second century AD, stressed a simple yet powerful argument for ethical behavior in his *Discourses.*

".... the rational and the irrational appear such in a different way to different persons just as the good and the bad, the profitable and the unprofitable. For this reason, particularly we need discipline, in order to learn how to adapt the preconception of the rational and the irrational to the several things conformably to nature. But in order to determine the rational and irrational we use not only of external things, but we consider also what is appropriate for each person.... Well, then, it is you who must introduce this consideration into the inquiry, not I; for it is you know yourself, how much you are worth to yourself, and at what price you sell yourself; for men sell themselves at various prices..."

Interest in ethics is nothing new. Throughout human history, ethics has been among the great, concerns of philosophical studies and debates, there have always been notions about what is "right" and what is "wrong". However, only in 20th century did the modern idea of what we now call "business ethics" truly emerged as a result of corporate scandals. The impact of these scandals on the capital markets, globalization, rapid technological developments, changes in the structure and the social role of corporations, changes in socioeconomic and environmental trends, increased the concern against the failure in order to establish and/or to adhere standards of proper conduct and so on. Businesses are started to be confronted with a demand for ethics from all corners of society. This demand is twofold: on the one hand there is a

demand for *"integrity"*, on the other for *"social responsibility.* (Jeurissen 2007). Inevitably this increased demand on integrity and corporate social responsibility has led many organizations to establish their own Codes of Conduct having realized that ethical dilemmas can directly impair an organization's reputation and ultimately its financial performance. So what is ethics? What constitutes moral progress? What criteria should we use to evaluate conduct? Can I morally justify my actions? Should I do the so-called right thing if it is against my self-interest? What is the right thing anyhow? Is ethics is a body of knowledge? If so how do we acquire this knowledge? From books? Experience? Both? Employees who are working for an organization need guidance on these matters. That's why in order to give the answers of these questions organizations need to develop their own Codes of Conduct. Corporate Codes of Conduct are practical corporate social responsibility (CSR) instrument commonly used to govern employee behavior and establish a socially responsible organizational culture. The term "Code of Conduct" does not have an authorized definition. Most of the definitions emphasize that a Code of Conduct is a formal statement of the values and business practices of a corporation and particularly helpful when an individual's self-interest is incompatible with acting in accordance with his or her ethical standards.

In its 1999 report Code of Corporate Conduct: Inventory, the OECD Working Party of the Trade Committee defined codes of corporate conduct for the purpose of its survey as?

"Commitments voluntarily made by companies, associations or other entities, which put forth standards and principles for the conduct of business activities in the marketplace".

In its Defining and Developing an Effective Code of Conduct for Organizations: International Good Practice Guidance, the IFAC Professional Accountants in Business Committee defined, "code of conduct" for purposes of the guidance as; (Weiss and Solomon 2011)

"Principles, values, standards, or rules of behavior that guide the decisions, procedures and systems of an organization in a way that (a) contributes to the welfare of its key stakeholders, and (b) respects the rights of all constituents affected by its operations."

Some codes of conduct are labeled as "Code of Ethics"," Code of Business Practices", "Code of Values", "Code of Behaviors" and etc. The most common term seems to be "Code of Conduct", although some companies individualize the title with one of their core values, such as **"**Integrity" or with a phrase such as **"**Performance with Integrity" or "The way we do business". Also it is possible to see separate "Ethics Policy" and "Code of Conduct" of some of the companies. (PAIB, 2007)· An organization's ethics policy would be to set out organization's values and principles and organization's Code of Conduct would outline standards of behavior and practices. Each company's ethics program and development of its Code of Conduct are both rooted in company's core values which are important beliefs which shape attitudes and motivate actions. Developing and reviewing a code is the responsibility of Board of Directors and it makes how the company operates visible, how it embeds its core values and how it relates to its stakeholders. On the other hand codes also helps investors and other stakeholders, in particular those looking for socially responsible investment, integrity, and a commitment to ethics.

There is not a standard form of Code of Conduct that should be filled out and issued by companies since core values of one company might be different from another company. There have been several studies performed on how to develop codes of conduct of an organization. It has been found out that the most recent studies take Professional Accountants Business Committee (PAIB) of International Federation Of Accountants (IFAC) Report issued in June 2007 on how a Code of Conduct should be prepared under the name of "Defining and Developing an Effective Code of Conduct: International Good Practice Guidance" as a reference. However as it has already been mentioned that it is just a guide for organizations underlying key principles. The key principles underlying widely accepted good practice guidance according to the IFAC's PAIB Committee uses values as the basis for ethical decision making, indicating that a code cannot cover all ethical and unethical actions. It should only be a guideline for managers and employees to "do the right thing" and sometimes address ethical dilemmas that do not have clear answers. That's why this approach can also be translated into a Code of Conduct by using the term "values-based code".

Development of an organization's ethics policy and Code of Conduct are under the responsibility of Board of Directors. That's why it is highly believed that board characteristics effect the existence, content and implementation of Code of Conduct of a company and there have been several studies performed whether there is a relationship between them or not. The purpose of this paper is to determine whether characteristics of board members have an impact on the Code of Conduct Handbook for the companies listed in Borsa Istanbul X100. Logistic Regression Model and Stepwise Backward Regression Method are used for analysis.

2. LITERATURE REVIEW

Recent corporate scandals and failures have put the spotlight on Board of Directors and numerous suggestions have been made about how to improve the governance of companies in order to rebuild trust. One of the widely discussed issues in

academic literature for years is how appropriately and to what extent the structure of the Board of Directors influences board actions or corporate performance. Since developing a Code of Conduct is one of the basic responsibilities of board of directors, we expect that those board characteristics also affect the existence, content and implementation of Code of Conduct Handbook of companies. B*oard size* is one of the well-studied board characteristics because the number of directors may influence the board functioning hence corporate performance. Researchers studied Boards of Directors as decision-making groups by integrating literature on group dynamics and work group effectiveness. From this perspective, board size can both have positive and negative effect on board performance. Goodstein *et al.*1994; Forbes and Milliken, 1999 found out that as the number of members in a board increase, it will have a positive effect since larger boards are likely to have more knowledge and skills, which will provide a larger pool of expertise. Additionally they also found out that large boards may be able to draw on variety of perspectives on corporate strategy and may reduce domination by the CEO. On the other hand Judge and Zeithaml, 1992; Goodstein *et al.*1994; Eisenberg et al. 1998; Forbes and Milliken 1999; Golden and Zajac, 2001 found out that as the board size gets larger, it will have a negative effect because larger boards are more difficult to coordinate and may experience a communication and experience problem. *Board composition* is another well-studied board characteristics having different dimensions such as gender diversity, being a dependent or independent member, being shareholder of the company or not.

Empirical studies on impact of *gender diversity* have produced conflicting results. While Kidwell *et al* 1987; Barnett and Karson 1989; Jaffee and Hyde 2000; Smith and Rogers 2000 found that there is no significant gender differences about perceiving what is ethical or unethical; Stedham *et al* 2007; Bear *et al* 2010 found out that as female members give more importance to what is ethical or unethical and have a positive impact on corporate reputation. *Number of independent members* in a board is another dimension of board composition. Recent changes in corporate governance require firms to maintain boards with a majority of outside independent directors since it is highly believed that outside independent directors will strengthen corporate boards by monitoring actions of management and ensure that management decisions are made in the best interest of the stockholders. However, because of the limited involvement with corporate activities, outside independent directors do not have exposure to the day-to-day activities of the firm and this may actually hinder the efficient operation of Board of Directors (Petra 2005).

Number of board members who are also shareholder of the company is another dimension of board composition. In general, these two dimensions are explained by two conflicting theories, namely Agency Theory and Stewardship Theory. Agency Theory focuses on conflicts of interest that occur among the shareholders and managers stemming from the separation of ownership and control. (Berghe and Levrau 2004) According to Agency Theory managers who gain control may have a potential to pursue actions which will maximize their self-interest at the expense of shareholders. Jensen and Meckling 1976; Fama and Jensen 1983 supports that Board of Directors is one of the mechanism which is designed to monitor conflict of interests that means as the number of independent managers increase in the board, the board may function more effectively and ethically. Stewardship Theory is just the opposite of Agency Theory. According to this theory managers are good stewards of company assets and never misappropriate corporate resources at any price because they have a range of non-financial motives, such as the intrinsic satisfaction of successful performance, the need for achievement and recognition and etc. (Berghe and Levrau 2004). Academic studies provide evidence that support both perspectives.

3. DATA AND METHODOLOGY

It has been already mentioned that Board of Directors are responsible for developing Code of Conduct Handbook of an organization and informing employees and other interest groups. Although companies take into consideration IFAC's PAIB Committee key principles as a guide, board characteristics may affect the development and content of Code of Conduct Handbook. That's why it is believed that there has to be a relationship between the characteristics of the board members and content of the Code of Conduct Handbook of a company. The aim of this paper is to find out whether board characteristics have an impact on the Code of Conduct Handbook for companies. For this purpose information provided from the websites of Borsa Istanbul X100 companies which are operating in Turkey are examined.

As a result of the literature review made the following are mentioned as board characteristics:

- Number of board members
- Ratio of independent members in the board to total number of members
- Ratio of female members in the board to total number of members
- Majority of shares belonging to individuals or corporations
- Ratio of board members who are also shareholder of the company to total board members.

It is highly believed that as the number of board members, independent board members, female board members, ratio of individual board members to total board members, ratio of board members who are also shareholder of the company increase, it is more likely that companies become socially more responsible, their commitment to the ethical rules increase and they will have an increased tendency to prepare a more comprehensive Code of Conduct Handbook and announce it to third parties. To find out whether this is valid for companies operating in Turkey, the following hypothesis is developed:

H_0 = *Board characteristics do not affect the existence of Code of Conduct Handbook.*

H_1= *Board characteristics affect the existence of Code of Conduct Handbook*

This study is conducted on the companies which are listed in Borsa Istanbul X100 index. Out of 100 companies, information of 92 companies is reached through their websites. It is found out that out of 92 companies, 26 companies do not have a Handbook of Code of Conduct. As a result, this study is conducted on the remaining 66 companies and Logistic Regression Model is used for analysis. Existence of Code of Conduct Handbook is considered as a dependent variable and number of board members (BOARD), ratio of independent members in the board to total number of members (INDMEM), ratio of female members in the board to total number of members (FEMEM), shares belonging to corporations (INSTOWN), shares belonging to individuals (INDOWN), ratio of board members who are also shareholder of the company to total board members (BOARDOWN) considered as independent variables.

4. FINDINGS AND DISCUSSIONS

In order to analyze whether specific board characteristics have an impact on existence of Code of Conduct Handbook, logistic regression model and stepwise backward regression is used at 90% significance level. In the model for the original values "0" denotes companies not having a Code of Conduct Handbook and "1" denotes companies having a Code of Conduct Handbook.

Table 1: Dependent Variable Encoding

Original Value	Internal Value
0	0
1	1

Table 2: Classification Table [a, b]

			Predicted		
			DSCORE		Percentage
	Observed		0	1	Correct
Step 0	DSCORE	0	0	26	.0
		1	0	66	100.0
	Overall Percentage				71.7

    a.   Constant is included in the model

    b.   The cut value is .500

Table 3: Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp (B)
Step 0	Constant	.932	.232	16.186	1	.000	2.538

Table 4: Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	FEMEM	.065	1	.800
		INDMEM	2.730	1	.098
		BOARD	2.945	1	.086
		INSTOWN	1.072	1	.300
		INDOWN	1.063	1	.302
		BOARDOWN	.277	1	.598
	Overall Statistics		12.533	6	.051

Table 5: Variables in Equation

		B	S.E.	Wald	df	Sig.	Exp (B)	90% C.I. For EXP.(B)	
								Lower	Upper
Step 1[a]	FEMEM	.006	.021	.085	1	.771	1.006	.972	1.042
	INDMEM	.094	.041	5.361	1	.021	1.098	1.028	1.174
	BOARD	.311	.143	4.750	1	.029	1.365	1.079	1.726
	INSTOWN	38.058	82605.301	.000	1	1.000	33768881312875808.000	.000	.
	INDOWN	38.048	82605.301	.000	1	1.000	33429931469638812.000	.000	.
	BOARDOWN	.017	.018	.881	1	.348	1.017	.987	1.048
	Constant	-3810.020	8260530.129	.000	1	1.000	.000		
Step 2[a]	FEMEM	.005	.021	.066	1	.797	1.005	.972	1.040
	INDMEM	.080	.038	4.478	1	.034	1.084	1.018	1.153
	BOARD	.298	.137	4.747	1	.029	1.347	1.076	1.686
	INSTOWN	.011	.011	1.046	1	.307	1.011	.993	1.030
	BOARDOWN	.019	.018	1.066	1	.302	1.019	.989	1.050
	Constant	-4.808	2.180	4.865	1	.027	.008		
Step 3[a]	INDMEM	.079	.038	4.456	1	.035	1.083	1.018	1.152
	BOARD	.291	.133	4.751	1	.029	1.337	1.074	1.666
	INSTOWN	.011	.011	1.000	1	.317	1.011	.993	1.029
	BOARDOWN	.019	.018	1.066	1	.302	1.019	.989	1.050
	Constant	-4.643	2.070	5.029	1	.025	.010		
Step 4[a]	INDMEM	.080	.037	4.640	1	.031	1.084	1.019	1.152
	BOARD	.298	.133	5.033	1	.025	1.347	1.083	1.675
	BOARDOWN	.014	.017	.665	1	.415	1.014	.986	1.043
	Constant	-4.056	1.962	4.272	1	.039	.017		
Step 5[a]	INDMEM	.077	.036	4.479	1	.034	1.080	1.017	1.147
	BOARD	.282	.129	4.793	1	.029	1.326	1.073	1.639
	Constant	-3.725	1.874	3.951	1	.047	.024		

a. Variable(s) entered on step 1: FEMEM, INDMEM, BOARD, INSTOWN, INDOWN, BOARDOWN

Based on the hypothesis developed and given below it is expected that all of the board characteristics determined have a significant impact on the development of code of conduct handbook.

H₀ = Board characteristics do not affect the existence of Code of Conduct Handbook.

H₁= Board characteristics affect the existence of Code of Conduct Handbook

However it is found out that only the number of independent members (INDMEM) and total number of board members (BOARD) have a significant impact on the development and existence of Code of Conduct Handbook in companies. Details of the analysis conducted are as follows:

- Having independent members (INDMEM) in the board has a significant impact (.034 < .50) on the development of Code of Conduct Handbook in a company and when we look at its "B" value which is .077, we see that this is a positive impact since the sign of the value is positive. To be more specific we also have to also look at "Exp. (B)" value, we see that as the number of independent members increase by 1, the possibility of having a Code of Conduct Handbook increases 1.080 times and at 90% significance level this value may change within the interval of 1.017-1.147.

- Total number of members in the board (BOARD) has a significant impact (.029 < .50) on the development of Code of Conduct Handbook in a company and when we look at its "B" value, which is .282, we see that this is a positive impact since the sign of the value is positive. To be more specific we have to also look at "Exp. (B)" value, we see

that as the number of independent members increase by 1, the possibility of having a Code of Conduct Handbook increases 1.326 times and at 90% significance level this value may change within the interval of 1.073-1.639.

This result can be summarized in the following logistic regression equation. -3.725 is directly taken from Table 5 as the constant of the equation.

$$y= -3,725+0,077INDMEM+0,282BOARD$$

5. CONCLUSION

Taking into consideration the problems of trust experienced after recent financial scandals, Codes of Conduct Handbook is an increasingly popular tool for promoting, encouraging and guiding responsible behavior. Board of Directors are responsible for standing of their company in the community and developing a Code of Conduct for a company is just one of the basic responsibilities of it. That's why it is highly believed that board characteristics affect the existence, content and implementation of Code of Conduct Handbook of a company. As a result of the study conducted to determine whether board characteristics have an impact on development of Code of Conduct Handbook for the companies listed in Borsa Istanbul X100, it is found out that only the increase in the number of total board members (BOARD) and in the number of independent members (INDMEM) have a significant positive impact on the development and the existence of Code of Conduct Handbook at 90% significance level, whereas the other independent variables have no impact at all.

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A COMPARISON OF THE INNOVATION PERFORMANCE OF TURKEY WITH THE EUROPEAN UNION

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ABSTRACT

Purpose – The aim of this study is to examine recent innovation performance of Turkey in comparison to the European Union member states and hence to determine in which dimensions Turkey lags behind the European Union countries.
Methodology – In order to investigate Turkey's innovation performance in comparison to the European Union member states European Innovation Scoreboard 2016 is descriptively analysed.
Findings-According to the results of the descriptive analysis, it is found that the innovation performance of Turkey has generally improved in recent years. However, Turkey falls behind the European Union countries in terms of a number of dimensions of the innovation performance.
Conclusion-Although Turkey has improved its innovation performance recently it still lags behind from the European Union countries with regard to the several dimensions of innovation. Thus, the policies which help firms to increase their innovation performance should be implemented in order to reach better outcomes in the future.

Keywords: Research and development, Innovation, Turkey, European Union
JEL Codes: O30, O40, O52

1. INTRODUCTION

Research and development and innovation have been regarded as the main determinants of economic growth and development both in theoretical and empirical spheres of the economics literature in recent years. Thus, developed and developing countries try to improve their innovation performance in order to reach high and sustainable economic growth and development rates. In recent years Turkey has implemented a number of policies which help firms to increase their innovation performance. As a result of these policies, Turkey has turned into moderate innovator from modest innovator according to the European Innovation Scoreboard 2016 (European Union, 2016c). However, Turkey still lags behind from the European Union member states with regard to the different dimensions of the innovation performance measured by the European Union (European Union, 2016b). Thus, Turkey should continue to implement the policies which aim to develop the innovation performance of the firms. This study investigates recent innovation performance of Turkey in comparison to the European Union countries in order to determine in which dimensions Turkey still falls behind the European Union member states. The remainder of the paper is structured as follows: In section 2 the relationship between innovation and economic growth and development has been explained by summarizing theoretical and empirical studies briefly. In Section 3 Turkey's recent innovation performance in comparison to the European Union countries has been analysed. Finally, in section 4 we conclude.

2. THE ROLE OF INNOVATION IN ECONOMIC GROWTH AND DEVELOPMENT

Research and development activities and innovation have been regarded as the main drivers of economic growth and development in recent years. As it is very well-known, the role of technology in economic growth and development has first been put forward by Ramsey (1928), Solow (1956) and Swan (1956). According to the Solow Model (Solow, 1956; Swan, 1956), which is the initial point of modern economic growth literature, since there are diminishing returns to capital and labour the marginal contribution of the increasing level of capital stock to economic growth will be smaller and smaller (Uppenberg, 2009). However, this model asserts that technological progress leads to a positive economic growth rate in the long-run because it eliminates the problem of diminishing returns to capital (Guloglu and Tekin, 2012). The main criticism about this model is that technological progress is not explained in the model (Guloglu and Tekin, 2012). In contrast to the Solow Model (Solow, 1956; Swan, 1956), Endogenous Economic Growth Models developed by Romer (1986, 1990), Lucas (1988), Grossman and Helpman (1990, 1991) and Aghion and Howitt (1992) put forward that technological progress is the main determinant of long-run economic growth. According to these models, technological developments generated in research and development industries are employed for production and lead to persistent increase in economic growth levels of the countries (Ulku, 2004). Endogenous Economic Growth Models suggest a number of reasons that explain why technological progress and knowledge are the main determinants of long-run economic growth. These reasons are as follows (Runiewicz-Wardyn, 2009):

- Knowledge is not exposed to "diminishing returns" because it can be used and shared indefinitely
- Technological progress and knowledge create positive externalities or spillover effects since these factors increase intangible resources of a society.

As it is clearly seen from the above explanations, both traditional economic growth models (Ramsey, 1928; Solow, 1956; Swan, 1956) and Endogenous Economic Growth Models (Romer, 1986, 1990; Lucas, 1988; Grossman and Helpman, 1990, 1991; Aghion and Howitt, 1992) emphasize the key role of technological progress and innovation in economic growth process. In line with these developments in the theoretical sphere, many studies examine the effects of technology and innovation on economic growth empirically. In an earlier review, Cameron (1998) surveys the results of empirical studies that examine the relationship between innovation and economic growth. According to his analysis, Cameron (1998) comes to the three conclusions: 1- Innovation contributes to economic growth significantly, 2- Significant spillover effects occur among countries, firms and industries and 3- Spillover effects are inclined to be localized, so domestic firms and economies gain more from innovation than foreign economies. Similarly, in a recent study Reamer (2014) reviews the literature on the effect of technological invention and innovation on economic growth from different perspectives such as economic history, innovation accounting, macroeconometric analysis and microeconometric analysis. By making a comprehensive survey of existing studies Reamer (2014) suggests that technological invention and innovation play a central role in economic growth. To summarize, it is clear that traditional and modern economic growth models underline the importance of technological progress and innovation in economic growth process and most of the empirical studies in the existing literature confirms this argument. Thus, it can be stated that technological progress and innovation are sine qua non in order to reach sustainable high economic growth rates both in developed and developing countries.
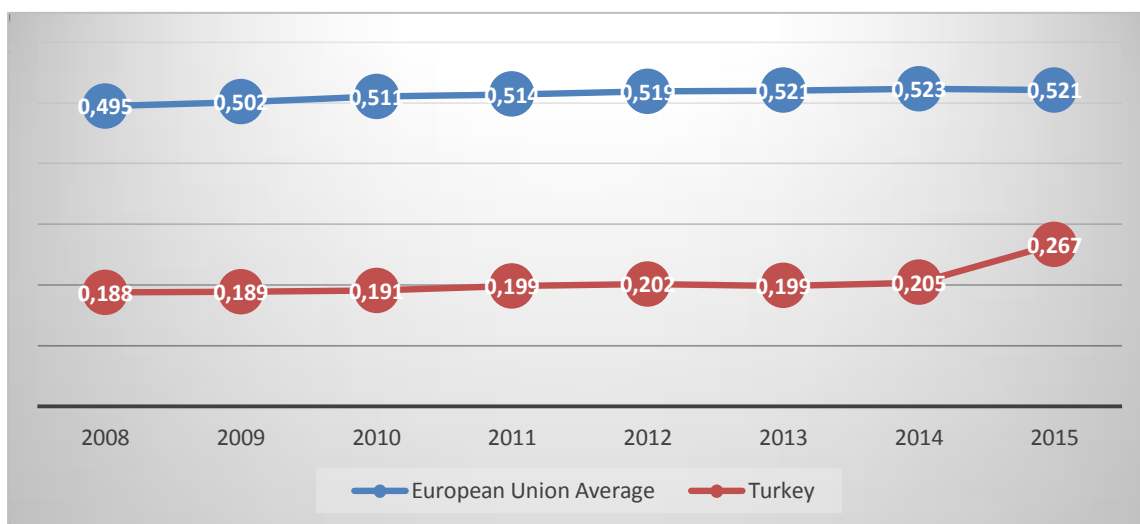
3. RECENT INNOVATION PERFORMANCE OF TURKEY IN COMPARISON TO THE EUROPEAN UNION

The main tool used by the European Union to evaluate the research and innovation performance of the member states and the actual/potential candidates of the union is the European Innovation Scoreboard. According to this scoreboard, innovation performance is measured by the Summary Innovation Index which consists of a number of indicators (European Union, 2016a). According to the summary index of 2015, member states and actual/potential candidates are grouped into four performance groups which are explained as follows (European Union, 2016a; European Union, 2016b):

- The first group is called innovation leaders which comprise of countries whose innovation performance is 20 percent higher than the European Union average. The countries fall into this group are Denmark, Finland, Germany, the Netherlands and Sweden.
- The second group is strong innovators which consist of countries that have innovation performance between 90 percent and 120 percent of the European Union average. These countries are Austria, Belgium, France, Ireland, Luxembourg, Slovenia and the United Kingdom.
- The third group is moderate innovators which include countries with an innovation performance between 50 percent and 90 percent of the European Union average. These countries are Croatia, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Italy, Latvia, Lithuania, Malta, Poland, Portugal, Serbia, Slovakia, Spain and Turkey.
- The forth group is modest innovators which cover the countries whose innovation performance is less than 50 percent of the European Union average. These countries are Bulgaria and Romania.

As it is stated above, Turkey is in the group of moderate innovators in 2015. Without doubt, in order to evaluate the innovation performance of Turkey in comparison to the European Union countries it is required to investigate the course of this index for Turkey in recent years. Graph 1 shows the summary index for Turkey together with the European Union average over the period 2008-2015. As it is clearly seen from the graph, the innovation performance of Turkey is well below from the European Union average and it has been stable between 2008 and 2014. However, in 2015 the innovation index of Turkey has jumped to 26.7 percent which is a dramatic increase from the previous year. Together with this increase, Turkey has turned into moderate innovator from modest innovator (European Union, 2016c).

Graph 1: The Summary Innovation Index of Turkey and the European Union Average (2008-2015)

Source: European Union, 2016b, European Innovation Scoreboard 2016-Database, http://ec.europa.eu/ DocsRoom/documents/17823, 01.05.2017.

Although Turkey has become a moderate innovator in 2015 the innovation performance of Turkey still lags behind from the European Union average for all dimensions apart from the firm investments (European Union, 2016c). Graph 2 shows the dimensions of the innovation performance for Turkey and the European Union average.
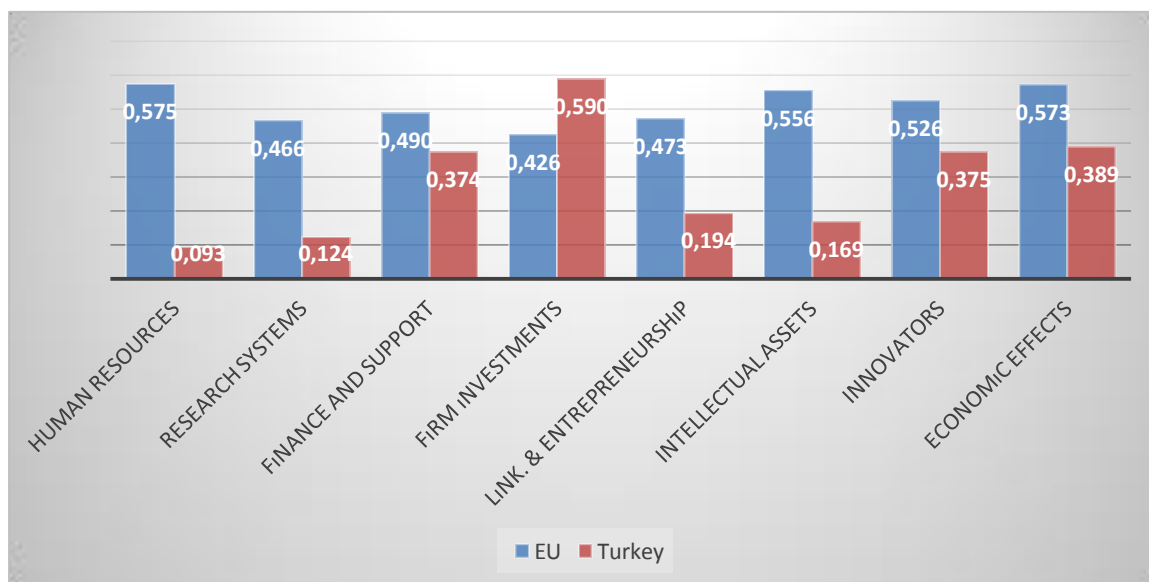
Graph 2: The Dimensions of the Innovation Performance for Turkey and the European Union Average (2015)

Source: European Union, 2016b, European Innovation Scoreboard 2016-Database, http://ec.europa.eu/ DocsRoom/documents/17823, 01.05.2017.

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According to Graph 2, the innovation performance of Turkey is very low in comparison to the European Union average in terms of human resources, research systems, linkages and entrepreneurship and intellectual assets. Human resources cover new doctorate graduates per 1000 population aged 25-34, percentage population aged 30-34 having completed tertiary education and percentage youth aged 20-24 having attained at least upper secondary level education (European Union, 2016b). When we investigate the sub-dimensions of human resources we find that Turkey is the last country among the European Union countries with regard to all of these sub-dimensions except scientific publications among the top 10 percent most cited publications worldwide and non-European Union doctorate students (European Union, 2016b). Hence, it can be argued that the innovation performance of Turkey in terms of human resources should be improved. Research systems include international scientific co-publications per million population, scientific publications among the top 10 percent most cited publications worldwide as percent of total scientific publications of the country and non-European Union doctorate students as percent of all doctorate students (European Union, 2016b). Similar to the human resources dimension, the performance of Turkey with regard to the sub-dimensions of research systems is below the European Union average (European Union, 2016b). While Turkey is the last country with regard to the international scientific co-publications it is the twenty fifth country among the European Union countries according to the scientific publications among the top 10 percent most cited publications worldwide (European Union, 2016b). In addition to this, in terms of the non-European Union doctorate students Turkey is the eighteenth country within the European Union countries (European Union, 2016b). Thus, in order to reach a better score for the research systems dimension Turkey should increase its international scientific co-publications, scientific publications among the top 10 percent most cited publications and non-European Union doctorate students.

The third dimension of the innovation performance is finance and support. Finance and support consist of public research and development expenditures as percent of GDP and venture capital investments as percent of GDP (European Union, 2016b). While there is no data for the venture capital investments as percent of GDP for Turkey the rank of Turkey is twenty-one among the European Union countries as regards to the public research and development expenditures as percent of GDP (European Union, 2016b). Although the performance of Turkey in finance and support dimension is better in comparison to the other dimensions it is still lower than the European Union average (European Union, 2016b). The fourth dimension of the innovation performance is firm investments. The performance of Turkey in terms of this dimension is better than the European Union average (European Union, 2016b). Firm investments cover business research and development expenditures as percent of GDP and non-research and development innovation expenditures as percent of turnover (European Union, 2016b). Although Turkey is the twenty first country according to the business research and development expenditures it is the first country among the European Union countries with regard to non-research and development innovation expenditures (European Union, 2016b). Non-research and development innovation expenditures have increased twelvefold from 2014 to 2015 and this is one of the reasons why Turkey has become a moderate innovator (European Union, 2016c).

Linkages and entrepreneurship include SMEs (small and medium sized enterprises) innovating in-house as percent of SMEs, innovative SMEs collaborating with others as percent of SMEs and public-private co-publications per million population (European Union, 2016b). For SMEs innovating in-house as percent of SMEs and innovative SMEs collaborating with others as percent of SMEs Turkey is ranked at the nineteenth and twenty sixth country among the European Union countries respectively (European Union, 2016b). As regards to the public-private co-publications per million population Turkey is the last country and the performance of Turkey for the linkages and entrepreneurship is well below the European Union average (European Union, 2016b). Intellectual assets cover patent applications per billion GDP, patent applications in societal challenges per billion GDP, community trademarks per billion GDP and community designs per billion GDP (European Union, 2016b). Whilst Turkey is the nineteenth country for patent applications it is the twenty second country among the European Union countries for patent applications in societal challenges (European Union, 2016b). However, with regard to the community trademarks and community designs Turkey is the last country among the European Union member states (European Union, 2016b). The last two dimensions of the innovation performance are innovators and economic effects. The sub-dimensions of innovators are SMEs introducing product or process innovations, SMEs introducing marketing/organizational innovations and employment in fast-growing enterprises (European Union, 2016b). Although the performance of Turkey with regard to the SMEs introducing marketing/organizational innovations is higher than the European Union average Turkey performs worse than most of the European Union countries in terms of the SMEs introducing product or process innovations and employment in fast-growing enterprises (European Union, 2016b).

The last dimension of the innovation performance is economic effects. Economic effects have five sub-dimensions (European Union, 2016b): 1- Employment in knowledge intensive activities as percent of total employment, 2- Medium and high-tech product exports as percent of total product exports, 3- Knowledge intensive services exports as percent of total service exports, 4- Sales of new to market and new to firm innovations as percent of turnover and 5- Licence and patent revenues from abroad as percent of GDP. There is no data for Turkey as regards to the licence and patent revenues from abroad and the performance of Turkey for the first three dimensions is well below the European Union average (European

Union, 2016b). However, sales of new to market and new to firm innovations are well above the European Union average and Turkey is ranked at the first among the European Union countries according to this sub-dimension of economic effects (European Union, 2016b). Sales of new to market and new to firm innovations have increased more than fourfold from 2014 to 2015 and this increase has caused Turkey to become a moderate innovator together with the rise in non-research and development innovation expenditures (European Union, 2016c).

To summarize, it can be argued that Turkey still lags behind from the European Union countries according to the most of the innovation performance indicators. Although the performance of Turkey has dramatically improved from 2014 to 2015 according to a number of indicators such as non-research and development innovation expenditures and sales of new to market and new to firm innovations Turkey still does not fall into the innovation leaders or strong innovators groups. Thus, new policies which help firms to increase their innovation performance should be implemented in order to reach better outcomes in the future.

4. CONCLUSION

Since the second half of 1980s research and development and innovation have been regarded as the main drivers of economic growth and development in theoretical models. Together with the developments in the theoretical sphere many empirical studies have examined the effects of research and development and innovation on economic growth and development in different countries. These studies generally find that research and development and innovation activities have positive effects on economic growth and hence confirm the arguments of the theoretical models. In recent years, Turkey has implemented a number of policies which aim to improve the research and development and innovation performance of the firms. As a result of these policies the innovation performance of Turkey has increased and Turkey has turned into moderate innovator from modest innovator among the European Union countries (European Union, 2016c). This improvement has stemmed from the developments in non-research and development innovation expenditures and sales of new to market and new to firm innovations (European Union, 2016c). Although the innovation performance of Turkey has progressed recently Turkey still lags behind the European Union countries according to the most of the innovation indicators. Hence, in order to reach better outcomes with regard to research and development and innovation policy measures which help firms to increase their research and development and innovation performance should be implemented in the future. Without doubt, together with the rising innovation performance Turkey will reach high economic growth and development rates.

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INNOVATION IN FINANCIAL MARKETS AND ITS IMPACT ON SAVINGS

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ABSTRACT

Purpose- Financial innovation augment the investment alternatives of individuals, allowing them to have different investment opportunities in changing economic conditions. Channeling the idle savings into productive sectors increase the fund margin of households and entrepreneurs facing financial squezee. The aim of this paper to examine the impact of financial services on savings and domestic savings. The paper analyzes the main determinants of savings in twenty upper middle income, high income countries for the period of 2005-2014.

Methodology- In this paper, we build panel data analyses to investigate the impact of innovation in financial markets on savings and domestic savings.

Findings- Level of financial innovation and financial access are important parameters affecting both gross savings and gross domestic savings. higher financial innovation leads to higher savings and domestic savings. The net interest margin and banking crisis has a negative effect on savings in both models. Increase in capital formation contribute to higher gross savings and gross domestic savings.

Conclusion- The paper finds that financial innovation and diversification is an important lever in the increasing of savings, therefore confirming the "liberalization of financial market" hypothesis.

Keywords : Financial innovation, Savings, Financial diversification and access, Panel data analyses
JEL Codes: E21, G2, P34

1. INTRODUCTION

Financial innovation is measured by advance in the financial products, which are employed in the borrowing and lending of funds. These variations in financial technology have given financial institutions modern and inexpensive ways to obtain resources and augmented existing credit lines for customers. Therefore, financial innovation provide an efficient movement and allocation of economic resources across time and among a number of investors and financial institutions. These changes, in turn, positively affects household savings who allocate funds for the purposes of smoothing consumptions and protection against unexpected future events. A great variety of financial innovation that became part of a new financial production process has been introduced into the financial markets in recent years. The most recent innovations in the financial markets are financial products such as derivatives; financial services such as internet banking, mobile banking, and online trading; financial technology such as Automated Teller Machines (ATMs). New financial instruments developed to better satisfy financial system participants' demands. From this point of view, a financial

innovation symbolizes a new financial service or financial asset that decrease risks, diminish costs and provide services that are more efficient for customers.

This paper will proceed as follows. In Section II we provide theoretical background on financial innovation and savings; Section III provides the available empirical works on financial innovation Section IV describes the data and statistical approach; Section V provides empirical results and findings.

2. THEORETICAL BACKGROUND

McKinnon and Shaw (1973) put forward the financial repression hypothesis, used to express every kind of control and intervention in the financial system during economic crises of the 1970s. Supporters of the theory of financial repression, which provide the basis for financial liberalization, criticized restriction of interest. They emphasized that the liberalization of capital flows, interest rates, and credit facilities will increase effective resource allocation and savings and this in turn will transform into investments. These changes will promote economic growth. Liberalization lead to increase in the number of new instruments used in the financial markets, this process mobilize savings and, economic growth realized through provision of financial development. In other words, the existence of diversified market will increase the efficient movement of fund, therefore increasing savings and eventually promoting the growth. The target of liberalization policies and financial development across financial markets is to channel financial resources from informal financial markets to formal financial markets. The downward pressure on interest rates promotes transfer of idle funds and internal savings to the financial sector and therefore eliminate saving gaps. (Shaw, 1973)

One of the most important implications of financial deregulation is indeed to increase openness to financial innovation and market diversification. Because not only technological innovation contributes to cost deduction but it also leads to product efficiency and new market opportunities. According to the Oslo Manual; innovation is classified as product innovation, process innovation, organizational innovation and marketing innovation. Marketing innovation defines as "Implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing" (Saldanli & Seker, 2013-38). The augmented intensity of competition in the financial sector has had direct impact on banks' approach to clients. Investors in the financial markets pursue the target of profit maximization. Their decisions and behaviors are not coherent and subject to great variations accross time. (Kıyılar & Akkaya, 2016-1). The banks are competing fiercely in the financial markets to satisfy the needs of these clients. This competition has direct implications in achieving competitive advantage through technological innovation. Rising awareness of importance of financial innovation in modern economies has increased research interest in this field. In fact, a broad theoretical information that discusses latest financial innovations has arisen. However, the absence of patent data in the financial sector impose limitations on conducting a quantitative cross-country analysis in this field. To fill this gap we therefore use data on R&D expenditure as proxy of a financial innovation. We obtain these data from Analytical Business Enterprise Research and Development database (ANBERD) of the OECD.
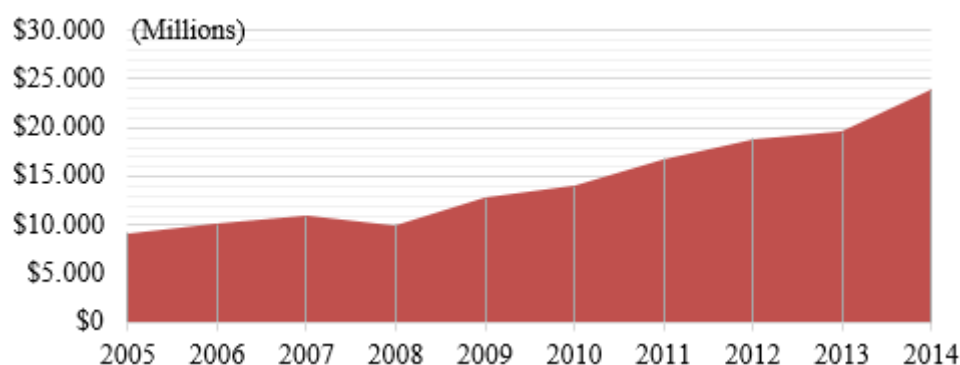
Figure 1: Financial Innovation (Financial R&D) Across Countries, Averaged 2005 To 2014.
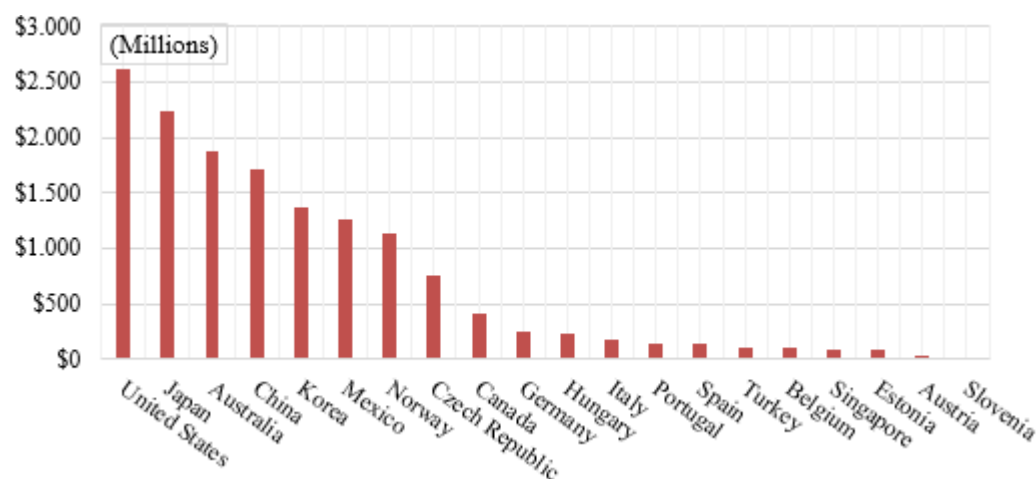
Sources: Analytical Business Enterprise Research and Development Database (ANBERD), (Online), Access date: March 01, 2017, http://www.oecd.org/

Observing research and development figures across countries, we find broad variation on financial R&D figures across countries ranging from high levels in United States, Japan and Australia to very negligent expenditures in Austria and Slovenia. Surprisingly enough, the upper middle-income countries such as Turkey and Hungary spend on financial R&D more than some high income: countries such as Singapore and Belgium.

Figure 2: Financial Innovation (Financial R&D) Across Time and Across Countries, 2005 To 2014.

Sources: Analytical Business Enterprise Research and Development Database (ANBERD), (Online), Access date: March 01, 2017, http://www.oecd.org/

Looking at graphical representation of financial R&D figures, we note an increasing trend in expenditures over time across our sample countries. However, financial R&D expenditures decreased by 8 percent during financial crisis of 2008. Financial innovation has increased by more than 2 times between 2005 and 2014 indicating on widening of financial system.

3. LITERATURE REVIEW

The Table 1 below provides information on literature review.

Table 1: Summary of Literature Review Table

Author	Sample	Title	Source	Findings
Josh Lerner (2002)	Financial patents (1971-2000)	Where Does State Street Lead? A First Look at Finance Patents	Journal of Finance	The results show that the patenting activity of investment banks is positively related to the size of the investment banks
Elizabeth Laderman (1990)	State by state analysis of a number of ATM cards and ATMs in use	The Public Policy Implications of State Laws Pertaining to Automated Teller Machines.	Economic Review, Federal Reserve Bank of SF	The number of ATM cards in use per state, as of 1987, is significantly and positively related to population and per capita income and negatively related to the number of branches.
Patrick Honohan (2006)	Financial access by households to financial assets, presenting data for over 150 countries	Hosehold Financial Assest in the Process of Development	World Bank	Financial access is negatively correlated with poverty rates, but the correlation is not a robust one.
Hannig and Jansen(2010)	Policy examples across countries	Financial Inclusion and Financial Stability: Current Policy Issues	ADBI	Innovations aimed at countering financial exclusion may help strengthen financial systems rather than weakening them.

Thorsten Beck, Tao Chen, Chen Lin and Frank M. Song (2012)	The bank-, industry- and country-level data for 32, mostly high-income, countries between 1996 and 2006	Financial Innovation: The Bright and Dark Sides	HKIMR Working Paper	Financial innovation is increased with higher growth volatility among industries more dependent on external funding and with higher idiosyncratic bank fragility, higher bank profit volatility and higher bank losses.
Santiago Carbó Valverde, Rafael López del Paso and Francisco Rodríguez Fernández (2011)	17 administrative regions of Spain over the period 1986- 2001 summing up to 272 panel observations.	Financial Innovations In Banking: Impact on Regional Growth	University of Granada, Spain	The results show that product and service delivery innovations contribute positively to regional GDP, investment and gross savings growth.

4. DATA AND METHODOLOGY

The sample covers annual data from 2005 to 2014 for a sample of 20 high-income and upper-income economies. The time span is constrained by the scarcity of financial innovation and financial services time series for individual countries. The Table 2 summarizes all variables and their sources.

Table 2: The Variables Used in Models

Variables	MODEL 1		MODEL 2		Sources
	Acronym	Description	Acronym	Description	
Dependent	Gsav	Gross Savings (% of GDP)[1]	GDsav	Gross Domestic Savings (% of GDP)[2]	World Bank, Development Indicators (www.worldbank.org)
Independent	FInov	Financial Innovation (Financial R&D) / GDP	FInov	Financial Innovation (Financial R&D)/ GDP	Analytical Business Enterprise Research and Development database (www.oecd.org)
	ATMKm	Automated Teller Machines (ATMs) per 1,000 km2	ATMPa	Automated Teller Machines (ATMs) per 100,000 adults	International Monetary Fund, Financial Acces Survey Dataset (www.imf.org)
	BanKm	Branches of banks per 1,000 km2	BanPa	Branches of banks per 100,000 adults	
	NInM	Bank Net Interest Margin (%)			World Bank, Global Financial Development Database (www.worldbank.org)
Dummy	BCr	Banking Crisis Dummy (1=Banking crisis, 0=None)	BCr	Banking Crisis Dummy (1=Banking crisis, 0=None)	
Explanatory	CapF	Gross capital formation (% of GDP)	CapF	Gross capital formation (% of GDP)	World Bank, World Development Indicators (www.worldbank.org)

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[1] Gross domestic savings are calculated as GDP less final consumption expenditure (total consumption).
[2] Gross savings are calculated as gross national income less total consumption, plus net transfers.

The panel data analysis employed to predict the impact of financial services on savings and domestic savings. The use of panel technique provides the benefit of rising the sample size while obtaining a cross-country perspective. A panel data regression differs from a regular time-series or cross-section regression in that it has a double subscript on its variables. (Tatoglu 2012: 37)

$$Y_{it} = \beta_{0it} + \beta_{1it}X_{1it} + \beta_{2it}X_{2it} + ... + \beta_{kit}X_{kit} + u_{it} \qquad i=1,...,N \quad t=1,...,T \qquad (1)$$

or

$$Y_{it} = \beta_{0it} + \sum_{k=1}^{K} \beta_{kit}X_{kit} + u_{it} \qquad i=1,...,N \quad t=1,...,T \qquad (2)$$

The subscript i denotes the cross-section dimension and t denotes the time-series dimension with different frequencies. Panel data encompasses several different linear models such as pooled OLS, fixed-effects and random-effects models. After running the tests to predict time and individual effects, it is important to make a clear distinction between the models (Tatoglu 2012: 37). Therefore, in this paper we employed a Hausman test to make a chose between fixed-effects and random-effects models.

Table 3: Individual and/or Time Effects Test Results

	Model 1			
Tests	**LR Test for Indv. And Time Effects**	**LR for Ind.**	**LR for Time.**	**F Test for Fixed Effects**
Prob.	(0.0000)	(0.0000)	(1.000)	(0.0000)
Individual Effect	Yes	Yes	-	Yes
Time Effect	Yes	-	No	-
	Model 2			
Tests	**LR Test**	**LR for Ind.**	**LR for Time.**	**F Test for Fixed Effects**
Prob.	(0.0000)	(0.0000)	(1.000)	(0.0000)
Individual Effect	Yes	Yes	-	Yes
Time Effect	Yes	-	No	-

According to LR Test result in the first column there is individual or time effects for both models. LR test also separately retest the time and individual effects; so second column shows that there is individual effect and third column test result shows that there is no time effect. Besides, F test reveals that individual effect exists in the models.

Table 4: Hausman Test for Random or Fixed Effects

Ho: difference in coefficients not systematic	
Model 1	**Model 2**
chi2(5) = (b-B)'[(V_b-V_B)^(-1)](b-B)	
= 14.95	= 23.34
Prob>chi2 = 0.0106	Prob>chi2 = 0.0003

The probability is 0.0106 for model 1 and 0.0003 for model 2, both of them are less than 0.05, so reject the null hypothesis that individual effect are random. According to the Hausman test result, all models should be estimated by using the fixed effects and determined one-way error component regression model shown by equation (3) below (Hausman 1978: 1251-1271).

$$Y_{it} = \beta_0 + \mu_i + \beta_1 X_{1it} + \beta_2 X_{2it} + ... + \beta_k X_{kit} + u_{it} \qquad i=1,...,N \quad t=1,...,T \qquad (3)$$

Then we tested the assumption of heteroscedasticity, autocorrelation and cross-sectional dependence.

Table 5: Test for Heteroscedasticity

H0: sigma(i)^2 = sigma^2 for all i	
Model 1	**Model 2**
chi2 (20) = 1532.62	chi2 (20) = 2017.16
Prob>chi2 = 0.0000	Prob>chi2 = 0.0000

Probabilities in both of models are less than 0.05, so reject the null hypothesis homoskedasticity and conclude heteroskedasticity.

Table 6: Test for Serial Correlation

H0: No AR(1)) in the following specification for the error terms AR(1) disturbances
Model 1
F test that all u_i=0:   F(19,154) =   5.97   Prob > F = 0.0000
Modified Bhargava et al. Durbin-Watson = .60065146
Baltagi-Wu LBI = .9557007
Model 2
F test that all u_i=0:   F(19,155) =   6.49   Prob > F = 0.0000
Modified Bhargava et al. Durbin-Watson = .57636599
Baltagi-Wu LBI = .94314423

DW and Baltagi-Wu LBI test statistics reject the null hypothesis of no first-order serial correlation for Model 1 and Model 2. Besides; DW critical values; d<2 shows positive serial correlation.

Table 7: Test for Cross Sectional Dependency

	Tests for Cross Sectional Independence	
	Model 1	**Model 2**
Pesaran's test	12.441 prob(0.0000)	13.554 prob(0.0000)
Friedman's test	51.240 prob(0.0001)	62.553 prob(0.0000)
Frees' test	2.048 Critical Value < alpha = 0.05 : 0.3429	2.201 Critical Value < alpha = 0.05 : 0.3429

Pesaran's and Friedman's test strongly rejects the null hypothesis of no cross-sectional dependence at the 1% level of significance. Frees' test also reject null hypothesis. Three test results for both models conclude enough evidence to reject the null hypothesis of cross-sectional independence. In accordance with the test results from Stata, using xtscc command, all models are assumed to be heteroskedastic, autocorrelated, and possibly correlated between the groups. Therefore, Driscoll and Kraay standard errors are appropriate for both models.

Table 8: Fixed-Effect (Within) Regression With Driscoll And Kraay Standard Errors

MODEL 1			MODEL 2		
Gross Savings (% of GDP)			**Gross Domestic Savings (% of GDP)**		
FInov		0.2577**	**FInov**		0.2708**
		(0.0981)			(0.0979)
ATMKm		0.0031**	**ATMPa**		-0.0441***
		(0.0013)			(0.0139)
BanKm	-0.000**	(0.0002)	**BanPa**		0.0145***
NInM		-0.4616**			(0.0048)
		(0.2136)			
BCr	0.0256**	(0.0100)	**BCr**		0.0264**
					(0.0091)
CapF		0.0044***	**CapF**		0.0050***
		(0.0008)			(0.0006)
Constant		0.1446***	**Constant**		0.1367***
		(0.0317)			(0.0232)
F Test (6,19)		31.84	**F Test (5.19)**		22.92
		(0.0000)***			(0.0000)***
Number of Obs / Groups		200/20	**Number of Obs / Groups**		200/20
R-squared		0.1408	**R-squared**		0.1775

*** significant at 5%; * significant at 10%, and *** significant at 1% level*

5. FINDINGS AND DISCUSSIONS

We estimate a fixed effect model to analyze the interaction among variables. Only statistically significant factors are interpolated in the fixed panel regression model. We construct two different models and examine the impact of different factors on gross savings and gross domestic savings. The overall regression results are significant at 5 percent significance level, but explanatory powers are somewhat low. In model 2 we manage to increase the explanatory power of the test.

Model 1: *Gsav = 0.1446599 + 0.2577305FInov + 0.0031658ATMKm - 0.000546BanKm - 0.4616618NInM*

$\qquad$ *+ 0.0256333BCr +0.0044975CapF*

Model 2: *GDsav = 0.1367312 + 0.2708968FInov - 0.0441432ATMPa + 0.0145647BanPa + 0.0264495 BCr + 0.0050366CapF*

The results presented in Table 2 broadly confirm that financial innovation play an important role in affecting both gross savings and gross domestic savings. The estimations show that higher financial innovation leads to higher savings, therefore confirming the "liberalization of financial market" hypothesis. The effect of financial acces is captured by the number of ATMs and the number branches of banks. The results in the first model show that an increase in branches of banks per 1,000 km^2 contribute to lower gross savings; and higher ATMs per 1,000 km^2 contributes to higher savings. In addition, ATMs per 100,000 adults were found to decrease gross savings while branches of banks per 100,000 adults were found to increase gross domestic savings. These results suggests the great importance of effective distribution of financial access. These results might support the "diminishing marginal utility" effect of financial access after some break even point. The effect of financial stability is captured by the net interest margin and banking crisis dummy variable. The net interest margin has a negative effect on savings in both models. This result suggests that widening interest margin put a pressure on interest rates which would lead to diminishing savings. As expected, banking crisis also influence savings, and this impact is significant and positive. These results suggests that people hoarding funds with expectations of financial turmoils.

On the macroeconomic level, the results show that an increase in capital formation contribute to higher gross savings and gross domestic savings thus validating the strong relationship between the macroeconomic factors. We therefrore use capital formation as a proxy for explanatory variable.

6. CONCLUSION

In recent years many banks in higher and upper income countries experienced a rapid growth in financial innovation and financial access. It has been long debated by policy makers that one of the important implications of financial deregulation is an increase in openness which it turn lead to higher financial access and innovation. The fast increase in financial innovation and access not only broaden the banks' operations but also mobilize savings which lead to more efficient resource allocation. This paper assesses these feedback effects and identifies financial innovation among the main determinants of the savings over time and across twenty upper income and high income countries using a fixed panel estimation technique. The paper finds that the level of financial innovation and financial access are important parameters affecting both gross savings and gross domestic savings. The empirical results show that higher financial innovation lead to higher savings, therefore confirming the "liberalization of financial market" hypothesis. Moreover, the results also show that financial instability positively influence savings and suggest that people hoarding funds with expectations of financial crisis. The paper also finds that both gross savings and gross domestic savings are sensitive to number of financial services such as ATMs per and branches of banks. These results suggests that effective distribution of financial access is of great significance as after some point the increasing number of financial services might diminish marginal utility. There is merit to strengthen supervision on the number of financial services to prevent a sharp buildup of inactive technology.

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EFFECTS OF INSTITUTIONALISATION FACTORS AND BENCHMARKING TECHNIQUES ON THE FIRM PERFORMANCE

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ABSTRACT

Purpose- In this study, the effects of institutionalisation factors and benchmarking techniques in Turkish family companies providing service in the food sector on company performance were put forward with a literature survey.

Methodology- A survey was applied to the employees of family companies providing service in the food sector by using a seven-point Likert-type scale consisting of 56 questions, and 160 surveys were evaluated. The survey results were evaluated in the light of the reliability analyses of the answers, factor analyses, correlation analyses, and regression analyses by using SPSS.

Findings- The effects of institutionalisation, sustainable management, and benchmarking on company performance were determined with the applied analysis technique. As a result, it was determined that institutionalization and benchmarking techniques have a significant impact on company performance.

Conclusion- In Turkey, it is necessary for family companies to develop an action plan based on institutional principles rather than the boss-oriented management approach and take action accordingly. In other words, it is not possible to talk about institutionalisation without the employment of qualified professionals and training, along with objective performance evaluation.

Keywords: Family company, institutionalisation, sustainable management, benchmarking, company performance
JEL Codes: M10, M19, M20

1. INTRODUCTION

Under changing and developing world conditions, enterprises try to exist through various methods. The enterprises experiencing the greatest difficulties in these processes are undoubtedly small- and medium-scale family businesses, which try to adapt to competitive conditions through various performances, thereby increasing activities in the areas in which they operate. The purpose of this study is to investigate the effect of institutionalization, benchmarking, sustainable management variables on the company performance, and the contribution of this effect to the competitive power of the company. Performing the literature review and application research to see the current situation in family businesses and receiving guiding results for enterprises are aimed in our study. Under today's conditions, the importance of the contribution of performance tools to the enterprise by adapting to enterprises is mentioned in order to be able to sustain the existence of enterprises. It is aimed to increase the competition by including enterprises in change efforts with the variables of institutionalization and benchmarking and by examining the processes.

2. LITERATURE REVIEW

2.1. Family Company Concept

When it comes to the concept of the family company, the first thing that comes to mind is undoubtedly the unity of economic gain that family members, who have the spirit of entrepreneurship among family members bound by blood, usually establish in a certain capital framework. It also can be said that many definitions have been made after the studies and examinations made on the concept of family companies. According to Craig, the family company is a complicated concept because the concepts of the family and company interact with each other. It is possible to say that there are positive and negative aspects of interaction. For this reason, it will not be accurate to put forward the concept of the family or company alone in the concept. A separate evaluation of the two concepts in the examination of a family company will be healthier in terms of forming a definition (Akça, 2010). Family companies are profit-oriented social organizations established by individuals bound by blood to produce goods and services by coming together (Sadrı, 2013).

2.2. Basic Characteristics of Family Companies

Family companies have a number of characteristics arising from the fact that individuals with specific characteristics and bound by blood come together. Regarding this issue, Karpuzoğlu states that strict rules are applied in family businesses, and these rules tire professionals as much as family members (Ak, 2010). Family companies have strengths besides their characteristics. These strengths contribute to the company development and serve for many years. The fact that there is not much bureaucracy in family companies makes it easier to adapt to the environmental conditions. Because family companies are established with the family spirit, it makes it possible to create a positive image of employees and contribute to the increase in the commitment of employees (Sadrı, 2013).

2.3. Institutionalisation Concept

According to the dictionary issued by the Turkish Language Association, the term "institutionalisation" is defined as becoming institutional and organized and obtaining continuity. Institutionalisation can be defined as "the process of the organization's acquiring a separate identity and becoming a sensitive and flexible organism as a natural consequence of social needs and pressures" (Sadrı, 2013). According to Aslan and Çınar, institutionalism is the creation of standards, routines, or traditions that people have practiced in the order they exist. In the institutionalised systems, the approaches or ideas are interpreted as the works formed in the organization creating an integrity by being standardized in the future (Koyuncu, 2015,). *Institutional power* is different conception of power that has played a central and strict role in policy research. According to this context, institutional power may be defined as actors' control of others through the formal and informal institutions that mediate between A and B (Barnett and Duvall, 2005; Carstensen and Schmidt, 2016). Thanks to institutionalisation, it is possible to contribute to the success of the company by having all works done by competent people. According to Çakıcı and Özer, institutionalisation is defined as businesses with specific characteristics in terms of family companies, with a strong organisational structure, operating in accordance with the rules, contributing to the employees, state, customers, and their suppliers and connecting their business relationships with family to certain rules and in which there are no personal implementations; works and activities are standardised; and innovations are followed closely (Turhan, 2016, 43).

2.4. Types and Levels of Institutionalisation

It is possible to mention a process descended from father to son in the tradition of family companies. This process can be regarded as a formation, far from professionalism, progressing between the presence of information obtained from the father and the current situation of the company. According to Müftüoğlu, the need for institutionalization arises in two ways. The first reason is that the company makes certain progress during the growth process. This situation is related to the fact that the entrepreneur is insufficient in management, and there is a need for a professional manager. It is possible to say that the second reason is the need for specialization in top management. With institutionalization, certain characters begin to be formed, and distinctive aspects start to be determined in businesses (Güngör Ak, 2010). In the literature, different perspectives were developed for the levels of institutionalization. According to Barley and Tolbert, the levels of institutionalization has four stages. The first stage is to form institutional principles in specific areas in the written form. The second stage is the standardization of written principles called legalization. The third stage consists of updates and repetitions. In the fourth stage, the modelled behaviours become objective, and interactions arise between the actions (Tavşancı, 2009). It is possible to say that institutionalization is not a result but an ongoing process. According to Fındıkçı, the process of institutionalization is defined as conducting business without its founder in accordance with a certain plan and making a profit, structuring works by leaving the jobs in the business to professional managers and maintaining this condition (Güngör Ak, 2010, 83). Institutionalization plays a great role in sustaining a business, adopting a sustainable management mentality, and obtaining a permanent profit. According to Güngör, taking the right steps during the institutionalization process, controlling operations at each stage, and conducting improvement works when required

will provide high success in terms of efficiency, quality, and the customer's satisfaction to be obtained from institutionalization (Günay, 2014). When the institutionalization study is correctly implemented, it will provide long-term benefits to the company. As a result of the fact that the individuals who will contribute to institutionalization do not provide the contribution required or do not adapt to the change, they may have negative reflections instead of success in the company. The concept of institutionalization has advantages and disadvantages. Family companies prefer to stay away from the concept of institutionalization as a result of the negative sense resulting from the fact that they focus on disadvantages rather than advantages.

2.5. Institutionalization Status of Family Companies in Turkey

Institutionalization can be simply defined as the status of proceeding to a certain system and order by the group such as the belonging unit, division, etc. According to Acar, institutionalization in family companies progresses as a process. In the determination of the processes, special conditions of the family are considered, and, first, the family constitution is prepared. In the second stage, decisions are made on how to train the next generations. In the third step, stages of the delegation of authority in the business are prepared (Koyuncu, 2015, 29). Fındıkçı stated that the transfer rate of family companies to the third generation is around 15%–20% in Turkey and around the world, and their average lives last between 25–30 years. He also stated that the most important reason for this failure is insufficiency in the management and non-institutionalisation (Şengün, 2011). There is a lot of information and opinions about the importance of the institutionalization concept for family companies. The general opinion suggests implementing the concept of institutionalization by developing a positive approach without evaluating the disadvantages negatively.

2.6. Resistance to Institutionalisation

Although businesses consider institutionalization as a means for growth and as a power increasing the ability to compete, some employees consider institutionalization as a factor making them lose their jobs or a negative tool that will change their working methods, and they resist this situation. According to Silverman, reactions to institutionalization were identified as ignoring personal skills, opinions, and abilities; leading organizations to lose their flexibility; and fear created in employees by the excess standardization and density of rules (Turhan, 2016, 79).

2.7. The Concept and Definition of Benchmarking

Every day in the world, millions of companies struggle to survive. According to Aktan, benchmarking is when an organization incorporates the best practices by analyzing them inside itself or other organizations to increase level of performance (Kocakahyaoğlu, 2008, 62). According to Saraç, with benchmarking, companies understand the developments, new practices, and changes that have emerged in their external environments by coming out of their shells toaddress adapting these to their own organizations with scientific methods. Acting independently from the external environment, believing that the work is best done by itself or underestimating others, not being open to mutual communication are the factors limiting the development of businesses (Akdağ, 2014, 32). Benchmarking is the process of finding, researching, and learning the best and the better in the processes that the organization takes with priority and ensuring continuous improvement by adapting the acquired knowledge to its own processes (Heptürk, 2003, 37). According to Burke (1996), benchmarking is a term from topography. A benchmark is a sign that cartographers use to remember a certain point (Aktaş, 2009, 6). According to Bergman and Klefsjö, the philosophy underlying the start of using the concept of benchmarking as an administrative tool in the business area originates from the far east and is defined as being related to the words meaning "*dantatsu*," in other words, "the best of the best" in Japanese. According to Bedük, benchmark is defined as a continuous and systematic process in which a company will evaluate products, services, and business processes of an organization or organizations known to have the best applications in terms of business management by comparing them with their own (Topaloğlu, Kaya, 2008, 27). Benchmarking is not a copying technique but a tool for new formations. Henry Ford forms a good example of the benchmarking technique by developing a band system following a tour to a slaughter house. In the world, the Japanese use this technique most intensively. The owner of Toyota sent his son to visit Ford facilities in the USA. During this visit, Eiji Toyota witnessed the work of supermarkets to ensure that products that run out on the counter quickly become available. When he returned to Japan, he shared this inspiration with the chief engineer of Toyota, and they established the famous system of Just-In-Time (Ertürk, 2013, 125). According to these cases, it is found that countries which have science-technology-innovation oriented global competitiveness strategies have sustainable competitiveness and long run growth (Şener and Sarıdoğan, 2011).

2.8. Types of Benchmarking

The concept of benchmarking has different types, and it is important to know them for the implementation phase. Companies can conduct benchmarking studies in different areas and functions. It is inevitable to select the correct type to implement correctly benchmarking and wait for positive results. The types of benchmarking are indicated in Table 1.

Table 1: Types of benchmarking

Focused Situation	The Most Appropriate Benchmarking
If inappropriate strategies are restructured. Example: If the changes in technology or customer needs are taken into consideration	Strategic Benchmarking
If the ways are searched to close the gaps in the performance and relative performance level in basic areas and actions according to other organizations in the same sector	Performance or Competitive Benchmarking
If basic processes are developed to create a difference in the performance in a short time	Process Benchmarking
If actions or services for which there are no others carrying out similar jobs are developed	Functional or Generic Benchmarking
If the pressures prevent benchmarking in the same sector and there is a need for radical changes	Functional or Generic Benchmarking
When the Following Situations Occur	**The Most Appropriate Benchmarking Approach**
When a few work units are an example of good practices in the same organisation, the change in information and data sharing is undesirable in the external organizations, being inexperienced in the implementation of benchmarking, time and other resources are limited	Internal Benchmarking
When there are examples of good practices in other organizations and when there is a lack of practice in individual companies and when there is a search for innovation	External Benchmarking
When there are good practice organizations in other countries, when there are very few partners (benchmarking) in the same country, when the objective is to achieve a world-class position	International Benchmarking

Source: Aktaş, N., "Kars, Ardahan, Iğdır Bölgesinde Faaliyette Bulunan Üretim İşletmelerinde Benchmarking Yönetim Tekniğinin Bilinirliği ve Uygulanabilirliği Üzerine Bir Araştırma" [A study on the Familiarity and Applicability of the Benchmarking Management Technique in Production Businesses Operating in the Region of Kars, Ardahan, Iğdır], Graduate Thesis, Kafkas University, Kars, 2009.

2.8.1 Strategic Benchmarking

According to Doğan and Demiral, strategic benchmarking is aimed to achieve improvement and development in the whole of the business; thus, long-term strategies of successful enterprises are examined. It is important to learn the business strategies that have attained success with and adapt them into the business and culture (Akdağ, 2014, 41–42). According to Bedük, it is possible to create a good example of benchmarking in industry-leading companies by specializing in a single area. Moreover, a leading company can show interest in seeing itself as a benchmark partner and use it as an instrument of motivation for itself. The information acquired from all the studies will create an advantage in terms of productivity for the companies making a contribution (Karataş, 2004, 26).

2.8.2. Competitive Performance-Oriented Benchmarking

In this type of benchmarking, rivals in the same market and which processes are well-regulated are examined. However, providing the current situation and information of the rival companies may not be possible all the time (Ertük, 2013, 318).According to Doğan and Demiral, this benchmarking study, which requires the selected benchmarking partner to be from the same sector, focuses on their position by comparing the performance of the basic products or services of the

business. In this kind of benchmarking study, because the benchmarking partner is from the same sector, it is difficult to create an environment of mutual trust and to share accurate information (Akdağ, 2014, 42).

2.8.3. Process-Oriented Benchmarking

While some businesses prefer product-oriented benchmarking, others prefer to benchmark their processes to carry on their businesses for a longer period of time. Success in process-oriented benchmarking can be more permanent. Process-oriented benchmarking is typically carried out to achieve excellence, satisfy customers, and deliver the best products or services in order to bring long-lasting success.According to Çolak, the correct processes produce correct outputs. In order to compete, in addition to the excellence of the characteristics of the product or service, the fact that their processes are excellent determines the competitiveness. Process-oriented benchmarking aims to provide outstanding performance by considerably reducing costs (Mert, 2006, 25).

2.8.4. Functional Benchmarking

In this type of benchmarking, well-regulated businesses that operate with a different topic, which is not competitive to the business in the market, try to benchmark similar processes of the businesses. Even if the production topics of the businesses are different, they may have similar processes, which can be benchmarked (Ertürk, 2013, 318). According to Şimşek, the characteristic of functional benchmarking is that it can focus on all kinds of institutions, including all kinds of industry. With this method, it was seen that productivity increased by 35% or more. It is also known as generic benchmarking in some sources (Avcı, 2007, 19).

2.8.5. Internal Benchmarking

With internal benchmarking, institutions aim at success by transferring the best practices and other studies carried out in their own structures to other functions. According to Şimşek, with internal benchmarking, institutions will conduct easier works when compared with the other methods because they will benchmark their own processes. With this method, productivity is typically increased by 10% (Avcı, 2007, 15). According to Nemlioğlu, the most important advantage of internal benchmarking is that data collection is easy. The practice is particularly advantageous for institutions operating in different locations. This method can provide successful results in companies in the same group. The most important disadvantage of this benchmarking is the limited focus (Mert, 2006, 29).

2.8.6. International Benchmarking

International benchmarking is used more often when the institutions are working in the field where international benchmarking is required and are located abroad or when the number of enterprises is insufficient in the country. The fact that it is abroad and the opportunities of time, money, etc. are difficult to attain when compared with other benchmarking types reduce its preference rate.

2.9. Benchmarking Of The Best Practice

In this benchmarking model, the most important difference is the participation of more than one organisation in the benchmarking study and the integration of the best practices in the field to the institutions included in benchmarking. Unlike all other types of benchmarking, the business regarded as the best in this study emerges from the combination of multiple businesses, which are good at specific issues. Each benchmarking partner provides benefit in terms of product, service, training, etc. (Doğan and Demiral, 2008, 9).

2.10 Implementation Process of Benchmarking And Literature Review

When institutions need benchmarking, they start by examining a number of processes. Although these stages show flexibility in terms of organisation, institutions should first decide in which area and for which purpose they will carry out benchmarking. The organisation that analyses its own processes and structure must find the most appropriate benchmarking organisation for itself. It is possible to arrange the processes followed in benchmarking practices in different ways. Benchmarking can be performed by determining a process appropriate for the change in operation. The benchmarking process starts with planning. Decisions regarding the determination of the benchmarking process to be improved, the determination of the parameters, and the selection of the business in which benchmarking will be performed are made at this stage. In this step, usually, time and which case will be benchmarked to whom are determined (Ertürk, 2013, 318–319). The more successful the benchmarking study is for the company, the more important it should be to comply with the rules of benchmarking. A lot of preconditions can be set for the benchmarking study according to the implementation area. According to Zairi and Al-Masri, achieving successful results by using the benchmarking technique requires acting in accordance with a set of principles (Topaloglu, Kaya 2008, 45):

- There must be senior management rules and support in the benchmarking practice.
- In order for the benchmarking technique to be implemented, the institutional culture required must be established by the working individuals.
- The most appropriate benchmarking technique, which is suitable for the culture of the business and that can be implemented, should be used.
- Benchmarking practices should be analysed and implemented in the best way within the prescribed time.
- A number of rules should be suggested and working methods appropriate for these rules should be determined to ensure that the applications can provide correct results.
- Benchmarking practice should proceed with a three-step body of rules consisting of comparative analysis, determination of a new process, and implementations.
- In benchmarking applications, it should be acted in accordance with the predetermined working principles.
- The aims of the enterprises should be determined and implementations required should be conducted.

The benchmarking technique first started to be used in the production sector and then began to be used in different areas. A great variety of benchmarking studies were conducted in our country and in the world. If we give an example of these studies, it is possible to mention the study group named "BENCHSA" established in 1997 by Beksa-Brisa-Dusa-Kordsa-Olmuksa, which are the companies of Sabancı Holding, and pursuing the aim of developing a perspective on benchmarking. This study group addressed benchmarking as a process and focused on the establishment of the required infrastructure, the announcement of the implementation and the evaluation of the efficiency of the study. In 1995, a similar benchmarking study was conducted in Eczacıbaşı community. Benchmarking percentages per sector are presented in Table 2.

Table 2: Benchmarking Percentage per Sector

Sector	Total Number	The Rate of the Demand for Benchmarking
State	55	32 (58%)
Education	37	23 (62%)
Health	52	36(69%)
Production and Construction	269	135(50%)
Financial Services	57	19(33%)
Service and Retail Trade	189	68(36%)
Publicly Owned Businesses	18	14(78%)
Others	49	19(39%)

Source: Erdem, B., İşletmelerde Yeni Bir Yönetim Yaklaşımı: Kıyaslama (Benchmarking) (Yazınsal Bir İnceleme) [*A new Management Approach in Businesses: Benchmarking (A Literary Review)*], Balıkesir Üniversitesi Sosyal Bilimler Dergisi, Cilt: 9, Sayı: 15, Balıkesir, 2006, p.72.

Similar studies have been conducted in the previous periods in terms of the effects of the concepts of institutionalisation and benchmarking on businesses, and a number of results have been obtained. Sancaklı used the data envelope analysis technique in his study on benchmarking in the field of transportation and conducted a benchmarking study on five companies. The analyses determined that the company's success and productivity were extremely high. High employee motivation, emphasis on training, improved information systems, paying attention to the sense of quality, taking customer complaints into consideration, and creating backward answers were indicated as reasons for this success. It was concluded that the fact that benchmarking is well understood, easy to implement, and its applicability is common, which has positive effects on a company's productivity and competitiveness (Sancakli, 2006, 89–90). Mert conducted a study on the organisational performance of benchmarking implementations with a textile company. The business demonstrated its strengths and weaknesses with a benchmarking study and implemented these decisions through strategic decisions. In the studies conducted in the textile field, businesses revealed their own weaknesses and took precautions in this regard. Nowadays, while increasing organisational performance against the increased competition is an aim, benchmarking is a means. In conclusion, it was identified that the concepts of performance and benchmarking are positively related to each other (Mert, 2006, 104). Akdağ conducted an implementation study in Istanbul by using a seven-point Likert-type attitude scale in the study on the effects of reengineering and benchmarking techniques on the company performance. The studies determined that companies can increase their performance only by applying modern management approaches.

Moreover, a linear relationship was identified between benchmarking and the growth performance of the companies; thus, it was concluded that the hypothesis related to the positive effect of benchmarking was significant (Akdağ, 2014, 118). Erdem conducted an implementation study by using a five-point Likert-type attitude scale using the benchmarking technique as a performance management tool in companies. In the light of the studies conducted and data obtained, it was concluded that there was a significant relationship between the benchmarking technique and performance management (Erdem, 2007, 299–300). Koyuncu used the descriptive and relational screening method in the study on the institutionalisation processes in family companies. The scale, developed by Roger C. Allred and Russel S. Allred, was used in the determination of the findings. The implementations were conducted by creating similar questions to a five-point Likert-type attitude scale. It was observed in the study that noninstitutionalised companies were family companies. It was identified that institutionalisation does not occur in family companies within certain problems. It was concluded that the existence of the family companies, in which the stages of institutionalisation are not completed, is short (Koyuncu, 2015, 75–76). In the study of Güngör Ak on the effects of institutionalisation in family companies on company success, the supervision study, which is included in the type of the screening study, and the screening study were used together. Questions in the form of a five-point Likert-type attitude scale were used for the implementation study. As a result of the implementations, it was indicated that cooperative skills in family businesses were insufficient. It was further concluded that it was difficult to make decisions on behalf of a company due to management staff being composed of family members in the companies, and that they moved away from institutionalisation (Güngör Ak, 2010, 245–247). Tavşancı used the general representation method in the study conducted on the effect of the level of institutionalisation on competitive power. A five-point Likert-type attitude scale was used in the implementation. These studies revealed that institutionalisation positively affects a company's competitive power (Tavşancı, 2009, 117–118).

3. DATA AND METHODOLOGY

Businesses try to survive by using various methods under changing and developing world conditions. Family companies try to adapt to the conditions of competition with various studies increasing performance in the areas they operate. This study is the research of the effect of the intended institutionalisation, benchmarking, sustainable management variables on the company performance and the contribution that this effect will provide to the competitive power of the company. It is aimed to conduct literature reviews in the study, carry out implementation research to indicate the current situation in family companies and the results are intended to guide the businesses. Institutionalisation, sustainable management, benchmarking were evaluated with a questionnaire study on the family companies providing service in the food sector. The general conditions and negative perspectives of the employees on the questionnaire prevented the questionnaire study from reaching larger masses. When the study is considered as a thesis study even under these circumstances, the data obtained are quite reliable and highly convenient to come to a conclusion. The study was conducted on the family companies providing service in the food sector. In the study, the data were obtained with the questionnaire method commonly used in social sciences. Some of the questionnaires were completed by e-mail, but a significant part was completed face-to-face. It is possible to say that especially the study conducted face-to-face was quite efficient. During the questionnaire, it was observed that the employees had difficulty in sharing information at the company level and were anxious to share information. Despite this hesitation of the participants, it was stated that the study was prepared for the scientific data purposes and the names and information would be examined with the principle of confidentiality. Thus, a participation of 160 people was ensured.

The questionnaire forms were prepared according to a 7-point Likert-type attitude scale and implemented. The scale used in the questionnaire is indicated in Annex-1. The options used in the evaluation of the answers in the questionnaire are as follows: (1) Completely Disagree (2) Mostly Disagree (3) Partially Disagree (4) Neutral (5) Partially Agree (6) Mostly Agree (7) Completely Agree. The data obtained from the questionnaire results were evaluated with SPSS (Statistical Package for Social Sciences) software. When the results of the questionnaire are examined, it is observed that 77,5% of the businesses participating in the questionnaire are regional. These results indicate that growth tendencies of the businesses in our country where family companies are intense remain at the regional level rather than being national or international. Businesses need to focus on performance and increase their studies in these areas so that they can overcome regionalism. When the sector distributions of the businesses participating in the questionnaire were examined, it was identified in the study that 99,3% of the businesses provided service in the food sector in accordance with their purposes. This situation is a detail indicating that the sample was obtained in accordance with the title of the study and the purposes in the section of objectives. When the distribution of the departments in which employees participating in the questionnaire work was examined, it was identified that 35,9% of the employees work in the production department, 31% work in the personnel department, 18,6% work in other departments, 8,3% work in the accounting department, and 6,2% work in the sales/marketing department. In accordance with these rates, it is observed that the majority of the employees work in production in the food sector. When the results of the gender distribution, which are among the remarkable results in the questionnaire distribution, are examined, the density of male employees continues in the business life with the rate of 70,8%. Although the share of women in the business life gradually increases in the national economy, it is possible to say

that still there is a male-dominated labour market. When the educational status of the employees participating in the questionnaire is examined, it is indicated that 27,1% of the employees are primary school graduates, 25,8% are university graduates. Since it is determined that the employees are in the intermediate working group, it is also possible to say that employees who are said to have been trained from the cradle consist of primary school graduates and in the developing businesses they try to choose employees among university graduates. The average age of the employees participating in the questionnaire is 32,05 years. When the total working periods of the employees are examined, it is possible to say that the average is 11,27 years and the rate of the working period in the business they currently work in is 4,81 years.

Various techniques were used in the study to confirm that the research model in the study was understood by everyone and was structurally valid. At first, the general reliability analysis including all variables was conducted. For the total of 56 questions, the Cronbach's Alpha coefficient was determined to be 0.945. The stated rate indicates that all scales included in the study complement each other, they are understood in the same way by everyone and they are reliable. The reliability rates of each scale within itself were checked to avoid any doubt. The questionnaire used in the study was formed with clear and understandable questions and various technical studies were conducted to provide an active participation in the field to be applied. 56 questions were addressed to the participants in the study and the reliability analysis was used. When the results of the reliability analysis were examined, the Cronbach's Alpha coefficient was identified to be 0,945. Based on these results, it is possible to say that the questions are read and understood by all participants and objective answers are provided. The reliability of the questionnaire results is important in terms of acquiring the most correct results in the study we conduct and directing scientific studies. The factor analysis is a statistical technique aimed at collecting variables that measure the same structure or quality with a small number of factors and measuring them. The process of the factor analysis is defined as "creating a factor by determining a factorization or new variables, or obtaining the functional definitions of concepts by using the factor loading values of the items". Briefly, it is used to identify the dimensions in which the concepts of the factor analysis are defined (Fındık, 2015). Factor loads are presented in Table 3.

Table 3: Factor Loads and Values

Sm1	,647	**Ifc1**	,675	**Bt1**	,796	**P1**	,769		
Sm2		**Ifc2**	,839	**Bt2**	,804	**P2**	,737		
Sm3	,678	**Ifc3**	,747	**Bt3**	,859	**P3**	,847		

Sm4	,690	**Ifc4**	,737	**Bt4**	,867	**P4**	,898		
Sm5		**Ifc5**	,659	**Bt5**	,559	**P5**	,895		
Sm6	,675	**Ifc6**		**Bt6**	,817	**P6**	,889		
Sm7	,587	**Ifc7**		**Bt7**	,842	**P7**	,776		
Sm8	,580	**Ifc8**		**Bt8**	,745	**P8**	,740		
Sm9	,607	**Ifc9**	,566	**Bt9**	,702	**P9**	,851		
Sm10	,716	**Ifc10**	,802	**Bt10**	,838	**P10**	,884		
				Bt11	,656				
				Bt12	,649				
				Bt13	,723				
				Bt14	,756				
				Bt15	,715				

*Sm(Sustainable Management) *Ifc (Institutionalisation in Family Companies)
*Bt (Benchmarking Techniques) *P (Performance of the Company)

The correlation coefficient indicates the direction and strength of a variable's correlation with another variable. The correlation coefficient (r) indicates a value between -1 and +1. The values close to +1 indicate that the positive correlation between two variables is strong, and the values close to -1 indicate that the negative correlation between two variables is strong. The threshold values frequently mentioned in the literature are as follows (Fındık, 2015):

- "Values between 0.30-0.00 indicate a low correlation
- values between 0.70-0.30 indicate a medium correlation
- values between 0.70-1.00 indicate a high correlation."

The correlation table obtained as a result of our study is indicated in Table 4.

Table 4: The Correlation Table

	1	2	3	4	5
Institutionalisation (1)	1	,596**	,462**	,265**	,421**
Sustainability (2)		1	,577**	,288**	,273**
Institutionalisation in Family Companies (3)			1	,620**	,508**
Benchmarking (4)				1	,518**
Performance Of The Company (5)					1

When the factors are examined, it is seen that all variables except for sustainability have a direct and positive effect on the performance of the company, which is a dependent variable of working in a high causality relationship. It is observed that, especially, institutionalisation principles and benchmarking techniques increase the performance of the company with high values at the level of 0,000 and between the coefficients of 0,329 and 0,344. In other words, it is possible to say that companies that implement the principles of institutionalisation in a disciplined manner and integrate the benchmarking techniques into their organisational structures encourage their shareholders for new investments with a high financial performance. Institutionalisation principles are the sum of the efforts of a company to increase employee and customer satisfaction by protecting certain principles that never change on every new day. The coefficients acquired as a result of the analysis are presented in Table 5.

Table 5: The Table of Coefficients

Model		Unstandardised Coefficients		Standardised Coefficients	t	Sig.
		B	Std. Error	Beta		
1	*Constant*	,838	,427		1,964	,051
	INSTITUTIONALISATION	,332	,078	**,344**	**4,231**	**,000**
	SUSTAINABILITY	-,191	,102	-,166	-1,877	,063
	INSTITUTIONALISATION IN FAMILY COMPANIES	,228	,094	**,237**	**2,429**	**,016**
	BENCHMARKING	,307	,078	**,329**	**3,951**	**,000**
R^2: 0,399	Adjusted R^2: 0,383					

As it is indicated in Table 5, when the cause and effect relation between the variables is examined, it is seen that the determination coefficient (R^2) of the model is 0.399. In other words, the percentage of the effect of the independent variables regarded as significant in the model on the company performance which is the dependent variable of the

study is 39,9%. Institutionalisation and benchmarking techniques have an increasing effect on the company performance at the rate of approximately 40%. Moreover, the factors of sustainability and institutionalisation in family companies remained in the background in this regression model; they do not have any effect on the company performance. The disclosure rate of 40% appears as a considerably high value in social sciences. The remaining effect of 60% is not a subject of our study.

4. FINDINGS AND DISCUSSIONS

Significant findings were obtained in this study in which the effect of institutionalisation principles, especially benchmarking techniques and sustainable management techniques, which can help an organisation to achieve success, on the company performance in family companies was examined. The reliability, validity, factor analysis, correlation, and regression analyses carried out within the scope of the empirical study were meticulously implemented, and some results, which may be important for family companies, were obtained. The most striking result is attaching importance to the benchmarking techniques and their adoption and implementation by top management in an organisations structured to be family companies. Analysing the strengths and weaknesses of the competitors, anticipating the threats and opportunities in the market in advance, and making an innovative entrance to the market with new products and services are some achievements that can be attained with the benchmarking technique by the new generation of family companies especially based on the companies in which there is a fierce competitive environment. Thanks to this technique, companies can draw their net profits, annual increases in sales, employee numbers, new customer numbers, and overall market competitiveness to the desired level. The high profits of a company and continuous growth with expansion investments are also important success criteria in terms of shareholders, and they increase the market value of the company. Companies with a high market value attract the attention of investors and contribute to the growth of the company.

Especially in developing dynamic markets such as in Turkey, stability and sustainability are not completely achieved because employees and managers are constantly changing, depending on the turnover rate of the labour force. Therefore, sustainability was found to be administratively meaningless within the scope of the study. The fact that each incoming management determines a vision and strategy, employs people whom they trust and its nepotism practices, constantly changing operational activities continuously change the organic structure of the company and prevent sustainable success. Business owners do not see sustainability as a means of growth for businesses, and they do not add the contribution to be obtained sustainability to the company. Circulation of employees, maintaining works not with people good at their jobs but with people who are currently available and reducing productivity by keeping learning processes short and utilising the staff who have learned their jobs in different fields prevent sustainable success. In this case, when considered within the scope of institutionalisation, it is indicated in the emerging picture that momentary changes will not bring success unless the company has rules and principles valid for everyone. In the developing world order, businesses working full-time and taking strategic decisions on time gain more importance when compared with the businesses acting with instant decisions.

In Turkey, it is necessary for family companies to develop an action plan based on institutional principles rather than the boss-oriented management approach and take action accordingly. In other words, it is not possible to talk about institutionalisation without the employment of qualified professionals and training, along with objective performance evaluation. Business owners who consider institutionalisation merely theoretically and imagine that institutionalisation is ensured by adding new systems are unfortunately mistaken. Institutionalisation is not just the whole of systems, but the whole of cases in which the systems are implemented, and efficiency is obtained from the implementations. At the same time, institutionalisation is a system that makes employees feel important and enables them to contribute to the field they work in. The formation and continuation of this system depends primarily on the fact that business owners focus their thoughts in this direction and on the choice of staff to be involved in the system in this direction. Thus, the business must examine the stages of institutionalisation from beginning to end at all stages and make a gradual transition.

Hypotheses developed within the scope of the study were accepted. The institutionalisation principles in family companies and new generation benchmarking techniques have a direct and positive effect on company performance. The level of importance assigned to these elements by senior management also determines the financial performance level of the company. A family company operating on a regional or national basis should adapt such strategies and tactics to the company if it wants to be a global player. For example, the management or working model of a global player can be imitated by being examined, and even a better one can be designed from this model. However, the company performing benchmarking should have a structure similar to that of the market in which the family company operates. If the external environmental conditions are not homogeneous, the results will be different.

5. CONCLUSION

The most important thing to which the executives of family companies should pay attention is the requirement of the company to be benchmarked of having a similar structure to the economy of their own country and to the sector they are in. If the benchmarking model is chosen incorrectly, these processes can turn into long-term systematic chaos. One of the most dangerous situations for a company is choosing the wrong role model. In order to determine the business role model, it is necessary to first analyse its own strengths and weaknesses and select a role model that can strengthen its weaknesses regarding the results of the analysis. In benchmarking processes, the establishment of benchmarking processes and benchmarking teams are just as important as the selection of a role model. An incorrectly selected process (e.g., benchmarking of a successful implementation in human resources with quality processes) will affect the study of the business negatively and cause a loss in time, costs, etc. It is important to select the benchmarking team from those who have full knowledge about the benchmarking processes, who can follow effectively and clearly information provided by the benchmarked company and put it into practice. The fact that the benchmarking team incorrectly transmits a positive process or deficiencies to occur in practice will lead to failure. The importance attached to the benchmarking study also will form a step in the name of institutionalism. Although people did not have an opinion about sustainability at the end of the study, it was identified that they were interested in institutionalisation and saw it as a variable that could bring success. The interest of employees in the institutionalisation and benchmarking variables will lead them to participate in these processes and become a part of the structure. This will enable businesses to be involved in the competitive power with employee potential and will provide easy adaptation to the changing world systems.

Today's Turkish family businesses see institutionalisation as a final result in their boss-oriented studies, and they get the idea that the development will be completed by completing the stages of institutionalisation. The perspective on benchmarking is seen as a copying procedure, which is directed to the studies that will provide financial gain as soon as possible. Although this situation is interpreted in this way in terms of bosses, it is revealed with the results of the study that the employees are of the opinion that the performance will be improved with institutionalisation and benchmarking. Employees will be able to plan a healthy career for themselves in the company that grows with each passing day, and their employment will be long-term. When we look at family companies from the window opening to the world, it is observed that the companies that manage to sustain themselves by developing for many years carry out all their formations and the performance of the companies is improving. If businesses want to make an effort to survive and keep up with the conditions of competition, although there is a negative perception of sustainability, they should build their institutional structures by considering the merit system, carry out analyses for benchmarking subjects, and contribute to the business with strategic decisions as soon as possible. Finally, it is suggested for academicians who want to conduct a study in this field to keep the study sample more comprehensive, and questionnaires should be applied to the companies in different countries. In the changing and continuously developing world order, conducting new studies, sharing results with business owners, as a result of reaching large masses in which differences are intense, will help countries improve their global perspective by contributing to their economies.

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INNOVATIVE ENTREPRENUERSHIP UNDER UNCERTAINTY

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ABSTRACT

Purpose- This paper analyzes the economic activity of innovative entrepreneurship under uncertainty. We examine the profit maximization model of innovative firm under two kinds of uncertainties. The first kind of uncertainty pertains to market conditions. Erratic behavior of future prices creates market uncertainty.

Methodology- This uncertainty is at least partly resolved by rational expectations hypothesis. But repercussions of market imperfections still loom large in the background of theoretical framework. The second kind of uncertainty is caused by technological changes and the patterns of innovations. We use the black-box approach methodology to production function and then improve it with a learning model.

Findings- The pace and space of innovation adoption is retarded and narrowed by technological uncertainties. This problem is tackled by neoclassical innovation models to some extent. In particular, endogenous growth models and the industrial dynamics model attempt to endogenize the innovation and technology under rational expectations.

Conclusion- But these models provide incomplete insights for they do not deal with learning behavior of innovative entrepreneurs. We propose an alternative learning model which takes into account the adaptive and imitative behavior of individual innovators whose economic actions matter in the general framework of real life economics.

Keywords : Innovation, technology, uncertainty, entrepreneurship, expectations
JEL Codes :O30, O32, O33

1. INTRODUCTION

More than half a century ago, the call for a synthesis between economic history and economic is now a necessity to tackle the contemporary complex economic phenomena in a more humane manner: "Economic historians and economic theorists can make an interesting and socially valuable journey together, if they will. It would be an investigation into the sadly neglected area of economic change" (Schumpeter, 1947). The economic inquiry into the causes and consequences of economic change requires multifaceted analysis in which theoretical links are deepened on the background of historical roots. The theory of innovative enterprise urges upon the integration of economic theory and history to understand economic phenomena in which *markets are outcomes rather than causes of economic development* (Lazonick, 2013). In neoclassical economics, the determinants of economic change particularly pertain to the technological breakthroughs and these changes are depicted as shifts along production curve. Thereby, the standard analysis in economic change becomes an equilibrium analysis in which technological innovations enter into the economic models as exogenous shocks. This level of analysis is insufficient since it only concerns with consequences in the aftermath of transient disturbance. What happens when an economy experiences a technological transformation is reflected as a movement from one equilibrium point to

another in a classical comparative static fashion. Although factors of production consist of capital, labor and technology in a classical growth model, the human factor is underestimated, if not totally ignored. Individual involvement in economic development and change plays an important role in micro-meso-macro level of economic analysis. The micro-meso-macro analytical framework of evolutionary economic theory is a useful tool to reexamine the dynamic process of socio-economic change in which *one in many and many in one* act interdependently. The theory of evolutionary economics develops the analytical tools to understand the complex human behavior. Oscar Lange's article "The Rate of Interest and the Optimum Propensity to Consume" (1938) was fundamental part of a larger project for the development of economic evolution (Assous and Lampa, 2014).

Today people are both more rational and more irrational at the same time. Rational irrationality and irrational rationality are among the most common behavior patterns of individual economic actors of our era. All of these facts render sufficient reasons for an economist to work with a broader perspective from within the economic profession. Hence we need to go far beyond the spatial picture of geometrical movements along the production function for it will be no avail to map complex behavior patterns of human action by shifting positions of points on a plain diagram. After all, as long as the human factor is left out of its domain, the production function will be an 'implicit function' and thereby a black box. The black box approach to production function emanates from the fact that the general construction of the function subsumes but does not actually embed individual decision making process and strategic behavior (Lewin, 2000).

2. THE PROFIT MAXIMIZATION MODEL OF INNOVATIVE FIRM

Technically, the innovation is defined as a shift of production function from one locus to another on a geometrical plane. In Schumpeter's words "we will simply define an innovation as the setting up of a new production function" (Schumpeter, 1939, p. 87). This is of course oversimplified and very abstract definition of innovation. Actually this is *not* a definition of innovation as a cause, but it is rather a definition of the effect of innovation. Lange (1943) also pointed out the same problem and showed how wide this definition is by considering the fact that, except innovations, there are very many ways which change the shape and shift the position of production functions.

"*Innovations are such changes in production functions, i.e., in the schedules indicating the relation between the input of factors of production and the output of products, which make it possible for the firm to increase the discounted value of the maximum effective profit obtainable under given market conditions*" (Lange, 1943, p. 21, emphasis in original).

Lange's analysis of innovations is based on the theory of the firm and the main motive behind innovative production is expected profit maximization that is discounted to the present value at a continuous expected interest rate as a cost of capital. Lange (1943) formulates the discounted present value of the expected profit (P) of a maximizing firm as follows:

$$P = \int_0^H s(t) e^{-\int_0^t i(t)dt} \, dt. \tag{1}$$

In Lange's terminology, $S(t)$ is the surplus expected at time t and it is identical to the difference of the receipts $R(t)$ and the expenses $E(t)$ at time t:

$$S(t) \equiv R(t) - E(t). \tag{2}$$

The receipts and the expenses are respectively related to the demand price and supply price of particular innovative product that the firm plans to produce. At the equilibrium point, demand price and supply price will be equal and only normal profit accrues to the competitive market participants. But the normal profit of perfect competition is not sufficient to take on an innovation decision of a production project for an innovative firm. Hence there will be no incentive to enter into the market for innovative entrepreneurs as long as the expected surplus is not more than to compensate the expected implicit and explicit expenses (or cost of production) and expected interest rate (or cost of capital). In this case, the expected surplus and thereby economic profits will be zero as a condition for perfect competition.

The difference of entrepreneurial profit from the normal profit enters into the model in the framework of innovation decision making criteria. In order for an innovative firm to take on a production project, entrepreneurial profit opportunity is to be greater than normal profits. The period of innovative production by the profit maximizing representative firm is defined by the term of 'economic horizon' and the length of the horizon is denoted by *H* according to Tinbergen (1933). The continuous expected interest rate as a function of time is $i(t)$ in the formula (1) and it denotes the cost of capital. The element of time is set to zero in order to denote the present moment: {t = 0}.

Amendment of Lange's model according to the theory of rational expectations will suffice for our analysis. The representative firm is supposed to maximize its profits according to the rational expectations hypothesis. Innovative expectations are classified under the general formulation of rational expectations. There are two kinds of uncertainties concerning the profit maximization in innovative activity. First one is called the "uncertainty of the market." It reflects

unpredictable patterns of future demand and supply functions, and thereby future prices. The other one is "technological uncertainty" which relates to the mode of state-of-the-art production and consumption.

3. UNCERTAINTY OF THE MARKET AND RATIONAL EXPECTATIONS

The market uncertainty emanates from the general movement of future prices. Rational expectations hypothesis under perfect competition and full information assumption provides robust theoretical solution for the market uncertainty. Tinbergen (1932) was the first to form an explicit function of rational expectations. In Tinbergen's model, uncertainty and expectations are linked with a probability theory. Keuzenkamp (1991) made a comparison between rational expectations models of Tinbergen (1932) and Muth (1961).

Though there is almost thirty years between two papers, models and the language they use are similar. The theoretical way they connect mathematical expectations to the expected value of economic variables, in other words subjective and objective expectations, resemble. The difference comes from the fact that Muth analyzes autocorrelated processes whereas Tinbergen uses the assumptions of normal probability distribution where disturbances are serially independent (Keuzankamp, 1991).

Lange (1943) also uses Tinbergen's terminology in his profit maximization model of innovative firm and these two models can be connected to construct an innovation expectations model. Innovation expectations can be decomposed into two main components according to the profit function of the firm. First component is of demand price and the second component is of supply price. The difference between these two components will be entrepreneurial profit. First component corresponds to market uncertainty whilst the second component corresponds to technological uncertainty.

Entrepreneurial profit maximization condition occurs where price is greater than average cost. In this sense, innovative entrepreneurial activity resembles to monopoly power in its very nature. Because every innovation in its initiation is unique. It takes time to imitate an innovation for competitors.

An innovative firm's production project will depend upon (i.) the profit function, (ii.) the time horizon and (iii.) the price expectations according to Tinbergen (1932).

(i.) *The profit function*: For convenience, the profit function with respect to price is set to be linear as follows:

$$\pi(p_t) = \pi_0 + \pi_1 p_t. \tag{3}$$

The level of profit will change according to the price change (Δp) and it is expressed as a first derivative of profit function: $\pi' = \pi_1$.

(ii.) *The time horizon*: The term 'economic horizon' as defined by Tinbergen (1933) is denoted *H* and for the general formulation of rational expectations, it is assumed to be infinite:$H = \infty$. The point of time denoted by {$t = 0$} represents the "present" moment.

(iii.) *Price expectations*: Price expectations are assumed to be rational. The general formulation of rational expectations under perfect competition and with full information assumption is as follows:

$$p_t = \sum_{t=0}^{\infty} E(p_t | \omega_t). \tag{4}$$

In the formula (4), p_t, the actual demand price of the innovative product that the innovative firm plans to produce at time *t* is equal to the expected demand price conditional upon the information set denoted by ω_t that the firm has at time *t*. The period spans over an infinite horizon {$H = \infty$} and begins from the "present" moment {$t = 0$}.

4. TECHNOLOGICAL UNCERTAINTY AND INNOVATION DECISIONS

Technological uncertainty creates hindrances for innovation adoption. Hence models of technological uncertainty concern with firms' research and development (R&D) strategies. These are essentially non-deterministic models of innovation since the stochastic element of expectations enters into the framework. The modeling of R&D decisions in a neoclassical framework of equilibrium analysis can be classified into two types. The first type is endogenous growth models and the other type is industrial dynamics models. (Oltra and Yıldızoğlu, 1998). The both types of models based on the assumption of rational expectations under perfectly competitive market structure. Profit maximization for competitive innovative firms

requires R&D process and thereby costs considerations of inputs into this process. The human factor plays an important role in R&D process. Skilled and professional labor is the main input in R&D studies of innovative firms.

5. NEOCLASSICAL MODELS OF INNOVATION

The accumulation and diffusion of knowledge in the economic system is an intangible engine of economic development. Standard neoclassical growth models ignore the role of entrepreneur in economic development. However, endogenous growth models take innovation decision process into account and to some extent try to endogenize it. The endogenous growth models are based on the rational expectations hypothesis and rest upon the pivot of equilibrium analysis. Although the technology and innovation are considered in the dynamics of economic development, the role and function of innovative entrepreneur is absent from the theoretical framework.

5.1. The Endogenous Growth Models

The important contributions in economic literature to endogenize the accumulation of knowledge were of Romer (1986) and Lucas (1988). The endogenous growth model of Aghion and Howitt (1992) takes vertical innovations as a source of growth and thereby analyzes R&D decision and investment rules within the framework of intertemporal equilibrium through Schumpeterian idea of creative destruction. Firms make R&D investment as a stochastic innovation process in order to improve products. Old products are rendered obsolete by new products. Each innovationary phase of production entails the innovative firm the patent and monopolistic power, and thereby supernormal profit until the next phase of innovation arrives.

The creative destruction is the key concept for neoclassical endogenous growth models and described by Schumpeter (1942, p. 83, emphasis in original): "The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new consumers' goods, the new methods of production or transportation, the new markets, … [This process] incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism."

Under rational expectations hypothesis, firms have perfect future foresight and full information of the cost of innovation. The cost of innovation consists of inputs in R&D process. The inputs of R&D process are skilled labor and specialized labor. For this reason, the expected wage rate is used to calculate the expected value of innovation. Under intertemporal equilibrium condition of perfect competition, the technological uncertainty turns into an optimal decision making under risk (Oltra and Yıldızoğlu, 1998).

5.2. The Industrial Dynamics Model

The industrial dynamics model of Ericson and Pakes (1995) analyzes an exogenous stochastic process of innovation. Profits are determined by the competition outside of the industry. Cost of inputs, demand schedule, state-of-the-art production methods come from the outside. In this framework, innovation is exogenous. The level of R&D investment maximizes the expected value of discounted profits described in the Lange's model (1). Industrial dynamics under rational expectations ensures that firms use all information available to them until marginal cost of acquiring another increment of information equals its marginal benefit. In the exogenous model of Ericson and Pakes (1995) information set of innovative firms consists of following elements:

  (i.)   The history of all past innovative states of the industry;

  (ii.)   The history of firm's own past innovationary investment decisions;

  (iii.)   The current innovative state of the industry;

  (iv.)   The probability function pertaining to the evolution of innovative states over time.

The industrial dynamic model follows the Markov process for it accurately reflects the beliefs of each firm under rational expectations. The coordination failure of firms is ruled out in the intertemporal equilibrium analysis since firms have perfect information of industry structure and rational expectations for the future outcomes.

The distinction between neoclassical general equilibrium analysis and entrepreneurial innovation is made by Schumpeter (1934). According to this distinction, the entrepreneur breaks the "circular flow" of equilibrium establishment which is a comparative static system of price adjustment. The innovative entrepreneur 'dynamizes' this closed system with a deep perception and perspective of future. Entrepreneur creates or captures disequilibrium conditions in a static and closed economic system (Kirzner, 1997).

6. EVOLUTIONARY MODELS OF INNOVATION DECISION PROCESS

The rational expectations hypothesis underlying the neoclassical endogenous growth models are criticized by being far from reality of ordinary economic life. Under imperfect competition and in heterogeneous market structure, all economic agents are rarely rational. Irrationality is more prevalent than rationality because of strategic interaction between economic agents. Also, full information assumption is almost impossibility. Since innovative entrepreneur breaks out of the boundaries of equilibrium analysis by its very nature of creativity, innovation is a matter of disequilibrium and dynamic process. Adaptive behavior rather than rational behavior is adopted by learning individuals. Learning is a fundamental aspect of innovative entrepreneurship. Rational behavior model takes learning for granted and focuses on the end result— *i.e.*, equilibrium. But learning process determines the innovation decisions. For this reason, evolutionary models shed light on the irrational part of human action by concentrating on the adaptive and learning behavior.

6.1. Adaptive Learning Models

Nelson and Winter (2002) gave a brief historical account on the evolution of evolutionary theorizing in economics. "During the first several decades of the twentieth century, evolutionary thinking and language was widespread in economics. But as one contrasts the economic textbooks and journals from prior to World War II with after, it is clear that while economics before the war still contained many evolutionary strands and concepts, these seemed to vanish in the early postwar period. What happened?" (Nelson and Winter, 2002, pp. 23-24).

The equilibrium notion of economic theory invaded the field after World War II. Profit maximization has become a mathematical question with respect to constraints. However, the essential problem was to perceive the difference between optimizing firm and innovative firm. The optimizing firm operates under the cost and revenue functions subject to technological and market constraints. The optimization process is a managerial task. On the other hand, innovative firm paves new ways to operate and is not restricted with the cost and revenue functions. For this reason, the innovative firm's operations are not subjected to optimization (Lazonick, 2013).

Nelson and Winter (1982) construct an evolutionary theory of economic change. It introduces Simon's (1982) concept of bounded rationality to innovation decisions. Winter (1984) introduces adaptive behavior to R&D decision rules. However, this adaptive behavioral rule is similar to imitation rather than learning in the sense of Schumpeterian creative destruction. Silverberg and Verspagen (1995a, 1995b, 1999) improve the simple rule of Winter (1984) so as to turn it into a simple imitation with strict informational assumptions for a random experience and mutations. After all, learning can best be defined by mutation from one point of time to another where the arrow of time is irreversible.

6.2. The Concept of Internal Model

Oltra and Yıldızoğlu (1998) adopt a "black box" strategy by introducing the concept of "internal model" to overcome the problems of Artificial Intelligence. They describe the dynamics of the internal model in a flow diagram depicted below.

The dynamics of the internal model represent a circular flow and the concept of internal "model" is very loose: It is not a simple mathematical formulation, it represents the innovative entrepreneur's perception of the economic environment (Oltra and Yıldızoğlu, 1998). The innovative entrepreneur compares *ex post* situation of actual observations to that of *ex ante* situation of expectations resulting from simulations. If actual experience contradicts the "internal model," then the latter is updated. This dynamic structure is depicted in the following Figure 1.

Figure 1: The Dynamics of the Internal Model
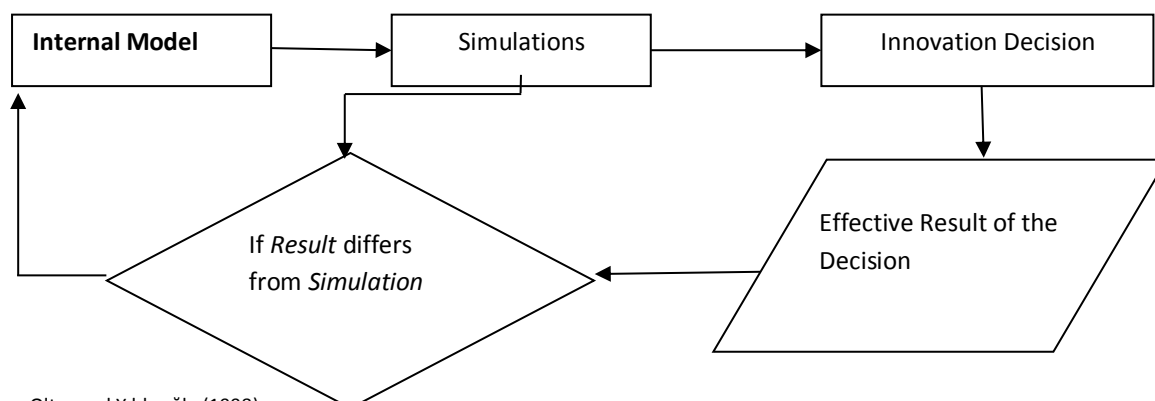
Source: Oltra and Yıldızoğlu (1998)

The main idea behind the "black box" or "internal model" approach is explained as "an intelligent being learns from experience, and then uses what it has learned to guide expectations in the future" (Dennett, 1998, p. 185). The nature of learning also requires learning from failures. For this reason, failed predictions can serve as well as overt reward as a basis for improvement. Particularly, the intelligent being who observes economic environment and learns from experience is innovative entrepreneur.

There are several drawbacks of "internal model" which considers innovation decision process as a "black box." First of all, the formal representation of the internal model is problematic. It uses an artificial neural network (ANN) that feeds forward with one hidden layer. This contradicts the backward looking nature of adaptive expectations. The other drawback of "internal model" is that the economic environment is not strategic. In other words, it does not represent the strategic interaction of economic agents. As long as strategic interaction is neglected, to model the true nature of learning process is not possible.

6.3. Learning Model

As an alternative to "internal model" of *black box* approach, we propose Bayesian learning model of the innovative entrepreneur in a competitive market. Under Bayesian learning process innovative entrepreneurs start as adaptive learners and undergo a mutation to become rational agents. We use state-space Hidden Markov Model (HMM) to analyze Bayesian learning process under disequilibrium. Under strategic interaction and technological uncertainty, the profit function (4.1.1) is redefined as follows:

$$\pi_{i,t} = \pi_{i,t}(P_{i,t}, \overline{P}_{-i,t}, M)$$ (5)

Assume that there are *n* number innovative entrepreneur in a market at particular point of time *t* and *n* is defined by a set of positive natural numbers {$n \in \Box$ } with an index as such *i* = {1, 2, 3, ..., *n*}. The nominal price of the innovative product for the innovative entrepreneur *i* at time *t* is $P_{i,t}$ and $\overline{P}_{-i,t}$ represents nominal average price for the rest of the entrepreneurs {*n* − 1} in the same marketplace and under the same technological uncertainty. *M* is nominal money supply and it is assumed that the money is neutral.

Learning innovative entrepreneurs start as imitators who have adaptive expectations and after a particular period of time become rational innovators by fully adopting new technology as they update their information gradually(Hacıoğlu, 2015). Thereby, adoption of a new technology requires an adaptation process which is defined by Bayesian learning procedure. The initial equilibrium is disturbed by a leading innovative entrepreneur who introduces an innovative product to the market. Under disequilibrium, supernormal profit opportunity arises and attracts the attention of competitors. This is reflected on the Lange's model in the discounted present value of the expected profit of a maximizing firm in (1).

The price expectation of a particular imitative entrepreneur P_i^e depends upon the average price of other entrepreneurs: $\overline{P}_{-i}$. They formulate their learning expectations on the forecasting of average price forecast of other entrepreneurs in the market. This is similar to the Keynesian beauty contest: "It is not a case of choosing those [faces] that, to the best of one's

judgment, are really the prettiest, nor even those that average opinion genuinely thinks the prettiest. We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practice the fourth, fifth and higher degrees" (Keynes, 1936, p. 156). Since market entry is free and no oligopolistic collusion is allowed, the competition in the market is atomistic. Bayesian expectations of imitator-learners are formulated in a distributed lag model as follows:

$$P_{i,t+1}^e = \alpha_0 P_t + \alpha_1 P_{t-1} + \alpha_2 P_{t-2} + \cdots + \alpha_l P_{t-l}. \tag{6}$$

with increasing weight of parameters where $\alpha_0 > \alpha_1 > \alpha_2 > ... > \alpha_l$ and the sum total of all parameter values are set to unity such that $\sum_{j=1}^{l} \alpha_j = 1$ where l denotes the number of past periods. Current period is $\{l = 0\}$. The factor of price adjustment or revision is denoted by the parameter α and information is contained in it.

Bayesian expectations are a kind of rational expectations that every particular price expectation at a particular period of time is conditional upon the information set available in the market as in (3.2). If we add the price adjustment parameter of current and past periods to the model then we have the following formula:

$$\alpha_l p_t = \sum_{t=0}^{\infty} E(p_t | \omega_t) \tag{7}$$

whereω_t denotes all possible information available for an imitative-learner i, and $I_i(\omega)$ represents imitative-learner i's information function. The updated information $\{\omega \in \Omega\}$ contains the knowledge of actions in the past and present. The general formulation of the information set of all past and present periods is formulated as follows:

$$(\Omega, \Pi) = [(\omega_{t-1}, \pi_{t-1}), ..., (\omega_{t-l}, \pi_{t-l})] \tag{8}$$

In particular, the formula for the individual imitative-learners' information function with Bayesian expectations is as follows:

$$I_i(\omega) = [(\omega_{i,t-1}, \pi_{i,t-1}), ..., (\omega_{i,t-l}, \pi_{i,t-l})] \tag{9}$$

Every imitative-learner entrepreneur updates information function from one period to another and profit function enters into the information set indirectly.

The state-space Hidden Markov Model (HMM) allows us to keep track of learning process in which transition from one learning state to another follows Markov process. In HMM, states are hidden which means that learning state is unobserved beforehand. This model is similar to that of *black box* approach of "internal model." The difference is that learning model uses forward-backward algorithm for HMM to form expectations. Expectations are Bayesian and rational which mean that they are adaptive in nature but updated rationally with forward pass and backward pass in time horizon. The particular state sequence of an imitative-learner i for all past and present periods is a set of each learning state such as $S_i = \{S_{i,t}, S_{i,t-1}, ..., S_{i,t-l}\}$. The corresponding set of actual prices (observed outcomes) is arrived at by agent i after the transition from a prior state to a present one through learning. The particular price at a particular period is conditional upon the relevant learning state.The dynamics of the learning model are represented in the following flow diagram. Although this circular flow seems similar to that of "internal model," the chief difference is that the learning creates *short-circuit* in the vicious circle of *black box* approach.

Figure 2: The Dynamics of the Learning Model
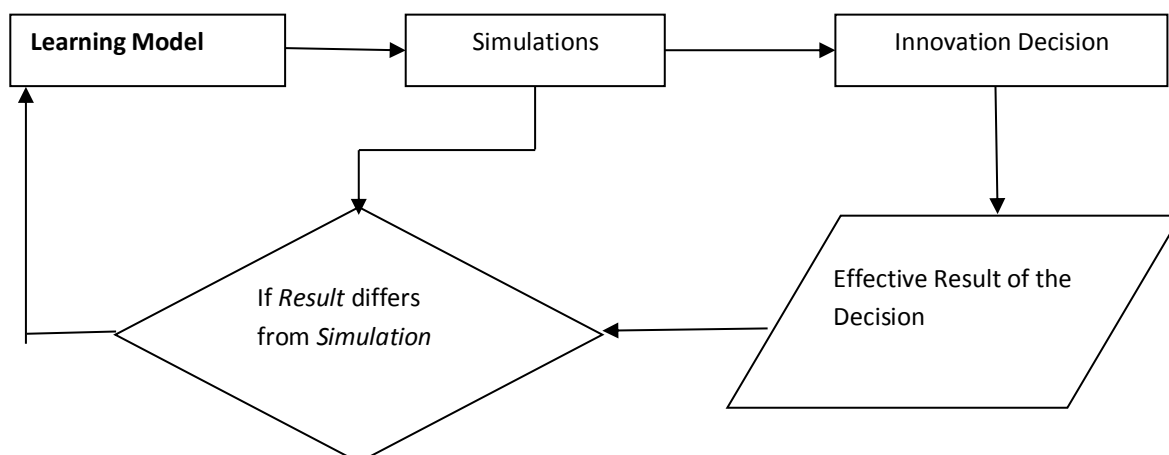
Innovation decisions are periodically updated with the flow of new information. Imitative-adaptive learner entrepreneurs approach to the sophisticated state of innovative entrepreneur as they update their knowledge state after state. The *short-circuit* created by the dynamic learning process can be translated into economics as a disturbance of equilibirium. In this dynamic system, there is an innovative entrepreneur who benefits from disequilibrium conditions. The dynamics of the learning model depicted in Figure 2 represent the stylized fact of Schumpeterian theory of creative destruction.

7. CONCLUSION

The integration of innovative entrepreneurship to the general neoclassical models of economic change and development requires considerable effort from economic theorists. Entrepreneur is absent from the production function and the role of innovation is taken for granted without its propulsive power behind the scene. However, in an era of technological breakthroughs the absence of entrepreneurial activity from the general locomotion of economic growth is no longer tolerable. Hence, there is an urgent need to analyze innovative entrepreneurship in contemporary market conditions. The classical profit maximization paradigm of economics can be used as a motive for innovation decisions. Since the behavior of innovative entrepreneurs is an action of disturbance for equilibrium state of the economy, the study of innovative entrepreneurship is a dynamic disequilibrium analysis. When Schumpeterian "creative destruction" is in operation, every innovation that comes successively one after the other is a wave of "doing things in a new way." Every new wave of innovation washes off the old techniques so that the production function is reconstructed from the outset. To tackle this task, we used the profit maximization model of innovative firm to analyze the innovation decision process. In competitive markets, innovation decisions are arrived under uncertainty, because the length and frequency of innovative waves are unforeseen by their very nature. Market and technological uncertainties are two important factors that push economic agents forth to form innovation expectations for the future. Neoclassical models of innovation deal with uncertainty in perfect competition where agents are fully rational. But this strong assumption ignores the learning process which is a central concept in innovation economics. We suggest an alternative model of learning to understand the actual course of action of innovative entrepreneurs under uncertainty. In this way, the circular flow of *black box* approach to innovation decision making is broken and new vistas are opened for the future research.

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INNOVATION EXPERIENCE OF ENTREPRENEURS OF HIGH TECH SMEs IN TURKEY

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ABSTRACT

Purpose- The goal of this study is to explore and define the barriers to innovation perceived and experienced by entrepreneurs of High Tech SMEs in Turkey.

Methodology- In order to investigate the research question, an online questionnaire that was created for the purpose of this analysis. Questionnaire consists of 25 questions covering up four groups of barriers to innovation (formal, informal, environmental and skill barriers). In total, 225 High Tech SME entrepreneurs from the Istanbul region completed the questionnaire. Logit models were estimated using the Eviews software programme.

Findings- An analysis of 225 High Tech Turkish SME entrepreneurs reveals the fact that "lack of sufficient government's R&D and technology policy" from formal barriers; "Informal economy's negative impact on investment" from informal barriers; "high cost of innovation" and "lack of appropriate source of finance" from environmental barriers and "lack of qualified personnel" from skill barriers, are the most important barriers, which have significant effects on the entrepreneurs' innovation decisions in Turkey.

Conclusion- The survey results show that entrepreneurs, who know how to innovate, are those who have more perception of the barriers to innovation. However it is observed through the logistic regression model that some of the relations established between the barriers to innovation and the entrepreneurial innovative capacity are not statistically significant.

Keywords: High Tech SMEs, Barriers to Innovation, Entrepreneur, Turkey
JEL Codes: D01, D04, M21, M12

1. INTRODUCTION

The term 'innovation' originates from the Latin 'innovate', meaning to take something new. The term 'entrepreneur' was first introduced by an economist Richard Cantillon, defining the entrepreneur as the "agent who buys means of production at certain prices in order to combine them" into a new product. The conceptual relationship between innovation and entrepreneurs has attracted considerable attention in the economic literature for many years. Some theoretical attempts to establish a link between entrepreneur and innovation came from economics (Mill, 1848; Marshall, 1890; Schumpeter, 1951; Kirzner 1985; Leibenstein, 1995; Drucker, 1985, 1994; Buggie, 2001; Herbig et al., 1994; Hargadon and Sutton, 2000). Drucker (1985, p. 32) states that: "innovation is the specific tool of entrepreneurs". Drucker's definition shows that incorporating innovation is a key challenge facing entrepreneurs and small to medium-sized enterprises (SMEs, Tidd et al., 2001). Nevertheless, in many SMEs, basic operational functions are carried out by the owner or manager, and not by the innovative entrepreneur, and thus this challenge often leads to a lack of realisation of the processes needed to implement

innovation within the SME. In order the overcome this challenge, small businesses actually need entrepreneurs in order to transfer their knowledge and their information into very successful practices throughout continuous innovation at every level (OECD LEED Programme, 2009). So that, without any doubt, innovation should be intrinsically linked to the entrepreneurial operation within SMEs wherever they operate. In the literature, small entrepreneurial firms are generally credited with introducing several radical innovations (Utterback, 1994), especially in industries characterised by skilled labour and low capital intensity (Acs and Audretch 1988).

In addition to the challenges mentioned earlier, several studies (Davidsson 1989, Hakim 1989; Storey, 1994) also showed that most small firms are, in fact, not very entrepreneurial or innovative; and these firms experience difficulty in acquiring external capital for rapid growth and managerial skill to cope with the increasingly complex organisational process; they often lack the time and resources to identify external sources of information and technical expertise; they have difficulty attracting risk capital; and they have difficulties in responding properly to their markets. Therefore, these disadvantages of SMEs in relation to innovation are often called barriers to innovation. Despite the interest in improving knowledge about barriers to innovation, there has been little research in the field of main innovation barriers for entrepreneurs from the economic literature perspective. The main aim of this paper is to understand the innovation barriers for Turkish high tech SME entrepreneurs from the economic perspective. Once barriers to innovation are removed that would increase innovation and growth in the small firm sector, and consequently boost economic growth. To do so, some formal and informal, as well as skill and environmental barriers perceived and experienced by high tech SME entrepreneurs in Turkey should be identified through a survey questionnaire, in order to comprehend what prevents entrepreneurs being more innovative. This paper is structured as follows: Section 2 provides the theoretical background of innovation barriers for SME entrepreneurs. Section 3 discusses the Turkish SMEs and country specific barriers, Section 4 looks into research methodology and data in detail and presents empirical findings on questionnaire survey. Findings and policy implications form the conclusion in Section 5.

2. LITERATURE REVIEW

Even in industrialised countries, SMEs are expected to face relatively more barriers to innovation than large firms. Keegan et al. (1997) and Cooney et al. (1996) have focused on barriers to innovation in European SMEs and found that some of these barriers are shared across countries and some of them are country-specific. Nevertheless, common barriers, according to Keegan et al (1997), are as follows; 'high costs associated with innovation', 'too long pay-off period for innovations', 'lack of government support for business', 'low availability of venture capital', 'innovations are too easy to be copied by competitors', 'high rates of income tax and social insurance', the 'small size of the domestic market', 'national tendency towards jobs with security', an 'education system that influences people to get a job', and a 'national tendency to recent successful entrepreneurs'. These high number of innovation barriers proves that there is a need for a clear strategy for SMEs to deal with these basic barriers to their position and to implement innovation practices within the firm (Teece, 1996). Irrespective of the scenario of the strategy adopted by the small business it is crucial to know that the small business entrepreneur should implement the best policy to implement their innovation decisions. As SMEs have comparatively more inadequate internal resources and lack of expertise, the interactive character of innovation in their case becomes even more intense than in large firms (Rothwell, 1991). This is one of the reasons that higher importance is attached to barriers. It is generally believed that once SME entrepreneurs identify their innovation barriers, study their impacts and take actions to eliminate them, then the natural flow of innovation will be re-established and maintained. Because innovation is not an automatic or spontaneous process it requires entrepreneurs to provide motivation, effort and risk acceptance to proceed (Tidd et al., 1997). Piatier (1984) carried out research for the Commission of European Communities, under the title "Barriers to innovation in SME" in eight countries of the European Economic Community, and differentiated barriers as *external to the firm* (supply, demand and environment related) and *internal to the firm (*resource related and human nature related)[1]. For Rush and Bessant, 1992 these barriers may act on one or more points of the innovation process. In his study, Piatier (1984) found that impacts are mainly on finance, manufacture and manpower. General government action, which is estimated to cause about half of the difficulties experienced, has its strongest negative impact upon the downstream end of the innovation process (i.e. distribution and exports). After Piatier (1984) barriers to innovation in SMEs have been the object of investigation in a large body of national and international studies, and among them; Acs and Audretsch (1990) for the US; Ylinenpää (1998) for Sweden; Hadjimanolis (1999) for Cyprus; Mohnen and Rosa (2002), Baldwin and Lin (2002), and Baldwin and Gellatly (2004) analyzed the obstacles to innovation in a sample of service and manufacturing firms for Canada; FES (2004) for Germany; Mohen and Röller (2005) studied the complementarities between barriers to innovation with a sample of the CIS1 data from Ireland, Denmark, Germany and Italy; Galia and Legros (2004) investigated the complementarities between obstacles to innovation using CIS2 data for a

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[1] Resource related, e.g. lack of internal funds, technical expertise or management time; culture and systems related e.g. out-of date accountancy systems; and human nature related, e.g. attitude of top manager to risk or employee resistance to innovation

sample of manufacturing firms for France; Freel (2005) observed the barriers to product innovation in a sample of small manufacturing firms in the West Midlands for the West Midlands area; March et al. (2002) analysed empirically the barriers to innovation in a small sample of SMEs located in the Valencia region of Spain. These can be counted as pioneer studies. Segarra-Blasco et al in 2008 used a data set in their research which was 2004 official innovation survey of Catalonia and used a sample of 2,954 Catalan firms in manufacturing industries and knowledge-intensive services. For these researchers, managers and owners of firms considered these obstacles to innovation as external and internal factors. *External barriers* become visible when the firm has difficulties accessing technological information, or when it lacks external finance, or skilled personnel, or when there are factors related the market conditions. A firm has *internal barriers* when it lacks internal funds and when the firm's members feel that the risks and costs of innovation are too high.

In their study, Madrid-Guijarro et. al (2009) examined barriers to firm innovation among a sample of 294 managers of SMEs in Spain, and evaluated the relation between product, process, and management innovation; and 15 obstacles to innovation, which can limit a firm's ability to remain competitive and profitable. Findings of the study show that barriers have different kinds of impact on the various types of innovation. For example, product, process, and management related innovations are affected differently by the various barriers. The most significant barriers are associated with costs, whereas the least significant are associated with manager/employee resistance. Additionally, the results demonstrate that the costs associated with innovation have proportionately greater impact on small than on larger firms. They suggested that the findings can be used in the development of public policy aimed at supporting and encouraging the innovation among SMEs in Spain. In addition to all those general problems mentioned above, SMEs in less developed countries face further barriers, such as; lack of technological and policy infrastructure, the low degree of innovativeness, bad location and inappropriate firm size for the market. In addition to these, comprehensive studies on barriers to innovation in such countries are relatively rare. There are limited but still some studies for less developed countries to examine barriers to innovation. For example, Levy (1993) examined *barriers to growth* and Lall et al. (1994) studied *technological development* in less developed countries. Governments in those countries make serious efforts to reduce these barriers in order to improve innovation activities for SMEs and to increase their international competitiveness, but still the number of regulations or lack of technology policy of governments can be counted among the most important barriers for SMEs and their entrepreneurs. In addition, internationalisation activities of developing countries expose SMEs to a more complex and risky business environment compared to larger firms. SMEs are also relatively unprepared for competition and less well-resourced in those countries. Another very important reason might be that there are so many formal and informal barriers to innovation in less developed countries (Some of these risks, barriers and complexities have been already addressed by some economists (such as; Stewart, 1977; Lall, 1983; Fransman, 1985; Kumar and Sagip, 1996; Evanson and Johnson, 1998; Johnson et. al. 2000; Glas et. al., 2000; Pissarides et.al., 2000; Woodword, 2001; and Anderson et. al., 2004).

Bobera (2013) explored the barriers to innovation perceived by entrepreneurs in Northern-Backa region, and identified the most significant barriers that have strong, negative influence on a process of creating a healthy, competitive entrepreneurship environment for development of innovation with special direction to three areas of barriers: organizational, formal and informal barriers.This study recommended following actions: understanding barriers to innovation in order to minimize their influence, fostering an innovation culture, increasing a number of successful inovations. Baron and Tang (2009) also indicated that positive affect among founding entrepreneurs is significantly related to their creativity and that creativity, in turn, is positively related to firm-level innovation. Both of these relationships are moderated by environmental dynamism, being stronger in highly dynamic than stable environments. For the creation of a more business friendly innovation environment, and for a more integrated economy at the international level it is obvious that governments in less developed countries should harmonise their regulatory, administrative and policy environments to world standards.

3.   FOUR CATEGORIES OF BARRIERS TO INNOVATIONS IN TURKEY

The size of the informal sector in Turkey is a very important barrier. According to OECD (2004) estimates, there are more than four million in total registered-unregistered SMEs in Turkey, and the informal economy could represent about 50% of the activity of SMEs. In order to reduce the size of the informal sector in Turkey, Turkish governments have implemented very detailed programs but it still stands as one of the most important barriers for SME entrepreneurs to be more innovative. In addition to the informal sector, financing is also another handicap to improve or to develop the innovation culture in SMEs. As the Turkish banking system is not well equipped and prepared to provide investment funds to SME entrepreneurs, Turkish governments have created a number of targeted investment credit programmes in support of SMEs. However, this support is not enough for SMEs to overcome their basic problems. Beside the lack of funding, Turkish SMEs also appear to suffer from a lack of industrial space, a lack of information and efficient production technology, scant use of management and control systems, an inability to access consulting services, a lack of computer knowledge and

related deficiencies. Most countries experience these shortcomings to varying extents, but they seem especially significant in Turkey (OECD, 2004, p.19).

Following the literature, four types of barriers to innovation for SME entrepreneurs, in addition to firm specific determinants, are specified in this research. These are;

i) **formal barriers** (such as government's weak R&D policy, instability of tax policies, too much business legislation, insufficient property rights, and too many regulations and standards e.g. Bobera (2013); Piatier (1984); Acs and Audretsch (1990); Hadjimanolis (1999); Baldwin and Gellatly (2004); Silva et. al. (2007); Tourigny and Le (2004): Rush and Bessant (1992); Hadjimanolis (1999); Rammer et al. (2006));

ii) **informal barriers** (corruption, impact of informal economy, misleading cultural attitudes and a lack of transparency, e.g. Baldwin and Gellatly (2004); Hadjimanolis (1999), Bobera (2013); Segarra-Blasco et al (2008), Silva et. al. (2007); Tourigny and Le (2004));

iii) **environmental barriers** (excessive perceived economic risks, the high cost of innovation, high inflation and interest rates and the lack of appropriate sources of finance, e.g. Acs and Audretsch (1990); Bobera (2013); Hadjimanolis (1999); Rammer et al. (2006); Baldwin and Gellatly (2004); Silva et. al. (2007); Tourigny and Le (2004); Baron and Tang (2009)); and

iv) **skill barriers** (lack of qualified personnel, lack of information on markets and the lack of information on technology, e.g. Segarra-Blasco et al (2008); Silva et. al. (2007); Tourigny and Le (2004); Ylinenpää (1998); Rammer et al. (2005); Rammer et al. (2006)). These barriers will be examined empirically in more detail in section 4.

4. DATA AND METHODOLOGY

4.1. Survey, Data, Hypotheses

To examine the determinants of barriers to innovation among High Tech SME entrepreneurs in Turkey, a survey questionnaire was prepared in 2011. First of all, the four-page questionnaire containing a total of 25 questions was sent to 20 Turkish High Tech SME participants as a pilot study in order to capture the key barriers for entrepreneurs to innovate. Then, based on responses, some important adjustments were carried out and the final questionnaire was randomly sent to 525 High Tech SME entrepreneurs selected from the state statistics and KOSGEB's list. Out of 525 High Tech SMEs, 265 High Tech SMEs responded to the survey giving a 55% response rate of which 225 SMEs were selected from as the intention was to select High Tech SMEs only for this study. These 225 High Tech SMEs and their characteristics can be seen in Table 2. The subjective responses of SME entrepreneurs provide us with insights into the actual barriers and it is a valuable technique for understanding the key issues concerning barriers. However, this survey has its own merits; it has also it own limitations. Firstly, it is a static study and so captures at best "certain aspects of reality at a moment in time" (Johnson and Loveman, 1995). Second, it is also possible that a percentage of respondents did not express their true opinion when filling in the questionnaire. Nevertheless, it is assumed that this percentage is small and does not change the overall results, and it is still the best technique to obtain primary data for our research question. In this research, all variables were measured on a five-point Likert type scale; except for few open ended questions. Then, logit models have been estimated using the Eviews software programme. The general characteristics of High Tech SME respondents can be seen from Table 1.

Table 1: General Characteristics of High Tech SME respondents

Characteristics of SME entrepreneurs (n =225)	Category	Percent
Sex	Male	73
	Female	27
Education	PhD	7
	Post graduate	23
	University	37
	High school	22
	Secondary	11
Sector	High Tech	80
	High The Related	20
Turnover	Up to 5 m TL	38
	More than 5 m TL	62
Location	İstanbul	100
Characteristics	**Mean**	**SD**
Number of employees	11.21	5.77
Years in business	7.44	3.56

As seen, most of the respondents are male (73 %), and 37 % of them have higher education; 80% of the respondents engage in direct manufacturing and 20% are in high tech related sectors. Almost two thirds of High Tech SMEs have more than 5 million TL turnover and are located in İstanbul. The research question of the present paper is: *What are the barriers to innovation faced by Turkish High Tech SME entrepreneurs?* To address this research question, we formulate hypotheses to be empirically tested through the use of a logistic regression. The hypotheses presented below aim to identify the significant barriers to innovation on the innovative capability of Turkish High Tech SME entrepreneurs in relation to product innovation and process innovation.

Hypothesis 1: Formal barriers are negatively related to the entrepreneur's propensity for innovation decision in Turkey.

Hypothesis 2: Informal barriers are negatively related to the entrepreneur's propensity for innovation decision in Turkey.

Hypothesis 3: The environmental barriers are negatively related to the entrepreneur's propensity for innovation decision in Turkey.

Hypothesis 4: The lack of skill, technology and information related barriers is negatively related to the entrepreneur's propensity for innovation decision in Turkey.

4.2. Logit Regression Model

Because we would like to know what the main barriers to innovation for SME entrepreneurs are, the dependent variable will be dichotomous and the applicable analytical model should come from the binary-choice genre of models (Judge *et al*. 1985;

Pindyck and Rubinfeld, 1991), namely a Logit model, as the dependent variable, Y_i takes the value 1 if the Turkish high tech SME entrepreneurs innovate, that is, when the entrepreneur carried out product or process innovation during 2009–2011. The value 0 is for when the firm does not do this as shown in Equation (1).

$$Y_i = \begin{cases} 1 & \text{if } Y_i^* > 0 \\ 0 & \text{if } Y_i^* < 0 \end{cases} \tag{1}$$

$$Y_i = BX_i^{\bullet} \tag{1}$$

$$\text{where } B = [\beta_1 \ \beta_2 \ .... \ \beta_k] \text{ and } X_i^{\bullet} = [1 \ X_{i1} \ ... X_{ik}]$$

If the innovative status is adopted for the period 2009–2011 when the SME entrepreneur produces or starts the innovation process, the binary logit model Equation (2) can be written as:

$$Y_i = \beta_0 + \beta_i \ X_{i1} + \beta_2 \ X_{i2} + ... + \beta_k \ X_{ik} + u_i > 0 \quad i = 1... N \tag{2}$$

where the innovation decision of the firm *i* is a function of a set of explanatory variables X_{ik} that explain the barriers to innovation that an entrepreneur perceives; β_i are the corresponding coefficient vectors, and u_i is the usual error term, which we assume to be iid N(0, σ2), and σ2=1.

In the literature, the probit and logit models are quite comparable and give qualitatively similar results. According to Griffiths et al. (1993) "because the logistic CDF is not in integral form, that makes the logit model somewhat easier to work with" (p.751). Gujarati also points out that "the logit model is generally used in preference to the probit" Gujarati (2002, p.67). Similarly, Pindyck and Rubinfeld consider "the logit model to be somewhat more appealing then the probit model" (Pindyck and Rubinfeld 1991, p.256). In particular, logit regression is an approach used in studies of high tech firms (Kaufmann and Tödtling, 2001; Silva and Leitão, 2007). Therefore, we also utilise the logit model in this paper.

4.3. Variables and Estimation of Model

The choice of variables that were included in the questionnaire was based on a review of the literature (Riding and Swift, 1990; Pack, 1992; Brush, 1992; Evenson and Westphal, 1995; Rodrik, 1995; OECD, 1998; Johnson et al., 2000; Glas et al., 2000; Pissarides et al., 2000; Smallbone and Welter, 2001; Barlett and Bukvic, 2001; Muent etal., 2001; and Aidis, 2002). The probability of innovating is influenced by the following factors:

a) Those such as firm size, R&D activities and the competitiveness of products are to determine *firm specific characteristics*.

b) In order to determine *formal barriers*, lack of government's R&D policy, instability of tax policies, too much business legislation, insufficient property rights and fulfilling regulations and standards have been selected as variables.

c) Similarly, corruption, the negative impact of the informal economy on investment, cultural attitudes and a lack of transparency are assumed to represent *informal barriers*.

d) For *environmental barriers*, excessive perceived economic risks, the high cost of innovation, high inflation and interest rates and a lack of appropriate sources of finance are selected.

e) Finally, for *skill barriers*, the lack of qualified personnel, a lack of information on markets and the lack of information on technology are identified. The logit estimation results can be seen from Tables 2-7.

Model 1, in Table 2 explains the results of the systematic relations between the entrepreneurial innovative capability and the barriers to innovation in Turkish case. Since some of the variables associated to the barriers are not statistically significant at a level of 5%, (there are only seven statistically significant variables), we estimate Model 2. In addition to insignificant variables, Model 1 also shows that there is multicollinearity between independent variables, and R square values do show that they are highly correlated. As some of the formal, informal, environmental and skill related hypotheses were not

empirically tested, the second estimation of the model, Model 2 in Table 2, was set without considering those insignificant variables.

Table 2: Logit Regression Results for SME Entrepreneurs and Innovation Barriers

	Model 1	Model 2
Independent Variables	Coefficients	Coefficients
Constant	0.79 (-0.41)	0.63 (-0.30)

Dependent Variable

Yi=1, innovation happens,   Yi=0, innovation does not happen

Table 3: Firm Specific Characteristics *Determinants to Barriers*

Firm Size (log)	0.03 (0.62)	----------
Intensity of R&D/per employee (log)	0.33** (2.60)	0.31** (2.33)
Education of the entrepreneur (dummy)	0.14** (2.42)	0.11** (2.19)
Turnover of the company (log)	-0.31 (-0.04)	----------

Table 4: Formal Barriers to Prevent Innovation

Lack of Government's R&D and technology policy	-1.52** (-2.38)	-1.21** (-2.32)
Instability of tax policies	2.56 (-1.48)	----------
Too much government regulation	1.15 (-1.0)7	----------
Insufficient property rights	4.81 (0.06)	----------
Inappropriate standards	-1.54 (-1.31)	----------

Table 5: Informal Barriers to Prevent Innovation

Corruption	-0.58 (0.90)	----------
Informal economy's (-) impact on investment	-1.98** (-2.99)	-1.99** (-2.67)
Cultural attitudes to bribery	3.08 (0.72)	----------
Lack of transparency	-0.88 (-0.04)	----------

Table 6: Environmental Barriers to Prevent Innovation

Excessive perceived economic risks	0.05 (0.02)	----------
High cost of innovation	-1.72** (2.40)	-1.20** (3.21)
Lack of appropriate source of finance	-1.37** (2.45)	-1.11** (2.37)
High inflation and interest rates	-1.55 (-1.31)	----------

Table 7: Skill Barriers to Prevent Innovation

Lack of qualified personnel	-0.57** (3.11)	-0.68** (2.44)
Lack of staff information on technology	0.33 (1.00)	----------
Lack of understanding of the market	-0.03 (-0.04)	----------
Diagnostics		
Number of Observations	225	225
Log Likelihood Function	-57.27	-57.11
Likelihood Ratio Test	25.54**	25.00**
Percent Correctly Predicted	0.77	0.70
Madalla R^2	0.21	1.20
McFadden R^2	0.17	1.16

P value is significant at *** 0.01, ** 0.05, *0.10.

In terms of firm specific characteristics, "intensity of R&D/per employee" and "education of the entrepreneur" are the significant variables to innovate for SME entrepreneurs in Turkey.   In Model 2, we identify that all the estimators of the regression parameters are statistically significant up to 5%, and multicollinearity problems from our estimation in Model 2 is eliminated. The predictive capacity of the model is 70 %, which results from the comparison between the predicted and the observed values of the answer variable. The log-likelihood statistic, comprising 57.11, also corroborates the global significance of the model, when compared with the null model. The obtained results show that most of the variables associated with barriers to innovation present a negative signal, for which reason they are considered as restraining factors that may influence entrepreneurial innovative activities and consequently lead to a decrease in the firm's propensity for innovating. The results of the model suggest that "lack of government's R&D and technology policy" as a formal barrier to innovation has a significant effect on the entrepreneur's propensity for innovating. That means, SME entrepreneur's propensity to innovate gets smaller with the clear and non-existent government R&D and technology policy. That also means that *H1* hypothesis is been confirmed. On the other hand that does not mean that government has not got any policy, but it means that this policy has not been perceived by the entrepreneur as an existent policy. The obtained results are similar to other empirical studies (Piatier, 1984; Silva and Leitão 2007; Rush and Bessant, 1992; Hadjimanolis, 1999; Segarra-Blasco et al., 2008; Baldwin and Gellatly, 2004). "Informal economy's negative impact on investment" as one of the informal barriers is another variable, which has a significant effect on the entrepreneur's propensity for innovating decisions. That means that when the informal economy becomes larger, then the entrepreneur's innovative decision probability gets smaller, and consequently the hypothesis *H2* is sustained. These obtained results are also on the same line with some studies (Piatier, 1984; Baldwin and Gellatly, 2004). When we test the null hypothesis, *H3*, for environmental barriers, we also confirm that "high cost of innovation" and "lack of appropriate source of finance" are two other statistically significant variables, which have a significant impact on the propensity of entrepreneur's innovation decision. Entrepreneurs who consider the innovation costs to be excessive have a smaller propensity for innovating in their decisions (Silva and Leitão, 2007; Tourigny and Le, 2004; Segarra-Blasco et al., 2008; Madrid-Guijarro et al., 2009). Finally, the results of the model show that "lack of qualified personnel" like Segarra-Blasco et al., 2008; Piatier, 1984; Ylinenpää, 1998; Silva et al.; 2007; Rush and Bessant, 1992; Hadjimanolis, 1999; and Rammer et al. (2005, 2006), have a significant effect in the propensity to innovate. The rejection of the null hypothesis of nonexistent relation amongst variables, allows the confirmation of the *H4* hypothesis. Thus, firms that perceive "lack of qualified personnel" show lower propensity to innovate, Therefore, if the entrepreneur perceives the fact that access to qualified personnel is a problem, s/he has no incentive to innovate, and then this consciousness ends up creating a barrier to innovation.

5.   CONCLUSION

The survey results show that entrepreneurs, who know how to innovate, are those who have more perception of the barriers to innovation. However it is observed through the logistic regression model that some of the relations established between the barriers to innovation and the entrepreneurial innovative capacity are not statistically significant. Our analysis shows that eleven variables out of sixteen are statistically insignificant for high tech SME entrepreneurs in Turkey. Our regression results indicate that only five independent variables are statistically significant among all barriers to innovation groups, therefore, we do not reject our four hypotheses. The results provide insights that "lack of government's R&D and technology policy"; "informal economy's negative impact on investment"; "high cost of innovation", "lack of appropriate source of finance"; "lack of qualified personnel" have a negative and significant effect on the innovation propensity and the perception of entrepreneurs in Turkey, which are also in line with the findings of Piatier (1984), Keegan et al. (1997), Sener et al. (2014), Segarra-Blasco et al. (2008) and Cooney et al. (1996). Sener et al. (2014) also stated that SMEs form 99,9% of the industry in Turkey however only 55% of the SMEs are operating in value added sectors. Therefore, they need government financial support programmes and policy initiatives for increasing their levels of global competitiveness. In particular, governments' R&D and technology policies that encourage and support innovation among all firms, especially small firms, can help countries remain competitive in a global market. Therefore, government should change the perception of entrepreneurs to support their competitiveness in the global market. Public policy that encourages innovation and improves the education of the labour can enable firms to remain competitive and survive, both of which have direct implications for employment and a country's economic viability. The results may also be insightful for entrepreneurs who are attempting to engage with innovation. Understanding barriers can assist entrepreneurs in fostering an innovative culture by supporting new ideas or by avoiding an attitude that creates resistance to new ideas.

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REAL ESTATE INVESTMENT TRUSTS IN TURKEY: STRUCTURE, ANALYSIS, AND STRATEGY

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ABSTRACT

Purpose- Aim of this study is to make the determinations related to the problems mentioned in the REIT sector in Turkey, to offer a solution for this issue, and to ensure the classification in the sector by adhering to the financial data of the REITs

Methodology- Financial data set of the REITs was firstly standardized by using median instead of mean. Then, the scoring was performed according to defined coefficients. After that normality test of the obtained scores was performed, the area of each score under standard normal distribution curve was calculated and the scores were moved to the 0-100 range. Finally, scores were collected under 5 groups as "Very good, Good, Not Bad, Bad and Very Bad" by using k-means algorithm. Clustering were made on R Studio.

Findings- Our analyses conducted that REITs traded on the Istanbul Stock Exchange are divided into two subgroups depending on their financial data.

Conclusion- It will be important the REITs, in the sub-group especially in terms of the score distribution, to diversify their portfolio by extending their asset investments, to stabilize dividend payments and to take steps on institutionalization so that they are equivalent to REITs in the super-group.

Keywords: Real estate investment trusts (REITs), Turkey, performance ranking, K-means algoritm, R studio
JEL Codes: G12, G23, G29

1. INTRODUCTION

Real estate industry in Turkey has been always the biggest supporter and locomotive of the country's economy by itself by providing employment and business volume to more than 250 sub-sectors and has enabled reducing both general and seasonal unemployment by creating a permanent and regular job opportunity for the lowest skilled labor force. Institutionalization of this sector, which undertakes such important functions, is a very important resource for establishing reliable, long term, and transparent company structures for the construction industry in Turkey which must live with a very important risk especially such as earthquake. The Real Estate Investment Trusts (REITs) which are not engaged in construction work in Turkey according to the capital market legislation, could provide works to construction companies, to control them, and to enable them to operate at a certain level owing to both strong, accountable management structure and power of carrying out the large-sized

projects. The present time shows that now the capital globally can change hands and geography very easily. Real estate is a very important investment tool all over the world. The REIT legislation currently in force in more than 30 countries that attract investments and investors is a very important instrument for all investors who are intending to invest in this area (EPRA Global REIT Survey, 2016). On the other hand, low transaction volume on the stock market, no obligation for disclosure of the net asset value, insufficient investor relations, loss of trust experienced during public offering, unhealthy and insecure sectoral data, REITs with very different portfolio sizes and diversities, confusions on the regulation side, and current dividend policy can be listed as the main and crucial problems in the sector which cause REITs to be traded at a high discount rate compared to the net asset value. When detailing the problems mentioned towards the REIT structure in Turkey, the fact that REITs' transaction volume in the Istanbul Stock Exchange is low, comes up against the investors. On the other hand, the fact that the net asset value tables required to be announced quarterly according to the capital market legislation until 2011 were excluded from the scope of the mandatory explanation after the decision taken by the Capital Markets Board (CMB) and that the net asset value follow-up has been left to the initiative of analysts or direction of the companies causes exclusion from an important REIT indicator and makes the performance of companies harder to follow, thus causing question marks about transparency. In addition, REITs make profit distribution decisions within the rates determined by the general assemblies at the end of the year and cannot display a sustainable dividend policy from the point of investor. This situation has resulted in a situation that does not attract REIT investors in terms of dividend income especially in the last period. An important problem in the sectoral sense is deficiency of the investor relations departments of the REITs. Even though there are departments called as investor relations in the REITs, most of them do not have officers who are focused on this subject. Apart from these, the data concerning both construction and real estate sector are extremely inadequate, their continuity is problematic, and their reliability is debatable. In this context, it is getting harder to draw a general picture of the sector to the investor and this situation abolishes the possibility of comparing with different countries during reflection of the general situation of the sector. The aim of this study is to make the determinations related to the problems mentioned in the REIT sector in Turkey, to offer a solution for this issue, and to ensure the classification in the sector by adhering to the financial data of the REITs.

2. STRUCTURE OF REITS IN TURKEY

Despite the intense demand in the real estate sector, due to reasons such as rapid population growth by years, broken families, urbanization phenomenon, increasing household income levels and rapidly developing construction technology, the difficulties in financing have led to different quests in the sector and different perspectives to come up. At this point, the first applications of the REIT structure to bring the real estate sector and the finance sector together are seen in the United States of America and this structure has started to be established also in Turkey and the stocks have started to be traded in Istanbul Stock Exchange. In this direction, according to the Turkish Association of Real Estate Investment Companies, the first REIT in Turkey was established in 1995, and as of today, the total number of REITs is 31 (CMB Monthly Statistical Bulletin, 2016).REITs are capital market institutions that can operate to invest in real estates and real estate-based capital market instruments, real estate projects, real estate-based rights, and capital market instruments (Chiang, Y.H., et. al., 2008). The REITs collect resources, obtained from many investors, in a pool by going public and realize valuable and high-amount real estate investments. Thus, while individual investors are given a chance to share indirectly in large real estate investments they cannot make with their own savings, investment risk can be reduced by investing with a diversified portfolio logic and professional asset management function in different projects (Basse and Friedrich, 2009). In this way, REITs can create a real market through the sale of their stocks on the stock market for illiquid real estates by obtaining the opportunity to invest professionally in estate projects with institutional principles. However, it can be asserted that REITs whose stocks are traded on the stock market in a contradict way to the importance and expressions here are traded with discount at a considerable ratio (Titman and Warga, 1986). The following table (Table 1) summarizes the situation, for example, while non-consolidated total assets of the sector are 53 billion TL in the first quarter of 2016, the market value sum is only 23 billion TL. Over the years a similar situation has been observed.

Table 1: Real Estate Investment Trusts in Turkey

Period	Number of Trusts	Total Market Value		Total Assets	
		Million TRY	**Million $**	**Million TRY**	**Million $**
2011/12	23	11,708	6,224	20,770	11,041
2012/12	25	15,782	8,857	24,087	13,518
2013/12	30	18,632	8,730	37,573	17,604

2014/12	31	21,981	9,462	42,059	18,105
2015/12	31	21,280	7,279	52,530	17,969
2016/03	31	23,531	8,315	53,090	18,760

Source: CMB Monthly Statistical Bulletin, July 2016.

Table 2 shows, number of total REITS and their total market values in various countries. For instance, out of 28 EU Member States, 12 have a REIT regime. Those 12 countries represent 83% of the EU GDP.

Table 2: Total Market Values of the REITs in Various Countries

	Number of Trusts	Total Market Value (Million EUR)		Number of Trusts	Total Market Value (Million EUR)
USA	220	986,770	Spain	5	7,806
Australia	61	106,458	Turkey	31	7,131
Japan	56	102,695	Malaysia	16	6,381
UK	36	56,585	N. Zealand	6	3,973
Singapore	44	51,236	Germany	4	2,792
France	32	49,357	Ireland	3	2,416
Canada	46	41,180	Italy	3	2,172
Netherlands	5	29,124	Taiwan	5	2,007
Hong Kong	13	28,828	Greece	4	1,817
S. Africa	34	26,797	Bulgaria	53	865
Mexico	13	14,261	S. Korea	4	773
Belgium	17	11,027	Pakistan	1	196
Thailand	63	10,617	Finland	1	75

Source: EPRA Global REIT Survey, 2016 (as of 29.04.2017)

As shown on Table 3, to make comparison between the developed and emerging countries, Emlak Konut as an emerging country REIT is displaying 3,3 Million Euro market value, while the top developed country USA's REIT Simon Property Group is showing a 60,9 Million Euro market value. This gap among the market values, indicates the level of REIT performances between the two different markets.

Table 3: REITs in Various Countries

Country	Company Name	Total Market Value (Million EUR)	Annual Return (EUR Based)	Dividend Yield
USA	Simon Property Group	60,966	24.66%	2.82%
Netherlands	Unibail-Rodamco	24,244	5.59%	3.94%
Australia	Scentre Group	18,965	39.12%	3.94%
Hong Kong	Link REIT	14,608	29.14%	3.56%
France	Klépierre	13,382	7.43%	3.97%
UK	Land Securities Group	10,105	-13.01%	3.20%
Japan	Nippon Building Fund	7,844	16.68%	2.59%
Canada	RioCan REIT	6,150	13.00%	4.87%
Mexico	Fibra Uno Administracion	6,016	-1.11%	5.17%
Singapore	CapitaLand Mall Trust	5,159	12.67%	5.29%

S. Africa	Growthpoint Properties	5,068	-4.87%	4.96%
Turkey	Emlak Konut	3,372	5.53%	3.30%
Spain	Merlin Properties Socimi	3,340	4.54%	0.81%
Belgium	Cofinimmo	2,227	17.66%	3.17%
Germany	Alstria Office REIT AG	1,899	2.98%	4.02%
Italy	Beni Stabili SpA	1,316	-15.35%	4.10%
N. Zealand	Kiwi Property Group	1,279	18.62%	4.93%
Malaysia	IGB REIT	1,266	25.19%	3.82%
Ireland	Green REIT Plc	1,004	-4.05%	1.72%
Greece	Grivalia Properties REIC	711	-1.45%	4.52%

Source: EPRA Global REIT Survey, 2016 (as of 29.05.2017)

3. LITERATURE REVIEW

In literature, many researchers have studied on REITs from different views and in different environments however risk/return analysis and examine financial performances are the much-examined area in REITs. One of the earliest study done by Chan et al. (1990) examined that there are three factors driven of REIT and general stock market: changes in the risk, term structure and unexpected inflation. They analyzed monthly returns on an equally weighted index of eighteen to twenty-three equity REITs that were traded on major stock exchanges over the 1973-1978 period. They employed a three-factor Arbitrage Pricing Model (APM) as well as Capital Asset Pricing Model (CAPM). They found that with CAPM there was an evidence of excess real estate returns, especially in the 1980s; but with APM, this evidence disappeared. Redman and Manakyan (1995) examined the risk-adjusted performance of REITs from 1986 to 1990 in relation to financial and property characteristics of their portfolios. The Sharpe measure of risk-adjusted rate of return was regressed against financial ratios (gross cash flow, leverage, asset size) and property investment ratios for a sample of equity and mortgage REITs. The result of their study is financial ratios, location of properties (more specifically, in the western United States) and types of real estate investment determine the risk-adjusted performance. Ziering et al. (1999) studied the relationship between real estate size and risk-return profile which is performance measurement. They found that real estate size is a powerful moderator of risk/return across the spectrum of size and that the largest category of real estate while providing investors with the highest average yield, also exhibits greatest volatility. Ambrose and Linneman (2001) stated that there is a positive relationship among REIT size, Revenue and Profit. The larger the size, the higher the rental income and profit margin therefore the better the yield. Chaudhry et al. (2004) and Hamelink and Hoesli (2004) stated that larger REITs are found to be more geographically diversified but less diversified across property types and this cause negative relationship among size and return. According to Ratcliffe and Dimowski (2007) there is a significant negative relationship between long term interest rates and returns, with a positive insignificant relationship with short term interest rates in Australian REITs. Yong et al. (2009) stated that there is an inverse relationship between returns and size implying that smaller yields tend to yield more return than the larger REITs. Alias and Tho (2011) examined the performance of six selected REITs in Malaysia (M-REITs) and the United Kingdom (UK-REITs). Researchers findings and analysis showed that the total revenue was the main factor affecting the performance for both the largest M-REITs and UK-REITs. Furthermore, they also demonstrated that for every billion increases in market capitalization, the profit margins generated by the REITs will raise by approximately 9%. Brounen and Sjoerd (2012) attributed REIT stock outperformance in Europe to size, specialization and geographic focus. Gabriel et al. (2015) clustered American (USA-REITs) and Brazilian (BR-REITs) Real Estate Investment Trusts based on their risk-adjusted measures of performance from January/2003 to August/2013, as well as before, during and after the financial crisis of 2008 by using factor and cluster. They found out that BR-REITs achieved a better performance before and during the crisis, but an inferior performance after the crisis. USA-REITs presented a more aggressive strategy after the crisis, whilst BR-REITs presented a more conservative strategy during the same period.

Even though many studies about REITs were undertaken in many countries, however there are quite limited literature devotes from Borsa Istanbul perspective. For instance, Kıyılar and Hepşen (2010) carried out a study on performance appraisal of real estate investment trusts traded on Borsa Istanbul. The sample for the study was composed of eight REITs covering the period between January 2000 and December 2008. Reasearchers employed the Sharpe Index and the Jensen Index to measure the performance of each REIT relative to the market portfolio. The results of the study indicated that Pera REIT performed better than the other REIT stocks for both Sharpe and Jensen Indices over the period. Önder et al. (2014) evaluated the financial

performance model of Turkish Real Estate Investment Trusts (REITs) during 2012-2013 period using Analytical Network Process (ANP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) methodologies. Their model applied to a case study for the financial performance evaluation of 24 REITs. They found that Return on Equity, Return on Asset, Net Profit Margin and Long-Term Assets/Total Assets are the four most important financial ratios for the performance of the REITs. A recent study was carried out by İslamoglu et al. (2015) assessing the financial performance of REITs by means of liquidity, profitability, turnover and capital structure ratios in Turkey using Entropy Based TOPSIS method. The results of the method showed that the weighting of liquidity ratios was found to be high as İdealist, Vakif, Alarko and Atakule had by far the highest liquidity ratios among the REITs. Due to the structure of the industry, as real estate projects are liquidated following their completion, the current assets of the firms notably increase. Among the REITs, the asset and capital structure ratios had closer distance values compared to profitability and turnover ratios, especially the values of capital to asset ratio had the closest distance values. Therefore, the weighting of asset and capital structure criteria were found to be the lowest according to the results of the Entropy Method.

4. METHODOLOGY AND FINDINGS

The main provision of making the analyses healthfully depends on the fact that the real estate investment trusts in the sector are correctly grouped by their scales. In this sense, each of the variables in the data set was firstly standardized by using median instead of mean. Then, the scoring was performed according to defined coefficients. After that normality test of the obtained scores was performed, the area of each score under standard normal distribution curve was calculated and the scores were moved to the 0-100 range. Finally, scores were clustered by using k-means algorithm. It was found appropriate to conduct a survey on the internet to direct this study in the light of more objective and concrete information. Accordingly, a survey study was conducted by using an online survey tool called Survey Monkey to 990 people that consist of both foreign and domestic investors, to get opinions about REIT stock market in Turkey, to learn priority preferences, and to determine the weights in scoring work according to these priorities. According to the survey results, in the present study 31 REITs which were traded on Istanbul Stock Exchange were firstly subjected to clustering by considering the median values of the last 5 years according to the following criteria, and then the related variables were scored based on the effect coefficients shown in Table 4. After compatibility of these scores for normal distribution was tested, the scores were moved to the 0-100 range and ordered. Finally, the firms were gathered in 5 groups according to their performances by using K-Means Algorithm.

The following standardization method was used for each variable:

$$Standardized\ Value = \frac{x - median(x)}{\sqrt{\sum_{i=1}^{n}(x_i - median(x))^2}}$$ (1)

Table 4: Selected Variables

Effect Coefficient	Variables
0.2500	Asset Growth
0.2500	Return on Assets
-0.2500	Net Debt/EBITDA
0.5000	Gross Profit Growth
0.5000	Dividend Yield
0.2500	Share of Real Estate Investments in Portfolio
0.2500	Share of Affiliates in Portfolio
-0.2500	Share of Money and Capital Market Instruments in Portfolio
0.5000	Free Float Market Value's Exceeding 100 Million TL
0.5000	Equity Capital Size's Exceeding 500 Million TL
0.2500	Total Asset Size's Exceeding 1 Billion TL
0.2500	Total Sales' Exceeding 100 Million TL

0.2500	Whether or not REIT is in BIST 100 Index
0.2500	Whether or not REIT is in BIST Dividend Index
0.2500	Whether or not REIT is in BIST Corporate Governance Index

The standardized values were weighted with the above effect coefficients and scores were obtained. Later, it was determined that the obtained scores complied with normal distribution by using Shapiro-Wilk Normality Test. R Studio was used for Shapiro-Wilk Normality Test. As seen in Table 5, the "Data is compatible with Normal Distribution" null hypothesis could not be rejected because the P value was greater than the significance value determined as 0.05 (0.5492> 0.05), and it can be asserted that the obtained scores complied with normal distribution with a confidence level of 0.95.

Table 5: Shapiro-Wilk Normality Test Results

W	0.97108
P Value	0.54920

It's now possible to move the scores between 0-100 since they met normal distribution. Therefore, it's required to calculate the area of each score under the standard normal distribution curve. In order to calculate the area, p-norm function on R Studio was used and all scores were moved to 0-1 range. Then, all scores were multiplied by 100 and moved to 0-100 range. Lastly, they were collected under 5 groups as "Very good, Good, Not Bad, Bad and Very Bad" by using k-means algorithm. Clustering were made on R Studio. K-means algorithm is one of the simplest algorithms that solve the well-known clustering problem. The procedure follows a simple and easy way to classify a given data set by using a certain number of clusters. The main idea is to define k centroids, one for each cluster. These centroids should be placed in a cunning way since different locations cause different results. So, the better choice is to place them as much as possible far away from each other. The next step is to take each point belonging to a given data set and associate it to the nearest centroid (Liberty, 2012). Accordingly, within the scope of the data of 2011-2015 obtained from Istanbul Stock Exchange, Capital Markets Board and Public Disclosure Platform, 31 REITs were grouped as shown in Table 6.

Table 6: Results of Analysis

Company Name	Score	Rank	Cluster
IS REIT	100,0	1	Very Good
YENI GIMAT REIT	100,0	2	Very Good
TORUNLAR REIT	99,9	3	Very Good
PANORA REIT	99,8	4	Very Good
AKMERKEZ REIT	99,8	5	Very Good
SAF REIT	99,7	6	Very Good
AKIS REIT	99,6	7	Very Good
EMLAK KONUT REIT	99,0	8	Very Good
VAKIF REIT	97,5	9	Very Good
SINPAS REIT	93,2	10	Good
HALK REIT	91,9	11	Good
AKFEN REIT	91,6	12	Good
OZAK REIT	89,0	13	Good
DOGUS REIT	88,9	14	Good
ALARKO REIT	88,8	15	Good
NUROL REIT	84,8	16	Good
YESIL REIT	73,9	17	Not Bad

SERVET REIT	73,6	18	Not Bad
AVRASYA REIT	71,4	19	Not Bad
OZDERICI REIT	66,7	20	Not Bad
YAPI KREDI KORAY REIT	63,4	21	Not Bad
REYSAS REIT	61,7	22	Not Bad
PERA REIT	53,2	23	Not Bad
ATAKULE REIT	40,5	24	Bad
TSKB REIT	39,3	25	Bad
IDEALIST REIT	34,9	26	Bad
MARTI REIT	22,1	27	Bad
KILER REIT	21,7	28	Bad
KORFEZ REIT	16,1	29	Very Bad
DENIZ REIT	2,9	30	Very Bad
ATA REIT	1,1	31	Very Bad

5. CONCLUSION

As in many developed and developing countries, REITs, which are an important capital market instrument in Turkey as well, have showed a rapid development all around the world especially in 1990s. REITs are capital market institutions which can invest the resources, they gather from their investors in return for certificates of stock, on real estates, real estate-based capital market instruments, and real estate projects and are established based on principle of distributing their earnings to their investors as a dividend. In general, investors can participate in real estates in REIT's portfolio in small rates by taking the shares of REITs traded in stock markets. Thus, investors can both benefit from the appreciation of assets in the REIT's portfolio and convert the share certificates into cash in the stock exchange at any time. On the other hand, real estate investment trusts enable small deposits to create resources for large-scale real estate projects, leading to the formation of a healthy urbanization by avoiding unplanned urbanization. From these perspectives, it is known that Real Estate Investment Trusts undertake important roles in gaining the idle resources into economy due to unrecorded real estate investments. Real estate investments have become excessively preferred investment instruments in developing economies such as Turkey because of having lower risk than other investment instruments and offering high yield opportunities to their investors in the long run. However, when examining the real estate sector in Turkey, it is observed that housing financing or, in a broader sense, a very small part of real estate financing is realized through capital markets. There are numerous causes behind why capital markets are not sufficiently integrated into the real estate market. One of these causes is the lack of institutionalization. However, even though there has been issue of many different financing instruments based on real estate through capital markets except for housing in recent years, the best example of the institutionalized real estate financing is REITs. It is seen that REITs, which are among the most important investment instruments based on real estate, remain mostly incapable in terms of investor satisfaction because they are traded at a discount when their share performances in Turkey comparing with their counterparts abroad. The main purpose of this study is to investigate the underlying causes of this situation creating dissatisfaction in terms of both domestic and foreign investors. As we have tried to explain in the previous sections of the study, the continuity and value creation of the real estate sector are very important both for the investor and, perhaps more importantly, for the contribution to the country's economy. When examining the examples in the world, the main reasons of why the REITs, which are a highly efficient and preferred financial instrument, have not reached the levels desired over the past 20 years since 1995 are as follows;

- low transaction volume on the stock market,

- no obligation of disclosing the net asset value,

- insufficient investor relations,

- loss of trust during public offering

- unhealthy and insecure sectoral data,

- current dividend policy

- REITs with very different portfolio sizes and diversities,

- confusions on the regulations side

These reasons affect values of REIT shares with various weights and consequently cause REITs to be traded below net asset values. Since the Capital Markets Board has ruled out the obligation to disclose Net Asset Value (NAV) data of REITs starting from 2011, it's now the case that following of this important indicator has been left to the initiative of analysts or to companies' guidance. This made comparison and following of company performances difficult and thus created some question marks about transparency. Since there is no regulation made about dividend distribution by the CMB until today, REITs make profit distribution decisions at the rates determined by the general assemblies by the end of the year and cannot display a sustainable profit share distribution policy for the investor. Thus, this situation is assessed as a negative matter in terms of REIT investor.

On the other hand, especially in most of the REITs operating in Turkey, there are also cases of experiencing problems in sharing data of the company performance with domestic and foreign investors because of unauthorized personnel in the investor relations departments as well as the inadequacy of answering the questions during the meetings held with investors. It is also a fact that the disclosed data related to the sector are inadequate compared to the data disclosed in foreign countries, their continuity is problematic and their reliability is debatable. It's an important matter to consolidate and support all the sectoral data with the data provided by specialized consultancy firms to share more healthy and common data during investor presentations. In addition, the fact that REITs publish their own data regularly on their web sites and enable analysts to have easy access to information will also give the sector a more transparent and reliable identity in the presence of investors. In brief; analyses conducted by the researchers show that REITs traded on the stock exchange are divided into two subgroups depending on their financial data. It will be important the REITs, in the sub-group especially in terms of the score distribution, to diversify their portfolio by extending their asset investments, to stabilize dividend payments and to take steps on institutionalization so that they are equivalent to REITs in the super-group. Results of this study are hoped to help the investors and portfolio managers to deepen their understanding of the dependence factors that might influence the performance of REITs in Istanbul Stock Exchange.

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