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Journal of Economic and Social Studies (JECOSS) aims to develop scientific knowledge in the areas that include, and are related to Economics, Business Administration, Public Administration, Political Studies, International Relations, Labor Economics and Industrial Relations, Econometry, Sociology and Psychology. As an international social sciences journal with interdisciplinary feature, it will set a ground to bring social science communities across disciplines identified above with a view for sharing information and debate. The journal publishes refereed articles and technical research notes that build on theory and contemporary scientific knowledge. Articles submitted to JECOSS will be peer-reviewed and expected to report previously unpublished scientific work. Submitted manuscripts should follow journal guidelines and should not be under consideration elsewhere.

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Stock Selection Based on Discriminant Analysis: Case of Capital Market of Bosnia and Herzegovina

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Abstract: *The main goal of this paper is to scientifically examine and propose new approach of stock selection and analysis based on multivariate technique, i.e. discriminant analysis, in order to help investors, individual and institutional, in their decision making process, especially in case of underdeveloped capital markets. Therefore, in this paper we investigate the cross—sectional relation between the independent variables of the model, comprised of beta coefficient and some fundamental variables as well as the average stock returns on the underdeveloped capital market of Bosnia and Herzegovina. We concluded that discriminant analysis is a useful quantitative tool that can help investors in shaping their investment strategies. We also found that the beta coefficient, market capitalization and realized historical return have discriminatory capabilities in case of the capital market of Bosnia and Herzegovina. The real implications of this research can be seen in the shaping of investment strategies of potential investors looking to diversify their portfolios. The main limitations of this study are to be found in the shorter available financial time series in newly formed capitalistic economy, missing data due to the lack of collective records on levels of securities offerings issues.*

Keywords: *discriminant analysis, stock selection, stock return, capital market of Bosnia and Herzegovina*

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Introduction

The stock selection is one of the most important decisions an equity investor has to make. The use of quantitative models and methods of stock selection has many advantages in the portfolio construction. For underdeveloped capital markets, however, quantitative stock selection models are still rarely used. Therefore, and based on theoretical inferences and empirical evidence on stock selection process, the main goal of this paper is to scientifically examine and propose new approach of stock selection and analysis based on multivariate technique, i.e. discriminant analysis, in order to help investors, individual and institutional, in their decision making process, especially in case of underdeveloped capital markets. These markets are generally characterized by low market capitalization, poor liquidity and turnover, weak legal protection for minority shareholders, low correlation with developed and emerging capital markets, etc. All of this directly determines investment decision making process on one hand and on the other may have crucial impact on portfolio performance as well. Therefore, in this paper we investigate the cross – sectional relation between the independent variables of the model, comprised of beta coefficient and some fundamental variables as well as the average stock returns on the capital market of Bosnia and Herzegovina. Since the goal defines objectives of any research, the main objective of this paper is stock selection process based on discriminant analysis. Having in mind the above said, the central research hypothesis shall be as follows: *Discriminant analysis is a useful quantitative tool that can help investors in shaping their investment strategies.* The paper is organized as follows. After introduction, the first section gives a short overview of the recent literature that is relevant to the main objective of the paper. The second section brings description of our research methodology. In the third section we explain the data and finally the fourth section, that is the centre of the paper, contains analysis of the result of the stock selection process based on discriminant analysis. In the end, we give some final remarks and conclusions.

Literature Review

So far, a significant number of scientific researches have been conducted on the use of quantitative models and methods of stock selection. Siqueira, Otuki and Da Costa (2012) used discriminant analysis in order to analyze nexus between stock return and some selected fundamental variables. They examined stocks traded on Sao Paulo Stock Exchange and found out that the beta coefficient has discriminatory capabilities.

Şenol, Dinçer and Timor (2012) proposed stock selection model based on fundamental and technical analysis by using artificial neural networks and support vector machines. Schadler and Eakins (2001) examined a stock selection model using Morningstar's style box. Basing on the Gordon model perspective and applying multiple criteria decision making (MCDM), Lee, Tzeng, Guan, Chien and Huang (2009) explore the influential factors and relative weight of dividend, discount rate, and dividend growth rate. Among the eight evaluation criteria, market *beta* was the most important factor influencing investment decisions, followed by dividend growth rate and risk-free rate.

In their research, Shiu-Nan, Chin-Tsai and Wang-Ching (2007) chose relative operating performance and stock price evaluation as stock classification criteria, and applied them to divide the sample stocks into four types, i.e.: value, monitor, speculative and avoidance. Kuang Yu and Chuen-Jiuan (2009) combined the moving average autoregressive exogenous (ARX) prediction model with grey systems theory and rough set (RS) theory to create an automatic stock market forecasting and portfolio selection mechanism.

Chunhachinda, Dandapani, Hamid and Prakash (1997) investigated portfolio selection and skewness. The empirical findings suggested that the incorporation of skewness into an investor's portfolio decision causes a major change in the construction of the optimal portfolio. Sorensen, Miller and Ooi (2000) introduced an alternative approach to traditional methods of stock screening based on a statistical technique known as classification and regression tree (CART). In their paper, Achour, Harvey, Hopkins and Lang (1998) examined stock selection in emerging markets of Malaysia, Mexico and South Africa, where they presented a comprehensive, market – by – market analysis of the information in firm attributes for portfolio strategies. Van der Hart, Slagter and Van Dijk (2002) concluded that within emerging markets, value, momentum and earnings revisions strategies are successful in selecting well performing stocks. The excess returns of these strategies are strongly significant. Combining the factors into one model enhances the performance.

Theoretical Background

According to Huberty and Olejnik (2006) some of the ideas associated with discriminant analysis (DA) go back to around 1920 when the English statistician Karl Pearson (1857–1936) proposed what was called the coefficient of racial likeness (CRL), a type of intergroup distance index. The idea of multivariable intergroup distance was translated to that of a linear composite of variables derived for the purpose of two – group classification by R. A. Fisher (1890–1962) in the 1930s. The distance and variable composite ideas appeared in print prior to Fisher’s seminal discriminant analysis article in 1936.

Discriminant Analysis: A Methodological Overview

Basically, discriminant analysis is a multivariate statistical method designed to set up a model to predict group memberships. The model consists of discriminant functions that appear based on a linear combination of predictive variables that provide the best discrimination between groups.

This analysis is the appropriate statistical technique when the dependent variable is categorical and the independent variables are metric. Brown and Wicker (2000, p. 209) claim that discriminant analysis is a powerful descriptive and classificatory technique developed to: (1) describe characteristics that are specific to distinct groups; and (2) classify cases (i.e., individuals, subjects, participants) into pre-existing groups based on similarities between that case and the other cases belonging to the groups.

Discriminant analysis results with the *discriminant function* (or variate), i.e. linear combination of the independent variables that are capable to discriminate between a priori defined groups. Discrimination is achieved by setting the variate’s weights for each variable to maximize the between – group variance relative to the within - group variance (Hair, Anderson, Tatham and Black, 1998, p. 244). Each discriminant function has the general form (Brown and Wicker, 2000, p. 219):

$$D = a + b_1x_1 + b_2x_2 + \dots + b_px_p, \quad (1)$$

where D is the discriminant score, a is the y - intercept of the regression line, b is the discriminant function coefficient, x is the discriminator variable raw score, and p is the number of discriminator variables. Discriminant analysis multiplies each

independent variable by its weight and adds these products together. As a result, *discriminant score* for each independent variable in the analysis is calculated. By averaging these scores for all the independent variables within a particular group, we get the group mean. This mean is referred to as *centroid* that indicate the most typical location of any independent variable from a particular group, and comparison of the group centroids shows how far apart groups are along the dimension being tested (Hair, Anderson, Tatham and Black, 1998, p. 245).

Data

The capital market of Bosnia and Herzegovina is characterized by territorial division, the incompatibility of entity institutions and of legal regulations; which negatively affect the investment climate and the liquidity of securities.

According to the MSCI Global Market Accessibility Review (2012), capital market of Bosnia and Herzegovina is included in the so called *standalone markets*. These markets include all country markets covered by MSCI but not included in the MSCI International Indices. This category includes potential candidates for the MSCI Frontier Markets Indices that currently do not meet the minimum liquidity requirements as well as markets that are currently partially or fully closed to foreign investor. Furthermore, stocks lending and short selling are activities that are either not developed or completely prohibited in all standalone market countries and the summary does not highlight these issues on a country-by-country basis.

Basically, the MSCI Global Market Accessibility Review (2012) provides an evaluation of the four market accessibility criteria, which are: (1) openness to foreign ownership; (2) ease of capital inflows/outflows; (3) efficiency of the operational framework and (4) stability of the institutional framework. In case of capital market of Bosnia and Herzegovina, the evaluation of the above mentioned criteria is given in Table 1.

Table 1. Assessment results for the capital market of Bosnia and Herzegovina

Criteria	Evaluation
Openness to foreign ownership	
Investor qualification requirement	++
Foreign ownership limit (FOL) level	++
Foreign room level	++
Equal rights to foreign investors	++
Ease of capital inflows / outflows	
Capital flow restriction level	++
Foreign exchange market liberalization level (there is no offshore currency market)	+
Efficiency of the operational framework	
Market entry	
Investor registration and account set up	++
Market organization	
Market regulations (not all regulations can be found in English)	+
Competitive landscape	
Information flow ⁱ	-/?
Market infrastructure	
Clearing and Settlement (there is an absence of a real DVP system and the prefunding of trades is required in Republic of Srpska)	-/?
Custody ⁱⁱ	++
Registry / Depository (there are two central depositories, each of them acting as central registry)	++
Trading (there is a very limited level of competition among brokers which can lead to high trading costs)	-/?
Transferability	
(in-kind transfers and off-exchange transactions are prohibited)	-/?
Stock lending	+
Short selling	-/?
Stability of institutional framework	+

Source: *The MSCI Global Market Accessibility Review (2012)*, p. 45

Note: ++: no issues; +: no major issues, improvements possible; -/? : improvements needed / extent to be assessed

The capital market of Bosnia and Herzegovina consists of two independent regions that have separate stock exchanges, i.e. *The Sarajevo Stock Exchange* or SASE which operates in Federation of Bosnia and Herzegovina and *The Banja Luka Stock Exchange* or BLSE which operates in Republic of Srpska. Each of the above mentioned stock exchanges has its own regulation and indices calculated on daily

basis. SASE, for example, has three indices, i.e.: **(1)** Bosnian Investment Fund Index - BIFX which is the first index published by the SASE. It consists of the stocks of the 11 investment funds registered in the Federation of Bosnia and Herzegovina (formerly Privatization Investment Funds - PIFs). By its purpose, it is considered a benchmark index, whose main goal is to provide investors a general view and evaluation of the current market trends in the segment of investment funds listed at the SASE.ⁱⁱⁱ **(2)** The Sarajevo Stock Exchange Index 10 – SASX-10 is the main index on the SASE. It depicts the price movement of the top 10 issuers on the SASE (excluding investment funds) ranked by market capitalization and frequency of trading.^{iv} **(3)** The Sarajevo Stock Exchange Index 30 – SASX-30 is the index of the Primary Free Market of the SASE. It depicts the price movement of the issuers on the Primary Free market, which is reserved for the most liquid issuers from the free market. Its main goal is to serve as a general benchmark index.^v

On the other hand, BLSE has six indices, but only three are active. These indices are: **(1)** The Investment Funds Index of the Republic of Srpska – FIRS which consists of the stocks of investment funds that fulfill selection criteria^{vi}. **(2)** The Stock Exchange Index of the Republic of Srpska – BIRS which consists of the stocks of from 5 to 30 issuers. Number of issuers whose stocks may be included in the BIRS depends on the number of the issuers listed on the BLSE Official Market and the number of stocks that fulfill criteria for the BIRS composition.^{vii} **(3)** The Index of Electric Energy Sector of the Republic of Srpska – ERS10 which consists of the stocks of the 10 companies from the power utility sector which are listed on the BLSE.^{viii}

The only index that represents stocks traded both at SASE and BLSE is the Bosnian Traded Index or BATX^{ix}. It is a capitalization-weighted price index^x which is made up of the most actively traded and highest capitalized stocks traded at the SASE and BLSE. The index is calculated and disseminated on a real-time basis in EUR, USD and BAM. BATX is designed as a tradable index to be used as an underlying instrument for structured products and for standardized derivatives (futures and options).^{xi}

Sample

Given the large number of available, but not actively traded securities, in this paper we will use subset of the most actively and highest capitalized stocks traded on SASE and BLSE. Since BATX incorporates the most liquid securities from the capital market of Bosnia and Herzegovina (BH Telecom – BHTSR, Bosnalijek - BSNLR,

Fabrika duhana Sarajevo - FDSSR, JP Elektroprivreda BiH - JPESR, Nova banka ad Banja Luka - NOVBR-E, Telekom Srpske - TLKM-R-A)^{xii}, we will use them as a sample^{xiii} in the further process of stock selection as well as some of the top 10 issuers

in 2012 (Tvornica cementa Kakanj d.d. Kakanj - TCMKR, Elektro grupa d.d. Jajce - ELGJR, ZIF BIG Investiciona grupa d.d. Sarajevo - BIGFRK3, ZIF Bosfin d.d. Sarajevo - BSNFRK2, ZIF MI Group d.d. Sarajevo - MIGFRK2, IK Banka d.d. Zenica - IKBZRK2, ZIF Zepter fond ad Banja Luka - ZPTP-R-A, ZIF Jahorina Koin ad Pale – JHKP-R-A).

Our observed period of time is December 2009 - December 2012. Top 10 issuers by turnover both on BLSE and SASE in 2012 are presented in Table 2.

Table 2. Top 10 issuers by turnover in 2012

Rank	Issuer (SASE)	Turnover (in BAM)	Issuer (BLSE)	Turnover (in BAM)
1.	Bosnalijek d.d. Sarajevo	35.762.756,14	Republika Srpska T - bills	14.841.884
2.	BH Telecom d.d. Sarajevo	4.716.269,56	Republika Srpska - izmirenje ratne štete	14.175.515
3.	Tvornica cementa Kakanj d.d. Kakanj	4.531.367,17	Telekom Srpske ad Banja Luka	12.979.869
4.	Fabrika duhana Sarajevo d.d. Sarajevo	4.256.016,17	Republika Srpska - stara devizna štednja	7.616.466
5.	Elektro grupa d.d. Jajce	4.149.400,00	Kaldera Company d.o.o. Laktaši	6.624.484
6.	ZIF BIG Investiciona grupa d.d. Sarajevo	2.430.672,12	Republika Srpska - izmirenje ratne štete	4.525.190
7.	ZIF Bosfin d.d. Sarajevo	2.269.729,58	Republika Srpska - izmirenje ratne štete	4.191.977
8.	ZIF MI Group d.d. Sarajevo	2.185.090,45	ZIF Zepter fond ad Banja Luka	4.161.346
9.	Dobrinja d.d. Ilidža	2.070.613,85	Republika Srpska - izmirenje ratne štete	2.781.926
10.	IK Banka d.d. Zenica	1.889.629,11	ZIF Jahorina Koin ad Pale	2.564.735

Source: *Annual Report 12 (2012)*, p. 21 and *Annual Statistical Report (2012)*, p. 2

Dependent and independent variables

Since, index BATX is made up of the most actively traded and highest capitalized stocks traded at the SASE and BLSE we coded all issuers that, at the moment when this research was done, were included in the index mentioned, with number 1 (*Highest liquidity*). And those issuers from our sample that, at the time this research was conducted, were not included in BATX we coded with the number 2 (*Lowest liquidity*).

In this context, liquidity may be defined as possibility to convert stocks into cash and vice versa without affecting the price or with minimal impact on it. If we denote successive stock price^{xiv} made at time t and $t+1$ as P_t and P_{t+1} , respectively, then continuous compounding transforms a stock price series $\{P_t\}$ into a return series

$\{r_t\}$ as:

$$r_t = \ln \frac{P_t}{P_{t-1}}. \quad (2)$$

The independent variables of the model were comprised of following variables: beta coefficient, market capitalization, turnover and return. The beta coefficient was estimated as:

$$\beta = \frac{\text{cov}(r_i, r_m)}{\sigma^2(r_m)}, \quad (3)$$

where $\text{cov}(r_i, r_m)$ is the covariance between the asset returns and the returns on the selected indices, and $\sigma^2(r_m)$ is the variance of returns on the selected indices.

Special attention was given to the variables “market capitalization” and “turnover” which are a gross value, and therefore represented in rather high monetary terms.

Thus, to standardize it according to the other variables and make the analysis more meaningful its logarithm was calculated.

Empirical Results and Discussion

Empirical results^{xv} will be present in the following order. First, we will give short overview of descriptive statistics and correlation analysis. After that, estimation of the beta coefficient will be presented and at the end results of estimated discriminant function will be discussed.

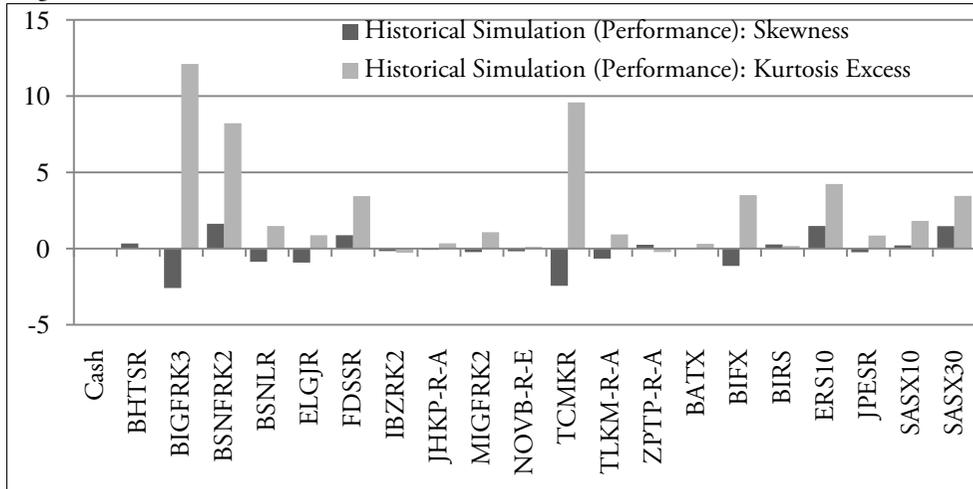
Descriptive Statistics and Correlation Analysis

By using scientific method, and in order to create a better insight into a specificity of observed financial time series, we will analyse some basic parameters of descriptive statistics for the observed period of time.

Based on the Jarque-Bera test we reject the null hypothesis (H_0 : *the data are from a normal distribution*) at the 5% significance level for the following variables: BIGFRK3, BSNFRK2, FDSSR, TCMKR, ERS10 and SASX30. Only BSNFRK2, JHKP-R-A, ZPTP-R-A and TLKM-R-A had positive average return (Table 3). The same conclusion is for ERS10 and FIRS (Table 4). Based on the analysis of results given in Table 3, it can be concluded that BH TSR, BSNFRK2, ELGJR, FDSSR, JHKP-R-A, JPESR, MIGFRK2, NOVB-R-E and ZPTP-R-A had positive skewness. In the case of selected indices, positive skewness has been detected with BATX, BIRS, ERS10, FIRS, SASX10 and SASX30.

Skewness and excess kurtosis, based on historical simulation, are given in Figure 1.

Figure 1. Skewness and kurtosis excess



Why is this so important to analyze? Well, the skewness of a symmetric distribution, such as the normal distribution, is zero. Positive skewness means that the distribution has a long right tail and negative skewness implies that the distribution has a long left tail.

In other words, negative skewness means there is a substantial probability of a big negative return. Positive skewness means that there is a greater-than-normal probability of a big positive return. Furthermore, kurtosis points out leptokurtosis for all selected variables, except for IKBZRK2, NOVB-R-E and ZPTP-R-A.

Table 3. Descriptive statistics - issuers

Variables:	BHTSR	BIGFRK3	BSNFRK2	BSNLR	ELGJR	FDSSR	IKBZRRK2	JHKP-R-A	JPESR	MIGFRK2	NOVB-R-E	ZPTP-R-A	TLKM-R-A	TCMKR
Parameters:														
Mean	-0.001852	-0.006771	0.008400	-0.004344	-0.020388	-0.015503	-0.010584	0.004514	-0.008554	-0.001089	-0.018033	0.007638	0.003334	-0.004022
Median	-0.004523	-0.006185	-0.005902	-0.000611	0.000000	-0.017015	-0.000770	-0.004660	-0.012735	0.000000	-0.014536	-0.001969	0.003413	0.000000
Maximum	0.152630	0.295117	0.914309	0.184340	0.497922	0.309673	0.113516	0.251314	0.193816	0.258574	0.169603	0.188324	0.108733	0.133531
Minimum	-0.091216	-0.470358	-0.308615	-0.211553	-0.497922	-0.189757	-0.160657	-0.223144	-0.214070	-0.211309	-0.202524	-0.136203	-0.121361	-0.318208
Std. Dev.	0.054109	0.118211	0.187597	0.083051	0.254728	0.086779	0.066792	0.104454	0.080365	0.096131	0.089948	0.082181	0.046859	0.078867
Skewness	0.464632	-1.249478	3.059631	-0.518837	0.010894	1.364898	-0.012285	0.238849	0.065970	0.179005	0.083453	0.428155	-0.470501	-1.753493
Kurtosis	3.124869	8.586634	16.47644	3.756509	3.473340	7.218904	2.507085	3.049095	3.360884	4.005455	2.883006	2.730604	3.476562	8.555399
Jarque-Bera	1.318688	56.18290	328.5897	2.473606	0.336788	37.87641	0.365353	0.345909	0.221468	1.708668	0.062318	1.208760	1.668897	64.40940
Probability	0.517191	0.000000	0.000000	0.290311	0.845021	0.000000	0.833038	0.841176	0.895177	0.425567	0.969322	0.546413	0.434114	0.000000

Stock Selection Based on Discriminant Analysis:
Case of Capital Market of Bosnia and Herzegovina

Table 4. Descriptive statistics - indices

Variables:	BATX	BIFX	BIRS	ERS10	FIRS	SASX10	SASX30
Parameters:							
Mean	-0.004267	-0.003875	-0.005721	0.000244	0.000330	-0.009035	-0.004603
Median	-0.002465	-0.000760	-0.007594	-0.007388	-0.011953	-0.004061	-0.009721
Maximum	0.097816	0.079885	0.095962	0.280094	0.175007	0.146682	0.096895
Minimum	-0.086516	-0.148956	-0.080724	-0.125555	-0.106946	-0.120636	-0.047559
Std. Dev.	0.042950	0.042600	0.038246	0.073986	0.062848	0.048972	0.028226
Skewness	0.162552	-0.856056	0.364747	1.782538	1.062165	0.445566	1.521780
Kurtosis	3.201353	5.147046	3.094798	7.671008	4.146038	4.796183	6.242264
Jarque-Bera	0.219352	11.31171	0.811722	51.79214	8.739272	6.030584	29.66329
Probability	0.896124	0.003497	0.666403	0.000000	0.012656	0.049032	0.000000

Table 5. Correlation matrix

	BIFX	BIRS	ERS10	FIRS	SASX10	SASX30	BATX	BHTSR	BIGFRK3	BSNFRK2	BSNLR	ELGJR	FDSSR	IBZFRK2	JPESR	JHKP-R-A	MIGFRK2	NOV-R-E	TCMKRR	TUKM-R-A	ZITP-R-A
BIFX	1	.557**	.469**	.613**	.581**	.546**	.572**	.290	.813**	-.027	-.380**	.000	.518**	-.275	.454**	-.401*	-.185	.113	.168	.238	.543**
BIRS		1	.825**	.755**	.321	.367*	.314	.014	.444**	.172	.142	.073	.206	.240	.228	.547**	-.164	.241	.303	.405*	.642**
ERS10			1	.762**	.241	.360*	.169	.047	.330*	.001	.039	-.067	.073	.270	.275	.515**	-.214	-.012	.182	.124	.637**
FIRS				1	.325	.509**	.226	.054	.503**	.269	.100	.129	.078	.350*	.346*	.761**	.068	.060	.222	.276	.868**
SASX10					1	.788**	.802**	.679**	.513**	.094	.527**	.002	.588**	.351*	.784**	.165	-.324	.011	.268	.098	.264
SASX30						1	.638**	.527**	.522**	-.034	.332*	.103	.446**	.348**	.621**	.342*	-.146	-.149	.089	.246	.458**
BATX							1	.717**	.516**	-.020	.710**	-.169	.801**	.352*	.689**	.071	-.203	.253	.136	.343*	.167
BHTSR								1	.334*	-.072	.396*	-.137	.515**	.249	.463**	.068	-.327	.039	-.094	-.065	-.042
BIGFRK3									1	.077	.418*	.056	.314	.297	.255	.341**	-.145	.173	.155	.323	.522**
BSNFRK2										1	.029	.052	.075	-.020	.182	.246	.192	.220	.376*	-.015	.279
BSNLR											1	.306	.485**	.185	.403*	-.106	-.300	.296	.203	.085	.184
ELGJR												1	.091	.055	-.094	-.021	.028	-.105	.227	.057	.025
FDSSR													1	.136	.589**	-.027	-.101	.173	-.034	.175	.098
IBZFRK2														1	.348*	.150	-.034	.061	.607	.280	.188
															.038	.381	.842	.724	.697	.098	.272

Correlation matrix was presented in Table 5. Correlation between two variables indicates the level to which those variables move together. The sample correlation coefficient r is an estimate of the population correlation coefficient ρ . We also tested statistical significance of correlation coefficients where the following hypotheses were being tested (Doane, Seward, 2009, p. 501):

$$H_0: \rho = 0,$$

$$H_1: \rho \neq 0.$$

Shaded values in Table 5 show that the correlation coefficient is significant at the 0.01 or 0.05 level. After examining basic parameters of descriptive statistics and correlation analysis, in the next part of the paper, we give results of the beta coefficients estimation.

The Beta Coefficients Estimation

In the case of prime linear regression, it is significantly important to test the hypothesis if the slope coefficient (β) equals zero. This is an important question because if $\beta = 0$, than independent variable does not influence dependent variable. In that case, the following hypotheses are tested (Doane, Seward, 2009, p. 520)

$$H_0: \beta = 0,$$

$$H_1: \beta \neq 0.$$

Results of the beta coefficient estimation for selected dependent and independent variables are presented in the following table.

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Table 6. Beta coefficients estimation

Dependent variable		Independent variables										Adj. R ²
		BATX	BIFX	BIRS	ERS10	FIRS	SASX10	SASX30				
BHTRS	Beta coefficient	0.629	-0.162	-0.476	0.307	0.029	0.344	-0.008	0.553			
	p-value	0.005	0.365	0.047	0.175	0.898	0.164	0.972				
BIGFRK3	Beta coefficient	0.043	0.760	0.092	-0.176	0.039	-0.087	0.158	0.601			
	p-value	0.828	0.000	0.673	0.406	0.854	0.704	0.434				
BSNFRK2	Beta coefficient	-0.133	-0.466	0.349	-0.720	0.943	0.687	-0.585	0.265			
	p-value	0.618	0.049	0.245	0.017	0.003	0.034	0.038				
BSNLR	Beta coefficient	0.841	0.009	-0.142	-0.016	0.143	0.071	-0.280	0.423			
	p-value	0.001	0.964	0.590	0.950	0.577	0.797	0.250				
ELGJR	Beta coefficient	-0.590	-0.020	0.527	-0.691	0.187	0.181	0.308	0.052			
	p-value	0.058	0.939	0.126	0.040	0.570	0.610	0.323				
FDSSR	Beta coefficient	0.808	0.283	0.036	0.016	-0.281	-0.184	0.045	0.615			
	p-value	0.000	0.094	0.868	0.936	0.186	0.417	0.819				
IBZRRK2	Beta coefficient	0.337	-0.150	-0.254	0.160	0.428	0.119	-0.060	0.038			
	p-value	0.272	0.566	0.457	0.625	0.202	0.740	0.846				
JPESR	Beta coefficient	0.342	-0.140	-0.471	0.311	0.339	0.704	-0.187	0.629			
	p-value	0.078	0.388	0.032	0.133	0.107	0.003	0.338				
JHKP-R-A	Beta coefficient	-0.108	-0.047	0.122	-0.223	0.876	-0.033	0.053	0.505			
	p-value	0.620	0.802	0.618	0.345	0.001	0.899	0.812				
MIGFRK2	Beta coefficient	0.202	-0.239	0.208	0.270	-0.107	-0.627	0.232	0.072			
	p-value	0.501	0.354	0.534	0.403	0.741	0.081	0.450				
NOVB-R-E	Beta coefficient	0.619	-0.099	0.579	-0.513	0.250	-0.166	-0.514	0.226			
	p-value	0.030	0.673	0.065	0.088	0.403	0.604	0.073				
TCMKR	Beta coefficient	-0.254	-0.133	0.409	-0.231	0.210	0.742	-0.447	0.041			
	p-value	0.443	0.610	0.233	0.479	0.527	0.045	0.157				
TLKM-R-A	Beta coefficient	0.598	-0.092	0.835	-0.684	0.135	-0.808	0.422	0.374			
	p-value	0.020	0.662	0.005	0.014	0.613	0.008	0.100				
ZHTP-R-A	Beta coefficient	-0.075	0.063	0.040	-0.075	0.840	-0.067	0.110	0.701			
	p-value	0.660	0.667	0.834	0.680	0.000	0.737	0.529				

Shaded values in the previous table show that, with 5% risk, can be concluded that variable x (selected indices) influences variable y (selected issuers), and that the estimation of parameter β is statistically important, i.e. in this case we reject null hypothesis.^{xvi}

Discriminant Function Analysis

The first objective of discriminant analysis is to identify a set of variables that “best” discriminates between the two groups. In our case, we had two groups, i.e. the most liquid (group 1) and the least liquid (group 2) stocks from the capital market of Bosnia and Herzegovina. As we explained earlier, the independent variables of the model were comprised of the following variables: beta coefficient, market capitalization, turnover and return. Since we have, depending on index selected, seven beta coefficients for every issuer, general form of the discriminant function can be noted as follows:

$$D = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + b_8x_8 + b_9x_9 + b_{10}x_{10}, \quad (4)$$

where $x_1, x_2, x_3, x_4, x_5, x_6$ and x_7 represent estimated beta coefficient in accordance with indices BATX, BIFX, BIRS, ERS10, FIRS, SASX10 and SASX30, respectively; x_8 represents (logarithmic) market capitalization, x_9 is used as representation of (logarithmic) turnover and x_{10} as a representative of return. We used stepwise method that basically removes independent variables that are not significant. A variable with very low tolerance contributes little information to a model and therefore may be removed from it. In our case, out of initial ten independent variables, we are left with only five of them: x_1 – BATXBETA, x_4 – ERS10BETA, x_6 – SASX10BETA, x_8 – LOGMCAP and x_{10} – RETURN. Summary of the most relevant results is presented in the following tables.

Table 7. Eigenvalue

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
(1)	210.391	100.0	100.0	0.998

The larger the eigenvalue, the more of the variance in the dependent variable is explained by that function. Also, the canonical correlation is the measure of association between the discriminant function and the dependent variable. The square of canonical correlation coefficient is the percentage of variance explained in

the dependent variable. In our case, that means that 99.60% (0.998 x 0.998) of variance in the dependent variable is explained by the model.

Furthermore, results of the Wilk's Lambda test are presented in Table 8.

Table 8. Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
(1)	0.005	24.092	5	0.000

Wilks's lambda, is an inverse measure of the importance of the functions. Values close to 1 indicate that almost all of the variability in the discriminator variables is due to within-group differences (differences between cases in each group); values close to 0 indicate that almost all of the variability in the discriminator variables is due to group differences (Brown and Wicker, 2000, p. 223). Basically, Wilks' lambda is a measure of how well each function separates cases into groups. Smaller values of Wilks' lambda indicate greater discriminatory ability of the function.

The interpretation of the discriminant coefficients (or weights) is like that in multiple regression. Table 9 provides an index of the importance of each predictor like the standardized regression coefficients did in multiple regression. The sign indicates the direction of the relationship.

Table 9. Standardized canonical discriminant function coefficients

Function	x ₁	x ₄	x ₆	x ₈	x ₁₀
(1)	8.078	-6.110	-3.274	7.045	-4.643

Summa summarum, our estimated model can be written as follows:

$$D = 8.078BATXBETA - 6.110ERS10BETA - 3.274SASX10BETA + 7.045LOGMCAP - 4.643RETURN$$

Basically, the standardized discriminant function coefficients indicate the relative importance of the independent variables in predicting the dependent. In our case, BATXBETA score (variable x₁) was the strongest predictor while LOGMCAP score (variable x₈) was next in importance as a predictor. These two variables with large coefficients stand out as those that strongly predict allocation to the most liquid or the least liquid group. In general, if we rank these other coefficients by their absolute values, next to LOGMACP, as the best predictor comes ERS10BETA (variable x₄),

RETURN (variable x_{10}) and finally SASX10BETA (variable x_6). Let us now examine the practical implications of these results.

BATXBETA, or the beta coefficient as a measure of sensitivity of a stock price to movement in BATX, is very important tool when making an investment decision on capital market in Bosnia and Herzegovina. Why? Well, since the BATX is made up of the most liquid stocks traded on SASE and BLSE, every investor should first examine the sensitivity of the selected stock to the mentioned index.

Beta coefficient has proved itself as a very useful instrument which investors can use in the process of defining an investment decision on the capital market. For example, if we look at Table 6, we see that the estimation of parameter BATXBETA was statistically important in case of the following issuers: BHTRS, BSNLR, FDSSR, NOVB-R-E and TLKM-R-A. Furthermore, when knowing the beta coefficient, an investor may classify any selected stock in one of the three possible groups, i.e.: (1) an average stock ($\beta = 1$); (2) an aggressive stock $\beta > 1$, and (3) a defensive stock ($\beta < 1$). An average stock, according to the definition, will have beta 1 value, which means that its return will proportionally follow return on the selected stock exchange index. A beta coefficient higher than 1 implies that returns for the stock move more than the market. These stocks are known as aggressive. On the other hand a beta of less than 1 means that the stock will be less volatile than the market. These stocks are known as defensive. According to the results presented in Table 6 all of the selected stocks may be classified as defensive.

As second best predictor in our analysis, LOGMCAP, or the number of stocks multiplied by their current price on the stock market, is in general, very important tool in investment decision making. Since market capitalization may be used as a measure of liquidity (Von Wyss, 2008) this indicator is especially important when investing in underdeveloped capital markets.

Furthermore, the modern portfolio theory predicts that if the general assumptions of the capital asset pricing model (CAPM) hold, and the markets are efficient, systematic risk is the only priced in factor. However, there is a stream of literature that spills doubt over CAPM and provide evidence that the systematic risk factor is not the only priced factor, adding firm-specific parameters such as company size (which can be seen as a proxy for marketability, large bid-ask spreads, non-transparent information, etc.) and earnings yield affect returns to the discussions. Measuring the size of a company by its market capitalization value, studies utilizing

data from different stock exchanges, often find that smaller companies carry a so called “small-firm” premium and earn higher returns than their larger counterparts in a buy and hold strategy. Since 1926, the nominal returns on large cap stocks have averaged about 10% per annum, whereas small-cap stocks brought about 12% and corporate bonds about 6% gross of inflation rate and taxation (Keating, 2013). Developed markets have acknowledged this, and decision makers have placed large incentives in form of commissions and trading spreads to support small-caps with equity analysis, market makers and the like. As concerns for investor protection rise in the recent years the rule making has reversed a bit.

When allocating funds to peripheral and emerging markets, investors particularly look into parameters such as market capitalization and liquidity, as well as market depth (the sensitivity of bid-ask spreads on the local stock exchange to the placement of trading volumes within a certain period of time). This liquidity risk is defined as the risk of a security not being able to trade quickly enough in the market such to prevent losses. In the modern times of high frequency trading, sophisticated systems and cash abundant investors in search of yields, liquidity provides investors with an option to exit, and induces them to take risk, growing capital formation, which in turn funds innovation and leads to constantly improving standard of living. If liquidity is eliminated or reduced, this process is reversed meaning that smaller markets will be more and more excluded in investment decisions based on these parameters and seen as unattractive for any sort of capitalization, which in turn diminishes future economic growth. The impact of liquidity can be reduced, if firms have a firm financial management in place and diversify across several liquidity providers in the region.

Investing in small-cap companies is one of the most widely used passive growth strategy where discipline and diversification gains on importance. A conviction bet in a less liquid market can bring higher returns; as such markets are more volatile, rewarding their participants for the risks being taken. Understanding this relationship between company size, return potential and risk is crucial before adding any equity position to the investor portfolio.

Conclusion

In this paper we investigated the possibilities of stock selection and analysis on the underdeveloped capital market of Bosnia and Herzegovina. Due to its many specificities (such as low market capitalization, poor liquidity and turnover, weak

legal protection for minority shareholders, low correlation with developed and emerging capital markets, etc.), any kind of scientific research on this market can help investors in shaping their investment strategies. Therefore, the main goal of this paper was to scientifically examine and propose new approach of stock selection and analysis based on multivariate technique, i.e. discriminant analysis, in order to help investors, individual and institutional, in their decision making process, especially in case of underdeveloped capital markets. The main limitations of this study are to be found in the shorter available financial time series in newly formed capitalistic economy, missing data due to the lack of collective records on levels of securities offerings issues. However, the main advantage of this research is that we concluded that discriminant analysis is a useful quantitative tool that can help investors in shaping their investment strategies in case of capital market of Bosnia and Herzegovina. We also found that the beta coefficient, market capitalization and realized historical return have discriminatory capabilities in case of the capital market of Bosnia and Herzegovina. The real implications of this research can be seen in the shaping of investment strategies of potential investors looking to diversify their portfolios as well as financial managers of smaller listed companies looking for ways to make their financial structure more attractive to investors. To summarize, previously formulated scientific hypotheses can be confirmed and further research suggests a need for more in depth analysis of effects investment strategies based on the new approach of stock selection and analysis proposed in this paper.

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ⁱ Stock market information, including dividend information, is often not complete and is not always disclosed in English. There is no central source for this type of information.

ⁱⁱ According to additional information, it has been learned that there are several active custodians available for foreign investors.

ⁱⁱⁱ Bosnian Investment Fund Index – BIFX, The Sarajevo Stock Exchange, Retrieved 18 April 2013, from http://195.222.43.81/sase-final/language/en-US/Market/Index/Index_BIFX.aspx

^{iv} SARajevo Stock EXchange Index 10 – SASX-10, The Sarajevo Stock Exchange, Retrieved 18 April 2013, from <http://195.222.43.81/sase-final/language/en-US/Home.aspx>

^v SARajevo Stock EXchange Index 10 – SASX-10, The Sarajevo Stock Exchange, Retrieved 19 April 2013, from <http://195.222.43.81/sase-final/language/en-US/Home.aspx>

^{vi} Methodology for Establishing, Calculating and Revision of Investment Funds Index of Republic of Srpska, The Banja Luka Stock Exchange, Retrieved 20, April 2013, from <http://www.blberza.com/Cms2FileCache/files/cms2/docver/19709/files/FIRS%20methodology.pdf>

^{vii} Methodology for Establishing, Calculating and Revision of Stock Exchange Index of Republic of Srpska, The Banja Luka Stock Exchange, Retrieved 20 April 2013, from http://www.blberza.com/Cms2FileCache/files/cms2/docver/19710/files/Methodology_BIRS_20_05_11.pdf

^{viii} Methodology for Establishing, Calculating and Revision of The Index Of Companies Of Power Utility Of The Republic Of Srpska, The Banja Luka Stock Exchange, Retrieved 20 April 2013, from <http://www.blberza.com/Cms2FileCache/files/cms2/docver/19711/files/METODOLOGIJA%20ERS10%20engl.pdf>

^{ix} For more information see: The Bosnian Traded Index (BATX), The Wiener Börse AG, Retrieved 30 December 2012, from <http://en.indices.cc/indices/cee/profiles/batx.html>

^x Real historical values for BATX are available at: BOSNIAN TX BAM (BXL.VI), Yahoo! Finance, Retrieved 14 December 2012, from <http://finance.yahoo.com/q/hp?s=BXL.VI+Historical+Prices>

^{xi} Bosnian Traded Index (BATX), The Wiener Börse AG, Retrieved 20 April 2013, from http://en.indices.cc/static/cms/sites/indices/media/en/pdf/download/profiles/en_BATX.pdf

^{xii} For more information on composition of BATX see: Bosnian Traded Index in BAM - BATX BAM, The Wiener Börse AG, Retrieved 7 July 2012, from <http://en.indices.cc/indices/details/bxl/composition/>

^{xiii} Dobrinja d.d. Ilidža was not used because at the time this research was done, quotes weren't available on the official web site of the SASE.

^{xiv} For this, in this paper the stock closing prices for the first and last trading day of each month were collected.

^{xv} All results in this research were generated by: *SPSS® Student Version 11.0 for Windows*®, ©SPSS Inc. 2002, Quantitative Micro Software *EViews 7.1* Enterprise Edition 2010 and *STATISTICA 7.0* Copyright® StataSoft, Inc. 1984-2004.

^{xvi} Null hypothesis is confirmed in this case, if p – values are higher than selected significance level.

Impact of Related Acquisition Strategy on Bidding Company Performance

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Abstract: *Strategy researchers believe that the better the strategic fit or relatedness between the bidding and acquired firms, the greater should be the economic gain from the merger. Although merger performance has been widely researched we recognized that empirical results on merger performance are inconclusive and that there are research gaps related to geographical settings, time frame and methodological approach. Thus, the research question examined in our study was to find out if acquisition strategy or relatedness of merging companies increases performance of the bidding company. Also we considered moderating effect of premerger bidder profitability on the performance of the merger. Our study predicts that relatedness between merging companies has a positive impact on the merger's performance. Results of 49 mergers completed in 2008 in EU member countries and Switzerland show that related mergers have better merger scores than unrelated mergers. We also predict that the impact of the related acquisition strategy becomes more positive as bidder premerger performance decreases.*

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Introduction

According to the Thompson One Banker database, in 2010, the total value of merger and acquisition transactions amounted to 555 Mil USD which encompassed more than 11 thousand deals worldwide. Because of such practical relevance, mergers and acquisitions have been studied from multidisciplinary perspectives. This field attracted interest of practitioners and academics within a broad range of management disciplines taking into account its financial, strategic, behavioral, operational and cross-cultural aspects.

Mergers and acquisitions could be explained as strategically planned transactions in which the target company and the bidding company jointly create a new entity to gain competitive advantage in the market place. This term describes either the purchase or sale of corporate assets and shares (an acquisition), or the act of combining two or more companies in a single corporate entity (a merger; Ernst and Häcker, 2007). On the surface, the distinction in meaning of “merger” and “acquisition” may not really matter, since the net result is often the same: two companies (or more) that had separate ownership are now operating under the same roof, usually to obtain some strategic or financial objective.

According to Marks and Mirvis (2001), less than one quarter of mergers and acquisitions achieve their financial objectives, as measured by share value, return on investment and post combination profitability. Gugler et al. (2003) compared the performance of merging companies with a control group of non-merging firms, focusing on profitability and sales. The results show that 43% of all merged companies worldwide reported lower profits than comparable non-merged firms. Likewise, more than 50% of U.S. mergers earned negative cumulative abnormal returns (Agrawal et al., 1992). Given these outcomes, it is not surprising that more than half of the merged companies end up being divested (Porter, 1987). Because of the negative financial results in post-mergers special emphasis in different research has been put on successes and failures of merger and acquisition activities.

According to Straub (2007) and Larsson and Finkelstein (1999) mergers and acquisitions have been studied on the basis of several theories. First, there are studies on mergers and acquisitions as a method of diversification, from the strategic perspective, focusing on both the motives for different types of combinations and the performance effects of those combinations. Second, finance scholars have studied mergers and acquisitions by focusing on factors such as economies of scale and

market power as the motives and on the acquisition performance, based on stock-market measures. Third, mergers and acquisitions have been studied from the viewpoint of organizational behavior as well. Furthermore there is also 'process' literature which focuses on the important role of the choice of integration strategy and the acquisition process itself. This approach emphasizes that the acquisition process itself is a factor, in addition to the strategic and organizational fit, that affects the outcome.

In our research, we assumed the last mentioned approach also called the strategic perspective. The research question in this paper was to find out if acquisition strategy of relatedness of merging companies increases the performance of bidding companies. Our hypothesis was that relatedness between merging and bidding company will have an impact on the merger performance.

Literature Review

In the literature it is often found that the primary purpose of merging and acquiring new companies is to improve overall performance by achieving synergy (Lubatkin, 1983). Synergy is thus, the main motive and the source of value creation in mergers. Synergies can be used to explain performance differences among the various merger types (Lubatkin, 1983).

There are various typologies of synergies that exist in the literature. For example, according to Lubatkin's typology, (1983) there are three basic kinds of synergies, i.e. technical economies, pecuniary economies and diversification economies. Technical economies occur when the same amounts of inputs, or factors of production, produce a higher quantity of outputs. Pecuniary economies are achieved by the firm's ability to dictate prices by exerting market power, achieved primarily through size and diversification economies, are achieved by improving a firm's performance relative to its risk attributes.

Furthermore, Chatterjee (1986) uses broader categories of synergies. First, collusive synergy represents the class of scarce resources leading to market power. Second, operational synergy represents the class of scarce resources that leads to production and/or administrative efficiencies. Lastly, financial synergy represents the class of scarce resources that leads to reductions in the cost of capital.

Finally, Seth (1990) emphasizes that according to the value-maximizing hypotheses, positive synergy, or value creation, may be evidenced and value is created on the basis of market power, economies of scale and economies of scope, coinsurance and financial diversification. Market power is the ability of a market participant or group of participants to control the price, the quantity or the nature of the products sold, thereby generating extra profits. Economies of scale can be production-linked or functional. Product linked economies of scale may be achieved in the areas of purchasing or inventory management in the case of mergers involving companies using common raw materials or components. Functional economies of scale may be present in other functional areas of a business such as advertising, distribution, service networks and research and development. Economies of scope are said to exist when the cost of joint production of two goods by a multiproduct company is less than the combined costs of production of these goods by two single-product firms. A Coinsurance effect appears in a merger between companies whose earning streams are less than perfectly correlated. Financial diversification is created when a company acquires another with a different business cycle to its own, resulting in its income stream being stabilized and the variance of the firm's returns reduced.

Regardless of the description of particular synergies and details in their typologies, the mutual feature is that all those synergies provide the basis for value creation measured by financial indicators. Companies with better company performance in post-merger period are considered to have had better synergy effects.

Acquisition Strategy

Companies are able to create better synergies by implementing acquisition strategy. Several researches showed that acquisition strategy had an impact on the company performance in the post-merger period (Rumelt, 1947, Ramaswamy, 1997, Altunbas and Ibanez, 2004). Acquisition strategies have been usually classified by the US Federal Trade Commission (FTC) of merger classification. According to FTC classification, mergers can be horizontal, vertical, product and market concentric or conglomerate mergers. A horizontal merger or related diversification takes place between companies in the same industry, where the two combining companies produce identical products and/or are competitors. Vertical mergers are transactions that take place between companies at different levels of the industry value chain and occur when two companies combine, each working at different stages in the production and distribution of the same good (e.g. buyer-seller, client-supplier). Product or market concentric mergers are transactions involving businesses that

share similar in production or marketing technologies. Conglomerate takes place when the two combining companies operate in unrelated businesses (unrelated diversification).

From the theoretical strategic perspective, researchers believe that the better the strategic fit between the bidding and acquired firms, the greater should be the economic gain from the merger. Strategic fit is described as the level of relatedness of merged companies. According to Rumelt (1974) merging companies may be considered related 'when a common skill, resource, market or purpose applies to each', i.e. if they employ similar production techniques, serve similar markets, use similar distribution systems, and employ similar science-based research.

Lubatkin (1988) outlines the advantages of related mergers. First, related mergers provide opportunities to reduce cost and/or enhance differentiation through exploiting the economies of scale and scope in various operational areas such as manufacturing, distribution, and administration. Second, related mergers provide the potential for power gains and, by becoming larger, can influence the price of its outputs or inputs.

Furthermore in his paper Lubatkin (1988) argues that unrelated mergers involve the combination of noncompeting products that utilize different product and market technologies, thus offering fewer advantages than related mergers. Therefore, while they may provide allocation efficiencies, they will be less able to provide tangible and intangible efficiencies and power gains than related mergers. In other words, according to Lubatkin (1988), related mergers have greater potential to create shareholder value than unrelated mergers.

In studying the impacts of related and unrelated diversification effects on the shareholder wealth, two approaches have been used. One stream of research has examined the accounting performance of companies following different diversification strategies. A second research stream has used market based measures and the event study methodology.

An event study is a statistical method to assess the impact of an event on the value of a firm. For example, the announcement of a merger between two business entities can be analyzed to see whether investors believe that the merger will create or destroy value. The basic idea is to find the abnormal return attributable to the event being studied by adjusting for the return that stems from the price fluctuation of the

market as a whole. The market-based measures intrinsically differ from the accounting-based measures as they focus on the present value of future streams of income, i.e. on expected value, whereas the latter focus on the past performance. Most of the research on takeover performance has focused on the use of market-based measures. One reason for this is the susceptibility of accounting information to managerial manipulation through earnings management and changing accounting policies (Stanton, 1987). Also, because of different accounting standards, accounting performance measures are harder to compare.

Generally, literature of strategy has argued that companies following related diversification strategies should outperform the unrelated diversifiers (Salter and Weinhold, 1979; Rumelt, 1974). Likewise, Walker (2000) investigated strategic objectives and stock performance of bidding firms. His analysis shows that bidding firm's shareholders earn positive returns following related acquisitions and negative returns following unrelated takeovers. Relatedness in his definition encompass geographic expansion (bidding company seeks economies of scale by expanding its operations geographically), product line extensions (bidding company seeks economies of scope by expanding its product line), and market share increase (bidding company buys its competitor).

However, broader empirical evidence is mixed (Lubatkin and O'Neill 1988; Seth, 1990). For instance, Chatterjee (1986) found that unrelated targets significantly outperformed related, non-horizontal targets. On the other hand Lubatkin (1987) found no significant difference in the performance levels of related and unrelated bidders and targets and concluded that related mergers do not create more value than unrelated mergers. So, strategic fit does not have an important effect on success of acquisitions. Many mergers are consummated on the premise that the two companies have a natural "fit." In reality, this fit is often illusive (Lubatkin and O'Neill, 1988). Because of the inconclusive results, we considered that it would be interested to test the effect of acquisition strategy on merger performance.

Research gaps

Understanding merger performance on the basis on current review on merger research is complex and inconclusive task (Tuch and O'Sullivan, 2007). Since researchers are employing both, market-based and accounting metric, covering a range of time periods, and using different sample sizes, it is not easy to make generalizations on this phenomenon.

On the basis on our identification of before mentioned inconclusive evidence in current empirical research in mergers' performance, we recognized certain gaps related to geographical settings, time frame and methodological approach (Table 1).

Table 1. Gaps in Previous Researches of Mergers

Geographical gap	Most of the research was done on US and UK companies.
Time-frame gap	Research mostly covers mergers in 1980s and 1990s with few of them at the beginning of 2000.
Methodological gap	Analysis of mergers mostly done by event studies, with focus on market based measures.

Most empirical research in the leading academic research journals has been done in Anglo-Saxon geographical settings. For example, in their paper, Tuch and Sullivan (2007) present a review of empirical research on the impact of acquisitions on company performance. Out of 78 presented empirical studies 51 merger studies are from the US market, 24 mergers are from the UK market, and the remaining 3 merger studies are from the other EU countries. To cover the geographical gap that exists in previous research, which encompasses mainly companies in Anglo Saxon countries, we selected companies involved in mergers and acquisitions activities within EU countries and Switzerland. Switzerland was chosen because of the highest number of multinational companies per capita.

Furthermore, research on mergers and acquisitions has been done extensively in 1980s and 1990s and a relatively low number of studies have been done recently. It is believed that mergers performed prior to 1990's are quite different than those done later because of the different economic and other factors outside of the company (Kukalis, 2007). For mentioned reasons, and to be able to look at the results of two years before and after the merger, we selected mergers that have been completed between January 1st and December 31st 2008.

Also the majority of these empirical studies are using event study methodology with market based measures. In order to measure mergers' success, we decided to use accounting metrics. As an argument for accounting metrics Ramaswamy (1997) emphasizes that some surveys of merger decisions have indicated that managers primarily seek to improve profitability through mergers (Ingham, Kran, and Lovestam, 1992; Rose, 1989). As profitability measure we used Return on Assets (ROA).

Model, Data Set and Measures

Model

Our research was developed on studies of Ramaswamy (1997) and Altunbas and Ibanez (2004). Ramaswamy (1997) analyzed the impact of relatedness between US banks on their performance after the mergers. Altunbas and Ibanez (2004) examined the impact of strategic similarities between bidders and targets on post-merger financial performance.

Our model proposes that merger performance is in function of acquisition strategy, premerger bidder performance and relative size. Research model was as following:

$$\text{Merger performance} = F(\text{Acquisition strategy, premerger bidder performance, relative size}).$$

The research question examined in our study was to find out if acquisition strategy or relatedness of merging companies increases the performance of bidding companies. The main hypothesis was the following:

H1: Relatedness between merging companies has a positive impact on merger performance.

Given the results of previous researches, that included acquisition strategy and premerger bidder performance, we assumed that those two variables will have a positive effect on merger results. In other words, we expected that the best merger results will be presented by companies that had related acquisition strategies and lower premerger bidder performance.

H2: Premerger bidder performance moderates the impact of related acquisition strategy on merger performance. The impact of related acquisition strategy becomes more positive as bidder premerger performance decreases.

Data set

To find relevant mergers and conduct the analysis, the Thompson One Banker database on mergers was used. Following criteria were used to screen merging companies:

- (1) Merging companies should be from the EU member countries and Switzerland and mergers should be effective in the period between January 1st and December 31, 2008.
- (2) Mergers in which the bidding companies had between 50 and 100% of ownership have been selected. According to International Accounting Standards, control is presumed when the parent acquires more than half of the voting rights of the entity (Mackenzie et al., 2011). Also, control is the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities (Mackenzie et al., 2011). Consequently it is reasonable to expect that control over subsidiary should impact performance of bidding firm.
- (3) In order to obtain financial data, only publicly listed companies had been selected.
- (4) We limited the sample with the requirement for market capitalization of bidding company above 5 Mill USD.

The resulting sample comprised of 81 mergers. Out of 81 mergers, only 49 mergers had full set of required financial data. So a final sample of 49 mergers as a unit of analysis (comprising 98 companies) meeting the above conditions was identified.

Measures

As dependent variable, we measured *merger performance* as the difference between the bidding firm's two-year average return on assets (ROA) after the acquisition and the average of the ROA of the bidding company two years before the acquisition. We considered two years time window to avoid the effect of other economic factors or other mergers which could distort the results if we would take longer time span. According to the Meeks and Meeks (1981) when using accounting measures in assessing impact of merger on efficiency, the problem of extracting the effect of efficiency changes on profit from that of changes in bargaining power resulting from the merger arises. In their paper, among other profitability measures, ROA is the least sensitive in the case of enhancement of leverage or bargaining power resulting from a merger.

Acquisition strategy, as an independent variable, was measured by a dummy variable. If an acquisition was categorized as a 'horizontal merger' (i.e., related acquisition; meaning in the same industry), the variable 'related acquisition' was coded '1'. All other mergers (i.e., unrelated acquisition meaning from different industries), were

coded '0'. Horizontal or related mergers in our sample encompass all mergers in which bidder and target are operating in the same macro industry defined within the Thompson One banker database. This approach was used in several other researches (e.g. Gerbauld and York, 2007)

Two control variables, namely, average premerger ROA of the bidder for two years prior to merger (premerger bidder performance) and the size of a target vis-a-vis the bidder (relative size) were used in the analysis. The level of the bidder's premerger performance, measured as its return on assets, is likely to influence post-merger performance. Altunbas and Ibanez (2004) argue that if a bidder already possesses a high-level of profitability before the merging process, it is more likely that the profitability of the new institution will decrease in the short term due to the process itself. Alternatively, it is probable that bidders with a lower level of performance will manage to increase their profitability after merging with a target. As a consequence, a negative relationship between bidders' premerger performance and post merger performance is expected initially. This effect is also known as a "floor-ceiling" effect (Ramaswamy, 1997).

Relative size was used as a control variable since various studies show that it may impact post merger bidder performance. Some researchers show that larger companies might acquire smaller companies to realize scale-related synergies that would otherwise be difficult to obtain (Datta et al., 1991; Kusewitt, 1985). Chatterjee (1986) states that the smaller the acquired firm, relative to the bidding firm, the greater the potential for synergy. Tuch and O'Sullivan (2007) state that there are a number of reasons why acquiring larger targets might result in better post-acquisition performance. First, larger targets are more difficult to assimilate into a combined organization, so the pool of potential acquirers is expected to be smaller. This may result in acquirers being able to acquire large targets on more advantageous terms (Roll, 1986). Secondly, the economic impact of acquiring a larger target is likely to have a stronger impact on the post-bid performance of the combined company (Bruner 2002). Finally, Moeller *et al.* (2004) argue that the contrasting findings from some studies examining the impact of size arise as a result of the different levels of care exercised by smaller bidders in the acquisition process. Small acquirers need to be more careful when making a potentially risky bid, as there will be a relatively larger economic impact on their company. The authors therefore argue that the size effect is due to smaller acquirers rather than to larger targets. Since data is not conclusive on the direction of the effect, but research shows impact of relative size on the merger performance, this variable is used as control variable.

Relative size was calculated as a relative number representing difference in sales between target and bidder.

In order to give better understanding to variables and their Operationalization but also to connect them with the hypotheses formed, latter table has been prepared (Table 2).

Table 2. Operationalization of the Variables and Hypotheses

Variables	Operationalization	Hypothesis
Control variables		
premerger bidder performance	Average premerger ROA of the bidder for two years prior to merger.	H2: Premerger bidder performance moderates the impact of related acquisition strategy on merger performance. The impact of related acquisition strategy becomes more positive as bidder premerger performance decreases.
relative size	Relative number representing difference in sales between target and bidder.	
Independent variable		
acquisition strategy	If an acquisition was categorized as a 'horizontal merger' (i.e., related acquisition; meaning in the same industry), the variable 'related acquisition' was coded '1'. All other mergers (i.e., unrelated acquisition meaning from different industries), were coded '0'.	H1: Relatedness between merging companies has a positive impact on merger performance.
Dependent variable		
merger performance	Difference between the bidding firm's two-year average return on assets (ROA) after the acquisition and the average of the ROA of the bidding company two years before the acquisition.	

Results

Prior to testing of hypotheses, we performed correlation analysis which is shown with descriptive statistics in Table 3. Generally, we can conclude that after the merger performance results are on average lower ($x=-4,38$) than before the merger ($x=5,70$).

Table 3. Univariate Statistics and Correlation Matrix for Explanatory Variables

	Mean	s.d.	1	2	3
1. Merger performance	-4.38	6.19			
2. Acquisition strategy	0.65	0.48	.14		
3. Premerger bidder performance	5.70	8.36	-.32*	-.33	
4. Relative size	1.38	6.57	.15	.12	-.12

* $p < .05$

To test our model we decided to calculate hierarchical regression analysis which is usually used when variables are determined by past research and analysis (Field, 2009; Cohen and Cohen, 1984). Some other researchers also used this hierarchical regression analysis to show how an additional set of variables are affecting independent variables, besides used control variables (Altunbas and Marques Ibanes, 2004; Ramaswamy, 1997). Even though data shows respectful standard deviation, the OLS regression was run for both models to generate variance inflation factors (VIF's). Average VIF's for the first model were below 1.014 which is considered acceptable.

Second model primarily included two control variables, one independent and 3 interaction effect but VIF's and eigenvalues proved that there is a presence of multicollinearity. Since there is proof that, in the case of multicollinearity, the dropping of the highly collinear variable can often make other variables statistically significant (Gujarati, 2002; Allison, 1998), we decided to drop out the relative size which had high correlations with other variables and had no predictive effect in the first model. Thus the second model was calculated with one control variable, one independent variable, and 3 interaction effects. The results of the two regression models are showed in the Table 4.

Table 4. Results of Hierarchical Regression Analysis

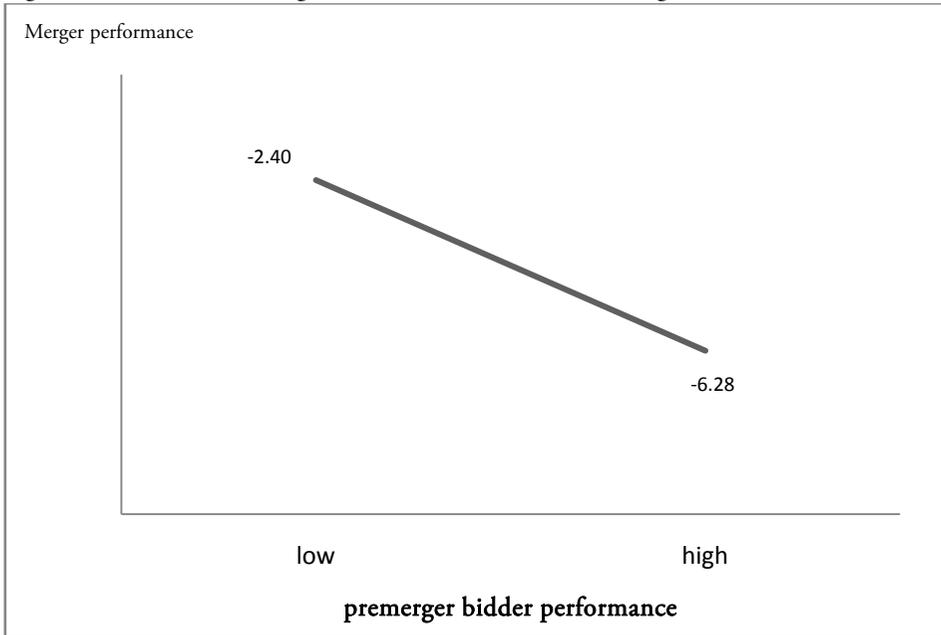
	Model 1	Model 2
Control variables		
premerger bidder performance	-0.31*	-1.09**
relative size	0.11	
Independent variables		
acquisition strategy		-0.54**
acquisition strategy x premerger bidder performance		1.12**
acquisition strategy x relative size		-0.07
premerger bidder performance x relative size		-0.30
Model R ²	0.12	0.54
F	3.05	10.25**

*p< .05

**p< .001

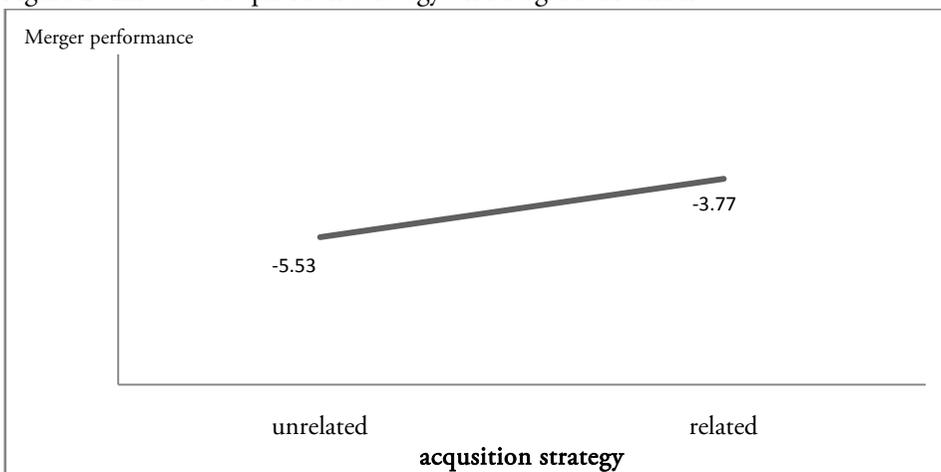
The results of the hierarchical regression analysis provide support for the first study hypothesis. The first model shows that the control variable, named relative size as the difference in sales between target and bidder does not have a significant impact on merger performance. Premerger bidder performance, as the second control variable, negatively impacts mergers performance and explains 12% of the variance. The merger performance was calculated as the difference of post-merger and premerger ROA, thus capturing floor – ceiling effect mentioned earlier. In other words, companies that were performing better prior to merging cannot be expected to have results after the merger as high as the companies that were performing poorly (Figure 1). These results are similar to the results of other authors (Harrison et al, 1991; Ramaswamy, 1997; Altunbas and Ibanes, 2004).

Figure 1. Effect of Premerger Bidder Performance on Merger Performance



The second model brings the same effect of the control variables and proves the effect of acquisition strategy, explaining additional 42% of the variance. Results also show that related mergers have better merger scores than unrelated mergers (Figure 2).

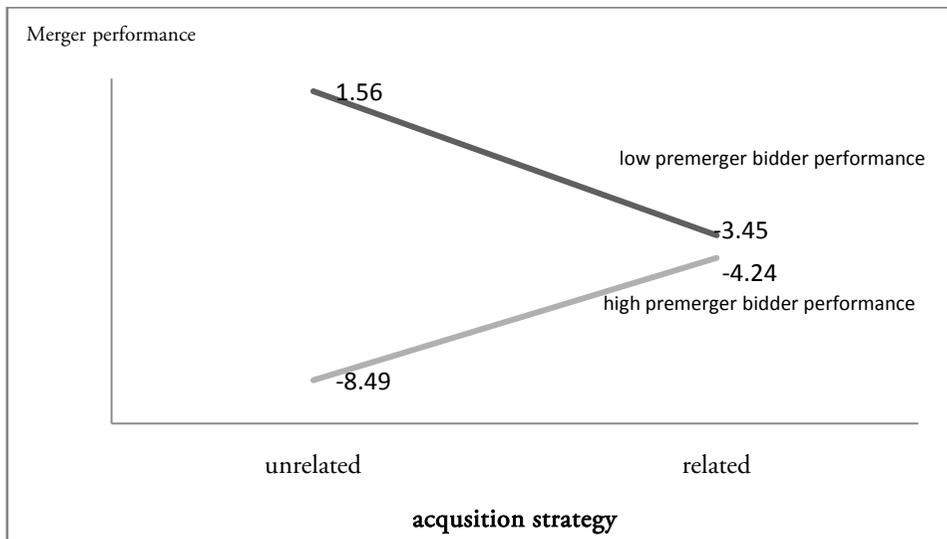
Figure 2. Effect of Acquisition Strategy on Merger Performance



Hypothesis 1 predicts that relatedness between merging companies has a positive impact on merger performance. Model 2 tests this hypothesis and coefficient for the acquisition strategy is negative and strongly significant ($b = -0.54$; $p < .001$) which indicates support for Hypothesis 1.

Hypothesis 2 in our research predicts a negative interaction between relatedness of merging companies and premerger bidder performance expecting that the most successful mergers will be among related companies with low premerger bidder performance. Results show positive interaction ($b = 1.12$; $p < .001$) and therefore hypothesis 2 is supported. Figure 3 graphically shows interaction among acquisition strategy and premerger bidder performance that was not predicted by the Hypothesis 2.

Figure 3. Two-Way Interaction between Acquisition Strategy and Premerger Bidder Performance



Discussion and Conclusion

One purpose of this research was to deal with found gaps in previous researches. Selection of mergers was geographically put in EU countries and Switzerland, only completed mergers in 2008 were included in the sample and premerger and post merger success was measured in a two year frame prior to and after the merger.

Results of the hierarchical regression analysis show that independent variables in the second model can explain a significant variance in merger performance. Acquisition strategy has an impact on merger performance and generally the more successful are companies that are merging with target companies in the same industry. This can be explained by creation of collusive and operational synergies in related mergers (Chatterjee, 1986). Since related acquisition may involve utilization of economies of scale and/or scope both in production and distribution, this may lead to reduced costs (i.e. operational synergies), as well as achievement of collusive gains, i.e. advantages based on the market power.

Our study also shows that related acquisition strategy and lower premerger performance has a positive effect on the merger's performance as well. On the other hand, unrelated strategies combined with lower premerger performance have an even better impact on merger performance than related ones do. Our results provide the answer that the most successful companies in mergers are those that had lower premerger bidder performance and that had unrelated diversification strategy.

These results can be explained by previous research which showed that in unrelated acquisitions, value creation occurs and is associated with the coinsurance effect (Seth, 1990). Some other empirical evidence shows coinsurance effect for conglomerate mergers (Kim and McConnell, 1977; Asquith and Kim, 1982; Choi and Philippatos, 1983; Shrieves and Pashley, 1984). Coinsurance effect appears in merger between companies whose earnings streams are less than perfectly correlated i.e. unrelated mergers. In effect, one company can supply funds following the merger to make up for the other's concurrent deficiency and thus creating higher cash flows (Seth, 1990).

Also better performance of unrelated mergers combined with low premerger bidder profitability may be explained with exploiting more financial synergies in unrelated mergers than operational and collusive synergies in related acquisitions. According to Chatterjee (1986) unrelated mergers are likely to have one form of synergy present, i.e. financial synergy. That means that on average a large company has cheaper access to capital than a small company does. Unrelated mergers may create financial diversification when a company acquires another with a different business cycle to its own, its income stream will be stabilized and the variance of the firm's returns reduced (Steiner, 1975).

Limitations

There are certain limitations which have to be discussed. First problem we will mention is the problem of conceptualization and measurement of relatedness. In our paper we defined relatedness on the basis of the same macro industry in the Thompson One Banker data base because of the availability of this statistic. Also, although readily available and widely used, the Standard Industrial Classification (SIC) and Federal Trade Commission (FTC) classifications of mergers into groups such as horizontal, vertical, product, conglomerate, are limited in their ability to provide insights into the complex nature of relatedness (Lubatkin, 1983, 1987). Besides of standard product-based definitions of relatedness, it implies connectivity of critical organizational and strategic factors such as resource allocation patterns (Harrison et al., 1991), management philosophy (Datta, Grant, & Rajagopalan, 1991), and organizational culture (Chatterjee et al., 1992; Jemison & Sitkin, 1986; Nahavandi & Malekzadeh, 1993), but a problem arises when researchers have to decide on measurements of relatedness and availability of data.

Also, as Meeks and Meeks (1981) also stressed in their research, limitation arise when using accounting measures as a metric of merger success. The central issue is distinguishing the effect of the profit of efficiency changes, resulting from a merger, from that of changes in bargaining power. For instance, if the participants' bargaining power is on average enhanced by a merger, then profitability could rise even though efficiency remained unchanged or actually fell.

One of the limitations could be the number of mergers used. As noted earlier, in our research we only focused on 49 mergers out of 81 because for the remaining number of mergers we could not find the needed data. If we would have this data, maybe the results would show some other effects.

Finally, limitation may be related to the measurement time frame. It can be argued that two years is not long enough for synergistic gains of merger to materialize, but we were forced to limit the time frame to two years to limit probability of further mergers in the sample. Therefore, adding additional years would have violated the "clean data" criterion suggested by Choi and Philipatos (1983) and Lubatkin (1987). Future research could compare different regions and countries during a longer period of time to give a more conclusive result.

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Capital Market in Bosnia and Herzegovina: Unused Potential as Alternative Source of Financing

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Abstract: *One of the most important factors of conducting business successfully and also in achieving the interests of the owner of entity is adequate structuring of source of financing of company or institution. Debt as a source of financing has its advantages in terms of potential of increasing of wealth for the owner of capital. On the other side, debt alone as source of finance can be realized on a several ways, where plenty of factors influence that choice. In the past few years in Bosnia and Herzegovina (BiH), the possibility of finance big infrastructural projects through emission of debt securities has been often mentioned. Until now neither of these projects has been financed in this way. About this problematic can be spoken from many aspects such as: strategic decisions, limits concerning budget deficit, technical conductions, efficient managing of public debt and so further. These are the facts that we want to consider when we speak about capital market as alternative source of financing trying to reach the advantages and disadvantages of emission of debt securities including the possibilities, techniques and benefits of financing of infrastructural projects through bonds.*

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Introduction

The foundations of the capital market in the Federation of Bosnia and Herzegovina were laid down with the adoption of the Law on Securities in 1998, the Law on Business Companies from 1999 and the laws establishing the fundamental capital market institutions – The Securities Commission of the Federation of Bosnia and Herzegovina and the Registry of Securities of the Federation of Bosnia and Herzegovina. The launch of the Sarajevo Stock Exchange in 2002 marked a milestone in the development of the capital market. On September 13, the Sarajevo Stock Exchange (SASE) was founded in accordance with the Law on Securities as a joint stock company by eight brokerage houses with the share capital of 300,000 KM. Following the adoption of the SASE Statute and the Rules, meeting of all the technical and personnel preconditions and completing extensive preparations, the first trading of shares was held on April 14, 2002 at the Sarajevo Stock Exchange.

The capital market development in the Federation of Bosnia and Herzegovina was linked closely with the process of (mass) privatization. The privatization receivables (“the certificates”) which were issued to all adults in the Federation of B&H were mostly invested into the Privatization Investment Funds (PIF) and companies offering state capital. Poor awareness of the certificate owners and later share owners on the rights and obligations regarding their ownership in the funds and privatized companies lead to the fact that initial trading by these issuers on the Sarajevo Stock Exchange was mostly conducted by discount rates.

The total turnover in SASE’s first year equalled to 41.6 million KM which was the lowest annual turnover in the Company’s 10-year history. The market values of the listed joint stock companies at the end of 2002 (market capitalization) amounted to 321 million KM.

Table 1. Overview of turnover and the market capitalization in the last ten years

Year	Turnover (KM)	Market capitalization on December 31 (in KM)
2002	41.678.465,00	321.253.156,34
2003	118.888.794,00	780.246.167,55
2004	201.137.333,00	3.751.568.969,67
2005	555.353.931,00	6.694.365.072,29
2006	654.717.252,00	11.404.786.537,71
2007	1.274.340.113,98	15.518.257.216,11
2008	477.076.375,47	7.808.681.905,37
2009	219.048.701,00	7.158.678.913,80
2010	108.554.379,41	7.210.603.026,80
2011	244.787.112,11	4.371.013.728,43
2012	373.577.487,70	4.504.560.828,97

Source: www.sase.ba

The initial trading on the Stock Exchange was in the auction trading format with one auction per day. The number of auctions later increased which lead to the introduction of the Multi-Fixing Trading Schedule (MFTS) in 2004 intended for stocks with higher solvency.

The SASE turnover and market capitalization were constantly increasing until 2007 when the annual turnover for the year amounted to 1.274 billion KM and the total company market value equalling to 15.5 billion KM.

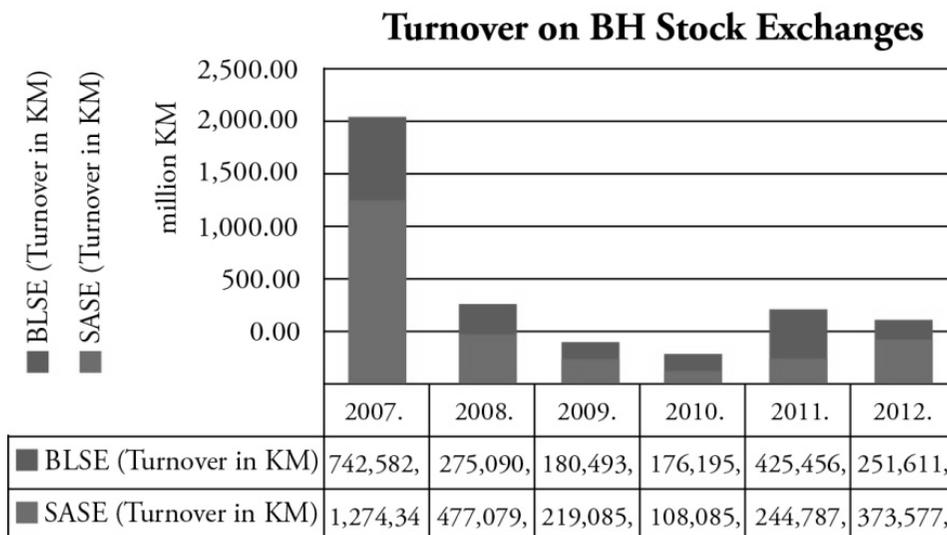
As a consequence of the global financial and economic crisis and its notable effect on the biggest investors (Slovenia and Croatia) on the FB&H capital market, the turnover in 2008 experienced a sudden plunge. The trend of turnover and market capitalization pull-down continued until 2010 which was followed by two years of turnover surge.

In the first six years of SASE, the primary market material was shares of issuers from the privatization process. After most of the companies of interest experienced ownership consolidation and considering the fact that there was a standstill in the privatization process the share of equities in the total turnover was reduced.

Despite the fact that in August 2007, a very successful sale of state-owned capital in “Interšped plc Sarajevo” was held, the political turmoil did not allow for the process to continue. Instead of equity instruments, the attention of the market from 2009 was drawn by the debt securities. This related to the bonds of the Federation of Bosnia and Herzegovina issued on the basis of internal debt (old foreign currency savings and war receivables). However, poor awareness of the bond owners on the possibility of their sale on the secondary market and a relatively long maturity period did not lead to the use of the securities’ full potential on the market.

A big change on the local capital market occurred in 2011 when the Sarajevo Stock Exchange organized for the first time the primary market auction of treasury bills in FB&H. Perceiving the advantages of borrowing from the local market through the Sarajevo Stock Exchange, the FB&H Government had multiple entries on the local market and thus fulfilled all its requirements for short-term and long-term financing.

Figure 1. Comparison of trading volume on BH stock exchanges



Source: *www.sase.ba*

The development of the capital market in the other BiH entity followed the trends in the Federation of BiH. Although the Banja Luka Stock Exchange was established somewhat earlier than SASE, until 2010 the turnover ratio of the two BiH Stock Exchanges was 2/3 to 1/3 in favour of the Sarajevo Stock Exchange. However, in 2010 and 2011 due to a higher demand of the RS to finance its budget deficit and

the large number of municipal bond issuing, the ratio was turned in favour of the Banja Luka Stock Exchange.

Ways of Financing Growth and Development

One of the most important factors of conducting business successfully and also in achieving the interests of the owner of entity is adequate structuring of source of financing of company or institution. Debt as a source of financing has its advantages in terms of potential of increasing of wealth for the owner of capital. The thing that we are speaking about is optimizing relationships of debt to ownership capital.

On the other side, debt alone as source of finance can be realized on a several ways, where plenty of factors influence that choice. We mean here on financing through bank credits versus financing by emission of debt securities. The sizes of a company or an institution together with the financial system are most important factors that determine not only the way of financing through emission of debt securities but also considering it as an option or a possibility.

In the past few years in BiH the possibility of financing big infrastructural projects through emission of debt securities has been often mentioned. Until now neither of these projects has been financed this way.

About this problem can be spoken from many aspects such as: strategic decisions, limits concerning budget deficit, technical conductions, efficient managing of public debt and so further.

If it is about finance of corridor 5C or about financing infrastructural projects on the local level, bank loans determine the way of financing in Bosnia. In most case these loans are offered by international finance institutions or some countries. On the other side by emission of bonds issued either by state/entity or more concrete public company „Autoceste FBH“, the state itself would become investor. Thus the state, entity, municipality and citizens instead of trading with bonds that are used with aim to cover budget deficits can be used for infrastructural projects and development.

These are the facts that we want to consider when we speak about capital market as alternative source of financing trying to reach what are the advantages and disadvantages of emission of debt securities, what are the possibilities, techniques and benefits of financing of infrastructural projects through bonds.

Debt as an Alternative Source of Financing

When we talk about debt or financing through debt and its reflection on the economy, there is no single stance on the type of debt although there are the Maastricht Criteria which state that it should not exceed 60% of the GDP and that the deficit should not exceed 3% of the GDP.

The experts believe that the best way of debt management is to compare it with the conditions in the countries in the region or beyond. If we take a look at the world map and the state of public debt in each individual country, we will perceive that the most developed countries are the ones most indebted. Doesn't that lead us to a conclusion that it is justified to go into a debt? On the other hand, countries which are also considered as developed but are not indebted are either countries rich with natural resources such oil or gas or the ones whose hyper-production and export orientation generates a surplus which does not require them to borrow such as China for example. Nevertheless, if we look at the situation in certain European countries whose debt exceeds 100% of their GDP we will see that they are facing bankruptcy while countries such as Belgium whose debt amounts to 97% of their GDP has no problems with solvency and development (Denk, 2013).

What is important with debt? Firstly, the rate of growth of GDP must always be higher than the rate of growth of public debt preventing the country to reach insolvency and thus fail to fulfil its obligations. Secondly, to establish the reasons for borrowing bas that will determine whether the current or the future generations are to repay the debt: if the reason is to fill budget holes, then the burden should be borne by the current generation (taxes) but if the borrowing is intended for infrastructural investments for the benefit of the future generations then there are grounds of transferring the debt onto the future generations (borrowings). The third issue is whether to borrow from the local or foreign market as the effects on the local economy are significantly different. The main arguments for local borrowing: development of the local financial market and transparent trading and less exposure to external risks (changes in interest and exchange rates). All this leads to the fact that the most important issues regarding debt are not just parameters but proper debt management - minimizing the negative and maximizing the positive effects.

The expected changes in interest rates are forecasted for the issuing of securities. If the interest rates are expected to rise, long-term bonds will be issued but if they are expected to drop the short-term bonds are to be issued. In the borrowing or in the

process of creating debt, it is important to evaluate whether the local economy can bear the burden of debt repayment in the long-term. In order for the debt to have minimum negative and maximum positive effects it is important to harmonize the fiscal policy with the monetary policy. Moreover, the funds generated through borrowing should be invested into developmental projects otherwise the public debt policy is a risk factor which can endanger the future economic growth.

The alternative sources of financing may be viewed as a competition to the banking sector. Namely, on the developed markets the banking sector is just one of the players in the overall financial system struggling to earn its place in the system whereas in our context the banking sector almost holds a monopoly. It goes without saying that the competition gives rise to better services provided by the players in the system and the capital market is the alternative source of financing for all target groups of citizens, municipalities, cantons, entities, states and companies. How?

For example, the citizens can direct their savings in the bank, held at an interest rate of 2% to 3%, towards buying of bonds which will bring them a return of 12% to 13% on an annual level through an interest rate incurred on the bond plus the discount as they are buying before the maturity. That means that someone is selling something for 92% 10 months before the maturity when he would get 100%.

The municipalities, cantons and entities may issue bonds and thus incur funds from the investors (citizens, banks, companies) to finance their projects and obtain access to financing for a much cheaper price than borrowing from banks. This means that the characteristics of bonds as the capital market instrument cannot be disputed, it is only the means of investing such funds which may be disputed for example if the state is using the bonds to cover for the budget losses in order to pay off salaries to the state administration instead of investing them into financing of projects which would generate return of investment. The fact that the banks are investing the citizens' savings into the buying of bonds goes to prove the fact that the bonds are a safe investment. The poor awareness of citizens and the absence of capital market culture just add to the case.

Should we consider safety of bonds compare with banks, claiming that bank are more sure – then it is more than questionable because if the banks run into trouble their mother banks will not be liable for the sisters on our market as the principle of solidarity is not valid in this case. Some banks are basic companies with limited liability carrying the name of their mother company while the state can always

undertake fiscal measures such as taxes and make up for the money needed to settle the debt.

Furthermore, in addition to bonds the companies also have the possibility of “going public” i.e. the IPO which means that if they need new capital to expand their prospective business they can transform themselves into a joint stock company and list their shares on the primary market and thus obtain the funds instead of borrowing from credit funds. Many people in BiH see this as a loss in the ownership structure which is a completely wrong approach.

Not going beyond the borders of the former Yugoslavia, Stock Exchanges in the region have developed as a consequence of the economic transition i.e. the transformation of state capital into both state and private capital. As a result, the offers of our Stock Exchanges usually included equity securities or simply shares and stocks which were later followed by the debt securities notably bonds and treasury bills.

Equity versus Debt

To explain briefly, shares are equity securities which give the shareholder the right to make decisions at an assembly and to participate in the distribution of dividends while the bonds and treasury bills are debt securities which oblige the buyer to pay the bidder the annual interest in addition to the principal upon maturity during the validity of the bond. The difference between the bonds and the treasury bills is that bonds are long-term debt securities while T-bills are short-term securities with a maturity of one year.

In principle, the bonds incur a regular income, less return with a low level of risk and volatility (although there are exceptions). Everyone can achieve financial profit if bonds are part of their financial portfolio. Bonds are debt securities issued by the state (state bonds), local authorities (for example: municipal bonds) and companies (corporate bonds) in order to finance different investments at a lower cost in comparison to a classic credit. As opposed to shares, the bonds do not give the owner the right to participate in decision-making and profit but they do entitle him to return of the invested principal increased by the contracted interest rate for the contracted period of time. The nominal value of the bond indicates the amount of money the bond owner will get at the time of its maturity. The nominal (coupon) interest rate on bonds is the rate used for calculating and paying interest in line with

the schedule stated in the bond. The maturity date is the date when the bond issuer must pay the principal to the bond owners. In view of the fact that the bonds are a long-term financing instrument, the maturity period is usually between 2 to 30 years after the bond issuing. Most often the short-term bonds have a maturity period less than a year, mid-term bonds have maturity period between two to ten years while long-term bonds usually last for more than 10 years. As for the bond issuers, the most common ones are state bonds, municipal bonds issued by the local authority or corporate bonds issued by large companies and corporations.

Bonds are usually considered to be a less risky investment than stocks. When you buy a bond at the time of their issue and you hold on to it until its maturity you will incur regular income (interest, return) and the whole investment amount upon maturity. The risk that you undertake (together with the inflation risk) might be in the fact that the issuer will not be able to settle all its obligations, pay the interest and pay your invested principal. This is known as the credit risk. In addition there is also the market risk i.e. the risk of the bond price change. There is a constant fluctuation in the value of bonds and if you wish to sell your bond before its maturity you might get less than what you have paid for. In any case, bonds are a good option for investment diversification (Orsag, 2011).

Bonds are a good form of investment for investors with low risk preferences and for reducing the overall risk of portfolio diversification. Namely, in contrast to the stocks, the bonds incur fixed return to their owners - the interest. Moreover, in the business result distribution hierarchy and its salvage value bonds hold a superior position over the share holders meaning that the companies are legally bound to pay off the outstanding debts stemming from bonds prior to any pay off to the owners of the company that has issued them. The state bonds are highly secure since the pay off of their receivables is warranted by the state.

In making their decisions on using the capital market as the source of financing for the development and/or expansion of their business activities, the legal entities have to decide on the type of security which they wish to issue - the equity or the debt securities. In the case of public sector- the state, cantons, city and municipality – this dilemma does not exist as they can issue only debt securities. With companies, the issue is whether they wish to enter into contractual relations (with the issuing of bonds) or they wish to expand their ownership structure (with the issuing of shares).

The issuing of shares changes more or less significantly the ownership structure of the company depending on the number of issued securities. That leads to changes in company management and profit distribution. The most notable transition is from the closed (equity) joint stock company into a (public) open joint stock company as this is usually the first time the ownership is separated from the management functions. This is the reason why the companies in BiH rarely opt for this move. On the other hand, this move enables the company to ensure long-term capital for their development as the issued shares do not have dates of maturity. Moreover, the dividend as one of the integral parts of the overall return to investor is not mandatory and is conditioned by the positive financial results and adequate assembly decision (Stanley, 1989).

With the issuing of bonds, the company borrows from the investor. They are entitled to period interest payoff (quarterly, semi-annually or annually) but do not have the right to manage the company nor participate in profit distribution. One advantage for the company is that there is no change in the ownership structure and it creates a possibility for a later buy off of the bonds from the investor provided that it stands in accordance with the decision on bond issuing.

From the investor's point of view, the bonds as debt securities are ranked into a category of safe securities in comparison to the stocks. The primary reason for this is that the bond owners have priority in payoff in case of company's bankruptcy while the shareholders are the last in line for the pay.

Financing the Development of Local Municipalities

The municipal bonds i.e. the bonds issued by the local authority are a globally popular means of financing the development of municipalities and other local self-authority units. The reason for the instrument's popularity lies in the advantages that it offers to both the municipality and the investors. The following sector will present according to the author's long year dealing with these issues the advantages for the municipality:

Lower financing costs

In addition to the presence of the so-called "humanitarian loans", the loans from commercial banks are one of the most frequently used mechanisms of financing municipal development. One of the reasons for this is primarily due to easy

accessibility of such loans (if we are talking about a financially sound municipality) but also due to poor awareness of the municipal administration regarding alternative sources of financing notably through the capital market. In order to understand the advantage of lower financing bonds with the issuing of municipal bonds, it is important to draw your attention to the difference between the active and passive interest rates in the banking system. The passive interest rates are those incurred by the citizens or companies when they deposit or term deposit their assets in the bank while the passive interest rates are paid when the citizen or the company takes out a loan to settle its necessities. If we analyse the situation in Bosnia and Herzegovina in 2012, the difference between the active and the passive interest rates or the so-called interest spread was not less than 4%. Why is this important in our elaboration of municipal bonds? It is because this is the so-called “interest area” from where the municipalities (or other legal entities) may opt to borrow achieving significant savings on one side and motivating the population enough to buy the municipal bonds on the other.

More flexible borrowing terms

Looking from the aspect of flexibility and adaptability to the needs of the municipalities for the financing of infrastructural projects, the bank loans are very limited. The banks are not very willing to give long-term loans and their loans are very often placed under a floating interest rate. In bond issuing, the municipality has much more flexibility in terms of maturity which enables much longer maturity dates but also enables more precise definition of modalities and loan repayment schedule. If we add a standard fixed interest rate to this there are enough reasons to seriously start thinking about bond issuing instead of taking up loans. Of course, in setting out the terms and conditions, the municipality needs to take into account that the issuing terms are attractive enough for the investors to buy these securities.

Fostering the municipal administration

With bond issuing, the municipality needs to be more transparent and open in terms of their financial operations. The investors are unwilling to invest into a “black box” and the municipal administration must define clearly the channels and the action plan for their incurred investments. The more detailed and credible the action plan, the less possibility for undedicated asset spending and the bond issuing will be more successful.

Investing into municipal bonds also has advantages for the investors. To name the few:

Higher return than with fixed-deposits

The municipal bonds often incur higher interest than fixed deposits and much higher return than in case of a vista deposits. Moreover, investing into municipal (and other public sector bonds) has a very positive tax treatment. For example, very often the amount of money invested into such financial instruments is deducted from the investor's tax basis which, together with the higher interest rates in general makes the municipal bonds instruments with a relatively high rate of return in comparison with other (debt) instruments.

Safety

As with other public sector securities, the municipal bonds are also considered to be safe securities. The logic behind this claim is that if there is a problem in the repayment of the borrowed amount, the municipality may always introduce the final measure of local tax increase or introduce para-fiscal levies although such behaviour surely would not have a positive effect on the investors.

Participation of local population in municipal development

A fact which we cannot forget is the effect the municipal bonds have on "local patriotism." in view of the fact that the municipalities are places where people live it is in everyone's interest for the municipality to prosper and develop. This can be an additional motivational factor for the local businessmen or wealthier citizens in the municipality to buy this type of financial instrument. However, we must be aware that today's sole reliance on patriotism will not ensure bond issuing success.

The first municipal bonds were issued in 2008 in Bosnia and Herzegovina, accidentally or not in Municipality of Laktaši. The issued bonds valued at 10 million KM issued at a period of 6 years and at an interest rate of 5.75% were issued to build a sports centre. In Republika Srpska, several dozen municipalities have issued bonds and thus generated significant funds. The fact that the Investment-Development Bank of Republika Srpska ensured the success of most of the issuing and that this served as a political instrument of awarding credits to politically eligible municipalities does not diminish the importance of the mere issuing for the

development of their capital market. In the Federation of BiH, two municipalities have issued their bonds. The pioneer step was taken by Municipality Tešanj with the issuing of bonds valued at 500.000 KM for a period of 3 years and at an interest rate of 6%. Tešanj was soon followed by Cazin which issued bonds valued at 1 million KM, at an interest rate of 6% for a period of 5 years.

Financing of Infrastructural Projects

The infrastructural projects are among other things a driver of development of the local community and the state/entity in general. In addition to being an incentive for economic growth, such (successful) projects raise the living standard of the whole population, provide support to business activities and finally increase the level of competition of the local community/region/state where the project is being implemented.

In addition to all the other factors involved in the implementation of infrastructural projects, a very important segment is the model and means of project financing. In view of that there is a whole range of modalities and approaches to financing. In the previous section we saw some basic characteristics and advantages of project financing by means of bond issuing (in public and private sectors) and in the following section we will give a brief overview of the alternative models for financing infrastructural projects and a longer review of debt financing via bonds and financing through a mixed partnership of the public and private sector.

Financing of infrastructural projects can be categorized in several ways depending on the criteria of categorization. These are (Aralica et al., 2007):

- local and foreign financing depending on the asset source of origin, then
- public, private, mixed types of models/categories depending on the investor's sector of origin (public/private);, and
- personal or external financing (from the current budget revenues) depending on the techniques and instruments of financing.

Within the scope of the third category, the external financing may come from different sources and be implemented with different techniques and instruments. Thus we can differentiate the following types of financings:

- donation that include for example EU funds, local funds and local development banks and agencies (state, entity...), foreign development banks and other institutions, foreign development agencies and similar institutions....,
- DEBT FINANSING where we usually have the commercial bank loans from local development banks and agencies, foreign development banks (EBRD, WB, EIB...), borrowing through BOND issuing
- financing by means of “own capital” (financing which includes private equity, the so-called public-private-partnership) where we can talk about concessions, joint ventures and the so-called project financing.

In this paper we will not be able to give a more detailed overview of the aforementioned aspects, models and categories of financing but we will rather focus on the debt financing through bond issuing and financing which involves the profit/private sector or the public-private partnership. Recently, the public sector has been turning to the private sector more often than ever to support it in their development and provision of infrastructural services. The public administration which is faced with the ever growing service demand, significant institutional and operational deficiencies and limited financial assets, has recognized the private sector as the valuable source of new technologies, management expertise and source of investment capital. The global experiences have shown that if they are designed properly, the system of the public-private partnership can largely influence boost in quality, availability and cost efficiency of local infrastructural services.

Financing through bond issuing as a realistic alternative to investment loans and the whole spectrum of possible financing sources, certainly has its advantages for both the lender and the borrower (which we mentioned in the previous sections of this paper) and leaves a positive effect on the financial market as a whole. However, the reality has shown that this system of financing was chosen by a relatively small number of municipalities and other levels of authority in the recent period. We can look for the reasons to this in the low level of awareness on the advantages of such forms of financing as it is (nevertheless) easier and (faster) to get access to the bank loan. Moreover we can add the insufficient engagement of the local and other levels of authority in choosing projects and seeking (combining) different sources of

financing. Perhaps this situation is favourable at the moment as it leaves the local authorities (and other levels) with a lot of space to borrow, however such borrowing needs to be accompanied with a strategic approach, coordination, a clear plan and aims, good budget planning and discipline.

In analysing the characteristics of bonds for financing infrastructural projects we can make a clear distinction between the state- financed infrastructural projects or projects financed on the local level (Orsag, 2012).

In the first case, the state can be easily indebted by using various instruments and arrangements with a standard coupon bonds (bonds with one-off depreciation) being the principal option. In this case, such bonds have significant advantages since the only thing financed until their date of maturity is the interest - this is a very important characteristic at the moment. Moreover, we need to take into consideration that it is important to plan and manage the public debt carefully. We can say that it is realistic to expect that due to an upward economic cycle, at the time of maturity the budget flow will be sufficient to settle the principal without additional borrowing which leads us to conclude that the public debt in this context may significantly be decreased in the upcoming period with the issuing of bonds at the moment. This gives us the right to claim that the current economic situation in BiH is favourable for borrowings for the financing of infrastructural projects - namely the most advantageous being the bond issuing (Šimović, 2005).

We will mention here that (apart from all the other classifications and characteristics) the bonds issued by the public authorities may be general obligation bonds and revenue bonds (bonds of special purpose). The general obligation bonds are characterised by the general obligation of the issuer to repay the debt and the principal and interest may be settled from any authority source of revenue.

The revenue bonds are issued with the purpose in generating revenue from specific projects. The principal and the interest are paid from the revenue generated by the facility built from the previous borrowing. For example, pay toll collection may pay for the obligations incurred with the issued bonds.

In principal, the state does not issue revenue bonds unless it represents a guarantor of the issuing for the local community or a state-owned company and different state agencies.

The direct financing of state infrastructural projects should primarily take place with the issuing of general obligation bonds. This is also possible in case the state is using state-owned companies or legal entities established specifically for these purposes as project holders intended for infrastructural project implementation and management. These companies are engaged in one phase or throughout the project, either independently or in partnership with the private sector (Special Purpose Vehicle). here we can talk additionally about the public-private partnership where we can involve the private sector in the ownership structure of such companies and the combinations in that context (the contractual relations, the modalities of financing) are vast and require special attention as the adequate model may generate significant positive results both in the financial terms and other aspects of the infrastructural project (Kačer et al., 2008).

We have to understand that the possible combinations of the private and public sector partnership are vast in terms of financing, implementation, ownership, management, level of risk and its distribution. In the following section we will give a brief overview of these models. All models of the PPP may be grouped into several basic forms of implementing the public-private partnership:

- Management contracts and service contracts by which the private sector undertakes to provide services on behalf of the public sector.
- Lease agreements by which the public sector offers the private sector the use of its property. The private partner leases/rents the property and often develops it in both technological and functional context.
- Joint venture agreements by which the public and the private sector establish a joint business entity in order to implement a project where the amount and means of investing and sharing risk is defined by contract.
- Build-Operate-Transfer – concession agreements by which the public sector transfer part of its rights and tasks for conducting the relevant business activity onto the private sector partner for a specific period of time.
- Private finance initiative PFI– a form of PPP belonging to the Design-Build-Finance-Operate contract type. The other forms of partnership include BOOT (Build-Own-Operate-Transfer), DBFOOT (Design-Build-Finance-Own-Operate-Transfer) and other. As part of the PFI, the public sector leases or buys a specific type of public assets or public services rendered by the private sector partner.

- BOO (Build-Own-Operate) and BBO (Buy-Build-Operate) contracts- by which the private partner is buying, building, maintaining and operating the property in its sole ownership and by managing it, the private sector partner bears all the risks but also enjoys all the benefits of providing the contracted public service (Guidelines for Successful Public-Private Partnership, 2003).

In the following section we will present the different forms which appeared as models of PPP in practice (especially after the 1980's):

- FO - Finance Only: The private sector, notably banks and funds directly finance the building of public infrastructure.
- DBB: Design-Bid-Build: The public sector partner sets out project terms of reference, ensures financing and project design while the private bidder is responsible for the building. The public sector partner provides the service, maintains the facility and owns the constructed building.
- DBM: Design-Build-Maintain: The private sector designs, builds and maintains the infrastructure, undertakes cost, quality and maintenance risks of the building.
- OM: Operate-Maintain: By means of contract, the private sector partner provides the service using public assets or public property but the ownership is still in the hands of the public sector.
- DBO: Design-Build-Operate: The private sector designs and builds the public asset while the financing costs are borne by the public sector. Upon the building completion, the private partner take up a long-term lease over the facilities and uses them for service provision.
- BOT: Build-Operate-Transfer: The private sector builds the public asset and uses it for service provision. The public partner as the service provider (controlled by the public sector) collects the fees for the provided services from the public sector and/or the end users. After the expiry of the long-term lease, the public asset is returned to the public sector partner.
- DBFO: Design-Build-Finance-Operate: The private sector designs, builds and finances the implementation of the public asset and takes up a long-term lease. It manages the service provision and uses the public asset for a contracted number of years.
- (BOOT: Build-Own-Operate-Transfer): The private sector builds the public asset upon the design of the public sector, owns it for a contracted period of time and uses it for service provision. The public partner as the service

provider (controlled by the public sector) collects the fees for the provided services from the public sector and/or the end users. After the expiry of the long-term lease, the public asset is returned to the public sector partner without a fee.

- LDO: Lease-Develop-Operate: The private partner takes the public asset up for a lease, develops it in technical and functional terms and manages its use.
- BLOT: Build-Lease-Operate-Transfer: The private partner builds the public asset and takes it up for a lease. The ownership over the asset remains with the public sector while the private sector provides services using the leased public asset. With the expiry of the contracted period, the ownership over the public asset is returned to the public partner.
- BUYOOT: Buy-Own-Operate-Transfer): The private sector buys the public asset, uses it for a contracted number of years and provides services. With the expiry of the contracted period, the ownership over the public asset is returned to the public partner without a fee.
- DBFOOT: Design Build-Finance-Own-Operate-Transfer): The private sector designs, builds and finances the public project, manages the service provision and operates the public asset which is in his ownership for a contracted number of years. With the expiry of the contracted period, the ownership over the public asset is returned to the public partner without a fee.
- BOO: Build-Own-Operate: The private sector builds and manages the public asset in its ownership without the obligation of transferring the property to the public sector. The monitoring over the private sector service provision is most often performed and regulated by the public authorities.
- BBO: Buy-Build-Operate: The private sector buys the public asset, develops and manages it, provides services to the public sector or the end users. With the expiry of the contracted period, the private sector retains the ownership rights over the public asset (Robert, 2001).

Conclusion

The debt as the source of financing has potentially significant benefits (if adequately managed and implemented) both in the private and the public sector. If analysed in the wider context, the capital market should provide its participants multiple means and instruments for debt collection and implementation namely the long-term debt which is to be used for investment projects (both public and private). In the current practice, the most common debt was the banking debt from traditional credit agreements implemented without incurring securities. Such an arrangement has its

advantages but also disadvantages as it does not have the option of debt implementation through the issuing of debt securities. The presence of a number of institutions representing the infrastructure of the modern capital market creates a basic precondition for the future segmentation of the capital market regarding the offer/generation of different forms of securities holding different characteristics (risks, maturity...etc) and it seems that at the moment there are realistic conditions for a more significant bond issuing on the local and other higher levels of authority in BiH.

The bonds take up their place both with private and public issuers although in the case of the private sector, this instrument is primarily reserved for the big joint stock companies. On the other hand, bond issuing as the means of financing development and infrastructural projects in municipalities, regions, entities and states represents a potentially very important segment of functioning and purpose of the capital market.

A very popular phrase in the last several decades has been the public-private partnership. There are reasons why there has been an “explosion” of this joint approach in the provision of public services/products. It is necessary to know the different models that have appeared in the current practice all with the aim of drawing on the positive experience and applying the suitable model responding to the specific project or need.

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Technological Progress as a Generator of Economic Growth and Development

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Abstract: *Bosnia and Herzegovina (B&H), as well as many other countries in transition, was faced with inadequate and insufficient technological progress, which is the result of years of neglect of investment in science, research, and new technology. This paper attempts to present the actual situation in B&H in terms of technological progress, innovation and investment in scientific research, as well as to offer basic guidelines for getting out of this difficult situation. B&H is located at the bottom of the all European countries when it comes to innovation, research and new technologies, and consequently it is not surprising that the B&H economy consistently recorded poor results. Investment in research and development and employee education is the primary goal of any successful company, whether it is a small, medium-sized enterprise or oligopoly. Therefore, the aim of this paper is to determine the guidelines i.e. strategic objectives, which will constitute the basis for future progress of B&H in the field of technological progress. Empirical research, which was conducted in order to determine the strategic objectives, has been carried out by using a questionnaire built on a sample of the leading experts in this field in B&H.*

Keywords: *Technological Progress, Innovation, Research and Development, Patents, ICT Index.*

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Introduction

For decades, technological progress has been considered the key pillar of economic development in the world. Consequently, investment in research and development should be the primary goal of every company in B&H, and also the state.

The progress and success of one country largely depends on science and technology, research and innovation, but if one wants to talk about the existence of high-quality research and technological competitiveness it is necessary to have sufficiently good educational system, i.e. educated workforce, young scientists, researchers, and so on. However, a good educational system implies the existence of active support and protection by the state! B&H cannot boast with high quality education and with much care to invest in scientific research activities, new technologies, inventions and inventors. The reason why the educational system, research, and thus technological progress in Bosnia and Herzegovina, is in such a desperate position is the lack of adequate support from the state.

Finland can be mentioned as a good example of success and taking care of human capital, education, investing in innovation. In the period 1991 – 1995, Finland increased investment in science and education for incredible 82%! The results were impressive. In 1991, Finland was a country with serious problemsⁱ, but in 2000 it realized a budget surplus of 7% and an unemployment rate of 10%. Thanks to investment in education and new technologies, Finland regenerated and significantly increased its technological competitiveness, which was driven by rising exports and industrial production. Here, we speak about industry based on information technology (IT industry), innovation and education, i.e. knowledge economyⁱⁱ.

Position of the EU, in this field is not very good, compared to the rest of the world. For many years, the EU has been trying, by size of funds for investment in research and development, to catch up with the U.S. and Asian countries especiallyⁱⁱⁱ. It suffices to say that in the top twenty companies in the world, by number of innovations, EU has only two firms - German Siemens and Finnish Nokia. It should be mentioned that the lead story on this topic belongs to companies from the U.S., followed by Japan and South Korea. Consequently, EU decision to establish "Innovation Union" is no surprise. The main task of "Innovation Union" will be to raise competitive readiness of the EU compared to the rest of the world in the field of technological progress, i.e. investment in research and development.

Therefore, it is necessary for B&H to begin to follow the path already headed by Finland, Turkey, China, India and so on. It is necessary to pay more attention to education, scientific research, new technologies, as well as to prevent the outflow of "brains" from Bosnia and Herzegovina.

The fact is that progress in the field of new technologies and technological progress in B&H is not possible without adequate help and support from the state. Bosnia and Herzegovina has a very small investment in science, research and development, and therefore it is very important that the already meager funding available is not put into the wrong hands. Help from the state should primarily be directed towards firms (entrepreneurs) who are willing to invest their capital in research and development, employment, local and regional development, in order to stimulate economic growth and technological progress. What are these companies? Which market structures do they belong to? The first part of this paper will try to provide an answer to these questions, in order to give guidance in which direction the government support should be directed when it comes to research, innovation and technological progress. In fact, all major research and analyses carried out in this area are based on the hypothesis of Schumpeter (1928, 1942), which is based on the fact that most of the innovations are implemented by large companies (monopolies). Attention will be based on Schumpeter hypothesis, and the paper will try to come to the knowledge what size of the company (the market structure) is most prepared for serious investment in research and development, i.e. implementation of innovative activities. On the one hand, there is the attitude of Schumpeter that favors highly concentrated markets, i.e. large firms and on the other hand, especially in recent times, there are more and more supporters of the opposite position involving that the greatest willingness to invest in research and development is shown in the small and medium-sized companies - competitive market structures. It is known that the EU is on its way to increase technological competitiveness, giving special attention and support to small and medium enterprises. In fact, there are serious indications that the oligopoly is the most appropriate and best market structure, and also the fastest market structure to implement certain innovative activities.

Due to the loose connection of scientific and business sector, universities and the private sector, the constant neglect of the importance of technological progress, B&H is very low positioned in the field of technological readiness and innovation, which is discussed in the second part of this paper.

In the end, the paper will talk about ICT index, as one of many indices that will enable us to study the competitor readiness and B&H position, relative to other countries in the region and the world, in the field of technological readiness and progress.

Market Concentration and Innovation

Schumpeter's hypothesis

“The fundamental impulse that sets and keeps the capitalist engine in motion comes from the new products, new methods of production or transportation, the new markets, new forms of industrial organization that capitalist enterprise creates.”

(Schumpeter, 1942)

As it has been already announced in the introduction of this paper, the starting point of its analysis is Schumpeter's hypothesis, from his work "Capitalism, Socialism, and Democracy" (Schumpeter 1942), that larger firms invest more in research and development. Schumpeter's view was based on the fact that the existence of large firms and their market power are the basis for the implementation of large-scale plans. According to Schumpeter large firms represent "the engine of economic progress." However, the main problem of this approach to the problem might be the fact that Schumpeter never explicitly explained why the big companies are better innovators.

On the other hand, Schumpeter has provided two complex arguments - hypotheses (Hutschenreiter, Leo, 1994: 52):

- Innovations increase more than proportionally with the size of the company,
- Innovations increase along with the increase of concentration.

During the past few decades, many experts in this field have tested these arguments. The results to which most of them came are that they could not fully confirm the claims of Schumpeter.

The small company also may have a relative advantage in innovation in terms of highly innovative industries, in which highly educated workers are essential components. Also, small firms have a relative advantage in innovation when it comes to radical innovation, and also where production is more labor-intensive than

capital-intensive. Under these conditions, and if there are no significant barriers to market entry, a small company can access particular industry with more competitive and flexible ideas, products and manufacturing processes, challenging the domicile companies and continuously disrupting the existing patterns of production in a given industry. The advantage of small businesses rely on the idea that firms with high market power usually become "lethargic" in an effort to adapt to certain changes in technology, and that they are more concerned about maintaining the current technological development rather than initiating new investments in process innovation^{iv}. On the other hand, large firms have an advantage in innovation in industries that are capital-intensive, and concentrated, and have the production of differentiated products. Large companies have also advantages in innovation when the environment is stable, where the tastes are not changing fast, and where the product is standardized. Under these circumstances, specialization provides cumulative advantage to current leaders, which allows large companies to achieve abnormal profit, which they will be able to use later for the enormous investment in research and development, and also for the hiring of professional managers and engineers. Large firms possess more assets compared with small firms. Consequently, large firms more easily access loans with more favorable interest rate, they are also capable to quickly reduce their operating costs and invest more in innovation - that finally would lead to the reduction of production costs. All mentioned advantages that large firms can achieve are usually converted to barriers for entry of small firms (Mazzucato, 2000: 33-34).

It is certain that Schumpeter's arguments are not entirely acceptable. One of the reasons to be noted here is the diversity and specificity of certain industries. Of course, there are industries in which large firms are the leading innovators (aluminum, computer equipment - software), and on the other hand, there are industries in which the size of the company means greater investment in research and development (steel).

It should be noted, that the well-known experts in this field such as Mason, Galbraith, even Schumpeter, did not provide an empirical study with which they could provide answer to the aforementioned dilemma. Yet we can conclude that large firms can be considered as engines of economic growth and development of a country, although they are not exclusively and only the greatest innovators.

In the end, it is necessary to mention the term "creative destruction", originating from Schumpeter, where he tried to describe the economic impact of technological

change. The term creative meant the introduction of new technologies in manufacturing processes that would lead to the reduction of production costs, as well as provide new services and products. However, on the other hand, there is the destructive aspect of technological change. The introduction of new technologies inevitably leads to the question of domicile market power of firms that remained faithful to the old, less efficient, technologies. Creative destruction, therefore, rewards successful innovators and at the same time punishes those firms whose technology is obsolete (Lipczynski, 2005: 496).

Firm size and innovation

Readiness for the implementation of the research project, the timing of innovation and the nature of patent competition are determined by the market structure in manufacturing and research industries. There are two links between market structure (firm size) and innovation. First, the patent allows the innovator to exercise some market power on the basis of innovation - competitive (small) firms. Second, firms with some market power can prevent the entry of new firms into the market and potential mimicking by defensive patents, or retain their power through the introduction of new products - monopoly (Carlton, Perloff, 2005: 560).

When it concerns the size of the company, there are usually two extreme cases meant: small firms (competitive market) and large companies (monopolies). The largest number of executed analyzes take the competitive and monopoly market structure as a base for establishing the importance of the interaction between firm size and innovation. However, this mater should seriously include oligopolistic market structures. Why? It is due to the irrefutable arguments that oligopolies are the very market structure - the size of the company which is facing the most innovation. The oligopolies have adequate market power, and thus can have abnormal, i.e. extra profit. Given the market structure to which they belong, they are very prone to innovation, because it is one of the fundamental aspects of their fight against close competitors, and so on. No one can deny these arguments! But in order to better "understand" the very core of the problem, we will start from the beginning.

Monopolies have the best position for innovative activities. The key question that arises here is: Do monopolists need and want to invest in research and development? The answer to this question would be: It depends on the possible competition! Monopolies have a great market power, abnormal profits, low investment risk, low

degree of diffusion^v, the lack of competitive pressure, etc. In other words, monopolies have the money, time and space, which may enable certain technological progress. However, in most cases, monopolies' decision is not to invest in new technologies, except when faced with potential competitive pressure.

Monopolies are usually, due to absence of competition, "put to sleep" - safe market, profit - simply they have no desire to change anything. One of the problems that monopolists often face is a growing bureaucracy, which usually leads to their technical inefficiency. In addition, if the monopolist achieved its current market position based on an earlier successful innovation usually there appears the so-called attachment to existing technology and the shift to another - a new technology is usually considered by the monopoly as a too expensive move. In accordance with the foregoing, it can be concluded that monopolies are not a market structure that most invests in research and development (Lipczynski, 2005: 498).

On the contrary, monopolies are often prone to quite opposite strategy. Monopolies decide not to engage in innovative race with the other participants, waiting for the competitors to carry a serious and compelling innovation. After confirmation of innovation as very successful and profitable, monopolies step into action. Thanks to their market and financial power, and already established "brand" - consumer confidence - monopolies easily copy given innovation and take most (almost all) of the profits from the initial innovators.

Companies in competitive markets (small companies) have a strong desire to invest in new technologies, because the provision of a new product or production process with lower costs is one of the most effective ways to cope with the extremely tough competition in the market. However, unfortunately, firms in competitive markets are faced with the fact that they can earn only normal profits, leaving them little room to invest in high risk investments. Small firms are also faced with a large degree of diffusion, which further negatively affects their willingness to invest in new technologies.

Monopolist usually has only a few research teams, while in a competitive market there exist a lot more of research teams, which compete with each other – who will first succeed to get innovation. Consequently, the conclusion can be drawn that successful innovation could be provided by a competitive market structure rather than by monopolies. Therefore, between monopolies and competitive market, we prefer a competitive market (small businesses).

Regardless of the strong desire for innovation, competitive market structure is not an ideal solution for innovative activities. Why? It is due to the fact that a large number of competitors operate within a given market structure and they are ready to quickly copy the successful innovation, and therefore, for a short period of time substantially reduce the profit of the company which had originally introduced innovation to the market.

After consideration of two basic market structures, attention is going to be paid to the third oligopolistic market structure. Of course, the inclusion of an oligopoly into the consideration further complicates the situation, because oligopolies are just somewhere between the monopoly and competitive market. Two things are important in terms of investing in research and development: the ability of investment (financial, infrastructure) and willingness - mood to invest. So far, it can be concluded that:

- *monopolies* have great opportunities (capital) for investment, but weak – moderate willingness to invest;
- *perfectly competitive firms* have great desire and willingness to invest, but they have little opportunity for it (low - normal profits);
- *oligopolies* possess moderate^{vi} - large investment opportunities, as well as the greatest desire and willingness to invest in new technologies.

Based on the above arguments, it can be concluded that oligopolies have the advantage over the monopoly and perfectly competitive firms. The proofs of the previous claim are the industries in which the biggest global oligopolies rule: computer equipment, cars, tires, electronics, cigarettes, beer, power turbines, aircraft, etc. We can claim with high confidence that the large profits achieved in this industry can be used to invest in new technologies. It is known that oligopolies are constantly faced with competitive pressure, and that is why they see investment in new technology as the only successful solution of this competitive struggle. It should be noted that the oligopolies face less degree of diffusion than it is the case with competing firms. Thus, oligopolies have market power, high profits, and great willingness to invest in new technologies because of the constant competitive pressure, the strong interdependence between competitors and the moderate degree of diffusion - as opposed to a competitive market, and so on. The conclusion simply suggests itself: oligopolies are the size of the firm that has the best conditions and the reasons for investing in new technologies. It should also be noted that companies

that have a market share between 20 – 30% achieve the best results in the field of innovation and patent record, and they are oligopolistic firms.

The following table shows the top ten firms in the United States, which achieved the highest number of patents in 2006 along with their ranking in 2005 and 2004. It is important for this study that all ten companies are big companies, of whom the vast majority operate in an oligopolistic market with only a few large firms. Looking at this table, we can draw the conclusion that large firms (oligopoly) in concentrated markets are more innovative (Pepall, Richards and Norman, 2008: 573-574).

Table 1. Top ten companies in the largest number of U.S. patents in 2006, and their ranking in 2005 and 2004

Firm	Number of patents in 2006	Rang in 2005	Rang in 2004
International Business Machines	3,621	1	1
Samsung Electronics	2,451	5	3
Canon Kabushiki Kaisha	2,366	2	4
Matsushita Electric Industrial	2,229	4	2
Hewlett – Packard	2,099	3	6
Intel Corporation	1,959	7	5
Sony Corporation	1,771	12	7
Hitachi	1,732	8	8
Toshiba Corporation	1,672	9	9
Micron Technology	1,610	6	11

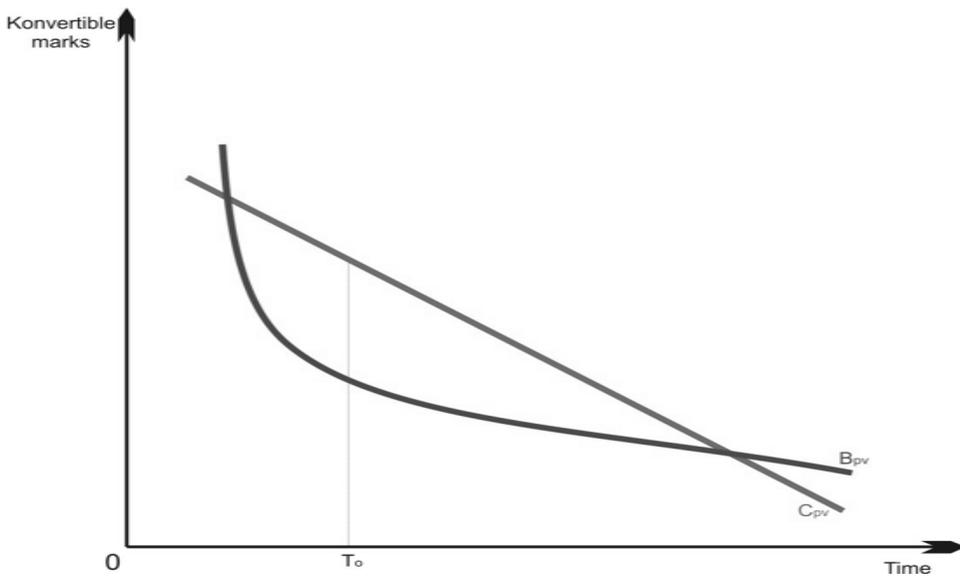
Source: Lynne Pepall, Dan Richards and George Norman, 2008.

The link between market structure, time and innovation

Finally, in addition to the possibility and willingness to invest, it is necessary to take into consideration another important factor - the time of implementation of research programs. When it concerns oligopoly, where there exists a strong interdependence between competitors, the speed has a big impact on the possible success or failure of a particular research project. If the research process is going too slowly, competitors can implement a similar idea before, and take over the patent. However, if the research process is carried out too quickly, it usually leads to some errors, higher costs, but also to less worry about protecting the very idea of imitation - all of these events will inevitably lead to failure in achieving the benefits of their own

investments (Lipczynski, 2005: 503). Given that consideration includes the cost and time, the time - costs analysis represents ideal solution for eliminating concerns when making investment decisions. This analysis usually takes into consideration the present value of the costs and the present value of benefits. Therefore, it is necessary to find the optimal time for technological development and market structure that is closest to meeting given optimum time for the successful realization of the research project, based on the time - costs analysis.

Figure 1. The optimal time for technological development

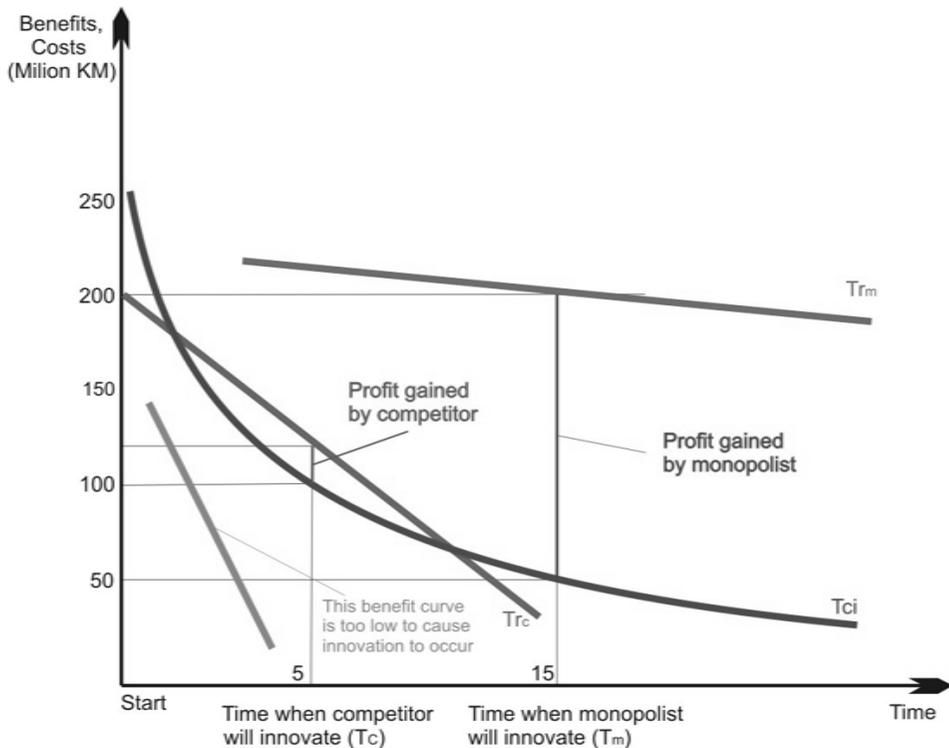


Source: Waldman, Jensen, 2007: 477

The analysis of the previous graph shows that the present value of the costs of developing an innovation is labeled as a curve C_{pv} (Cost Present Value), where costs are reduced as the development time increases. The present value of benefits from the development of the innovation is labeled as a curve B_{pv} (Benefit Present Value), which is used to reduce the time required for development increases. Socially optimal time is achieved when the value of the marginal benefits equals the value of marginal costs, for the time T_0 . On this point (T_0), vertical distance between the two listed curves (profit) is maximized (Waldman, Jensen, 2007: 477).

After getting acquainted with the manner of determining the optimal time for the development of an innovation, we will first conduct an analysis of a dominant firm and a competitive small firm, and then include oligopoly in consideration as well.

Figure 2. Time, costs and benefits of innovators: Monopoly versus small firms



Source: *Shepherd, 2004: 115*

In the Graph 2, it is assumed that there is a base curve that will represent the ratio of the time-cost (T_{C_i}) for a given innovation in a given industry. Let's say that this is a radical innovation, new models of mobile phones. This innovation can be implemented quickly with considerably higher research costs or slower and therefore make less research costs.

Now, we are going to concentrate on our case, monopolies and small businesses. Monopoly will expect the highest profits from innovation only at some future period. This position is represented by the graph 2, the total revenue curve TR_m ,

which is the total revenue that a monopoly could exercise on the basis of a given innovation. It can be noted that the curve is high, reflecting the size of the revenues. It can also be noticed that the given curve is almost a horizontal line, due to the fact that the monopoly has no fear of a possible takeover of innovation and the related future profits from foreign competition. The advantage of monopoly actually lies in the given fact, the dominant firm can realize innovation slowly, and again "grab" a bigger share of profit. However, this is not the case with a small firm. At the start, a small company can expect less revenue from the same innovation, simply because they start as a firm with lower market share. Small firms are now faced with the fear of the fact that other small firms can realize first a given innovation, or copy it very quickly and so grab profits for themselves. For these reasons, the curve of the total income of a small firm is designated as TR_c, and it is much steeper and lower than the monopoly one, barely above TC_i in a short period of time. Each firm will maximize its profit when the marginal costs are equal to the marginal revenue. When MC = MR, the vertical distance between the curves is maximized.

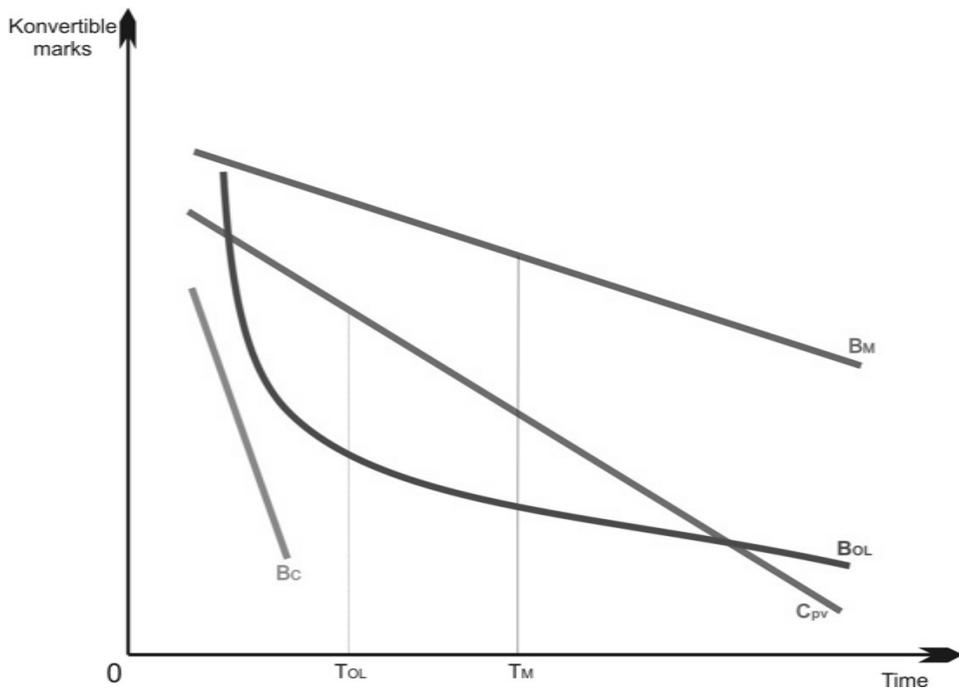
As for the monopoly, it is time T_m, presented as 15 years. For a small business, time is much shorter T_c, and it is represented as 5 years. Small company is also faced with significantly higher costs in the amount of KM 100 million, as opposed to monopoly in which the cost was KM 50 million. Consequently, and due to the fact that it possesses more market power, monopoly has been able to appropriate much more revenue than KM 200 million, and therefore much higher profit of KM 150 million. Small company generated revenue of KM 120 million, and a smaller profit of KM 20 million (Shepherd 2004: 114).

If the consumer surplus is taken as a criterion, small innovator imposes as a faster and better solution^{vii}. In these circumstances, the innovation will be implemented by small firms. However, monopolies usually prefer to deliberately "drag" the research process, to make room for the small firms to face the investment risks and the risk of implementation of new ideas. If monopoly notices that some of the ideas implemented by small businesses are successful and profitable, it will react quickly - copy a given innovation in order to catch up and to achieve complete ejection of small innovators from the market. This move of monopolies is commonly called "fast - the second" strategy^{viii} (Shepherd 2004: 115).

In the former case, the study has analyzed the behavior of monopoly and small competitive firms, assuming that the investment costs are eligible for both participants. It has been found that the small company will carry a given innovation

for several reasons^{ix}. However, the harsh reality says otherwise. Usually high costs of investing in the development of new innovations represent a stumbling block for small competitive firms. That is why they are out of the race compared to oligopolies^x. Thus, oligopolies emerge as a market structure, which is able to implement research projects in the optimal time possible. Now let us attempt to introduce next graphics.

Figure 3. The link between the market structure and the time required for technological progress



Source: Waldman, Jensen, 2007: 479

This analysis needs the curve of the present value of costs (C_{pv}), development of given innovation, as well as three curves of the present value of the benefits provided by the development of innovation (B_m , B_c , B_{ol}). The three curves for three different market structures: monopoly (B_m), a small competitive firms (B_c), and oligopolies (B_{ol}). The assumption that the cost function is independent of changes in market structure is understandable, because it is primarily a function of technological

knowledge and input. On the other hand, the curve varies with the change in market structure.

As it can be seen in the graph number 3, the optimal time for the development of innovations in the monopoly is (T_m), and it is higher than in the case of oligopoly (T_{ol}). For small competitive firms, total costs exceed total benefits of given innovation, so there will be no investment (Waldman, 2007: 479).

The curve of the present value of the benefits of monopoly B_m is presented as the tallest and straightest. As it has already been said, regardless of the timing of actual innovation, monopolies achieve the greatest benefit because of their largest market share and the minimum degree of diffusion^{xi}. As for the competitive firm, its present value curve is the lowest and steepest. The reason for this is a very small market share of small firms, as well as the highest degree of diffusion. Small firms typically generate smallest benefits of innovation, and the reason for that is the rapid implementation of the innovation process (short time frame). Curve B_c is very vertical, and the reason for this lies in the fact that any delay in presenting new innovations in the market increases the likelihood that another company will imitate a given innovation. Finally, let us analyze the participation of oligopoly. Its curve B_{ol} - present value of the benefits, lies between the previous two curves, because the oligopoly has a larger market share than the competitive companies - but less than monopoly, and because it confronts a moderate degree of diffusion (Waldman, 2007: 478).

So, after analyzing all of the above, it can be noticed that the oligopoly allows for the fastest level of technological progress in most cases. Of course, it is possible that the oligopoly gives up the race if the investment costs are much higher. Then only a monopoly can be the bearer of innovation. The fact is that some innovations do not require large investment, so in that case the small competitive firms emerge as carriers of innovation. However, it is the fact that investment costs are usually higher (in many cases) than small firms can bear, and yet they are not abnormally large that only monopolies can bear it.

So, an oligopolistic firm represents market structure that usually provides the fastest level of technological progress. What does it mean to Bosnia and Herzegovina? Given the very difficult situation in the country in terms of investment in research and development, and innovation, it is logical that B&H needs a quick solution to this important problem. Companies that can provide the fastest progress in the field

of technological progress are oligopolistic firms. Thus, in addition to small and medium-sized enterprises that have been already in the focus of the state, any oligopolistic firm in B&H, which is ready to seriously invest in research and development, should be supported and assisted by the government. However, the fact is that in B&H operates a small number of oligopolistic firms, which in turn shifts the focus of the development of technological competitiveness to small and medium-sized enterprises.

Technological Progress and Innovation in Bosnia and Herzegovina

Bosnia and Herzegovina has made some progress in the field of research and innovation policies. The participation in the Seventh Framework Program for Research (FP7) increased, and teamed with COST and EUREKA. The government has provided funding for entities that prepare projects for FP7, COST and EUREKA. However, administrative and research capacity for taking full advantage of the opportunities offered by European programs and resources to actively stimulate the scientific community is still weak.

Efforts have been made to integrate into the European Research Area and the EU contribution to innovation. Bosnia and Herzegovina joined the EURAXESS network aimed at ensuring the mobility of researchers, and the umbrella organization that coordinates the domestic network EURAXESS was established at the Banja Luka University. There is a slightly increased allocation of funding for research, modernization of infrastructure, equipment and publishing, particularly accessing COBISS library information system. The Republic of Srpska and other entities have increased investment in research and development. However, the level of investment in research remains low in general, particularly in private sector investment. As the entities and cantonal policies are financed from their budgets, it is difficult to direct research policy and avoid fragmentation, which is one of the key objectives of the ERA. There are no reliable statistics of scientific and technological progress.

The economic recovery of Bosnia and Herzegovina is slow and under the influence of long years of continuous unfavorable economic and political conditions and unstable economic environment, problems and difficulties caused by the global economic crisis, with the decline in industrial production, high unemployment and the trade deficit being some of the main difficulties in faster recovery and development. Technological readiness and innovation of B&H in comparison with

other countries in the world can be indirectly drawn from data from the World Economic Forum's Global Competitiveness Report for 2013. According to the "GCI 2012-2013" B&H occupies 88th place out of 144 countries (Sierra Leone and Burundi were the last ones), which is an improvement compared to 2012 when B&H was at the 100th place out of 142 countries. It should be noted that the progress of the 12 places is equivalent to an increase of 0.1 rating points, which in any case would not be considered as a success. Progress on this year's list has not been achieved through implemented reforms and qualitative improvements, but it is largely determined by the lower results of other countries. B&H ranking viewed by items of interest for technological development is shown in Table 1.

Table 2. Position of B&H in the field of technological readiness and innovation according to the Global Competitiveness Report for the period 2009-2012

GCI Indicator for Bosnia and Herzegovina	GCI 2010 (of 134)	GCI 2011 (of 139)	GCI 2012 (of 142)	GCI 2013 (of 142)
Technological readiness	95	85	73	68
Availability of latest technologies	122	116	105	89
Firm-level technology absorption	131	119	107	105
FDI and technology transfer	115	102	117	98
Internet users	50	59	44	42
Broadband Internet subscriptions	56	56	51	51
Internet bandwidth	-	71	56	66
Mobile broadband	-	-	-	70
Innovation	131	120	104	99
Capacity for innovation	121	116	124	101
Quality of scientific research institutions	126	104	98	72
Company spending on R&D	122	104	96	90
University-industry collaboration in R&D	130	117	84	48
Gov't procurement of advanced tech products	129	116	109	94
Availability of scientists and engineers	122	115	68	48
Utility patents per million population	71	69	90	50

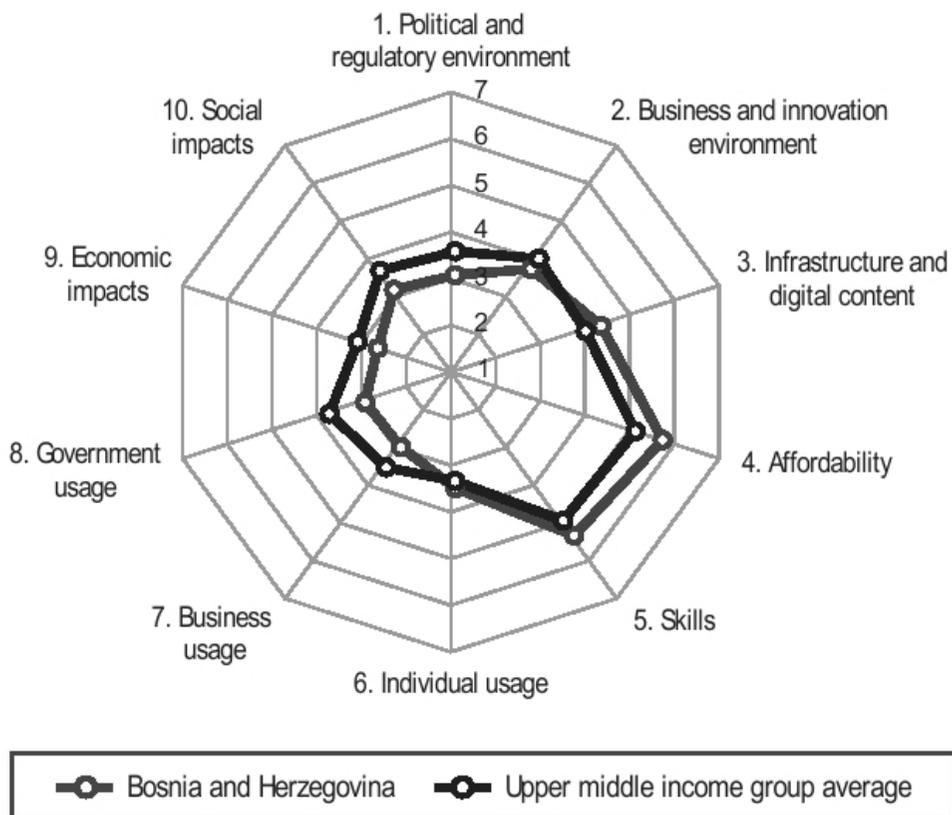
Source: WEF. (2009,2010, 2011, 2012)

Indicators, primarily, indicate a weak association of scientific and economic sectors. Positive developments have been observed over the past three years in technological readiness and innovation. In general, the current situation in B&H is not even close to satisfactory, and in some ways it is the reflection of the overall socio-economic

status, and also a very low awareness of the importance of technological progress in the development of the society.

Regarding The Networked Readiness Index - NRI that measures the propensity of the country to seize the opportunities offered by information technology, Bosnia and Herzegovina is at the 84th position. This position is not due to lack of development of infrastructure and skills of their populations, but is a result of poor political and business environment, the lack of adoption of new technologies (by the public and private sector) and low socio-economic impact of ICT (Figure 4). In addition, there is a serious weakness in its Innovation System, which needs to be restructured and expanded, because it interferes with its ability to use ICT for deeper economic and social changes.

Figure 4. Network readiness index of B&H for 2012.



Source: WEF, (2012b.)

The Lisbon review rates Bosnia and Herzegovina as the lowest ranked country. Out of the eight areas to be evaluated, B&H has the worst rating in six. Only in the areas of innovation and network industries, Albania occupies the lower position than B&H.

Application of ICT Development Index

Unique ICT development (ICT Development Index - IDI) compares developments in the field of ICT in 155 countries. The index is produced in response to calls from ITU Member States to consolidate previous ITU indices into one index, in order to follow the development of the information society. The main index objectives are to survey:

- Levels and the evolution of ICT development over time;
- Progress in ICT development in both developed and developing countries;
- Digital gap, i.e. the difference between countries with different levels of ICT

Development;

- Development potential of ICT and the extent to which the government can use ICT to enhance growth and development, based on the available capabilities and skills.

Development ICT Index consists of 11 indicators grouped into three subgroups: ICT infrastructure and access, ICT efficiency (primarily by individuals and households and businesses) and the intensity of use of ICT and education (human capacity required for the use of ICT).

Table 3. Indicators Index ICT development

ICT access		
1.	Fixed-telephone lines per 100 inhabitants	40%
2.	Mobile-cellular telephone subscriptions per 100 inhabitants	
3.	International Internet bandwidth (bit/s) per Internet user	
4.	Percentage of households with a computer	
5.	Percentage of households with Internet access	
ICT use		
6.	Percentage of individuals using the Internet	40%
7.	Fixed (wired)-broadband Internet subscriptions per 100 inhab.	
8.	Active mobile-broadband subscriptions per 100 inhab.	

ICT skills		
9.	Adult literacy rate	20%
10.	Secondary gross enrolment ratio	
11.	Tertiary gross enrolment ratio	

Source: ITU, (2011.)

Globally speaking, most progress has been made in the area of ICT access, which includes indicators relating to the fixed (wired) and mobile telephony, Internet bandwidth and volume of households with computers and Internet. Slower progress is achieved regarding the use of information and communication technology, which includes a number of indicators of Internet users, the number of fixed and mobile telephony, and so on. There is still very little progress in most countries in broadband access as the latest technology.

The results show that the most developed countries in the top ten come from Europe, except for the Republic of Korea and Japan. Differences between countries are small, but it can be seen that Korea, Sweden and Denmark stand out from the rest. Opportunities for the development of ICT in these countries are truly remarkable. Looking at the first thirty countries, except the U.S. and Canada, all countries come from Europe or East Asia. The index is linked to a high-income countries and the strong correlation between the level of development of ICT and the gross domestic product. Countries with the most dynamic development in ICT Development Index, in the past period, include: Kazakhstan, Brazil, Rwanda (7 places), Bahrain (5 places or 0.66 points), Saudi Arabia (6 places or 0.62 points), Ghana (4 places - with IDI change for 23%).

Table 4. ICT Development Index for 2008, 2010 and 2011

Country	Rank	IDI 2008	Rank	IDI 2010	Rank	IDI 2011
Republic of Korea	1	7.80	1	8.40	1	8.56
Sweden	2	7.53	2	8.23	2	8.34
Denmark	3	7.46	4	7.97	3	8.29
Iceland	7	7.12	3	8.06	4	8.17
Finland	12	6.92	5	7.87	5	8.04
Netherland	5	7.30	9	7.61	6	7.82
Luxembourg	4	7.34	7	7.78	7	7.76
Japan	11	7.01	13	7.42	8	7.76
United Kingdom	10	7.03	10	7.60	9	7.75
Switzerland	9	7.06	8	7.67	10	7.68

Hong Kong (China)	6	7.14	6	7.79	11	7.68
Singapore	15	6.71	19	7.08	12	7.66
Norway	8	7.12	11	7.60	13	7.52
United States	17	6.55	17	7.09	15	7.48
Germany	13	6.87	15	7.27	16	7.39
New Zealand	16	6.65	12	7.43	17	7.34
France	18	6.48	18	7.09	18	7.30
Austria	21	6.41	16	7.17	19	7.10
Ireland	19	6.43	23	6.78	20	7.09
Australia	14	6.78	14	7.36	21	7.05
Canada	20	6.42	26	6.69	22	7.04
Belgium	22	6.31	22	6.83	23	6.89
Estonia	28	5.81	33	6.16	24	6.81
Slovenia	24	6.19	24	6.75	25	6.70
Spain	25	6.18	25	6.73	28	6.62
Italy	26	6.10	28	6.57	29	6.28
Poland	38	5.95	41	5.29	31	6.19
Czech Republic	37	5.97	37	5.42	32	6.17
Greece	30	5.70	30	6.28	33	6.14
Lithuania	35	5.44	35	6.04	35	6.06
Latvia	39	5.31	40	5.90	36	6.06
Portugal	29	5.70	28	6.57	37	6.05
Russian Federation	49	4.42	47	5.38	38	6.00
Slovakia	40	5.30	39	5.94	39	5.86
Hungary	34	5.47	34	6.04	41	5.77
Croatia	36	5.43	31	6.21	42	5.75
Cyprus	43	5.02	36	5.98	44	4.73
Belarus	58	3.93	52	5.01	46	5.57
Serbia	47	4.51	50	5.11	48	5.40
Bulgaria	45	4.75	49	5.19	51	5.20
Romania	46	4.67	48	5.20	52	5.13
TFYR Macedonia	52	4.20	53	4.98	54	5.05
Bosna and Herzegovina	63	3.58	63	4.31	63	4.53
Ukraine	59	3.83	62	4.31	67	4.40
Turkey	60	3.81	59	4.42	69	4.38
Albania	81	2.99	78	3.61	80	3.78
Niger	152	0.79	151	0.92	155	0.88

Source: ITU, (2012.) (Adapted)

Bosnia and Herzegovina is still at the bottom of all countries in the region, although according to a new report B&H has moved from middle group to a more advanced group of IDI countries. Otherwise, in the report there are four groups: highly advanced, advanced, intermediate and groups with lower levels of the index. Bosnia and Herzegovina has successfully improved its level of ICT, more than countries with similar previous values. It has achieved an improvement by 0.95 points in 2011, compared to 2008, but it stays at the same place (63rd position). B&H has achieved the greatest progress in the second sub-index use of ICT. ICT skills remained at the same level, and access to ICT recorded the worst result. Out of the neighboring countries, only Albania has worse result than Bosnia and Herzegovina.

Empirical Research

The prime objective of this paper is to determine what are the strategic guidelines, according to the opinion of relevant experts, which represent the key to the improvement of technological progress in B&H. The main goal of this research is to contribute to the development of knowledge about the importance of the set guidelines, which can significantly improve the competitive position of B&H in relation to the region - in terms of technological progress.

The empirical research was conducted through a survey of a sample of relevant specific experts in B&H. Interviewed experts were asked to assess the extent to which the following strategic guidelines are relevant to the improvement of technological progress B&H. There were 20 respondents (experts) to the given questionnaire^{xii}, of which 75% were employed in the public sector and 25% in private sector. The following table shows the analysis of the importance of the proposed objectives.

Table 5. Analysis of the importance of the strategic guidelines for the improvement of technological progress in B&H

	Questions	Not at all important	Not important	No opinion	Is important	The most important	1
1.	The importance of technological progress and adoption of new technologies for economic growth and development B&H	0%	0%	10%	20%	70%	100%
2.	The importance of active state support to education system, human capital and research	0%	0%	0%	20%	80%	100%
3.	The importance of oligopoly firms in research and development activity and investment in new technologies	0%	0%	25%	20%	55%	100%
4.	The importance of cooperation between Universities and business sector	0%	0%	20%	30%	50%	100%

Source: Research by author

Analyzing the table above, it can be concluded that none of the guidelines got a response *is not at all important* and *not important*, and the small number of respondents had *no opinion*. This fact shows the significance of the above mentioned guidelines for the technological development of B&H. When we look at answer *very important*, it can be noticed that all guidelines were assessed at 50% or more, of which the guideline *the importance of active state support to education system, human capital and research* achieved the best result. When the final results of the survey on a sample of relevant experts are analyzed, almost the same conclusions can be made as the ones previously mentioned in this study.

Conclusion

Investment in research and development of new technologies by the state - firm, provides them a technological advantage and superiority over those states - firms that do not take action in that field. If looked at all of the most developed countries in the world, it can be noticed that they are precisely characterized by heavy investment in the development of new technologies and ideas in general. Any country that provides decent and constant investing in research and development will provide continuous annual technological progress, which implies further strengthening of the standard of living of the population and the country's competitive position in the world.

Which market structure efficiently implements innovative activities and adopts new technologies? After considering all the facts, the conclusion is that it is oligopoly market structure (oligopolistic firms). On the one hand, monopolies do not have enough interest to include themselves into such a risky investment, but on the other hand, firms in competitive markets (small and medium enterprises) have plenty of interest, but they have little market power, they are moneyless, they have high risk, high possibility of a quick imitation etc. For these reasons it is necessary to pay more attention to oligopolies, because that market structure has sufficient market power, a sufficient amount of money needed for investment, high willingness to innovate, and eventually, a moderate risk of imitation.

It can be said that the situation is very bad for B&H and its position in the field of technological progress, investment in research and development. According to all the relevant parameters, B&H is at the very bottom of the rankings related to innovation, technological progress, patents and so on. Of course, this result is not

surprising, because this country makes "miserable" investments in research and development, and science in general.

To move forward, it is necessary to change the approach that B&H has to science, research and technological progress, but also awareness of companies in B&H. The largest number of firms in B&H looks at investment in research and development as one big expense and risk, rather than as an opportunity for future benefits and increase of the competitive position in the European and world markets. It is noted that B&H companies will never be competitive on the world market if they allow obsolescence of their production technology and if they continue to offer products with poor quality on the European and world markets.

The results of the ICT Development Index for Bosnia and Herzegovina are not satisfactory. B&H is at the 63rd place, although it recorded a growth of ICT index. Taking into consideration the neighboring countries, Bosnia and Herzegovina has improved a result only in relation to Albania. Furthermore, the results show that out of 155 observed countries, the Scandinavian countries achieved best results. The top ten countries in 2011 come from Europe, with the exception of the Republic of Korea and Japan.

The survey shows that most experts share the same opinion on the relevance of the strategic guidelines for the improvement of technological progress in B&H. Interviewed experts awarded the top mark to the guideline which is entitled *the importance of active state support to education system, human capital, and research*.

In order to remedy this bad situation, B&H must take measures to improve technological and business infrastructure. Modern scientific and technological innovation and business improvement cannot be ensured without adequate human resources, scientific research institutions, ICT equipment and systems, the relevant databases, incubation centers and technology parks, networking of all stakeholders in the country, and last but not least, all this cannot exist without adequate financial investments. It is necessary to encourage the use of modern ICT and accelerate development of information society in B&H. In order to increase innovation and competitiveness of its economy, B&H needs to strengthen technological innovation activities and link them with firms, and in that way speed up necessary changes. It should also encourage the employment of highly educated people in the economy and increased cooperation with research and educational institutions. Inclusion in the world of scientific research trends, international cooperation, as well as better

integration into the European Research Area is a key aspect of further development. To improve the design and monitoring of adopted policies to increase competitiveness and innovation it is needed to build effective institutions, following the European model, which monitor and direct the business sector. Managing of these processes means planning, organizing and directing the human and capital resources to new knowledge and ideas that create a successful production, new products and services and therefore a more competitive position of B&H in the world.

Therefore, if it wants to move away from the bottom of the list and become competitive with other countries in the region, it is necessary to: provide greater investment in science and research in general by the state, provide constant encouragement and stimulating of scientific research, increase investment in research and training of companies' personnel, promote extensively through seminars the importance of investing in research and development, etc.

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ⁱ In 1991, Finland's GDP has declined by as much as 13%, unemployment rate was 17%, which is a clear signal that the country was faced with difficult problems.

- ⁱⁱ Not about heavy industry.
- ⁱⁱⁱ Japan, Korea, and more recently China are seriously involved in this race, with the goal of becoming the market leaders in technological progress in Asia and the world.
- ^{iv} Innovations that are based on the reduction of production costs through the introduction of newer and more sophisticated technologies in the production process, which will ultimately lead to lower costs.
- ^v Weak ability to copy, as opposed to a competitive market.
- ^{vi} Possibilities of oligopoly to invest in research and development are influenced by the size of the profit and the size of profits depends on the intensity of competition it faces within its market.
- ^{vii} Faced with the fact that the monopoly in relation to small business, will launch the same product in another ten years, and when we add twice the price that monopoly will determine for the same product, then it is quite logical why the offer from small firms looks more acceptable to the customer.
- ^{viii} We will quote the example of "fast-second" strategy: Wilkinson was first to introduce the famous razor blades with steel (1960), but the Gillette responded quickly and by using this strategy easily caught up with Wilkinson, Apple was the first innovator in the field of personal computers until the end of the seventies, but the IBM soon took the lead in the eighties of the last century, however, it did not last long.
- ^{ix} It concerns the following reasons: the criterion of consumer excess, fast-second strategy of monopoly and so on.
- ^x And the position of monopoly is already known in terms of the race to innovate.
- ^{xi} Diffusion is the time - speed for imitating new ideas - innovation.
- ^{xii} The questionnaire was sent to over 30 experts selected at random. Only 20 of them responded to this questionnaire.



Combating Poverty towards Actualizing the Millennium Development Goals and Beyond: Do Cash Transfer Programmes add up to the Agenda?

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Abstract: *The Millennium Development Goals (MDG) among other things have not only brought poverty reduction onto the global development agenda but have also urged countries to help halve poverty by 2015. Various policy initiatives have been implemented towards actualizing the first MDG. Ghana, through its policy programmes is at the verge of meeting MDG 1 well before 2015. One of such programmes is the Livelihood Empowerment against Poverty (LEAP) which provides direct cash transfers to extreme poor and vulnerable. Do cash transfers add up to the agenda? By invoking a non-parametric chi-square test, we find evidence of the contribution of the cash transfer programme in LEAP-ing beneficiaries out of poverty by supplementing their income levels as well as improving their livelihoods. At least in our study area, we found a 29% decrease in the number of beneficiaries earning below the lower poverty line while 61% have been able to meet part of their basic needs. To ensure a continual reduction in poverty, we argue for the need to fundamentally go beyond short-term gains through co-ordinated, purposeful social and complementary services that will create opportunity for empowerment among the poor and vulnerable households.*

Keywords: *LEAP, cash transfer, poverty, vulnerable, Ghana.*

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Introduction

Over the past three decades or so, the international development mantra seems to have converged on concerns for poverty reduction. The United Nations (UN) General Assembly at the turn of the new Millennium emphasized on halving the number of world's people living on less than \$1 a day by 2015 (United Nations, 2000). This has spawned a growing consensus on the need to identify the various determinants of poverty as well as providing effective approaches through which poverty can be reduced in a sustainable manner (Carr, 2008). With only two years to hit the 2015 deadline of meeting the Millennium Development Goals (MDG), policy makers, researchers and the international development community in general are beleaguered with a quandary as to whether even the first of the MDG target would be achieved in individual countries. The MDG report in 2012 however claimed that the number of people living in conditions of extreme poverty fell in all developing countries including sub-Saharan Africa (SSA) where poverty seem to be endemic. The report further showed that the proportion of people living on less than \$1.25 a day fell significantly from 47% to 24% (representing a reduction in the absolute number from 2.4 to less than 1.4 billion people) between 1990 to 2008. With this, the report is optimistic that the first MDG which aims at reducing the number of people subsisting on less than \$1.25 a day would be achieved at the global level well ahead of the 2015 deadline (MDG report 2012). Despite this progress, estimate also suggests that close to 1 billion people will still live on less than \$1.25 a day by 2015 (MDG report, 2012). Notwithstanding the reduction in poverty rate at the global level, individual country performance especially in SSA is not encouraging. United Nations (2010) data shows that little progress has been made in reducing extreme poverty in SSA where the poverty rate marginally declined from 58% to 51% between 1990 and 2005. Portes and Hoffman (2003) argue that regardless of the global progress made in reducing poverty, majority of people continue to wallow below the poverty line especially in SSA and Mexico.

In recent times, Ghana has made considerable amount of progress in economic growth and poverty reduction (Nicola et. al., 2009). Between 2000 and 2006, the nation had recorded a 90% rate of progress in halving the number of people subsisting on less than \$1.25 per day and with a significant improvement in other non-income related MDG indicators such as gender equality, education and access to safe water (World Bank, 2011). This significant progress achieved in the country has been through various policy initiatives by the government. Typical of these include National Health Insurance Scheme (NHIS) established in 2003 which

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provides equitable health insurance for all; the Education Capitation Grant (ECG) introduced in 2005 (and expanded nationwide to all schools in 2006) with the view to improving the enrolment and retention in schools by providing grants to cover tuition and other levies that were previously paid by households; the School Feeding Programme (SFP) which was introduced in 2004 also aims at increasing school enrolment and retention by providing children with a daily meal at school; the National Youth Employment Programme (NYEP)ⁱⁱ which provides jobs for the unemployed and underemployed youth; and the Livelihood Empowerment Against Poverty (LEAP) which gives direct cash transfers to the poor and the vulnerable (Nicola et. al., 2009).

There is a growing consensus on the view that cash transfer programmes form an essential component of economic and social development strategies and constitute an effective tool in reducing poverty and vulnerability in developing countries (Barrientos and Shepherd, 2003; Barrientos and DeJong, 2004). Halon et al., (1941) opine that although cash transfer may be presented as social spending or charity, they form an important pro-poor growth strategy and historical evidence suggested that such initiatives served as a condition for economic growth in Europe. While cash transfer programme in particular remains an important development strategy in Ghana and other developing countries, there has been relatively little systematic empirical research aimed at examining the role that these programmes play in this endeavour (Nicola et. al., 2009).

In the Ghanaian context, few studies have been done to assess the contribution of LEAP on the lives of beneficiaries. Using the Kumasi Metropolis as a case study, this paper empirically assessed the contribution of the LEAP towards meeting MDG 1 in Ghana. We found a 29% decrease in the number of beneficiaries earning below the lower poverty line while 61% have been able to meet part of their basic needs. Thus, at least for the study area, one can argue that the cash transfer has contributed to improving the living standards of the poor and progress towards accelerating the attainment of the MDG 1 agenda. The aim of this paper is to add up to the few empirical studies of the contributions of cash transfers in reducing poverty. This paper is particularly relevant especially in the wake of the current debate where some policy makers remain sceptical of the contribution of cash transfer programme and thus calls for its abolishment.

The rest of the paper is organized as follows; in the next section, we provide a brief trend of poverty in Ghana while section 3 contextualizes the link between cash

transfer programmes and poverty reduction. Section 4 presents an overview of the LEAP while section 5 outlines our methodology. The empirical results and discussions are provided in section 6 and 7. Section 8 draws the implications for MDG 1 and post-2015. Conclusion and policy suggestions are provided in section 9.

Brief Trend of Poverty in Ghana

This section, which is based on the last three (3) surveys of the Ghana Living Standards Survey (GLSS)ⁱⁱⁱ provides a brief diagnostic analysis of the poverty trend in Ghana. This trend is relevant in understanding the contribution of intervention programmes in poverty reduction. The GLSS through the formal surveys calculates household consumption and expenditure levels. Based on the five rounds of the GLSS, the GSS (2007) set a nutrition-based income measured poverty lines which translates in monetary terms as GH¢288.47 (US\$196.23) (lower poverty line) and GH¢370.89 (US\$255.77) (upper poverty line) per adult per year. The implication is that individuals whose total expenditure falls below GH¢288.47 are considered to be in extreme poverty. This group of people are unable to meet their minimum nutritional requirement even if they commit their entire budgets to food consumption.^{iv} On the other hand, those whose income exceeds GH¢370.89 are able to purchase or consume enough food to meet their nutritional requirements as well meet other basic non-food needs (GSS, 2007).

Considering the upper poverty line of GH¢370.89, Ghana had an impressive decline (from 51.7% in 1991/1992 to 28.5% in 2005/2006) of the population defined as poor. In furtherance to this, there was also a considerable decline in the absolute number of the poor from around 7,931,000 in 1991/1992 to 6,178,000 in 2005/2006. The proportion of the extreme poor also decreased considerably. At the national level, the percentage of this group decreased from 36% in 1991/1992 to 18% in 2005/2006. However, changes in the poverty levels have been unevenly distributed and thus vary among the geographical regions of Ghana. Between 1998/1999 to 2005/2006, Central and Eastern regions experienced the most significant reductions in poverty – 48% to 20% and 44% to 15% respectively. Ashanti region only had about 8% reduction - that is from 28% to 20%. Poverty is mainly concentrated in the Northern part (Northern region, Upper East region and Upper West region) of the country. While the poverty incidence is about 12% in Greater Accra and 20% in Ashanti region, Northern, Upper East and Upper West regions respectively have about 52%, 70% and 88% (GSS, 2007). To put it bluntly,

poverty in Ghana has been predominantly rural. Two-thirds of the population in rural areas live in poverty. The 2005/2006 of GLSS 5 stated that the poverty incidence in this area was about 39% as against 11% in urban areas.

The discussions above do not highlight on the depth of poverty - that is the income gap ratio. This shows the proportion by which the average consumption level of poor households fall below the poverty line. In other words, it shows the minimum amount of income that is needed to meet either the nutritional requirements in the case of lower poverty line or to meet both the food and non-food needs in the case of the upper poverty line. The GSS (2007) showed that the average consumption among poor households in Ghana is about 34% below the upper poverty line in 2005/2006 as against 35% in 1998/1999. With regard to the extreme poor, the income gap ratio has seen a marginal decline from 30% in 1998/1999 to 31% in 2005/2006. This therefore suggests that the average consumption of the extreme poor in Ghana is about 31% less than the lower poverty line.

Cash Transfer and Poverty Reduction: Contextualizing the Links

In recent times, especially in the wake of the global economic crunch and the general slowdown in the world's economy, social protection for the vulnerable and destitute has increasingly become an essential part of mainstream development orthodoxy (Todd et al., 2006). The UN defined social protection as a "set of public and private policies and programmes undertaken by societies in response to various contingencies to offset the absence or substantial reduction of income from work; to provide assistance to families with children as well as provide people with basic health care and housing" (UN, 2000, p. 4). Given this understanding, it is noticeable that cash transfers have thus become an important and a growing part of social protection programming in many developing countries. Accordingly, within and across countries, these schemes have evolved differently with a significant variation in programme design and objectives. Different donor agencies, national governments and their development partners have increasingly presented different cash transfer programmes as an effective means of not only tackling transitory poverty and inequality but also for building human and physical asset of the poor (Slater, 2008). In some Latin American countries, these programmes have emerged in response to the growing inequality and the social cost of structural adjustment programme and the accompanying economic crises (Handa and Davis, 2006).

Do cash transfers add up to the agenda of poverty reduction and MDG actualization in developing countries? Some theoretical literature that seeks to provide explanation for the above research proposition indicates that cash transfers do support household consumption and micro enterprise development, thus directly improve household welfare. The theoretical justification for the use of cash transfers in poverty reduction can be traced to Sen's (1981) entitlement theory. At its very core, it argues that the lack of purchasing power limits the ability of the poor to gain access to or purchase food during hunger or emergencies. It then follows that cash support measures could be an appropriate response to increasing the purchasing power of the poor.

Closely linked in ideology but fundamentally different in form is the paternalism theory which calls for transfers in-kind. This idea was first put-forward by Musgrave (1959). Interestingly, the paternalism theory has received different interpretations in the literature. However, the core argument is that societal welfare function is assumed to be non-egoistic. As such, individuals in society have a uniform or identical indifference curves for a good assumed to be socially desirable at any given level. This type of good is called by many economics textbook as merit good. However, whether cash or in-kind, transfers may be given at different times and policy makers are faced with Samaritan's Dilemma. This dilemma introduced by Buchanan (1975) arise when policy makers are faced with the dilemma in choosing between bailing today's recipients out in the future or letting the recipients' current preferences be distorted albeit future transfers. Unfortunately, individuals have different preferences and ranks their choices based on need. They also vary their preferences in relation to time. As such, proponents of cash transfers call for equipping an individual with the purchasing power in order to acquire his choice of a good.

Notwithstanding these theoretical debates, there is a growing body of empirical literature which have shown that the institutionalization of cash transfer schemes in some developing countries have led to a reduction of poverty and inequality. For instance, a World Bank study in Mexico found that transfers from the *Oportunidades* which provides cash transfers to rural households in Mexico consequently increased investment in livelihood activities (agriculture) and a significant investment in micro-enterprise development. The study further indicated that for each peso transferred, close to 88% were spent on household consumption while the remaining were invested by beneficiary household. The investment considerably raised the ability of recipient households to generate income with a return of 17.55% which points to the fact that these households were credit constrained (Gertler et al., 2006).

Combating Poverty towards Actualizing the Millennium Development Goals and Beyond:
Do Cash Transfer Programmes add up to the Agenda?

In one study of cash transfer programme in Malawi, Miller (2009) reports that a \$13 grant per month received by poorer households resulted in a reduction in the number of people living in absolute poverty in the Mchinji district in Malawi. It further found that out of that transfer given, more than 90% were spent on locally produced food, household goods and services and this resulted in increased sales by local businesses (Miller, 2009). It is therefore argued that such positive outcomes of cash transfer may lead to upward spiral of stimulating local economic growth. Indeed, well designed and targeted cash transfer programmes stimulate aggregate demand and consumption. Samson (2007) concur with this view, arguing that cash transfer leads to investment, economic growth and job creation which has an equalizing effect on poverty reduction. In South Africa, Samson (2007) notes that the poor spend more of their income on domestically produced labour intensive food. In effect cash transfer programmes have the potential to increase household welfare as well as productive economic activity and subsequent increase in economic growth.

Critics however emphasize that the effect of cash transfer programmes should be evaluated by their relative efficiency on poverty - measured by poverty headcount and the poverty gap. Commentators further argue that given the long-term impact of conditional or unconditional transfers especially that which is spent on education of children, a 'given dollar' approach would be woefully inadequate in alleviating persistent poverty and thus ought to be complemented with measures spanning economic and social sectors (Hanlon, 2004). Handa and Davis (2006) in a study of conditional cash transfers in Latin America and the Caribbean found that cash transfers in general mostly achieve its core aims. However what remains unclear is whether such schemes have sufficiently addressed the 'development bottleneck' and whether conditional transfers are the most cost-effective or sustainable means of addressing such bottleneck. In this respect, the near exclusive focus of conditional cash transfers on human capital formation may pay no heed to opportunities relating to impact on household welfare and broader rural development context.

Overview of Ghana's Livelihood Empowerment against Poverty (LEAP) Programme

The LEAP is a conditional social cash transfer programme which provides cash to the extremely poor households across Ghana to alleviate short-term poverty and also to encourage long-term human capital development. The goal of this programme is "to empower and help targeted population to provide for the basic needs, poise them

to access existing government interventions, provide a 'spring board to help them to 'leap' of the malaise of extreme poverty, and ultimately empower them to contribute to the socio-economic development of the country" (GoG, 2007, p. 36). It started its trial phase in March 2008 with 21 districts and then began expanding gradually to other districts. Beneficiaries on the programme would be assisted for a period of 1 to 3 years depending on the changes in their livelihoods. (LEAP, 2007)

The LEAP which is the flagship programme of the National Social Protection Strategy (NSPS) has come to complement other existing social intervention programmes in Ghana. It targets the orphans and vulnerable children (OVC) who receive their cash transfer through the caregiver scheme, persons with severe disabilities (PWD) without any productive capacity and the extremely poor above 65 years. Targeting from the national level, districts are selected using the National Development Planning Commission (NDPC) poverty map; at the district level, targeting of communities by the District LEAP Implementing Committee (DLIC) is done using district poverty maps while at the community level, potential beneficiaries are targeted with the assistance of Community LEAP Implementing Committee (CLIC). Because members of the CLIC live with potential beneficiaries in the society, they tend to know some basic information regarding beneficiaries' livelihoods and this reduces moral hazard and information asymmetry as some rich might portray to be poor in order to receive the cash grant. Data on potential beneficiaries are collected at the community level by trained data collectors; the data is verified at the district and regional levels and then submitted to the Department of Social Welfare (DSW) headquarters for entries. The data is then entered into a developed database (The Single Register) which ranks and selects potential beneficiaries. The ranked list is sent back to the community for verification and then returned to the DSW headquarters for further work. Photos of beneficiaries are taken, identification cards, photo albums and payment vouchers are developed to facilitate payments. The Ghana Post in collaboration with the DSW and the CLIC identify pay points where payments are conducted. Payments are done every two months with amounts ranging from GH¢8 (US\$ 5.52)^v to GH¢16 (US\$ 11.03) per month depending on the number of dependents/households. The first payment of the cash grant was made available in 20 districts^{vi} between 27th and 30th March, 2008 where a total of 1,654 households received their initial payments. The second payments were done in the same districts in early June where an additional 198 households were enrolled onto the programme. An additional 1,050 households making a total of 2,902 received their cash grant during the third batch of payments which was done between 5th and 8th August, 2008.

While they remain on the programme, beneficiaries are expected to comply with certain conditions. These are:

1. Orphans and Vulnerable Children (OVC) within the school going age in the beneficiary households should be enrolled and retained in public schools.
2. All members of the household must be registered with National Health Insurance Scheme (NHIS) and be able to produce a receipt in the absence of a card.
3. New born babies (0 – 18 months) must be registered with the Birth and Deaths Registry, attend required post natal clinics and complete the expanded programme on immunization.
4. Ensure that no child in the household is either trafficked or engaged in any activities constituting the worst forms of child labour (GoG, 2007, p. 45).

While recognizing that conditional cash transfers in particular are far from being a panacea for development (Farrington and Slater, 2006), its vital role in consumption smoothing, education, health and other livelihood activities cannot be overemphasized. Few empirical studies have been done to assess the impact of the LEAP in relation to MDG 1. While pointing to some key challenges, the aim of this paper is to bridge the gap in literature by assessing the contribution of the LEAP in meeting MDG 1 in Ghana.

Methodology

In conducting this research, both qualitative and quantitative data were collected. Questionnaires, in-depth interviews and focus group discussions were used to collect the primary data. This was done from March, 2011 to May, 2011. Secondary data was however collected through journals, policy documents and books. The qualitative data allowed for direct interaction with people who benefited from the programme while the quantitative data were presented in frequencies, charts, percentages and cross-tabulation of variables using Microsoft Excel 2007. This work thus adopted a mixed approach which balances the weaknesses and strengths of each method. That is, the weaknesses of one approach are potentially compensated for by the strength of the other. The study was conducted in the Kumasi metropolis - the second largest city in Ghana, with some people living in urban slum. In particular, 6 out of 11 beneficiary communities were selected for the study and included Asafo, Asawasi, Dichemso, Moshie Zongo, Asuoyeboah and Tarkwa Maakro. These communities were selected because they were the first beneficiary communities^{vii} of

the LEAP programme in the Kumasi Metropolis. The sum of all the beneficiaries in the 11 communities was 166. In all, 20 respondents from each of the 6 selected communities were randomly selected. This gave each beneficiary in the various communities a fair chance of being selected. The study therefore sampled 120 beneficiaries. Data on demographic and socio-economic characteristics of the beneficiaries were collected. This covered their sex, age, educational level, occupation, monthly incomes and number of dependents or households. Three (3) key officials^{viii} from the DSW were purposively selected to elicit adequate information regarding the programme. This was done through questionnaires and interviews. Data was also elicited in order to assess the possible impact of the LEAP programme in contributing to the poverty reduction agenda especially in our study communities. The hypothesis proposed for the study was;

Null hypothesis (H_0): There is no improvement in the lives of beneficiaries.

The quantitative data was based on empirics and the hypothesis was tested using the chi-square contingency test statistic. This test statistic which is a nonparametric tool entails the cross-tabulation of observations according to some identifiable traits with unequal expected frequencies. The chi-square is used when the level of measurement is nominal or ordinal and each variable of interest is based on counts. Hence the fact that poverty reduction is based on headcount justifies the use of this test statistic.

Observed (f_o) and Expected Frequency (f_e)

Values actually recorded in the contingency table which were based on our observations are called the observed frequencies. The expected frequencies were however calculated using the formula:

$$f_{e\ ij} = R_i \times C_j / N \quad (1)$$

where N , R_i and C_j are the number of beneficiaries, row and column totals respectively.

The hypothesis was tested at 5% significance level. The chi-square test statistic was computed by invoking the formula used by Lind et al., (2005);

$$\chi^2 = \sum \left[\frac{(f_{oij} - f_{eij})^2}{f_{eij}} \right] \sim \chi_{df, 0.05}^2 \quad (2)$$

where f_{oij} and f_{eij} observe their usual definitions.

df = degrees of freedom => $(r - 1)(c - 1)$

r is the number of rows

c is the number of columns

i and j index the rows and columns respectively.

The computed test statistic (χ^2) in equation (2) is compared to the critical value ($\chi_{df, 0.05}^2$) in making the decision. The H_0 is rejected if the $\chi^2 > \chi_{df, 0.05}^2$ otherwise we do not reject H_0 .

We also focused on the challenges besetting the LEAP in contributing towards the actualization of the MDG 1 vis-à-vis cash transfers.

Results and Discussions

This section presents the empirical results of our study. It draws from the fieldwork conducted in the six communities in the Kumasi Metropolis.

Demographic and Socio-economic Characteristics of Beneficiaries

Age and Sex

Regarding the age of beneficiaries, about 16% were between the ages 1 to 18 years. This age bracket was mainly the OVC who received their cash grant through the caregiver scheme. About 35% were between 41 to 65 years while 28% represented the aged (above 65 year) who had no productive capacity. It was revealed that 25% of the beneficiaries were between 19 to 40 years majority of who were disabled. The mean age of beneficiaries was 47.31 years.

Of the 120 beneficiaries, about 87% were females while the remaining 13% were males. The study thus covered more females than males. This however varied from community to community. Each community under study had a female population of not less than 10. Among other criteria, gender roles influence the disbursement of cash to beneficiaries. Thus women are more preferred to men in terms of who

benefit from the LEAP development strategy. This is seen in the high number of females on the programme. This higher number of women takes precedence from the second and sixth objectives^{ix} of the LEAP. The NSPS recognizes elderly women as vulnerable. Women are mostly the caregivers of the OVC and may also be PWD or the aged. This increases the chances of women's enrolment on the programme. The higher number of females is therefore not surprising.

Diseases

The health status of beneficiaries was also considered. It was revealed that about 74% suffered from malaria in the first quarter of 2011. This is not surprising considering the unhygienic and poor drainage systems in the urban slums/communities which serve as breeding places for mosquitoes. It was further revealed that 2.5% of beneficiaries had also suffered from diarrhoea while 23% complained of other sicknesses.^x

Educational Background and Occupation

Education is often considered as an investment in human capital and a key to poverty reduction and national economic development. From the research, it was revealed that 53 beneficiaries representing 44% had no formal education while 67 (56%) had some form of formal education. Out of this 67 beneficiaries, 63 had basic education (i.e. primary and Middle/Junior High School) while the remaining 4 had secondary education. The lack of higher formal educational attainment among the beneficiaries is largely attributed to lack of financial resources. And partly account for the poor socio-economic conditions that confront them.

Regarding their economic activity, 45% were petty traders who engaged in the sale of such goods namely ice water, soap, kerosene, oranges and charcoal. Asuoeyeboah had the highest number (12 out of 20) of beneficiaries who were engage in petty trading while Asafo had the lowest (4 out of 20). About 16% were students while the remaining 39% were the aged and the disabled who were jobless and had no livelihood source.

Sources of Income and Savings

Aside the cash grant, beneficiaries receive income from other sources which are often unreliable. Those who relied on personal sources for survival constituted about 45%.

This group of beneficiaries often raise incomes from their petty trading. While 43% depends on their relatives, about 12% relies on other sources.^{xi} In furtherance to this, while only 4% often save about GH¢2.60 per month, only 6% saves below GH¢2.60. Majority (90%) of the beneficiaries do not save. This is not only due to the inadequate amount of cash grant from the LEAP, but also from the low returns from their petty trading and insecure incomes. The inadequate finance leads to low capital outlay. This makes it difficult to expand their economic activities. This is further worsened by their inability to secure bank loans which they attributed to the lack of collateral securities since they have low asset base.

Analysis of the LEAP

Registration and Enrolment of Beneficiaries

In 2008, a total of 34 beneficiaries were registered in the 6 communities. While Dichemso had the highest number (10) of registered beneficiaries, Moshie Zongo had the lowest (3). In 2009, a total of 73 new beneficiaries were registered with Tarkwa Maakro and Moshie Zongo each registering the highest number (15 new beneficiaries). Thirteen new beneficiaries were registered in 2010. It was realized that no beneficiary was registered in Tarkwa Maakro in 2010. Asafo, Dichemso and Asuoyeboah each registered 3 beneficiaries while Asawasi and Moshie Zongo registered 2. This means that after starting with 34 beneficiaries in 2008, 73 and 13 more were respectively enrolled in 2009 and 2010.

Cash Grant and Number of Dependents/Households

The amount of cash grant given to a beneficiary among other factors depends on the number of dependents/households of beneficiaries. A household is described by the Ghana Statistical Service (GSS) as an average of 5 persons. It was revealed that about 28% of the beneficiaries had no dependents while 26% had either 5 or more dependents. Majority (46%) of the beneficiaries had 1, 2, 3 or 4 dependents. Ideally, payments are supposed to be made once every two months with amounts ranging from GH¢8 (US\$ 5.52) to GH¢16 (US\$ 11.03) per month. Since payments are done “once in every two months”, beneficiaries get accumulated two months cash grants. Thus beneficiaries often receive a minimum of GH¢16 and a maximum of GH¢32 (US\$ 22.07).

On the aggregate, it was revealed that those with less than 5 dependents were receiving between GH¢16 (US\$ 11.03) to GH¢30 (US\$20.69). This category of beneficiaries represented about 74%. It was again revealed that beneficiaries with either 5 or more dependents often received above GH¢30. This group of beneficiaries represented about 26%. It is imperative to note that the number of dependents as well as the size of the households greatly varied from community to community and so is the cash grant.

Table 1. Challenges of the LEAP

Challenges	Frequency/Percentage
Inadequate cash grant	79 (65.83%) ^{xii}
Complications at payment point	0 (0.00%)
Delays in receiving cash grant	41 (34.17%)
Total	120 (100%)

Source: Authors' field survey (May, 2011)

Undeniably, the LEAP has made some achievements. However, it is still beset with challenges. Table 1 above depicts challenges of the LEAP beneficiaries often face. It indicates that about 66% of the beneficiaries complained of the inadequacy of the cash grant. Beneficiaries noted that the LEAP cash grant is rather too small and grossly inadequate for them to meet other pressing needs. They lamented on using the cash transfers in renewing their annual health insurance membership. Some respondents could not hide their feelings.

“I mostly search for monies elsewhere to add to this small money [referring to the cash grant] to renew our NHIS cards. Now the monies are not coming again and all our NHIS cards have expired. No money to renew them.” (Woman, Asawasi, 2011)

“This money is grossly inadequate to make any meaningful impact” (Married woman, Asouyeboah, 2011)

The inadequacy of the cash grant limits their ability to meet their basic needs (mostly food) as well as expand their business activities especially those engaging in petty trading. A significant proportion of the respondents (34%) complained of the delays and irregularity of the disbursement of cash grant. This undoubtedly brings their businesses into standstill for those who invest the grant into their businesses. However, beneficiaries never encountered any complications at payment points

which are mostly disbursed at some identified post offices. Interestingly, the major challenge beneficiaries' face varies from community to community.

While recognizing the inadequacy of the cash grant as the overall major challenge, the focus group discussions with beneficiaries revealed that almost all the beneficiaries had no idea regarding the period of payments of their cash grants and that they only wait to be told by a member of the CLIC when payments were due. This waiting period differ from community to community. Beneficiaries in Asawasi complained that instead of making payments once every two months, they receive their cash grants once every 5 months. As such, 19 out of the 20 beneficiaries in this community complained of such undue delays with only 1 beneficiary lamenting on the meagre amount they receive. Thus beneficiaries in this community consider the irregularity and the delays of cash receipt as their major problem. One male respondent retorted;

"I don't even know whether we are still part of the beneficiary communities because the last time we were called for the money was about 5 months ago if not more." (Male, Asawasi, 2011)

The situation was not different in Dichemso. Beneficiaries in Tarkwa Maakro, Moshie Zongo and Asuoyeboah complained they mostly receive their cash grant once every four months. However, it was only beneficiaries in Asafo who normally receive their cash grant once every two months. Apart from Asawasi, the other 5 communities consider the inadequacy of the cash grant as their major challenge and thus serving as a stumbling block in meeting their needs. We can therefore deduce that challenges faced by the beneficiaries are community-specific.

Our findings are not different from OPM (2013). Their discussions with beneficiaries revealed that beneficiaries had different views about the delays and regularity of cash receipt. They found that some beneficiaries prefer a smaller but regular cash transfers so as to have a smooth consumption. However, "beneficiaries that prioritized the use of the transfer for investment over consumption smoothing preferred lumpier payments" (OPM, 2013, p. 47)

Key informants were contacted to find out the reason for the varying times of payments. The Director of DSW argued that the cash grant disbursements were done in selected communities using the poverty maps given by the GSS as well as a range of other criteria including but not limited to the prevalence of adverse health

conditions. The implication is that if a community has not been selected at any point in time by the GSS, beneficiaries in that community will not receive their cash grant. They will only receive their cash grants once they are selected.

Table 2. Income Levels of Beneficiaries

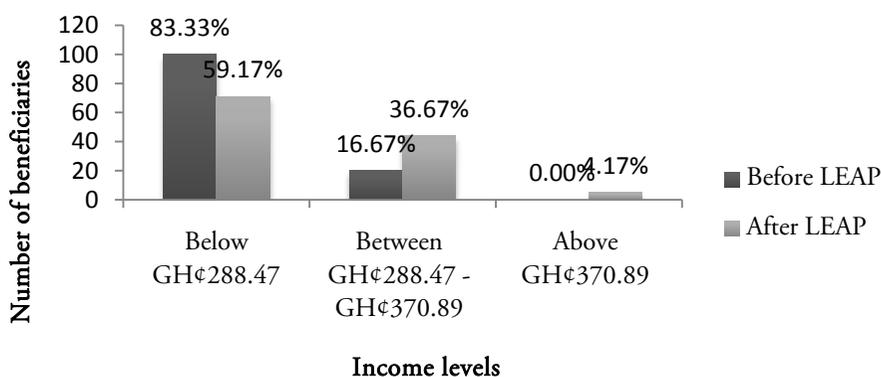
Community	Income Level	Number of Beneficiaries	
		Before LEAP	After LEAP
Asawasi	Below GH¢288.47	17	14
	Between GH¢288.47 - GH¢370.89	3	6
	Above GH¢370.89	0	0
Asafo	Below GH¢288.47	13	13
	Between GH¢288.47 - GH¢370.89	7	5
	Above GH¢370.89	0	2
Dichemso	Below GH¢288.47	19	14
	Between GH¢288.47 - GH¢370.89	1	6
	Above GH¢370.89	0	0
Tarkwa Maakro	Below GH¢288.47	16	6
	Between GH¢288.47 - GH¢370.89	4	14
	Above GH¢370.89	0	0
Mooshie Zongo	Below GH¢288.47	20	12
	Between GH¢288.47 - GH¢370.89	0	8
	Above GH¢370.89	0	0
Asuoeyeboah	Below GH¢288.47	15	11
	Between GH¢288.47 - GH¢370.89	5	6
	Above GH¢370.89	0	3
Total		120	120

Source: Authors' field survey (May, 2011)

Table 2 above shows the income levels of beneficiaries before and after the introduction of the LEAP programme. As stated earlier, GH¢288.47 and GH¢370.89 represents the lower and upper poverty lines respectively. Those with income levels below GH¢288.47 represents the “hard core” or the extreme poor while those whose with income levels between GH¢288.47 to GH¢370.89 are the poor. However, those with incomes above GH¢370.89 are not considered poor since they can afford both their food and non-food needs in the Ghanaian context. While recognizing the impact of other sources on income,^{xiii} from the table, it was revealed

that Tarkwa Maakro had the highest improvement in income levels as a result of the LEAP. Before the LEAP, 16 beneficiaries in Tarkwa Maakro earned income below GH¢288.47. After implementing the programme, though most beneficiaries were still below the upper limit of GH¢370.89, 10 out of the 16 beneficiaries moved above the lower poverty line of GH¢288.47. There were also appreciable improvements in the income levels of beneficiaries in other communities. Asafo and Asuoyeboah had some of their beneficiaries moving above the upper poverty line. Asafo and Asuoyeboah respectively had 2 and 3 beneficiaries earning above GH¢370.89 after the LEAP programme.

Figure 1. Overall income levels (per annum) of beneficiaries before and after LEAP



Source: Authors' field survey (May, 2011)

Figure 1 above shows the income of beneficiaries before and after LEAP. Before the LEAP, of the 120 beneficiaries, 100 earned below GH¢288.47 and 20 earned between GH¢288.47 to GH¢370.89. This means 100 (83.33%) beneficiaries were “hard core” poor and could not meet their nutritional requirements as well as satisfy their basic non-food needs. With the introduction of the LEAP, 71 (59.71%) out of 120 beneficiaries were earning below the lower poverty line while 44 (36.67%) beneficiaries earned between GH¢288.47 to GH¢370.89. Thus, there was a 29% decrease in the number of beneficiaries earning below the lower poverty line while the number of beneficiaries who earned between GH¢288.47 to GH¢370.89 increased by 120%. However, only 5 beneficiaries were able to earn above GH¢370.89. This group of people could now meet their nutritional requirements as well as satisfy their basic non-food needs. The country-case report on LEAP provided by the Oxford Policy Management (OPM) found that this cash transfer programme has indeed functioned as a safety net and thus adds to the meagre household

incomes. This enable beneficiaries to acquire better diet, have access to health care, reduction in school dropout and child labour. This finding is also consistent with earlier evidence provided by Osei (2011) based on his econometric microsimulation model. By using gini-coefficient to measure poverty and inequality, Osei (2011) noticed that this gini-coefficient decreased by 5 percentage points and that this reduction holds true for most regions in Ghana of which Ashanti region (with Kumasi as the regional capital) is not an exception. Thus such a universal social grant programme like the LEAP has reduced both the poverty incidence as well as the depth of poverty by bringing households closer to the poverty lines hence increases their chances of being “LEAP-ed” out of poverty. Such policy is pro-poor as it generally benefits relatively poorer households.

Table 3. Impact of LEAP on Poverty in Ghana

Impact of the LEAP	Communities						Total\Percentage
	Asawasi	Asafuo	Dichemso	Moshie Zongo	Tarkwa Maakro	Asuoyeboah	
Part of basic needs (mostly food)	10 (12.17)	14 (12.17)	12 (12.17)	16 (12.17)	12 (12.17)	9 (12.17)	73 60.83%
Part of educational needs	6 (2.17)	3 (2.17)	2 (2.17)	0 (2.17)	2 (2.17)	0 (2.17)	13 10.83%
Invest in business activity	0 (2.17)	3 (2.17)	1 (2.17)	0 (2.17)	4 (2.17)	5 (2.17)	13 10.83%
Part of educational and basic needs	1 (1.00)	0 (1.00)	2 (1.00)	2 (1.00)	1 (1.00)	0 (1.00)	6 5.00%
Part of educational and business activity	3 (1.67)	0 (1.67)	2 (1.67)	0 (1.67)	1 (1.67)	4 (1.67)	10 8.33%
Both basic needs and business activity	0 (0.83)	0 (0.83)	1 (0.83)	2 (0.83)	0 (0.83)	2 (0.83)	5 4.17%
Total	20	20	20	20	20	20	120 100%

Source: Authors' field survey (May, 2011)

**Figures in the brackets are their respective f_e calculated from (1).

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From table 3, it is revealed that with the introduction of the LEAP, 73 beneficiaries representing 61% were able to meet part of their basic needs. It was also found out that about 11% of the beneficiaries were able to meet part of their educational needs. This 11% included OVC and other beneficiaries who used the grant to cater for the educational needs of their dependants. Thirteen (13) beneficiaries (11%) also invested the grant in their businesses. only 5 out of the 120 beneficiaries were able to meet both their basic needs as well as investing part into their business activities. Performing the non-parametric test using the contingency table above, from (2),

$$\chi^2 = \frac{(10-12.17)^2}{12.17} + \frac{(14-12.17)^2}{12.17} + \dots + \frac{(2-0.83)^2}{0.83} \sim \chi_{df,0.05}^2$$

Table 4. Computing the Chi-square Test Statistic

Impact of the LEAP	$\left[\frac{(f_{oij} - f_{eij})^2}{f_{eij}} \right]$
Part of basic needs (mostly food)	2.698
Part of educational needs	11.444
Invest in business activity	10.522
Part of educational and basic needs	4.000
Part of educational and business activity	8.015
Both basic needs and business activity	5.817
$\chi^2 = \sum \left[\frac{(f_{oij} - f_{eij})^2}{f_{eij}} \right]$	42.796

$$\chi^2 = 42.796$$

$$df = (6 - 1)(6 - 1)$$

$$df = 25$$

$$\text{Critical value } (\chi_{25,0.05}^2) = 37.652$$

Based on the sample evidence, we reject the H_0 since the computed test statistic ($\chi^2 = 42.796$) is greater than the critical value ($\chi_{25,0.05}^2 = 37.652$). This means the implementation of the cash transfer has improved the lives of the beneficiaries at least in the study area with a stronger improvement in food consumption. This finding corroborates with Gertler et al.,'s (2006) study on Mexico's *Oportunidades*. They argue that for every cash transfer made to the poor, a greater proportion goes to the household's consumption. They also found that cash transfers serve as an additional working capital for the income generating activities of the beneficiaries. Cross country evidences indicate that transfers allow households to make small investments and in some cases take greater risks for higher returns (Arnold et al., 2011). In Dalung community in Northern Region of Ghana, the transfer provided an opportunity for beneficiary household caretakers to invest and expand their businesses, including but not limited to food preparation and processing of rice and shea butter. This presents complementary and synergistic local economy effect and the economic potential of the LEAP transfer. The LEAP money thus provided the necessary capital for the take-off especially in situations where the start-up capital posed to be the main challenge to emerging and growing businesses (OPM, 2013). From our focus group discussions, some beneficiaries asserted;

"Despite the meagre cash grant, I mostly use it to buy food" (Elderly widow, Asafo, 2011)
"As for me, all my monies including the LEAP cash grant go to food consumption" (Married Woman, Tarkwa Maakro, 2011)

"Everyone in this community knows I sell ice water, though the money is too small, I still invest some into my business and some for consumption" (Married Woman, Mooshie Zongo, 2011)

"I use all the LEAP monies to buy food especially when monies from people are not forthcoming" (Elderly man, Dichemso, 2011)

"The child's [referring to the OVC] parents died long time ago. So I only use the money to buy his books and get him school uniform" (Woman – Caregiver, Asawasi, 2011)

Using Northern and Central regions of Ghana, OPM (2013) found that majority (40%) of the beneficiaries in all the communities in the regions use the cash grants for food consumption. Their finding was also strengthened by the perception that, LEAP beneficiaries were better able to meet their basic needs mostly food and health. Based on the sampled evidence, it can be concluded that the LEAP has been able to

chalk some notable achievements by enabling the extreme poor and the vulnerable to meet their basic needs mainly food. Our findings therefore suggest that despite the small cash transfer, the programme has among other things improved the food consumption of beneficiaries. Our study confirms earlier evidence provided by Schady and Araujo (2008) and Amuzu et al., (2010). They concluded that the LEAP did impact significantly on household consumption by reducing their food expenditure. While noting the influence of household size on the spending decisions of caregivers, Dako-Gyeke and Oduro (2013) have shown that the cash grants received by caregivers are expended on all members of their households including non-beneficiary children. This dynamic can be attributed to the nature of the family living systems as well as the solidarity among the poor in Ghana.

Implications for MDG 1 and Post-2015

The Growth and Poverty Reduction Strategy (GPRS II) in Ghana operationalizes the various international agreements with poverty reduction as their primary objective. One of such international agreements is the MDG. Ghana has since 2000 pledged to meet these goals especially in the area of poverty reduction. Our findings imply that the LEAP programme constitute an important initiative and has improved the well-being of both the extreme poor and the vulnerable. This is manifested in increases in their income levels as well as the ability to acquire their basic needs. In view of the renewed interest in spearheading poverty reduction and what will become post-MDG best practices this paper draws some implications for this endeavour.

To begin with, efforts towards improving the living standards of the poor and addressing post-MDG inequality calls for effective institutional mechanisms and radical change in policy design and implementation practices. Our analysis indicates lack of effective political will demonstrated in the disbursement of cash grants given to beneficiaries. It is apparent that beneficiaries of the cash transfer significantly remain as passive players in the cash transfer initiatives as many are not consulted in the design while others do not even know the exact time they receive their cash grant. Nayaran et al., (2000) argue that efforts towards addressing poverty call for deepening the relationship between institutions on one hand, and poor on the other. In this regard, we argue for a radical shift in responsibilities in post-MDG policy design and implementation practices by constructing “a poor-centred design of cash transfer”. Such an approach will offer a means of not just supporting the poor by providing them with cash, but will also integrate them into policy design and

implementation practices with local institutions providing the enabling environment.

Secondly, while acknowledging the potential role cash transfers play in improving the lives of the poor, post-2015 strategies geared towards poverty reduction and inequality have to be in tandem with policies that support both the productive capacity and empowerment of the poor. It is imperative that post-2015 frameworks on poverty reduction and development should be constructed by revisiting the “productionist” approach of the old development economics (Chang, 2010) while paying adequate attention to policies that support improved access to credit, education, healthcare and social inclusion, as this would lead to addressing the multi-causal factors that influence poverty thereby improving the well-being of the poor.

Conclusion

The MDG have not only brought poverty reduction onto the global development agenda but have also encouraged and urged countries to help in halving poverty by 2015. As a result, several countries and developmental agencies have adopted pro-poor policies that seek to leap the poor out of poverty and to provide safety nets to the vulnerable. Ghana, through its various programmes has made remarkable efforts in meeting MDG 1 agenda. One of such programmes is the LEAP which provides conditional cash transfers to extreme poor and the vulnerable. Using chi-square test statistic, we found an improvement in the lives of the poor as well as increases in their incomes. While we find evidence of the positive contribution of the LEAP in poverty reduction in the short-run, it cannot however guarantee a sustained improvement in health and education outcomes and a reduction of poverty in the long-run. To ensure continual reduction in poverty, there is the need to move fundamentally beyond the short-term gains/effects through coordinated, purposeful social and complementary services to create opportunities for empowerment among beneficiaries. The existing ‘single register’ of LEAP beneficiaries provides the potential to develop an integrated database for a range of social protection programmes, which could facilitate referral to complementary programmes. However, increasing the cash grant is not a panacea for poverty reduction. Discussion with beneficiaries is extremely helpful in unearthing the different specific challenges they face at the community level. This will help in shaping the policy guidelines towards a successful future poverty reduction programmes.

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Appendix

Sex

Community	Sex		Total
	Male	Female	
Asawasi	2	18	20
Asafo	3	17	20
Dichemso	3	17	20
Tarkwa Maakro	2	18	20
Moshie Zongo	4	16	20
Asouyeboah	2	18	20
Total	16	104	120
Percentage	13.33%	86.67%	100%

Age

Community	Age					Total
	1 - 18	19 - 30	31 - 40	41 - 65	Above 65	
Asawasi	3	1	3	11	2	20
Asafo	5	3	3	6	3	20
Dichemso	3	1	1	10	5	20
Tarkwa Maakro	2	2	5	7	4	20
Moshie Zongo	3	1	2	4	10	20
Asouyeboah	3	1	2	4	10	20
Total	19	9	16	42	34	120
Percentage	15.83%	7.50%	13.33%	35.00%	28.33%	100%

Disease/Sickness

Community	Disease/Sickness				Total
	Malaria	Cholera	Diarrhoea	Others	
Asawasi	15	0	0	5	20
Asafo	18	0	0	2	20
Dichemso	10	0	1	9	20
Tarkwa Maakro	16	0	0	4	20
Moshie Zongo	17	0	0	3	20
Asuoyeboah	13	0	2	5	20
Total	89	0	3	28	120
Percentage	74.17%	0.00%	2.50%	23.33%	100.00%

Occupation of Beneficiaries

Community	Occupation				Total
	Petty Trader	Manual workers	Students	Others	
Asawasi	10	0	3	7	20
Asafo	4	0	5	11	20
Dichemso	9	0	3	8	20
Tarkwa Maakro	11	0	2	7	20
Moshie Zongo	8	0	3	9	20
Asouyeboah	12	0	3	5	20
Total	54	0	19	47	120
Percentage	45%	0%	15.83%	39.17%	100%

Educational Background

Community	Educational background					Total
	None	Primary	Middle School/JHS	Secondary/SHS	Tertiary	
Asawasi	11	4	4	1	0	20
Asafo	6	8	5	1	0	20
Dichemso	7	7	5	1	0	20

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Tarkwa Maakro	6	7	6	1	0	20
Moshie Zongo	11	7	2	0	0	20
Asuoyeboah	12	6	2	0	0	20
Total	53	39	24	4	0	120
Percentage	44.17%	32.50%	20.00%	3.33%	0.00%	100.00%

Year of Registration

Community	Year of registration			Total
	2008	2009	2010	
Asawasi	6	12	2	20
Asafo	4	13	3	20
Dichemso	10	7	3	20
Tarkwa Maakro	5	15	0	20
Moshie Zongo	3	15	2	20
Asouyeboah	6	11	3	20
Total	34	73	13	120
Percentage	28%	61%	10.83%	100%

Number of Dependents

Community	Number of dependents						Total
	None	1	2	3	4	5 or more	
Asawasi	5	1	2	2	3	7	20
Asafo	10	0	2	3	3	2	20
Dichemso	5	1	0	1	4	9	20
Tarkwa Maakro	5	1	4	5	2	3	20
Moshie Zongo	5	2	10	1	1	1	20
Asouyeboah	4	0	3	2	2	9	20
Total	34	5	21	14	15	31	120
Percentage	28.33%	4.17%	17.50%	11.67%	12.50%	25.83%	100%

Sources of Income

Community	Sources of income			Total
	Personal	Relatives	Other	
Asawasi	11	7	2	20
Asafo	4	14	2	20
Dichemso	8	9	3	20
Tarkwa Maakro	11	6	3	20
Moshie Zongo	8	9	3	20
Asuoyeboah	12	7	1	20
Total	54	52	14	120
Percentage	45.00%	43.33%	11.67%	100.00%

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Cash Grant

Community	Amount of cash received by each beneficiary		Total
	GHC 16 - GHC 30	Above GHC 30	
Asawasi	13	7	20
Asafo	18	2	20
Dichemso	11	9	20
Tarkwa Maakro	17	3	20
Moshie Zongo	19	1	20
Asouyeboah	11	9	20
Total	29	31	120
Percentage	74.17%	25.83%	100%

Challenges

Community	Challenges of the LEAP			Total
	Inadequate cash grant	Complications at payment point	Delays in receiving cash grant	
Asawasi	1	0	19	20
Asafo	14	0	6	20
Dichemso	16	0	4	20
Tarkwa Maakro	17	0	3	20
Moshie Zongo	19	0	1	20
Asouyeboah	12	0	8	20
Total	79	0	41	120
Percentage	65.83%	0.00%	34.17%	100%

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ⁱⁱ Now Ghana Youth Employment and Entrepreneurial Development Agency (GYEEDA)

ⁱⁱⁱ GLSS was conducted in 1987/1988, 1988/1989, 1991/1992, 1998/1999 and 2005/2006. The third survey conducted in 1991/1992 established 51.7% as the poverty incidence. The fourth survey was also done in 1998/1999 which saw a decrease in poverty incidence from 51.7% to 39.5%. The fifth one was conducted in 2005/2006 which established 28.5% as the new poverty incidence.

^{iv} Given that they consume the average consumption basket.

^v Exchange rate as at the time of the survey was around GH¢1.45 to US\$1.

^{vi} Payments in Bawku (one of the first 21 districts selected) was halted due to the protracted chieftaincy conflict in the area.

^{vii} As at 2010, the eleven (11) beneficiary communities in the Kumasi metropolis were Asawasi, Asafo, Dichemso, Moshie Zongo, Asuoyeboah, Tarkwa Maakro, Aboabo, Oforikrom, Apatrapa, New Tafo and Edwenase.

^{viii} The officials were the Metro Director of the DSW, the Regional Director and the Programme Head of the LEAP.

^{ix} The second objective specifies the criteria for targeting beneficiaries – OVC, PWD and the aged. OVC receive their cash grants through the caregiver scheme who are mostly women. The sixth objective explicitly states the adoption of a gender-sensitive approach in the implementation of the programme.

^x Most of the other sicknesses beneficiaries often suffer from are hypertension (high blood pressure), asthma, rheumatism and diabetes.

^{xi} This comprises of friends, religious groups and philanthropists who often live in the same community with the beneficiary.

^{xii} The numbers in the brackets are the respective percentages.

^{xiii} As said early on, apart from the LEAP cash transfer, beneficiaries earn incomes from other sources which also impacts on their overall income levels. To assess the impact of the cash transfer, those other sources of income were held constant.

The High-Speed Rail and the Productivity of Freeway Bus Service Industry: Taiwan's Caseⁱ

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Abstract: *This study explores the productivity of Taiwan's freeway bus service (FBS) industry in response to competition from the Taiwan High-Speed Rail (THSR). We employ the Malmquist index to investigate the productivity of Taiwan's FBS industry and apply the dynamic panel data (DPD) model to identify the factors influencing its productivity. The emergence of THSR initially worsened the total factor productivity of the FBS industry firstly and stimulated it in a longer time period. We also find that year 2007, sales and management expense, the total assets, and capital/asset ratio of an FBS company are the primary factors positively influencing the productivity. However, lagged 1 period Malmquist index service and service diversity reversely influence it significantly.*

Keywords: *High-speed rail, freeway bus service, Malmquist index, dynamic panel data (DPD) model, system GMM*

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Introduction

Before January 2007, the freeway bus service (FBS) industry was one of the most important transportation services in Taiwan for people traveling between western cities from the north (south) to the south (north) via Freeway No. 1 (also known as the Sun Yat-Sen Freeway). Alternative transport services included several airlines and the train service offered by the Taiwan Railways Administration (TRA), a government-owned railroad company. Taiwan's FBS industry was monopolized by the government-owned Taiwan Motor Transport Company (TMTC) until 1985. Subsequently, the market structure of the FBS industry changed to an oligopoly with the entrance of the Ubus Company. To increase competition in this industry, the Taiwanese government afforded all bus service companies the road right-of-way on highways by reviewing their operating proposals for specific routes beginning in 1996. After these changes in market conditions, the FBS industry had the highest market share of north-south intercity transportation in western Taiwan despite competition from various domestic airlines and the TRA.

However, in January 2007, this market was disrupted by the trial operation period of the Taiwan High-Speed Rail (THSR). Since the normal operation of the THSR began in March 2007, the market share of the FBS industry and other modes of north-south intercity transportation have continuously declined. In 2008, Taiwan's domestic airline industry was significantly impacted by the emergence of the THSR and closed the flying routes in western Taiwan, except the one to Penhu County. Besides, the average number of passengers traveling between Taipei and Kaohsiung from January 2007 to November 2007 decreased 33% as comparing to the same period in 2006 for TRA. Similar to the airline industry, the TRA was also significantly impacted by the THSR. For the FBS industry, the incumbent firms initially believed that the increased ticket prices of the THSR were too high to affect their market share. However, their market share decreased by 24% between January 2007 and October 2007. The FBS industry was further damaged by the implementation of the THSR's non-reserved seat policy on November 12, 2007, where THSR tickets were offered at an 80% discount. Travelers who purchase this type of ticket can board any THSR train on the day of purchase but are limited to traveling in the non-reserved seating cars (cars 10 to 12).

The construction of THSR in the western Taiwan corridor was considered as a new tool to trigger new waves of Taiwan's economic growth. During the latter half of the twentieth century, Taiwan's speedy economic growth led to the saturation of highways, conventional rail, and domestic airline traffic systems in the western transport corridor, which threatened to impede further growth. To solve this problem, the Executive Yuan in Taiwan's government announced a plan for construction THSR in 1990 by using the private finance and allowing the company to operate it for 35 years. THSR began its construction from 1999 and started its test operation in January 2007, which caused tremendous influences on the inter-city transportation markets in western Taiwan.ⁱⁱ

The standard economic argument said that the positive influence of competition on firms' performance because the firms have to avoid waste by achieving the maximum possible output from a given set of inputs or by minimizing the inputs given an achievable set of outputs (Nickell et al., 1997; Casu and Girardone, 2012). Such argument is usually concerning with the firms in the same industry, which is different from the competition between the THSR and the FBS. They are different industries which compete in the same "market". Besides, the competitions between FBS and HSR and conventional rail and HSR line on the choices trade-off between cost-saving/time-consuming (FBS or conventional rail) and time-saving/ cost-consuming (HSR) from the perspective of passengers. Besides, as comparing with other potential solutions to traffic problems in the corridor, a high-speed rail was considered to offer the highest transit volume, lowest land use, highest energy savings, and least pollution.

FBS industry, the largest intercity industry before the operation of THSR, the effects of this shock on its productivity is an extremely important research topic. In addition, its current operation areas in western Taiwan are also similar to THSR (see figure 1). Therefore, in this study, we compare the productivity of the FBS industry before and after the emergence of the THSR by constructing a panel dataset for 2005 to 2011. We also explore the factors influencing its productivity by applying the dynamic panel data (DPD) model. The remainder of this paper is organized as follows: Section 2 reviewed the literatures on the competitive effects new entrants of transportation mode have on an incumbent industries. The study methodology is presented in Section 3. Section 4.1 discusses the empirical results of productivity for Taiwan's FBS industry between 2005 and 2011, which includes the years before and after the emergence of the THSR. Section 4.2 explains the results of DPD model. Finally, the study conclusions, policy implications, and suggestions for further research are presented in Section 5.

Figure 1. The maps of Taiwan's Freeway and THSR
 A. Freeways
 B. THSR



Literature Review

Previous studies on the emergence of a new transportation service primarily explored how the market structure changes to compete with the new service. For example, Cheng (2011) conducted an ex post cost-benefit analysis of the operation of the THSR in Taiwan, examining the impact of the THSR on the intercity transportation market. The results obtained during the first stage of this study indicate that the net present value (NPV), which considers both the financial and social benefits of the THSR, will not be positive until 2024.ⁱⁱⁱ He contended that the impact of the THSR on the FBS industry was relatively low compared to its impact on domestic airlines because of the price elasticity of bus passengers.^{iv}

Mao (2011) examined the current air-rail competition pattern and predicted the future competition conditions between the civil aviation and the railway industry in response to the Beijing-Shanghai high-speed railway. He determined that if all the airlines discounted fares by 30%, and if the ticket price for the high-speed railway service was lower than airline ticket prices, 40% of passengers would use the high-speed railway and 60% would travel by airplane. Therefore, the pricing of the high-speed railway tickets combined with airfare policies has a significant effect on the transport mode used by passengers to travel this route. In addition, Chang and Chang (2004) proposed static traffic assignment methods to predict the market share of the HSR in the northwest-southeast corridor of South Korea. Under specific fare structures and capacity constraints for all competing transportation modes, such as airplanes, trains, and highways, they predicted that the market share of traditional transport modes would decline substantially after the emergence of the HSR and that the market share of the conventional railway service for this corridor would almost disappear. Roman et al. (2007) constructed a mode choice model to analyze the potential competition between a HSR and air transport for the Madrid-Barcelona corridor in Spain. Their estimated results indicated that the market share of the aviation industry would decrease faced with competition from the HSR.

Hsu et al. (2011) indicated that if the THSR's relative operating costs increased, it became less efficient compared to the TRA, and would be forced to increase its ticket prices. Consequently, with less competition from the THSR, the TRA would increase its prices and profits. Additionally, because the THSR is faster and has higher ticket prices, demand increases for the THSR and decreases for the TRA as the time value increases. Dobruszkes (2011) compared the overall supply dynamics of air transport in Europe compared to high-speed trains (HST). For a given city-pair, the number of flights decline under competition from the HST. However, this decline in the number of flights depends on the length of the HST journey and the strategies adopted by the airlines. Dobruszkes also stated that the development of low-cost airlines may affect the market competition structure between the aviation and the HST industries in Europe. Adler et al. (2011) developed a game theory method to assess infrastructure investments and their effects on transport equilibria (especially social welfare) considering the competition between HSR, hub-and-spoke legacy airlines, and regional low-cost carriers. They concluded that when travel time is significantly reduced by the establishment of an HSR service, the HSR obtains a large market share of long-distance travel markets, where passengers would have traveled by air had the high-speed alternative not been available.

Behrens and Pels (2011) examined inter- and intramodal competition between HSR and air transport for the London-Paris passenger market from 2003 to 2009. The HSR link between the two cities began operations in November 2007 and has continuously increased the demand gap between the two transportation modes. They also stated that the travel time and frequency of the HSR are the primary determinants of travelers' behavior. Finally, Fu et al. (2012) investigates the effects of HSR services on Chinese airlines. Although China's HSR service, named the "China railway high speed (CRH)," began operations less than one decade ago, in October 2011, more than 8,000 km of HSR lines were in service. The impact of the air-HSR competition on air traffic has already been experienced for a number of routes. In 2005, all flights between Shanghai and Ningbo were terminated because of the establishment of the Shanghai-Ningbo CRH service. Similarly, the introduction of the CRH Qingdao-Jinan service in 2008 forced airlines to withdraw from the area.

Most of the studies discussed previously emphasized the market impact of introducing HSR/HST services on other competition modes, such as the conventional rail and air travel industries. Few have examined the productivity changes of established industries faced with competition from HSR/HST services. Therefore, we investigate the productivity changes of Taiwan's FBS industry in response to competition from the THSR.

Methodology

We applied the Malmquist productivity change index to investigate the first question and employed a Tobit panel data model and DPD with system generalized method of moments (GMM) estimation to investigate the second question. We discuss the DEA and Malmquist index in Section 3.1 and DPD with system GMM in Section 3.2.

DEA Distance Functions and Malmquist Productivity Index

DEA Models

To calculate the Malmquist productivity, we have to introduce the distance functions in DEA model. DEA is one of the methods to estimate the production efficiency of a decision making unit (DMU).^v The methods proposed by Charnes et al. (1978) (called CCR model) and Banker et al. (1984) (called the BCC model) are often used in studies. The former assumes a constant returns-to-scale production technology for all DMUs, but the later allows the production technology to be variable returns-to-scale by adding a convexity condition in the model. The BCC model suggests that DMU may be affected by other factors to produce output in an increasing/decreasing returns-to-scale situation.

In addition, both the CCR and the BBC models contain two estimation concepts. The first considers the production level to achieve relative efficiency by reducing input usage, called input orientation estimation. The second concept considers the input usage level to achieve relative production efficiency by increasing the production level, called output orientation estimation. In this study, we only concern the output-oriented DEA only because the firms in FBS industry have to maximize its profit by attract more passengers to use their service.

For the output orientation of the CCR model, the linear optimization problem

$$\begin{aligned}
 & \text{Max}_{h,\lambda} \quad h_k \\
 \text{becomes} \quad & \text{s. t. } X_{ki} \geq \sum_{i=1}^n \lambda_i X_{ij}, & j = 1, 2, \dots, J \\
 & hY_{kr} \leq \sum_{i=1}^n \lambda_i Y_{ir}, & r = 1, 2, \dots, R \\
 & \lambda_i \geq 0, & i = 1, 2, \dots, N
 \end{aligned} \tag{1}$$

where λ_i is the weight of a single DMU, $i = 1, 2, 3, \dots, N$; X_{ij} is the j th input of DMU i , including the number of buses for transportation services, the number of drivers, and the quantity of gasoline used; h_k indicates that, considering the input levels of DMU k as X_{kj} , output should increase as $h_k Y_{kr}$ if X_{kj} is used efficiently. Consequently, the relative technical efficiency is estimated as

$$TE = \frac{1}{h_k} \tag{2}$$

When $h_k = 1$, the DMU k is at the efficiency frontier. In other words, the DMU has optimal efficiency. However, if $h_k > 1$ ($TE < 1$), the production of DMU k is comparatively inefficient. By including the convexity constraint $\sum_{i=1}^n \lambda_i = 1$ in this model, it becomes the output-oriented BBC model. Therefore, a TE value below 1 indicates that, even if all current inputs (both variable and fixed) were used efficiently, the output is less than optimal. By including the convexity constraint $\sum_{i=1}^n \lambda_i = 1$ in this model, it becomes the output-oriented BBC model.

In these models, when $h_k = 1$, the DMU k is at the efficiency frontier. In other words, the DMU has optimal efficiency. However, if $h_k > 1$, the production of DMU k is comparatively inefficient.

Malmquist Productivity Index

According to Färe et al. (1994), the Malmquist productivity change index ($M(\cdot)$) of a DMU can be defined as

$$M(Y^{t+1}, X^{t+1}, Y^t, X^t) = \left[\frac{D_o^t(X^{t+1}, Y^{t+1})}{D_o^t(X^t, Y^t)} \frac{D_o^{t+1}(X^{t+1}, Y^{t+1})}{D_o^{t+1}(X^t, Y^t)} \right]^{\frac{1}{2}} \tag{3}$$

where $D_t^0(X_t, Y_t)D_o^t(X^t, Y^t)$ and $D_{t+1}^0(X_{t+1}, Y_{t+1})$ are the output orientation distance functions of this DMU, which represent the relative production efficiency at time t ; $t+1$ is the inverse output orientation of CCR TE. $D_{t+1}^0(X_t, Y_t) D_o^{t+1}(X^t, Y^t)$ and $D_t^0(X_{t+1}, Y_{t+1})$ represent the relative production efficiency of input/output at time t and $t+1$ and compared to the production frontier input/output at time $t+1$ and t . If $M(Y_{t+1}, X_{t+1}, Y_t, X_t)$ is higher (less) than 1, the DMU productivity increases (declines). In addition, under the assumption of CRS, we can decompose the Malmquist index as the product of technical change (TECH) and TE change (TEEFFCH):

$$M(Y_{t+1}, X_{t+1}, Y_t, X_t) = \frac{D_{t+1}^0(X_{t+1}, Y_{t+1})}{D_t^0(X_t, Y_t)} \left[\frac{D_t^0(X_{t+1}, Y_{t+1})}{D_t^0(X_t, Y_t)} \frac{D_{t+1}^0(X_{t+1}, Y_{t+1})}{D_{t+1}^0(X_t, Y_t)} \right]^{\frac{1}{2}} \quad (4)$$

where

$$TECH = \left[\frac{D_t^0(X_{t+1}, Y_{t+1})}{D_t^0(X_t, Y_t)} \frac{D_{t+1}^0(X_{t+1}, Y_{t+1})}{D_{t+1}^0(X_t, Y_t)} \right]^{\frac{1}{2}} \quad (5)$$

$$TEEFFCH = \frac{D_{t+1}^0(X_{t+1}, Y_{t+1})}{D_t^0(X_t, Y_t)} \quad (6)$$

TECH represents the production frontier shift; if the value is higher (lower) than 1, the DMU production technology increases (declines). TEEFFCH represents the changes of DMU resource management capability. When the value of TEEFFCH is higher (lower) than 1, the production technology is closer (farther) to the optimal at time $t+1$ than at time t .

Furthermore, by applying the TE of a DMU with the assumption of variable returns-to-scale, TEEFFCH can be decomposed as the product of pure technical efficiency change (PTECH) and scale efficiency change (SECH), which are defined as

$$PTECH(VRS) = \frac{D_{t+1}^0(X_{t+1}, Y_{t+1}|VRS)}{D_t^0(X_t, Y_t|VRS)} \quad (7)$$

$$SECH(VRS) = \frac{\frac{D_{t+1}^0(X_{t+1}, Y_{t+1}|CRS)}{D_{t+1}^0(X_{t+1}, Y_{t+1}|VRS)}}{\frac{D_t^0(X_t, Y_t|CRS)}{D_t^0(X_t, Y_t|VRS)}} \quad (8)$$

where $D_t^0(X_t, Y_t|VRS)$ and $D_{t+1}^0(X_{t+1}, Y_{t+1}|VRS)$ are the distance functions under VRS assumptions, which equal the inverse of TE values in BBC model at time t and $t+1$. PTECH (VRS) measures whether the input and output efficiency increases from t to $t+1$, thus, it is also known as management efficiency change. If the value of PTECH (VRS) is higher (lower) than 1, the pure technical (management) efficiency of a DMU has improved (worsened). Conversely, SECH (VRS) refers to the proximity of the DMU's current production scale to the optimal long-term production scale. If the value of SECH (VRS) is larger (smaller) than 1, the production scale at time $t+1$ is closer (further) than the scale at time t .

Dynamic Panel Data Model

The general panel data regression form is as follows:

$$y_{it} = \beta' X_{p,it} + \alpha y_{it-1} + \mu_i + \omega_t + \varepsilon_{it} \forall i, t. \quad (9)$$

where y_{it} represents the Malmquist productivity change index of firm i at time t ; $X_{p,it}$ is the vector of all exogenous explanatory variables which are different from the input variables in DEA models. We also included the lagged variable y_{it-1} to facilitate the autocorrelation of the Malmquist index. Because of the involvement of this variable, (9) became a dynamic panel data model. Typically, we assumed that the absolute value of α was less than 1; however, it is determined by economic activity. If the estimation results for this parameter are significant, it indicates that the effectiveness of the FBS productivity changes continued intertemporally. The definition of u_i , w_i , and ε_{it} differ from the notations of the general panel data model; instead, they represent the effects of FBS companies, time effects, and error terms, respectively.

For the estimation of (9), we adopted the system generalized method of moments (system GMM) approach used by Arellano and Bover (1995) and Blundell and Bond (1998). The difference between system GMM and the difference generalized method of moments (difference GMM) proposed by Arellano and Bond (1991) is that the instrument matrix of system GMM contains not only the difference form of variables, but also the level form, whereas difference GMM contains only the difference form of variables. Thus, system GMM requires the following

orthogonal conditions: $E(Z'_{di,s}\Delta\varepsilon_{it}) = 0$, $E(Z'_{li,s}\Delta\varepsilon_{it}) = 0$, and $s < t$.^{vi} $Z_{si,s}$ in (10) is the instrument matrix of orthogonal conditions in difference GMM:

$$Z_{di,s} = \left[\left(\begin{bmatrix} y_{i1} & X_{i1} & 0 & 0 & 0 & 0 & \dots & 0 & \dots & 00 & \dots & 0 \\ 0 & 0 & y_{i1}y_{i2} & X_{i1} & X_{i2} & \dots & 0 & \dots & 00 & \dots & 0 \\ \vdots & & \vdots & & \vdots & & & & & \vdots & & \\ 0 & 0 & 0 & 0 & 0 & 0 & \dots & y_{i1} & \dots & y_{it-2}X_{i1} & \dots & X_{it-2} \end{bmatrix} \right) \right] \quad (10)$$

As shown in (10), the explained and explanatory variables at and before the $t-2$ period are instrumental variables in the instrument matrix. Difference GMM is estimated based on this matrix. To estimate system GMM, (11) must be included in the estimation process.

$$Z_{di,s} = \left[\left(\begin{bmatrix} \Delta y_{i1} & \Delta X_{i1} & 0 & 0 & 0 & 0 & \dots & 0 & \dots & 00 & \dots & 0 \\ 0 & 0 & \Delta y_{i1}\Delta y_{i2} & \Delta X_{i1} & \Delta X_{i2} & \dots & 0 & \dots & 00 & \dots & 0 \\ \vdots & & \vdots & & \vdots & & & & & \vdots & & \\ 0 & 0 & 0 & 0 & 0 & 0 & \dots & \Delta y_{i1} & \dots & \Delta y_{it-2}\Delta X_{i1} & \dots & \Delta X_{it-2} \end{bmatrix} \right) \right] \quad (11)$$

Additionally, (11) is the instrument matrix that contains the Δy_{i1} and ΔX_{i1} at and before the $t-2$ period. System GMM uses (10) and (11) to estimate the parameters of (9).

Empirical Results

Data process and descriptive statistics

Table 1 shows descriptive statistics of the variables used in the estimation processes of DEA, Tobit, and system GMM dynamic panel data regression. Passenger-kilometer was used as the output variable, and the number of buses, number of drivers, and gasoline consumption were used as input variables for the DEA model. Other data were applied as exogenous variables in Tobit and system GMM dynamic panel data regression. The data used in this study was at the firm level and collected from the statistical yearbooks of the National Federation of Bus Passenger Transportation in Taiwan from 2006 to 2011. We reorganized the raw data and focused solely on bus companies that offered FBS. We examined the bus companies that operated in the FBS industry throughout 2006 to 2011. Firms that left the market or entered the market during this period were eliminated. Our dataset adopted the panel data form and contained 32 FBS companies after deleting 7 firms with missing or incomplete data.

Briefly, the input and output variables of the DEA model must be in quantities used during the production process and not in monetary form. Excluding the number of drivers, the variable values specific for FBS were obtained directly from the statistical yearbooks. Then, we averaged the ratios of the number of FBS buses/total number of buses and the number of FBS vehicles/total number of vehicles to determine the percentage of FBS drivers. We multiplied this value with the total number of drivers for each firm to obtain the number of FBS drivers. The other exogenous variables counted in their monetary form were depreciated using the traffic price index provided by the Directorate General of Budget, Accounting, and Statistics, Executive Yuan, Taiwan.^{vii} The base year was set as 2006.

Market share was calculated using the revenues of bus firms that offered FBS services by dividing the number of passengers by the total revenue of the FBS industry. The result was multiplied by 100 and then squared to provide the index used in this study. For the diversity variable, we first summed the revenue of the general intercity bus, urban bus, highway bus, and tour bus services divided by the squared value; the total value was then inversed and multiplied by 100. Thus, the lowest value of this variable was 100, which indicates that a company only offered one of the four bus service types. The higher the value of this variable, the greater the firm diversity is. Total sales expenses were calculated based on salespersons' salaries and business

promotion costs. Similarly, total management expenses were calculated based on the salaries of management personnel and business management costs. Table 1 shows the descriptive statistics of all variables used in this research. Total observations are 224 (32 FBS firms×7 years). We find that the standard deviations are very large. There are two reasons for this phenomenon. One is that our data is in the form of panel data. Thus the distance between an observation i at time t and the overall mean in table 1 includes that distance between the observed value of observation i and group mean at time t and the distance between the group mean at time t to the overall mean in table 1. Two differences possibly exaggerate its calculated variance (and standard deviation) eventually. The other reason is that the high variability of data could be attributed to the tremendous influences resulted from the entrance of THSR, which resulted in immense changes of market in FBS industry.

Table 1. Descriptive statistics of variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
Passenger-km(billion)	224	222.1084	578.8819	0.248823	3015.412
Bus	224	96.47179	210.9193	1	1083
Gasoline (l)	224	4394538	9773634	18563	50900000
Driver	224	103.7446	223.4293	1	1015.274
Market share	224	56.44189	193.0203	0	1184.767
Diversity	224	158.0642	67.26538	100	650.31
ln (sales expenses)	224	16.71548	1.441279	10.78941	19.71247
ln (management expenses)	224	16.88235	1.333462	11.82	19.74922
Assets (billion NT\$)	224	1072.337	1121.569	13.23431	5183.153
Catipal/Assets	224	0.50136	0.57356	0.00107	3.04155

Source: *Yearly Operation Statistics of National Federation of Bus Passenger Transportation of Taiwan(R.O.C.), 2005-2011.*

Analysis of the Malmquist index

Regarding the Malmquist index and its decomposition, our estimation results are showed in Table 2 and Figs. 2 and 3. For Table 2, the Malmquist index, TECH, and TEEFFCH were estimated under CRS assumptions, whereas PTECH and SECH are decompositions of the TEEFFCH under VRS assumptions. The estimated values in Table 2 show that the Malmquist index increased in 2006/2007

compared to 2005/2006. However, from 2007/2008, the Malmquist index decreased to lower than the level in 2005/2006, indicating that the competitiveness of the FBS industry decreased in the longer term after the emergence of the THSR. Finally, it recovered to be higher than 1 in 2011. To sum up, even the FBS industry is not dead after the entrance of THSR, its productivity decreased gradually in the first few years and recovered after a longer time passed. The conventional economics indicates that the new competition in the market will improve the productivity of incumbent firms or industries. Our empirical results support the predicted productivity impacts of conventional economics of the competition brought by a new entrant industry on incumbent firms or industries, but it happens in the longer time period.

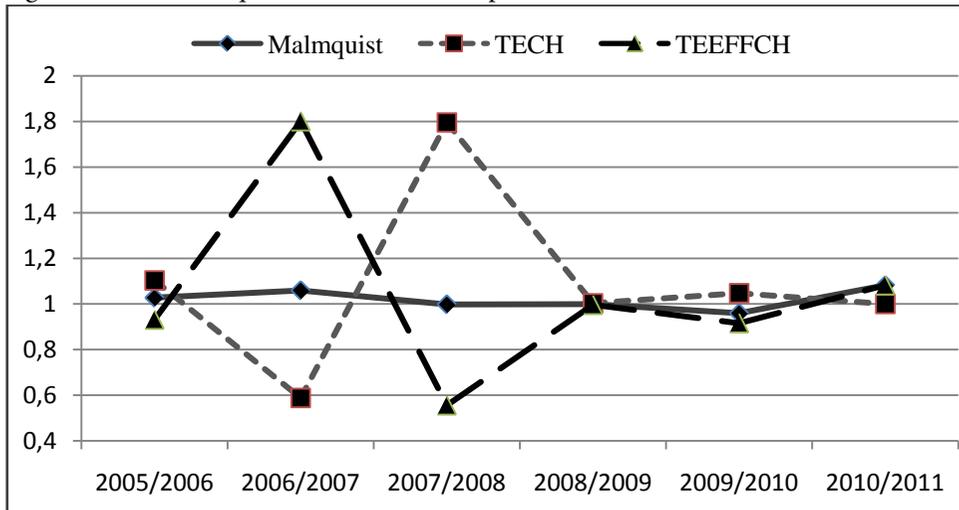
The changes of Malmquist decomposition indices are also very significant in 2005-2011. In 2006/2007, after the entrance of the THSR, the FBS industry increased its productivity by adjusting its resource management instead of production technology, as shown by the high TEEFFCH level (1.80) and the low TECH level (0.59). However, this situation was reversed in 2007/2008. After adjusting its resource management in 2007, the FBS industry improved its productivity by shifting its production technology, which is demonstrated by a comparatively lower TEEFFCH level (0.556) and a higher TECH level (1.79). This strategy lasted from 2008-2011. In summary, the analysis results show that, in response to the emergence of the THSR, the FBS industry first rearranged its internal resource management (production function) and then adjusted production technology to improve its productivity and maintain competitiveness with the THSR.

Table 2. The Malmquist productivity index and decompositions: industry

Year	Malmquist (TFP change)	TECH	TEEFFCH	PTECH		SECH	
				I-O	O-O	I-O	O-O
2005/2006	1.0277	1.1034	0.9315	1.0543	1.1088	1.0465	0.9951
2006/2007	1.0593	0.5881	1.8013	0.7737	0.6998	0.7601	0.8404
2007/2008	0.9980	1.7960	0.5557	1.2733	1.4392	1.4105	1.2479
2008/2009	0.9993	1.0031	0.9962	1.0568	1.0461	0.9492	0.9589
2009/2010	0.9592	1.0475	0.9157	0.9887	0.9968	1.0594	1.0509
2010/2011	1.0821	1.0001	1.0001	0.9339	0.9233	1.0709	1.0832

Note: I-O and O-O represent the input orientation and output orientation, respectively; TFP represents total factor productivity.

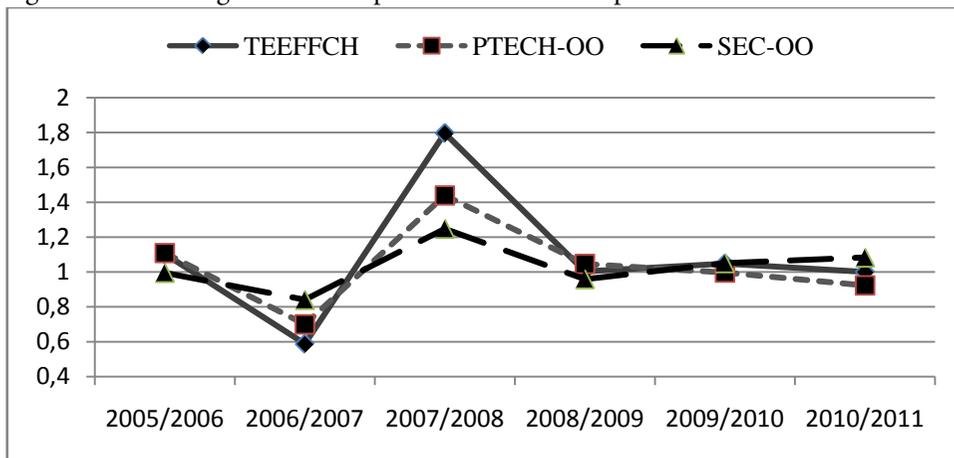
Figure 2. The Malmquist index and decompositions under CRS



Source: Table 2

For the decompositions of TEEFFCH, the PTECH and SECH in 2006/2007 were obviously lower than the values in 2005/2006, which reflects the negative impact of the THSR's emergence in 2007. Fortunately, these indices not only recovered but also surpassed their levels prior to the entry of the THSR, improving TEEFFCH in 2008. After 2008, these indices improved slightly, indicating that the development of TEEFFCH was stable because no sudden shocks occurred. Finally, the scale efficiency gradually lead the improvement of TEEFFCH from 2009.

Figure 3. The change and decomposition of TE in output-oriented VRS



Source: Table 2

Now we move our focuses to the productivity changes of the first two large FBS companies in Taiwan, the UBUS and Kuo-Kuang Motor (K-K Moter). We showed their self-own and aggregate market share on Table 3. We find that their aggregated market share was decreasing, except in year 2008. We cannot conclude that this decreasing trend of their aggregate market share was resulted from the entrance in 2007 directly because Taiwan’s macro-economy was also attacked by the global financial tsunami from 2008. The slumped economy had not yet totally recovered to the level before 2008. The worse economy in Taiwan might also decreases their market demands and market shares in advance.

Table 3. Market Share Change of Kuo-Kuang Motor and UBUS (%)

Company	UBUS	K-K Moter	Total
2005	33.48	27.78	61.26
2006	34.42	24.98	59.40
2007	29.81	25.42	56.23
2008	31.05	28.21	59.26
2009	29.55	26.40	55.95
2010	26.24	27.43	53.67
2011	25.55	26.85	52.40

Source: calculated from *Yearly Operation Statistics of National Federation of Bus Passenger Transportation of Taiwan(R.O.C.), 2005-2011*.

As for their productivity changes in 2005-2011, we find that the K-K Motor and UBUS also improved their resource management in 2006/2007 as facing the entrance of THSR and then shifted their production technology in 2007/2008. This is consistent with the actions taken from the perspective of whole industry. In addition, the K-K Motor continuously improved its productivity from 2008 through the shifting of technology.

Table 4. The Malmquist productivity index and decompositions: Kuo-Kuang Motor and UBUS

Year	Malmquist (TFP change)		TECH		TEEFFC H		PTECH				SECH			
							I-O		O-O		I-O		O-O	
Company	K-K	UBU	K-K	UBU	K-K	UBU	K-K	UB	K-K	UB	K-K	UBU	K-K	UBU
2005/2006	1.0409	0.713	1	1	1.0409	0.713	1	1	1	1	1	1	1	1
2006/2007	0.8733	1.0277	0.5894	0.5608	1.4817	1.8324	1	1	1	1	0.5894	0.5608	0.5894	0.5608
2007/2008	0.8252	1.0148	1.4844	1.7831	0.5559	0.5691	0.8751	1	0.875	1	1.6963	1.7831	1.6965	1.7831
2008/2009	1.1525	1.0179	1.0729	1	1.0741	1.0179	1.0732	1	1.0732	1	0.9997	1	0.9997	1
2009/2010	0.9124	0.904	1.0046	1	0.9083	0.904	1.027	1	1.0327	1	0.9781	1	0.9728	1
2010/2011	1.0249	1.0979	0.9307	1	1.1012	1.0979	0.9193	1	0.9308	1	1.0124	1	1	1

Note: I-O and O-O represent the input orientation and output orientation, respectively; TFP represents total factor productivity. K-K: Kuo-Kuang Motor.

Dynamic Panel Data Regression

Finally, this study explored the factors influencing the Malmquist index values. We used two estimation methods to estimate the dynamic panel data regression, namely difference GMM and system GMM. The estimated results are shown in Table 3. The Wald test results are significant in for both regression models, indicating that the estimation of these models is adequate. However, the results of the Sargan test are not significant but support H_0 , which suggests that the constraints are valid and the models are not over identified. Finally, the Arellano-Bond test results revealed the optimal period lagged dependent (explained) variables, which were included in the DPD model as lagged period 1. Finally, the estimated Malmquist index parameter at $t-1$ for system GMM is higher than that for difference GMM. According to Blundell and Bond (2000), this finding indicates that system GMM is more suitable for the DPD model compared to difference GMM because the values of estimated parameters of Malmquist index at $t-1$ in system GMM is less than the one in difference GMM (Blundell and Bond, 2000). Thus, we explored the variables that are significant to the system GMM estimation process.

According to the estimated results of system GMM shown in Table 5, the Malmquist index parameter at $t-1$ negatively influenced the Malmquist index at t , which indicates that the effectiveness of FBS productivity changes continued from time $t-1$ to t , but negatively influenced the productivity changes in the following period. The variable of year 2007 influenced the productivity changes of FBS companies positively and significantly, which means that the entrance of a new transport mode in a specific transportation corridor market stimulates the productivity of the established modes. According to our discovery in section 4.2, it showed that the FBS industry increased its productivity by adjusting its resource management instead of production technology. In addition, the significantly and negatively estimated result for the diversity variable suggests that FBS companies should increase their specialization by offering fewer types of bus services. Furthermore, the estimated results also showed that FBS companies should increase their sales and management expenses to improve productivity. Finally, the more assets an FBS company owns, the higher their productivity improvement is, because more assets provide an FBS company with more resources to adopt strategies for improving productivity. Finally, capital/asset ratio of an FBS company positively influences its productivity significantly. Usually, the capital is used by FBS companies as one of the inputs to offer services. The higher level of capital/asset ratio indicates the FBS companies leave more resources for the managers to employ as

facing the market competition. With the support of capital resource to manage a FBS company, a manager could operate will higher degree of freedom in management and result in a higher productivity.

Table 5. Estimation results of dynamic panel data regression

Variable		Difference GMM	System GMM
Constant		-5.8808**(-7.44)	-4.6782**(-11.49)
Malmquist index at t-1		-0.1298**(-13.02)	-0.1524**(-19.69)
2007		0.1173**(2.72)	0.1050**(4.28)
Market share		-0.276e-06(-0.02)	-0.00003(-0.30)
Diversity		-0.0002(-0.56)	-0.00098**(-4.26)
ln (sales expenses)		0.2350**(10.14)	0.1973**(14.99)
ln (management expenses)		0.1796**(5.80)	0.1595**(9.41)
Assets		8.90e-11(1.38)	4.99e-12**(0.13)
Capital/asset ratio		0.1276(1.42)	0.1512**(2.43)
Wald (χ^2) ($p(\chi^2 > \text{Wald}(\chi^2))$)		358.86**(0.00)	1434.31**(0.00)
Sargan test	χ^2 (p-value)	18.4549 (0.1410)	18.9623 (0.3941)
Arellano-Bond test Z (p-value)	First order	-1.6322(0.1026)	-1.6303 (0.1030)
	Second order	0.0985(0.9216)	0.1748(0.8612)

Note: * represents a 10% level of significance; ** represents a 5% level of significance. The Sargan statistical test results was used to investigate model overidentification. The Arellano-Bond test was used to determine whether autocorrelation existed in the error terms.

Conclusion and Suggestions

This study investigated the productivity changes of Taiwan's FBS industry in response to competition from the entrance of THSR. We use Malmquist index to understand the productivity level and applied the DPD regression to identify the factors influencing the productivity changes. Our results indicate that the FBS industry generally increased its productivity by improving its resource management in 2007 and adjusting its production technology (production function) in 2008 after the THSR's entrance into the north-south intercity transportation market in western Taiwan in 2007. In addition, the aggregate market share of first 2 large FBS firms, UBUS and K-K Moter, decreased more than 3% in 2007 and continuously to lower down after 2008. As regarding the factors influencing its productivity, the lagged Malmquist index ($t-1$) and service diversity would decreased the productivity level and year 2007, sales and management expenses, assets, and the capital/asset ratio could positively influence the Malmquist index values. Finally, the estimated results also indicated that the DPD of system GMM was superior to the difference GMM.

According to our estimated results, to increase the productivity, the FBS firms are better to increase the sales and management expense, amount of asset, and capital/asset ratio to support the firms' adjustment in response to the challenge brought by market competition, such as the entrance of THSR. They also should concentrate on less service categories and be more specialized in a specific bus service instead of offering diverse activities. In other words, there is no economy of diversities (scopes) for FBS industry in our observation periods.

As regarding the transportation policy, this study demonstrates that the entrance of new transportation services will lower the productivity of incumbent industry for several years and get improved later. The losing competitiveness in the market of FBS industry in the first 4 years (2007-2010) of THSR's entrance implied that the incumbent industry might disappear in the long run if it cannot find ways to reverse the situation. From this perspective, the policy for introduction of new transportation mode might have to evaluate and assess more before constructing it to prevent the damage imposed on the incumbent ones. However, our empirical results of total factor productivity of FBS industry slightly increased in 2011. It implies that, as long as the incumbent industry could sustain and survive long enough after the entrance of new competition industry, the incumbent industry could regain its competitiveness after a longer period. It also implies that the observation period is an important issue. If we can extend the observation period as long as possible, the impacts of THSR on the productivity of FBS industry might be consistent with the prediction of conventional industrial economics: the introduction of a new industry could improve the productivity of incumbents.

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ⁱⁱ Please refer to the introduction of THSR on Wikipedia: Taiwan High-Speed Rail, http://en.wikipedia.org/wiki/Taiwan_High_Speed_Rail. (Last retrieval on 12/19/2013).

ⁱⁱⁱ In this study, the original NPV was estimated for 2001 through to 2033 under a 6% discount rate and 3% GDP growth.

^{iv} The market share of domestic airlines was 24.95% for the Taipei-Kaohsiung route, 11.44% for the Taipei-Tainan route, 4.10% for the Taipei-Chiayi route, and 0.20% for the Taipei-Taichung route. After the emergence of the THSR in January 2007, the domestic airlines' market shares for these routes decreased to 13.00%, 7.66%, 1.64%, and 0.01%. By April 2008, their market share had declined further to 4.97%, 2.20%, 0%, and 0%. The domestic airline industry serving air routes between cities in western Taiwan was almost destroyed. The railway industry's market share for these routes was also impacted by the THSR. Consider the Taipei-Kaohsiung route for example, the railway industry's market share declined from 9.71% in April 2006 to 5.31% in April 2007 and 2.50% by April 2008. For further details of changes in market share after the entrance of the THSR, including other routes and transportation modes, please refer to Table 4 in Cheng (2011).

^v Another similar discussion concerns "productivity"; however, its analysis methods, such as total factor productivity (TFP), differ significantly from those of DEA. For efficiency analysis, DEA and stochastic frontier analysis (SFA) are often employed. This study explains the basic principles of DEA only. For further information regarding the difference between DEA and SFA, please refer to Cullinane et al. (2002). Generally, compared to SFA, estimates of the production function and probability distribution of disturbance are not required when applying DEA. Especially when an analysis comprises multiple outputs and inputs in an analysis, the calculation of DEA is significantly easier than that of SFA. However, DEA always assumes that a firm cannot achieve optimal production because of inefficient inputs

and outputs without considering other factors, such as the measurement errors of inputs and outputs; therefore, it may exaggerate the level of production inefficiency.

^{vi} According to Blundell and Bond (2000), whether the results of system GMM estimation are more precise than those of the difference GMM depends on whether the estimated parameter of the explained variables lagged by one period in system GMM is higher than that in difference GMM.

^{vii} Please refer to the website

(<http://ebas1.ebas.gov.tw/pxweb/Dialog/statfile1L.asp?lang=1&strList=L>) for the National Statistics of Taiwan (lasted retrieved on 12/19/2013). We recalculated the traffic price index after eliminating items related to the communication tools.



An Empirical Study on Organizational Infusion of Green Practices in Chinese Logistics Companies

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Abstract: *As environmental considerations have become a fundamental part of business strategies, there is a challenge for managers and academicians to explore the integration of environmental concepts and business operations. Although a number of studies on green practice adoption can be found in the literature, few of them analyzed the infusion of green practices in organizations. Furthermore, most prior research of green management focused on manufacturing sectors; scarce attention was paid on research in service sectors. This paper focuses on the green practice infusion in logistics companies because many logistics operations often lead to several environmental impacts. The main purpose of this paper is to explore the factors that affect organizational infusion of green practices in Chinese logistics companies. Drawing on the innovation diffusion theory, this paper groups the determinant factors into technological, organizational and environmental dimensions. We explored the influences of determinant factors on green practice infusion by conducting a questionnaire survey on logistics companies in China. The regression analysis is used to test proposed research hypotheses in the study. Research findings reveal that complexity, compatibility and relative advantage of green practices, quality of human resources, organizational support, governmental support and regulatory pressure exhibit significantly influences on green practice infusion for the logistics companies in China. The influences of adoption cost, company size, environmental uncertainty and customer pressure on logistics companies' green behavior are not significant. This paper can extend the scope of research on green management in service industries and green practice infusion.*

Keywords: *Green practice infusion, Logistics companies, Determinant factors, China*

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Introduction

To pursue sustainable development, many companies are attentive to enhancing their competitiveness through improvements in the environmental performance and mitigating the environmental impact of their production and service activities. As implementing green practices can be regarded as an important means of solving firms' environmental problems, it is particularly important to learn more about the factors influencing green practice implementation. Green management also becomes critical concerns of business research. Many researchers have surveyed firms' implementation of environmental management practices, and proposed various explanations as to what factors influence firms' adoption of green practices. However, scarce attention has been paid on analyzing the infusion behaviors associated with green practices.

Companies may be able to achieve considerable environmental performance by successfully implementation green practices into their work systems. Green practice implementation is a multiphase process consisting of adoption and infusion phases (Winn and Angell, 2000). Infusion refers to the extent to which an innovation's features are in widespread usage in a complete and sophisticated way (Fichmen 2001; Yan and Fiorito, 2007). Green practice infusion is the incorporation of green practices into work structures. Successful implementation of green practices requires significant involvement in developing operational responses to environmental issues. It is important to understand the infusion of green practices within organizations. Some researchers have analyzed the infusion of green practices within organizations, concerning with the extent to which these practices have been implemented (Fussel and Georg, 2000; Stead et al., 1998; Winn and Angell, 2000). However, these studies focused on exploring the infusion process of green practices within an organization. Much remains to be learned empirically about the factors influencing organizational infusion of green practices.

To fill the research gap, this paper studies the infusion of green practices in Chinese logistics service providers. This study focuses on the logistics industry because many logistics operations often lead to several negative environmental impacts. Although there is a burgeoning body of literature concerning with environmental issues in a variety of business disciplines such as manufacturing and marketing, the corresponding literature involving logistics has been still small but expanding (Gunasekaran and Cheng, 2008; Murphy and Poist, 2000). Furthermore, while China continues to develop into a global manufacturing base and a huge consumer

market, it suffers from various serious environmental problems such as air pollution, energy waste, and water pollution. Several researchers have investigated the implementation of environmental management in Chinese manufacturing companies. Scant attention has been paid to the environmental issues in Chinese service sectors.

The main purpose of this paper is to study the factors that affect organizational infusion of green practices in Chinese logistics service providers. An understanding of the determinant factors of green practice infusion is essential for researchers to best understand the issues that need to be addressed as well as for practitioners to best implement green practices. Due to the lack of research on determinants of organizational infusion of green practices, this paper can broaden the scope of research on environmental management by providing some explanations as to what factors influencing green practice infusion. Furthermore, as the implementation of green practices not only relates to the logistics industry, but also needs the attention of the government, manufacturers and consumers, verifying possible factors influencing the organizational infusion of green practices can give the government some valuable suggestions in designing environmental policies for the logistics industry, and help manufacturers, consumers, and logistics service providers themselves appreciate the drivers and barriers to implementing green management practices.

Literature Review

Organizational infusion of green practices

To achieve environmental performance, many companies attempt to implement several green practices. Applying environmental criteria into corporate operations requires exploring new resource combinations and deploying existing resources in new ways (Hart, 1995). Green practice implementation involves using new or modified processes and techniques to reduce environmental harms. As innovation is the use of new technical and administrative knowledge (Kimberly and Evanisko, 1981; Damanpour, 1991), the implementation of green practices can be regarded as an innovation process. Several researchers (e.g., Hansen et al., 2002; Henriques and Sadorsky, 2007; Lin and Ho, 2011; Rothenberg and Zyglidopoulos, 2007; Ziegler, and Seijas Nogareda, 2009) have analyzed environmental issues from the perspective of innovation.

From the innovation diffusion perspective, implementing innovations is a multiphase process and has been divided into a variety of phases (Damanpour and Schneider, 2006; Rogers, 2003). Innovation diffusion is a stage-based process of spreading a new technology within a universe of potential adopters. The adoption of an innovation does not guarantee that there is a widespread usage of the innovation within the organization to fulfill the full potentials of the innovation. A new technology may be introduced with a great enthusiasm and widespread initial acquisition; nevertheless it may fail to be thoroughly deployed among many firms (Fichman and Kemerer 1999).

Cooper and Zmud (1990) suggest a six-stage model of innovation diffusion, consisting of (1) initiation: scanning organizational problems, collecting and evaluating the information for innovation solutions, and finding the “right” innovation application for the organization, (2) adoption: getting organizational support and resource commitment for innovation implementation by negotiation, (3) adaptation: installing the innovation application, adjusting both the innovation and organizational procedures to achieve a good fit, and preparing employees to use the innovation, (4) acceptance: encouraging employees to commit to using the innovation application in their work, (5) routinization: using the innovation application to become a part of the working procedures and employees’ habit, and (6) infusion: using the innovation application in a more integrated manner to obtain its full potential in supporting the organization’s work. Rogers (2003) summarizes that the adoption process of innovations can be grouped into three more general phases of pre-adoption, adoption decision, and post-adoption. Zhu, Kraemer and Xu (2006) simplified above six stages into three stages of initiation, adoption, and infusion. Damanpour and Schneider (2006) suggest a three-stage model of diffusion process consisting of initiation, adoption decision, and infusion.

Like the implementation of other kinds of innovation, green practice implementation is also a process consisting of multiple stages, i.e. initiation activities, the managerial decision to adopt the green practices, and infusion activities. Companies may be able to achieve considerable environmental performance by successfully diffusing green practices into their work systems in all diffusion stages (Fussel and Georg, 2000). Winn and Angell (2000) address that corporate greening starts with top management awareness of the need for corporate responses to environmental issues, leads to policy commitment, and ideally, ends with implementation at the operational level. The infusion stage is the conclusion of technology implementation and is a post-adoption behavior. It means that

technology has been embedded and routinized in organization (Chang and Lung, 2002). Green practice infusion is the incorporation of green practices into work structures.

Infusion refers to the extent to which an innovation's features are in widespread usage in a complete and sophisticated way (Fichmen 2001; Yan and Fiorito, 2007). The extent to which innovation infusion is reached is positively related to the performance of the work that the innovation supports (Yu et al., 2009; Taylor and McAdam, 2004). Successful implementation of green practices requires significant involvement in developing operational responses to environmental issues (Stead et al., 1998). It is important and necessary to understand the infusion of green practices within organizations.

Prior literature has focused more on the issues of green management adoption decision. For example, Del Brio and Junquera (2003) summarized some factors influencing green innovation in small and medium-sized enterprises, including financial resources, management style, human resources, manufacturing activity, technological approach, innovative capacity, and external cooperation. Rothenberg and Zyglidopoulos (2007), in a study of the printing industry, found that the adoption of green innovations was positively associated with the dynamism of the company's task environment. Henriques and Sadorsky (2007) found that total quality management and external stakeholder pressure would increase the likelihood that Canadian manufacturing companies implement cleaner technical innovations. Liu et al. (2010) argue that Chinese firms' adoption of green practices is influenced by the coercive pressure from the organizations holding mandatory power, normative pressure from the industrial association and the public, and mimetic pressure from the competitors. Stakeholder pressure, environmental regulation, company size, managers' characteristics, human resources and industry sector are relevant variables frequently appeared in studies on green practice adoption decision (Etzion, 2007; Gonzalez-Benito and Gonzalez-Benito, 2006).

Little attention has been paid on analyzing the infusion behavior associated with green practices. Some researchers have analyzed the infusion of green practices within organizations, concerning with the extent to which these practices have diffused (Fussel and Georg, 2000; Stead et al., 1998; Winn and Angell, 2000). However, these studies focused on exploring the infusion process of green practices within an organization. Fussel and Georg (2000) explore how an environmental management tool becomes embedded in a Danish public university hospital,

including how a green idea travels from one setting to another and becomes an object, how the green idea is translated and mobilized into action by the hospital managers and made to perform in different contexts, and how hospital managers develop a new sense of identity. Stead et al. (1998) suggest that infusion (institutionalization) is a pivotal organizational process which determines whether a firm's environmental performance results in improved operating efficiency and market opportunities or in increased legal and regulatory hassles. In a study of the implementation of the 1991 German Packaging Ordinance, Winn and Angell (2000) propose an internal process model of corporate greening that integrates policy commitment and implementation dimensions. Corporate greening process starts with awareness of the need for corporate responses to environmental issues, leads to policy commitment and, ideally, ends with infusion (implementation) at the operational level.

Although Christmann and Taylor (2006) and Darnall (2006) have analyzed the factors influencing a firm's decision to totally or partially mandate its operational units to certify to ISO 14001, they did not explore the degree of infusion of environmental management practices within the organizations. In a study of Chinese companies, Christmann and Taylor (2006) conclude that ISO-certified companies in China select their level of compliance depending on customer preferences, customer monitoring, and expected sanctions by customers. Drawing on institutional theory and the resource-based view of the firm, Darnall (2006) analyzes the influences of regulatory pressures, market pressures, complementary resources, experiences with quality management systems, and experiences with pollution prevention on U.S. firm's decision in mandating ISO 14001 totally or partially. These two studies focused on the adoption decision regarding to whether a firm implements ISO 14001 substantively. A review on current research on environmental management reveals that, up to date, there is no literature give an analysis on the factors influencing infusion of green management practices in organizations.

Factors influencing organizational infusion of green practices

To fill the research gap, this paper attempts to study the factors affecting the infusion of green practices in Chinese logistics service providers. Although a body of research has proposed several factors influencing green practice adoption, factors affecting adoption decision may actually have the opposite effects upon infusion behavior (Cooper and Zmud, 1990; Damanpour and Schneider, 2006; Tornatzky and

Fleischer, 1990; Zhu et al., 2006). For example, in a study of the diffusion of Internet-based e-business innovations, Zhu et al. (2006b) address that firm size are positively related to e-business adoption, but negatively related to infusion. The costs in implementing innovations have been a barrier for the adoption of innovations, but the higher adoption costs could motivated the infusion of innovations in organizations (Cooper and Zmud, 1990). In general, the infusion of green practices could be influenced by a variety of factors. Because implementing green practices can be seen as an innovation process, studies on explanations as to what factors influence innovation infusion will be helpful for modeling green practice infusion in this paper.

Several studies have proposed a variety of factors influencing innovation infusion. Meyer and Goes (1988) address that organizational assimilation of innovations in hospitals is influenced by environmental, organizational, and innovation variables. According to meta-analysis results, Damanpour (1991) conclude that organizational innovation is significantly associated with a firm's specialization, functional differentiation, professionalism, centralization, managerial attitude toward change, technical knowledge resources, administrative intensity, slack resources, and external and internal communication. Fichman and Kemerer (1997) explore the influence of organizational learning capability on the infusion of software process innovations. Eder and Igbaria (2000) explore the influences of earliness of adoption, top management support, organizational structure, organizational size, information technology (IT) infrastructure, and IT structure on organizational infusion of intranets. Frambach and Schillewaert (2002) suggest that the determinants influencing organizational implementation of innovations include perceived innovation characteristics, adopter's organizational characteristics, and environmental influences. The availability and quality of internal resources and external knowledge, the knowledge transfer activities, and the political and legal environment are relevant for the adoption of technical innovations.

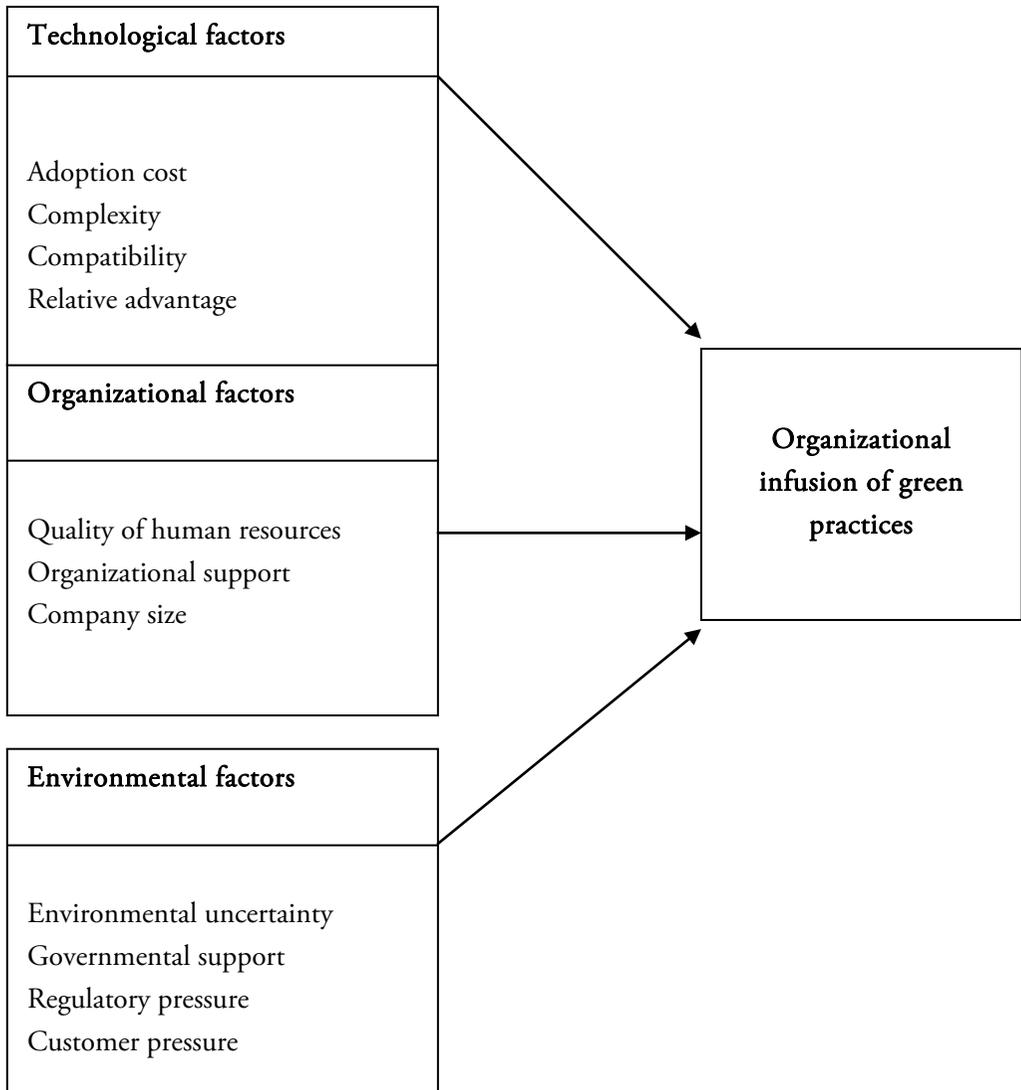
Ranganathan et al. (2004) argue that managerial IT knowledge, unit structure, supplier interdependence, competitive intensity, and IT activity intensity would affect internal infusion of Web technologies in supply chain management. In a study of public organizations in the U.S., Damanpour and Schneider (2006) analyze the influences of environmental, organizational and top managers' characteristics on the adoption and infusion of innovations in organizations. Zhu et al. (2006) suggest that technology readiness, technology integration, firm size, global scope, managerial obstacles, competition intensity and regulatory environment would influence e-

business infusion. Yan and Fiorito (2007) analyze the influences of external pressures, internal pressures, and firm size on the infusion of computer aided design/computer aided manufacturing in the U.S. textile and apparel industries. Yu et al. (2009) address that procurement process readiness, business knowledge of IT managers, organizational integration, organizational slack resources would influence the infusion of e-procurement applications.

While a variety of determinants of innovation infusion have been proposed in the previous studies, these factors can be grouped into technological, organizational and environmental context. According to the innovation diffusion theory (Rogers, 2003; Tornatzky and Fleischer 1990), a model for any innovation diffusion needs to consider different factors that can influence the inclination to use the innovation in its specific technological, organizational, and environmental contexts of an organization. The technological, organizational, and environmental (TOE) framework (Tornatzky and Fleischer, 1990) is widely used in studying innovation adoption and infusion from contextual perspectives. Lin and Ho (2011) have also utilized the TOE framework in analyzing green practice adoption decision for Chinese logistics companies; however, their study did not investigate the infusion of green practices in the firms.

The TOE framework identifies three aspects of a firm's context that have influences on innovation infusion. Technological dimension includes technology issues associated with the firms. Organizational dimension refers to descriptive measures such as company size, the quality of human resources, top management strategic behavior, and the availability of slack resources. Environmental dimension is the arena in which a firm conducts its business, including competitors, access to resources, industrial environment, and government regulations (Tornatzky and Fleischer, 1990). Therefore, based on the TOE framework (Lin and Ho, 2011), this paper attempts to study the influences of technological, organizational, and environmental factors on the infusion of green practices in Chinese logistics service providers. Figure 1 illustrates the research framework of the study. The technological factors include the adoption cost, complexity, compatibility and relative advantage of green practices; the organizational factors include quality of human resources, organizational support, and company size; and environmental factors include environmental uncertainty, governmental support, regulatory pressure, and customer pressure.

Figure 1. Research framework



Technological factors

Characteristics of an innovation such as compatibility, complexity, and relative advantage may affect innovation diffusion (Jeyaraj et al., 2006; Rogers, 2003; Tornatzky and Klein, 1982). Frambach and Schillewaert (2002) place the perceived characteristics of the innovation at the heart of their organizational innovation diffusion model. Boiral (2002) argues that characteristics of environmental knowledge are relevant in environmental management. Therefore, technological characteristics should be taken into account when analyzing the infusion of green practices. The perceived technological characteristics of an innovation can be considered as cognitive beliefs reflected in an attitude towards the innovation. Several technological characteristics of an innovation can affect its diffusion, including complexity, compatibility, relative advantage, triability, observability, ease of use, perceived usefulness, information intensity, uncertainty, and so on (Frambach and Schillewaert, 2002; Jeyaraj et al., 2006; Taylor and McAdam, 2004; Tornatzky and Klein, 1982; Zhu et al., 2006). The present study only considers adoption costs, complexity, compatibility and relative advantage because these characteristics have consistently been found to be more important in influencing innovation adoption behavior than the other characteristics (Rogers, 2003; Sia et al., 2004; Tornatzky and Klein, 1982).

Adoption costs include the required financial and human resources in implementing and using green practices. Costs have been long posited as a barrier for the adoption of innovations (Rogers, 2003; Iacovou et al., 1995; Torantzky and Klein, 1982). However, some researchers argue that high adoption costs may motivate innovation adopters to treat the innovation more seriously and implement it more actively in order to make the innovation more cost-effective (Cooper and Zmud, 1990; Rogers, 2003). Unfortunately, there is still lack of empirical evidence for this argument because previous studies on innovation infusion have not yet taken adoption costs into account. The present study argues that high adoption cost will make a firm treat the green practice more seriously and reinforce the infusion of the green practice within the firm. Therefore, the following hypothesis is proposed:

H1: Adoption cost of green practices has a positive influence on green practice infusion in Chinese logistics companies.

Complexity is the degree to which an innovation is perceived to be relatively difficult to understand and use. It will increase the difficulty in knowledge transfer and

innovation diffusion (Rogers, 2003), and is usually hypothesized to be negatively related to innovation diffusion (Tornatzky and Klein, 1982). Green practices incorporate both tacit and explicit knowledge. The tacit knowledge may be inherent in identifying sources of pollution, reacting quickly to accidental spills, and proposing preventive solutions (Boiral, 2002). It leads to the ambiguity of the practices. Ambiguity is a major barrier to the transfer of best practice within a firm (Szulanski, 1996). A firm is apt to implement innovation when knowledge is shared easily within the organization. Efficient knowledge sharing can lead to better innovative capabilities in terms of higher order learning, and consequently can improve organizational performance including environmental management effectiveness (Etzion, 2007). A green practice with high complexity contains a lot of tacit knowledge that requires laborious efforts to learn and diffuse. The difficulty in learning and sharing tacit knowledge makes it relatively difficult to infuse a green practice. Therefore, the following hypothesis is proposed:

***H2:** Complexity of green practices has a negative influence on green practice infusion in Chinese logistics companies.*

Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, experiences, and needs of the firms (Rogers, 2003). Compatibility is relevant to green practice diffusion. Because several green practices are additions to companies' current technologies and processes, diffusion of green practices is not a single event but can be described as a process of knowledge accumulation and integration. Green practices that are more compatible to a company's current technologies and processes will be more easily to be diffused within the organization. Dupuy (1997), in a study of Ontario organic chemical industry, found support for the notion that innovations that are additions to existing technology, such as abatement equipment, are most likely to adopt earlier than technologies that are more difficult to incorporate into the production process. Fit between previous experiences and environmental actions may generate a greater environmental effectiveness (Etzion, 2007). To lessen possible objection against the infusion of green practices, a company will be more likely to implement a green practice that is more compatible with the company's current operational knowledge. Therefore, the following hypothesis is proposed:

***H3:** Compatibility of green practices has a positive influence on green practice infusion in Chinese logistics companies.*

Relative advantage is the perception that an innovation is more advantageous than its substitute idea. The perceived benefits may be measured in economic and social terms like convenience and satisfaction. Companies are more likely to implement a technology which is able to provide better performance and higher economic gains than the other technologies. Relative advantage is positively related to the diffusion of innovation (Rogers, 2003; Tornatzky and Klein, 1982). Potential organizational benefits of green practices include reduced energy and natural resource consumption, reduced waste and pollutant emission, improved environmental and financial performance, and greater responsiveness to social environmental expectation (Etzion, 2007; Hart, 1995). In a study of the Spanish pulp and paper industry, Del Rio Gonzalez (2005) suggests that economic and financial advantages are important technological characteristics that influence the adoption of clean technologies. The perceived net benefits that the green practice offers will serve as motivations for companies to implement the green practice. Therefore, the following hypothesis is proposed:

H4: Relative of green practices has a positive influence on green practice infusion in Chinese logistics companies.

Organizational factors

The organizational context implies the processes and attributes that constrain or facilitate innovation. Several studies have discussed the influences of a variety of organizational characteristics such as quality of human resources, top management's leadership, organizational support, organizational culture and organizational size on innovation diffusion (Damanpour and Schneider, 2006; Taylor and McAdam, 2004), and environmental strategy (Etzion, 2007; Gonzalez-Benito and Gonzalez-Benito, 2006). Sufficient organizational resources and qualified organizational capabilities are two relevant organizational characteristics advancing innovation (Damanpour, 1991; Jeyaraj et al., 2006) and environmental performance (Hart, 1995; Russo and Fouts, 1997). The availability of resources, management support, organizational learning capabilities, and human resources will influence the adoption of green practices (Alvarez-Gil et al., 2007; Lee, 2008). The followings only introduce the quality of human resources, organizational support, and company size because they are organizational resource-related variables widely analyzed in the literature.

The quality of human resources is an essential factor influencing innovation diffusion (Fichman and Kemerer, 1997; Tornatzky and Fleischer, 1990). Qualified human resources are helpful to diffuse innovations because of their competent learning capabilities. Implementing green practices is a complex process requiring cross-disciplinary coordination and significant changes in the existing operation process (Russo and Fouts, 1997). It is intensive in human resources and depends on the development and training of tacit skills through the employees' involvement (Hart, 1995; Del Brio and Junquera, 2003). A company with higher innovative capacity will be more likely to successfully implement an advanced environmental strategy (Christmann, 2000; Judge and Elenkov, 2005). The recipient's lack of absorptive capacity is one of the major barriers to the transfer of technical knowledge within a firm (Szulanski, 1996). To overcome knowledge barriers to green practice infusion, employees need extensive, specialized training to learn the principles underlying the innovation. Employees with competent learning capabilities will be apt to increase their absorptive capacity through training programs that can advance green practice infusion. Therefore, the following hypothesis is proposed:

H5: Quality of human resources has a positive influence on green practice infusion in Chinese logistics companies.

Organizational support is the extent to which a company helps employees use green practices. Providing incentive for innovation diffusion and ensuring the availability of financial and technical resources for innovation have positive effects on the implementation of innovation (Damanpour and Schneider, 2006; Jeyaraj et al., 2006; Lee et al., 2005). For the development of environmental management, organizational support is essential because the employees will be motivated to implement green behavior and the resources required for adopting green practices will be more easily available. Also, the top management plays an essential role in organizational support. Many green practices require the collaboration and coordination of different departments and divisions during diffusion process. To ensure successful diffusion, green initiatives are usually endorsed and encouraged from the top management (Gonzalez-Benito and Gonzalez-Benito, 2006). The central task of top management is to obtain resources and assemble them into organizational capabilities so that the company is able to implement green practices to achieve environmental competitive advantage (Judge and Elenkov, 2005). Therefore, the following hypothesis is proposed:

H6: Organizational support has a positive influence on green practice infusion in Chinese logistics companies.

Company size has been repeatedly taken as a relevant organizational characteristic influencing companies' innovation diffusion (Frambach and Schillewaert, 2002; Rogers, 2003) as well as environmental activities (Del Brio and Junquera, 2003; Etzion, 2007; Gonzalez-Benito and Gonzalez-Benito, 2006). In general, large companies tend to adopt innovations and green practices more easily than small ones because they have sufficient resources and strong infrastructures. Small companies, in contrast, may suffer from the lack of financial resources and professionals, which results in difficulties in adopting green practices. However, some researchers argue that, due to less flexible structure, lower ability to adapt and more difficulty in assimilating change, larger companies may be more difficult than smaller companies in the infusion of innovations (Dampour and Schneider, 2006; Zhu et al., 2006). Therefore, the following hypothesis is proposed:

H7: Company size has a negative influence on green practice infusion in Chinese logistics companies.

Environmental factors

The environmental factors in this study refer to the standard conceptualization of external environment in the organizational behavior literature. The external environment in which a company conducts its business is an important factor affecting innovation adoption and environmental strategy. Certain environmental variables such as environmental uncertainty, environmental munificence, governmental support, industry type, competition, and network relations are often discussed in the literature of innovation diffusion (Frambach and Schillewaert, 2002; Damanpour and Schneider, 2006; Jeyaraj et al., 2006; Tornatzky and Fleischer, 1990; Zhu et al., 2006) and environmental management (Etzion, 2007; Gonzalez-Benito and Gonzalez-Benito, 2006a). Environmental uncertainty and external resource availability are consistently regarded as two primary environmental factors influencing innovation diffusion and environmental strategy (Aragon-Correa and Sharma, 2003; Jeyaraj et al., 2006; Rothenberg and Zyglidopoulos, 2007; Tornatzky and Fleischer, 1990). The government plays an important role in supporting resources for innovation adoption (Lee, 2008; Li and Atuahene-Gima, 2002; Scupola, 2003). Stakeholder pressure is another relevant environmental factor influencing organizational environmental behaviors, and is widely involved in

research on environmental issues (Buisse and Verbeke, 2003; Sharma and Henriques, 2005). The present study analyzes possible influences of environmental uncertainty, governmental support, and stakeholder pressure on green practice infusion.

Environmental uncertainty refers to frequent and unpredictable changes in customer preferences, technological development, and competitive behavior perceived by the managers. It has been viewed as the most relevant environmental characteristic that affects a firm's decision making (Li and Atuahene-Gima, 2002). Managers facing uncertain business environments tend to be more proactive and use more innovative strategies than managers in less turbulent environments. Under high environmental uncertainty, companies will attempt to gather and process information frequently and rapidly to address environmental changes (Gupta and Govindrajana, 1991), and also tend to pay more efforts on innovation and increase the rate of innovation to maintain a competitive advantage (Damanpour, 1991; Kimberly and Evanisko, 1981; Zhu and Weyant, 2003). Implementing green practices can be regarded as a technical innovation process that can improve a company's environmental performance. Companies are more likely to invest in resources to implement green practices to generate the capacity to improve environmental performance in uncertain environments (Aragon-Correa and Sharma, 2003; Rothenberg and Zyglidopoulos, 2007). The infusion of green practices is expected to be positively associated with the perceived environmental uncertainty. Therefore, the following hypothesis is proposed:

***H8:** Environmental uncertainty has a positive influence on green practice infusion in Chinese logistics companies.*

Governmental support is a relevant environmental factor influencing technical innovation. The governments can advance technical innovation through several encouraging policies such as providing financial incentive, technical resources, pilot projects, and tax breaks (Tornatzky and Fleischer, 1990; Scupola, 2003). Implementing green practices relies to some extent on the availability of external resources. Munificence of resources in the business environment increases the degree to which a company engages in environmental management (Aragon-Correa and Sharma, 2003; Rothenberg and Zyglidopoulos, 2007). The government can raise the munificence by providing governmental subsidies or tax incentives for alternative energy technologies, bank financing at lower rates for environmentally friendly technologies, and lower insurance premiums for lower environmental risks (Aragon-

Correa and Sharma, 2003). Lee (2008), in a study of Korean small and medium-sized enterprises, also suggests that governmental support in green initiatives has a positive influence on the company's willingness to participate in the green supply chain. A positive association between green practice infusion and governmental support is expected. Therefore, the following hypothesis is proposed:

H9: Governmental support has a positive influence on green practice infusion in Chinese logistics companies.

Stakeholders are individuals or groups who affect a company's activities and are also affected by the company's activities. Stakeholder pressure is regarded as the most prominent factor influencing a company's environmental strategy (Buysse and Verbeke, 2003; Gonzalez-Benito and Gonzalez-Benito, 2006a; Sharma and Henriques, 2005). According to the stakeholder theory, organizations carry out activities to satisfy their main stakeholders. Among various groups of stakeholders, customers and regulators are arguably viewed as a company's most important stakeholders (Christmann, 2004; Etzion, 2007). A body of research reveals the positive relationships between firms' environmental activities and customer and regulatory pressure (e.g., Christmann, 2004; Lee, 2008; Wong and Fryxell, 2004). The infusion of green practices will be positively associated with customer and regulatory pressure. Therefore, the following hypotheses are proposed:

H10: Regulator pressure has a positive influence on green practice infusion in Chinese logistics companies

H11: Customer pressure has a positive influence on green practice infusion in Chinese logistics companies.

Methodology

To examine the influences of determinant factors on green practice infusion, this paper collected data by means of mailing questionnaires to logistics service providers in China. The logistics industry plays an important role in the Chinese economy. Logistics companies provide logistics services for their customers, which include warehousing, transportation, inventory management, order processing, and packaging. With the fast growth in economy, the demand for logistics services has been growing significantly in China. Also, the environmental impact of the logistics practices has been an important issue in China. Many logistics operations often leads

to several negative environmental impacts, including air pollutants, waste disposal, and fuel consumption. Logistics companies need to address much effort on environmental issues.

Samples were randomly drawn from a list of logistics companies provided by the logistics associations in China. Logistics companies carry out logistics activities for their customers, including warehousing, transportation, inventory management, order processing, and packaging. The sampled companies were contacted via telephone and e-mail to confirm the names of respondents and their mailing addresses. One thousand samples were randomly drawn from a list of logistics companies in Shanghai. Questionnaires were mailed to these sampled companies' owners or senior managers who are familiar with the company's environmental activities. Two weeks after the questionnaires were mailed, a follow-up to the sampled companies was conducted to remind them of the importance of their responses and thank them for their assistance. In total, 314 completed questionnaires were returned. Of these respondents, 21 unusable questionnaires were excluded. The overall response rate is 29.3 percent. Among the respondents, approximately 82 percent of them have less than 300 employees. Most logistics companies in China belong to small and medium-size enterprises.

To evaluate the non-response bias, the wave analysis was used which assumes that late respondents tend to be more similar to non-respondents than early respondents in mail surveys (Armstrong and Overton, 1977). The non-response bias was tested by comparing respondents who responded readily to the survey with those who responded after the follow-up step is taken. Because comparisons of survey results reveal no significant differences between the two groups in the level of variables, the non-response bias is not significant in the study.

The questionnaire was developed in a two-stage process. First, an initial questionnaire was designed based on a review of related literature and a discussion with some experts in environmental management. Second, the initial questionnaire was modified by accommodating some logistics managers' suggestions to ensure that each item adapts to the logistics industry and is interpreted as expected. Afterward the final version of the questionnaire was administered to sampled logistics companies with business models conforming to the logistics services.

The major constructs outlined in the present research framework include green practice infusion, and determinant factors. The green practices commonly used in

the logistics industry include consolidating shipments, disposing waste responsibly, purchasing ecological products, reducing energy consumption, reducing solid/water waste and emissions, using cleaner transportation methods, and using recyclable packaging (Gonzalez-Benito and Gonzalez-Benito, 2006; Lin and Ho, 2011; Murphy and Poist, 2003). Infusion refers to the extent to which an innovation's features are in widespread usage in a complete and sophisticated way (Fichmen 2001). According to innovation infusion literature (Cooper and Zmud, 1990; Yan and Fiorito, 2007; Yu et al., 2009; Zhu et al. 2006; Zmud and Apple, 1992), we conceptualized infusion as the extent to which major logistics operations have integrated with green practices. Each sampled company was asked to score the degree of infusion of green practices according to a seven-point scale anchored by “not at all” and “to a great extent”.

The measurement of determinant factors was developed according to innovation diffusion literature (Rogers, 2003; Tornatzkey and Fleischer 1990) and green practice adoption model proposed by Lin and Ho (2011). Adoption cost was measured according to the financial resources required to evaluate the green practices and start to utilize the green practices. Complexity was measured by whether the green practices would be learned and used easily. Compatibility was measured based on the degrees of perceived fitness between the green practice and the company's existing technologies and processes. Relative advantage was measured by whether the green practice could increase environmental and economic performance. The quality of human resources was measured according to employees' learning capabilities. Organizational support was measured according to the degrees of the company's resource supports and leaders' attitudes toward environment issues. The company size was measured by the number of employees. The environmental uncertainty was measured according to the degrees of changes in competitors' innovative abilities, customers' requirement, and the development of new technologies. Governmental support was measured by whether the government provides financial and technical supports for adopting green practices. Customer pressure and regulatory pressure was measured by asking the respondents to score the environmental pressure exerted by customers and regulators.

The determinant factors were measured using seven-point Likert scales anchored by “strongly disagree” and “strongly agree”. The measurement items of determinant factors were submitted to factor analysis with varimax rotation. Factors with eigenvalues greater than 1.0 are summarized in Table 1. The result of factor analysis confirms the construct validity of this study. According to the reliability coefficients,

the smallest value of Cronbach's alpha for this study is 0.7743, which implies that the sampling results are reliable (Nunnally, 1978).

Table 2 shows the means, standard deviations and correlations for the variables. The determinant factors are not highly correlated, which implies that multicollinearity may not be significant in the following regression analysis. Furthermore, the high correlations between green practice infusion and most of the determinant factors give initial evidence of the hypotheses: technological, organizational, and environmental factors are associated with the organizational infusion of green practices.

Table 1: Measurement Items for the Determinant Factors

Determinant Factors	Factor Loading	Cronbach's α
Technological Factors (Total explained variance = 72.63% ; Cronbach's α = 0.8598)		
Adoption cost		
We spend a lot of money to evaluate the green practices.	0.788	0.8179
The cost in starting using the green practices is expensive.	0.762	
We spend a lot of time to evaluate the green practices.	0.705	
Complexity		
Using the green practices needs many experiences.	0.804	0.8663
Learning the green practices is difficult.	0.759	
Sharing the knowledge of the green practices is difficult.	0.698	
Compatibility		
The green practices are compatible with our existing logistics operations.	0.826	0.8802
The green practices are consistent with our company's values.	0.767	
Integrating the green practices with company's existing system is easy.	0.701	
Relative advantage		
The green practices can provide better environmental performance.	0.793	0.8395
The green practices can provide higher economic benefits.	0.775	
The green practices can enhance our company's reputation.	0.689	
Organizational Factors (Total explained variance = 75.87% ; Cronbach's α = 0.8906)		
Quality of human resources		
Employees are capable of using new technologies to solve problems easily.	0.841	0.8847
Employees are capable of providing new ideas for our company.	0.812	
Employees are capable of learning new technologies easily.	0.739	
Employees are capable of sharing knowledge with each others.	0.694	
Organizational support		
Top management encourages employees to learn green knowledge.	0.850	0.8951
Our company provides rewards for employees' green behavior.	0.809	
Top management can help employees dealing with environmental issues.	0.758	
Our company provides resources for employees to learn green knowledge.	0.706	
Environmental Factors (Total explained variance = 71.89% ; Cronbach's α = 0.8297)		
Environmental uncertainty		
Predicting competitors' behavior is difficult.	0.738	0.667
Customers' preferences vary frequently.	0.667	

The advance in new logistics service modes is quickly.	0.605	0.7743
Governmental support		
Government provides financial support for adopting green practices.	0.842	
Government helps training manpower with green logistics skills.	0.834	
Government provides technical assistance for adopting green practices.	0.725	0.8035
Regulatory pressure		
Government sets environmental regulations for logistics operations.	0.793	
Industrial associations require us to conform to environmental regulations.	0.718	0.8674
Customer pressure		
Our customers require us to improve environmental performance.	0.813	
Caring for the environment is an important consideration for our customers.	0.745	0.8317
Total Cronbach's $\alpha = 0.8693$		

Table 2: Result of correlation analysis

Variables	Means	Std	1	2	3	4	5	6	7	8	9	10	11	12
1. Adoption cost	4.52	1.79	1.0											
2. Complexity	4.41	1.90	0.1	1.0										
3. Compatibility	4.25	2.06	0.1	0.0	1.0									
4. Relative advantage	4.92	1.28	0.0	0.0	0.1	1.0								
5. Quality of human resources	4.73	1.34	0.0	0.0	0.0	0.0	1.0							
6. Organizational support	4.97	1.15	0.1	0.0	0.0	0.1	0.1	1.0						
7. Company size ^a	4.81	1.47	0.0	0.0	0.0	0.0	0.1	0.1	1.0					
8. Environmental uncertainty	4.08	2.05	0.0	0.0	-	-	0.0	0.1	0.0	1.0				
9. Governmental support	4.86	1.72	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	1.0			
10. Regulatory pressure	5.17	1.58	-	0.0	0.0	0.0	0.0	0.1	0.1	0.0	-	1.0		
11. Customer pressure	5.03	1.84	0.0	0.0	0.0	0.0	0.0	0.1	0.1	-	0.0	0.0	1.0	
12. Green practice infusion	4.79	1.63	0.2	-	0.5	0.5	0.5	0.6	-	-	0.5	0.4	0.2	1.0

^a Natural logarithm of the number of employees

Because a single informant technique was used in data collection, the study may be subjected to the potential for common method bias by artificially inflating observed relationships between variables. We used Harman's single factor test (Podsakoff, MacKenzie, Lee and Podsakoff, 2003) to check the potential common method bias. If common method bias exists, a single factor will emerge from a factor analysis of all survey items, or one general factor that accounts for most of the variance in an unrotated factor structure will result. The analysis revealed more than one factors with eigenvalues greater than 1.0, and the first factor accounted for only about 32 percent of the variance. The results indicated that common method bias was not a problem in the study.

Research Findings and Discussions

To test proposed research hypotheses, the regression analysis is used in the study, which takes the eleven determinant factors as independent variables and the infusion of green practices as the dependent variable. The regression analysis is a statistical process for estimating the relationship between a dependent variable and several independent variables. Before conducting the regression analysis, the regression assumptions of homoscedasticity, linearity, normality, independence of residuals, and the absence of multicollinearity are tested, and these assumptions are all satisfied. Table 3 shows the standardized results of the regression analysis. The regression results reveal that complexity, compatibility and relative advantage of green practices, quality of human resources, organizational support, governmental support and regulatory pressure exhibit significantly influences on green practice infusion for the logistics companies in China. The influences of adoption cost, company size, environmental uncertainty and customer pressure on logistics companies' green behavior are not significant. Except the hypotheses *H1*, *H7*, *H8* and *H11*, all the other hypotheses are supported.

Table 3: Standardized Regression Results for the Infusion of Green Practices

Dependent variables: Infusion of Green Practices		
Predictors	Standardized Coefficient β	<i>t</i>
Technological factors		
Adoption cost	0.089	1.135
Complexity of technology	-0.124	-2.109*
Compatibility of technology	0.184	3.274**
Relative advantage of technology	0.187	3.986**
Organizational factors		
Quality of human resources	0.179	2.979**
Organizational support	0.201	4.211**
Company size	-0.061	-1.004
Environmental factors		
Environmental uncertainty	-0.074	-1.084
Governmental support	0.183	3.315**
Regulatory pressure	0.175	2.843**
Customer pressure	0.098	1.241
<i>R</i> ²	0.617	
<i>adj R</i> ²	0.592	
<i>F</i>	24.33**	

* $p < 0.05$ ** $p < 0.01$

To advance green practice infusion, companies can attempt to improve their organizational learning capabilities, and make organizational resources easily available for their employees. In addition to being a regulator, the government should provide sufficient financial, technical and educational resources for green practice infusion within the company.

Adoption costs include the required financial and human resources in implementing green practices. Costs have been long posited as a barrier for the adoption of innovations. However, some researchers argue that high adoption costs may motivate innovation adopters to treat the innovation more seriously and implement it more actively in order to make the innovation more cost-effective (Rogers, 2003). The present study found that adoption cost did not have significant influences on green practice infusion. Complexity is the degree to which an innovation is perceived to be relatively difficult to understand and use. It will increase the difficulty in knowledge transfer. Green practices incorporate both tacit and explicit knowledge. The tacit knowledge may be inherent in identifying sources of pollution, reacting quickly to accidental spills, and proposing preventive solutions (Boiral, 2002). A green practice with high complexity contains a lot of tacit knowledge that requires laborious efforts to learn and diffuse. The difficulty in learning and sharing tacit knowledge makes it difficult to infuse a green practice. Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, experiences, and

needs of the firms. Because several green practices are additions to companies' current technologies and processes, diffusion of green practices is not a single event but can be described as a process of knowledge accumulation and integration. Green practices that are more compatible to a company's current technologies and processes will be more easily to be diffused within the organization. Relative advantage is the perception that an innovation is more advantageous than its substitute idea. The perceived net benefits that the green practice offers will serve as motivations for companies to implement the green practice.

The quality of human resources is an essential factor influencing innovation diffusion. Qualified human resources are helpful to diffuse innovations because of their competent learning capabilities. Implementing green practices is a complex process requiring cross-disciplinary coordination and significant changes in the existing operation process. To overcome knowledge barriers to green practice infusion, employees need extensive, specialized training to learn the principles underlying the innovation. Organizational support is the extent to which a company helps employees use innovations. Providing incentive for innovation diffusion and ensuring the availability of financial and technical resources for innovation have positive effects on the implementation of innovation. For the development of environmental management, organizational support is essential because the employees will be motivated to implement green behavior and the resources required for adopting green practices will be more easily available. Company size has been repeatedly taken as a relevant organizational characteristic influencing companies' innovation diffusion as well as environmental activities. In general, large companies tend to adopt innovations and green practices more easily than small ones because they have sufficient resources and strong infrastructures. Small companies, in contrast, may suffer from the lack of financial resources and professionals, which results in difficulties in adopting green practices. However, some researchers argue that, due to less flexible structure, lower ability to adapt and more difficulty in assimilating change, larger companies may be more difficult than smaller companies in the infusion of innovations (Dampour and Schneider, 2006). The present study found that company size did not have significantly influences on green practice infusion.

Environmental uncertainty refers to frequent and unpredictable changes in customer preferences, technological development, and competitive behavior perceived by the managers. It has been viewed as the most relevant environmental characteristic that affects a firm's decision making. The present study found that environmental

uncertainty did not have significantly influences on green practice infusion. Governmental support is a relevant environmental factor influencing technical innovation. Implementing green practices relies to some extent on the availability of external resources. The government can raise the munificence by providing governmental subsidies or tax incentives for alternative energy technologies, bank financing at lower rates for environmentally friendly technologies, and lower insurance premiums for lower environmental risks (Aragon-Correa and Sharma, 2003). Stakeholder pressure is regarded as the most prominent factor influencing a company's environmental strategy. According to the stakeholder theory, organizations carry out activities to satisfy their main stakeholders. The infusion of green practices was positively associated with regulatory pressure.

Conclusions

More than two decades of economic reforms have brought China unprecedented economic growth. While China continues to develop into a global manufacturing base and a huge consumer market, it suffers from various serious environmental problems such as air pollution, energy waste, and water pollution. The environmental crisis has led to some moral doldrums in China. To mitigate the environmental degradation in China, the Chinese government has stipulated several environmental policies, and many companies operating in China have begun to adopt a variety of environmental management practices. To help organizations implementing green practices successfully, it is necessary to give an analysis on the factors influencing green practice infusion in organizations. An understanding of the determinant factors is essential for practitioners to best implement green practices.

Although a body of research has proposed several factors influencing green practice adoption, none of them analyzed the factors influencing green practice infusion. This study conducts a questionnaire survey on the factors affecting green practice adoption for logistics companies in China. The determinant factors are classified into environmental, organizational and technological factors. The research findings reveal that regulatory pressure, governmental support, organizational support, quality of human resources, and relative advantage and compatibility of green practices have significantly positive influences on organizational infusion of green practices in Chinese logistics companies. Therefore, green practice providers should pay more efforts to increase the explicitness and benefits of green practices while providing green technologies, equipments and services for their clients. Logistics companies themselves need to sustain more organizational support for employees'

green behavior, and improve their quality of human resources. In addition to being a regulator, the government can provide sufficient resources for logistics companies to implement green practices

The contributions of this paper include providing logistics service providers guidelines for increasing their green competitiveness, providing the government suggestions in designing environmental policies for the logistics industry, contributing to an insight into the infusion of green practices in the logistics industry, and broadening the scope of research both on environmental management and logistics issues.

One limitation to this study is that the results may suffer from the respondent bias because the questionnaire survey was used in the study. In addition, because this paper focuses on organizational infusion of green practices in Chinese logistics companies, the research findings may be limited in their generalizability. Different countries and industrial sectors may lead to conclusions different from the present study. Future studies can use the proposed model to other countries and industrial sectors.

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Farmers Inclination to Adoption of Mobile Phone Agriculture Information and Trade Systems in Pakistan

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Abstract: *This research studies three aspects relating to farmers readiness for the proposed mobile phone information and trade system (MAITS) namely (a) farmer readiness to adopt newly proposed mobile information and trade system (b) key factors that affect farmers mobile decision support systems (c) farmers readiness to connect with mobile enterprise networks. These were investigated using a qualitative research method. After a careful selection of a set of questions, interviews were conducted with selected farmers from four cities of Pakistan including Lahore, Faisalabad, Vehari and Khanewal. The analysis revealed that farmers readiness to embrace new mobile phone information systems requires maximum level of optimism and innovativeness along with deal of the inhibiting factors which affect the readiness state; inhibiting factors in MAITS adoption comprised of uncertainty factors and current faulty existing system services; and there has been a complete consensus among the farmers to practice MAITS along with mobile decision support system because it can help them in crop planning, farm inputs (seeds, fertilizer, sprays etc), harvesting, transporting and trading. The findings of this study will provide guidance to the relevant organizations when considering readiness and barriers towards implementing of MAITS. The results of the study will give insight to many extension service and policy makers to understand what farmers actually need.*

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Introduction

Pakistan is an agriculture country with seventy percent of its population living in rural areas. The agriculture sector is an important sector contributing 50 to 60% revenue to the national economy of the country and provides 50% of the jobs (Khan, 2011). Almost half of labor earnings come from this sector and it is one of the biggest sources of foreign exchange (Akhtar, 2007). The significance of agriculture, despite the fact that country has faced adverse climate change, drought and flash flood, has witnessed remarkable growth in the past (Thomas, 2011). A tremendous increase in out-put of crops (per acre) was registered in 2009 till 2013 (Pakistan Today, 2013). Despite of good contribution of agriculture sector in the economic development of Pakistan, the farmers are facing various challenges. There are farmers who work hard throughout the year to get their crops ready, but when the crops ready for selling, they face the problem of access to the retail markets and buyers to get competitive market rates. Thus, the quality of goods and commodities are affected and farmers are often paid lower market rates for their commodities. This process puts farmers into a situation where they barely manage to pay off loans which may have been taken for crop cultivation, and they end up with making little or no profit.

Another key challenge is the location of the agricultural trade markets, which are often located far away from the villages. Due to lack of availability of transportation, it is very hard for farmers to take their goods to the market. When farmers are offered a lower rate, they have no other choice but to sell their goods sometimes without making any profit. Moreover, complicated procedures affecting agriculture farming comprise, crop planning and selling in the market which requires greater attention for farmers to choose the best route for them (Amjad, 2010). Similarly, scarcity of funds for rural infrastructure which affects farm productivity and growth is also one of the challenges. Moreover, the low literacy rate in the villages where most of the farmers cannot read and write is itself a big challenge. The farmers do not know how to access information using latest technology that could improve yields to get better market rates for their harvested crops. The farmers mainly rely on conventional information systems and are not familiar with the new technologies such as use of IT, whereas farmers in developed countries have realized the importance of information driven economies.

To address various challenges, the government of Pakistan has focused more on research and development network which comprises of institutions such as the

Agriculture Research Institutes (ARI), Agricultural Universities (AUs) and Agriculture Development Banks (ADB). The function of these set-ups in research and extension services support activities is of immense importance. However, there has been no major technological innovation which could give fresh momentum to agricultural productivity levels. Inadequate extension services for trading, and limited access to information further broaden the gap in the adoption of specific agricultural technology which results in the poor yields of agriculture products or crops. In order to achieve the higher levels of agricultural productivity, farmers must be equipped with up-to-date information and decision support in the agricultural systems. This has often been considered as the next step in modernizing agricultural setups. The current levels of mobile phones and mobile-enabled information services in rural areas could reduce information asymmetry and allow further awareness of the core expertise within the extension services. In the Pakistani context, the impact of mobiles as a mode of providing information for farming purposes would depend on how effectively the proposed mobile phone information and trading system network is embraced by the farmers in order to attain the market information. The impact of technology can generate significant results on productivity of crops in terms of increased returns by adapting changes in best practice for cropping patterns that could improve yields and the better price information for agriculture inputs and outputs which will make the farmer's position better. Other non-price factors such as information regarding farming inputs, seed quality, and adoption of modern techniques are also crucial to enhance productivity.

In order to maintain the enhanced productivity levels and to resolve crop selling hurdles like infrastructure limitations, distribution inefficiencies and the key factors resisting the spread / gain, and considering the high usage of mobile phones in Pakistan, the Government of Pakistan has shown immense interest by applying telecom industry exemplary model of growth with agriculture sector. The agricultural model can be more modified in a way that it can use telecommunications and access its benefits. Today in Pakistan 72% out of total telephone penetration rate is 119.9 million mobile users and Pakistan Telecommunication Authorities (PTA) has begun encouraging the development of indigenous based content on mobile/information and communication technology provisions and set to offer any kind of support to benefit farmers by offering the reliable and timely information (Saadia, 2012; Aziz 2012).

The objective of this study is to explore and evaluate farmer's readiness and barriers towards implementation of newly proposed mobile information and trade system

(MAITS) in Pakistan. More specific objectives are to investigate a) farmer readiness to adopt newly proposed mobile information and trade system (MAITS) b) key factors that affect farmers' mobile decision support systems and c) farmers readiness to connect with mobile enterprise networks.

The rest of the paper is organized as: after introduction, literature review has been carried out followed by methodology. In next section, analysis and discussion has been presented followed by findings. The conclusion of the study is given at the end of the paper.

Literature Review

Despite a huge organizational setup by the government of Pakistan, the extension services do not reach to the most of farmers because of the geographical scatter and low motivation of the extension staff serving them (Siraj, 2011). Resultantly, this affects the growth of agriculture sector. There are various government, private and multinational organizations, as well as Non Government Organizations (NGOs) working to empower the farmers by providing the necessary agricultural information tools and inputs. However, the most striking cause which the farmer experiences is the shortage of relevant information needed for taking befitting timely action. Farmers are therefore disadvantaged and are unable to benefit with the existing agricultural knowledge. To provide timely and relevant information to the farmers, the government and some ICT organizations are planning to develop mobile phone information and trading system (MAITS). The purpose of mobile information and trading system is to create an information pool allowing access to farmers and to provide them appropriate training, support and motivation, and also rewards to serve the whole community in a productive way. The use of ICT in agriculture is not a new attempt in Pakistan as almost every mobile operator has launched agriculture associated services on partial basis (Siraj, 2011). For example, Telenor mobile operator has provided “e-Mandi” (Urdu name for e-market) information which consist only the rates of each agriculture commodity (Telenor, 2009).

The ICT technology still has not been diffused in agriculture in Pakistan. There is a need to evaluate the readiness of farmers towards implementation of MAITS in Pakistan. The term technology-readiness refers to people’s inclination to embrace and apply novel technologies for accomplishing goals and objectives. It can be viewed as an evaluation process of overall state of mind that determines a person’s predisposition to make use of novel ideas by using those technologies

(Parasuraman, 2000). Although new technologies are diffusing through different segments of daily life at a much faster pace than ever before but on the other hand other survey-based evidence have shown signs of growing technology adopter's frustration and disillusionment (Alsop, 1999). Though overall benefits of technology is seen as prolonging the adoptive process - for instance, the automobile took 55 years to attain 25% share of the market, compare to the cellular telephones which took only 13 years to reach the same level of market share (Berry, 1999).

The concept of ICT readiness has received very infrequent attention in the literatures. Some studies have shown the evidence of higher level of technology readiness generally leads to lower level of innovation risk with a greater successful implementation outcome (Basole and Chao, 2004). A similar argument can be use in the context of mobile ICT: higher levels of mobile ICT readiness leads to lower technology risks and implementations that could also be successful. Individual readiness is important in explaining and predicting about the inclination to adopt new technology (Lin et al., 2007). Most of the models such as Technology Acceptance Model (Davis, 1989) and Technology Readiness Model (Parasuraman, 2000) were originally established for evaluating people's technology readiness or technology adoption behavior in particular organizational environments (Lin et al., 2007). People in work settings may unwillingly or reluctantly to adopt new technology due to management influence. However, individuals or consumers in free market settings are free to choose among conventional and mobile phones information and trading systems. When people make their minds to use new mobile information and trade system, they mutually create an e-service with the system but do not hold ownership of the system (Siraj, 2011). According to Lovelock et al. (2004), in e-service perspective, service provisions cannot be created separately from the customers' full contribution and participation explaining what they would like. Likewise a similar input is required from Pakistani farmers. Farmer readiness conceptualizes their general beliefs about technology, decision support factors and enterprise readiness linked with their engagement in technology-based products and services (Parasuraman, 2000; Basole and Chao, 2004; Basole, 2007). Indication of evidence from the work done in the field confirm that all the readiness and decision making factors are not enough to explain why farmers do not adopt new technologies, such as mobile phones with agriculture information systems or trade tracking systems.

Earlier research studies have developed different models/constructs/frameworks that had critically focused on several success factors related to technology adoption

decisions (Agarwal et al., 1997; Damanpour, 1991). Some focused on individual technology adoption of technologies which combined theories of consumer behavior and psychology. A variety of models have emphasized technology acceptance and use by individuals and these investigations have provided key indicators to technology adoption decisions. However, they do not describe organizational technology adoption decisions essential for integration process (Legris et al., 2003). Other researchers developed key dimensions of technology readiness (Basole, 2005) from the domain of engineering management, information systems, organization behavior and strategy, which has shown the different avenues of organizational adoption decision making criterion very well in adopting those technologies. (Lai and Guynes, 1997; Tornatzky and Klein, 1982).

In the literature, the recent and the most suitable and popular methodologies developed and adopted to evaluate the readiness of users for technology adoption are: Technology Adoption Model (TAM) (Parasuraman, 2000) which include optimism, innovativeness, discomfort and insecurity, Technology Readiness Index (TRI) (Basole and Chao, 2004) which include timeliness, trust, information richness, ease of use and Decisions Support Systems (DSS) (Basole, 2007) which include technology readiness, further including data and information readiness, process readiness, resource readiness, knowledge readiness, leadership readiness, employee readiness values and goals readiness...

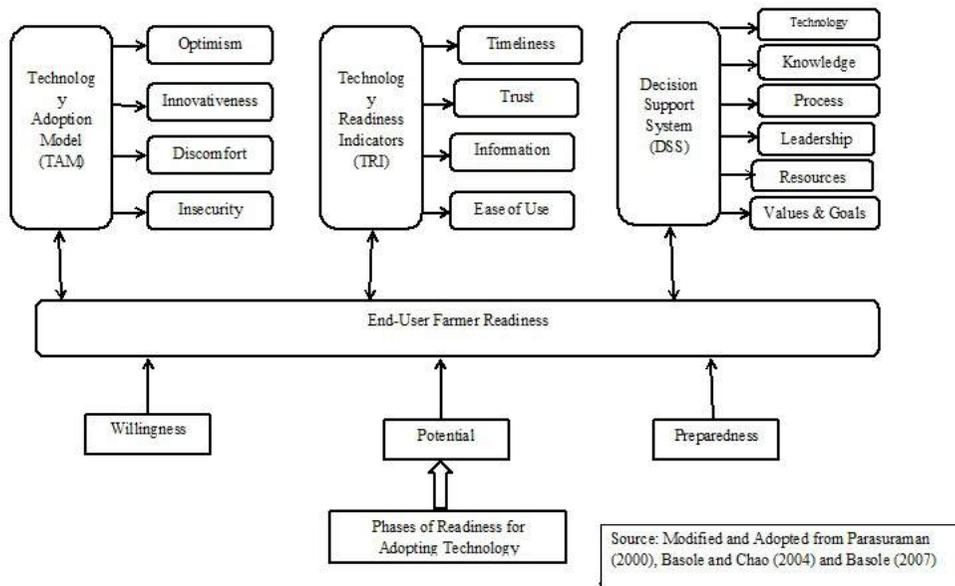
According to Basole (2007) any business entity itself passes through three phases which evaluate the readiness which include; preparedness, potential and willingness to adopt the mobile technology. A complete readiness assessment involves an evaluation process across the three layers along eight readiness dimensions. The first layer preparedness is assessed for all eight dimensions and refers to an organization's ability to adopt, distribute, and assimilate mobile information system. The second layer potential is evaluated along the process, employee, and value and goals dimensions which are aligned with organization's processes, employee, and strategy that could benefit from mobile information system. Third, willingness is assessed along the employee and leadership dimensions that reflect the leadership and employee attitudinal orientation towards adopting the mobile phone as a tool. Basole (2007) further find out the eight modes of readiness (key parameters) in evaluating specific aspects of readiness with actual information so that any company or entity can test these dimensions to check the readiness level before introducing the technology in their setup. These models include technology readiness, data and

information readiness, process readiness, resource readiness, knowledge readiness, leadership readiness, employee readiness and, value and goals readiness.

Methodology

In the literature, various methods have been adopted to evaluate the stakeholders' readiness for technology adoption. To evaluate the farmers' readiness to adopt mobile technology for agriculture development purpose, the following conceptual framework has been developed from Parasuraman (2000), Basole and Chao (2004) and Basole (2007) and adopted in this study.

Figure 1. Conceptual Framework for Evaluating Farmers Readiness for Technology Adoption



The following basic questions were designed on the basis of above framework.

- How ready are farmers to embrace the new mobile phone agriculture services in Pakistan?
- What are the key factors in mobile decision support systems which affect farmer readiness to adopt new mobile phone agriculture information and trade systems?
- How ready are farmers to work with mobile enterprise networks after getting agriculture services on their mobile phones?

The new proposed Mobile Phone Agriculture Information and Trade System (MAITS) is a mobile phone information system which will provide important market information to the farmers and traders about agriculture. The basic objective of MAITS is to increase farmers' returns by providing various information about agriculture activities including better price, better quality of seed, weather conditions, better time for cultivation, better pesticides and fertilizers etc for agriculture inputs and outputs which will make the farmer's position better.

Data was collected from four important city of Pakistan including Lahore, Faisalabad, Vehari and Khanewal using interview methods. The interview guide has been developed (see Appendix). In order to get valid and reliable data, interview was recorded from only those farmers who were listed by agriculture development banks and agriculture research institutes. Twenty people including farmers (Progressive Farmers, Economical Farmers and Small Farmers¹) and agricultural experts were interviewed. Interviews were conducted in local language Urdu and then translated into English because English was not the first language of informants. The research theme and the interview guide were sent to the informant a day prior of interview, so interviewees have clear perception about the research and be able respond correctly. A credit officer better known as a mobile credit officer from the Agriculture Development Bank and a second officer from the Agriculture Research Institute cooperated in conducting interview. A digital recorder was used to record all the interviews in order to increase the accuracy of the data collected and to remain more attentive to the informant.

Analysis and Discussion

Technology Adoption Model (TAM)

In Pakistan farmers are aware of the new technology uses in their personal life. Information is needed to cut down their problems related to agriculture. Different interactions with the people give them an ability to appraise and appreciate use of new technology whilst working in their fields. They use technology to produce more crops and to get good offers from customers or market dealers.

According to the Expert of Horticulture and Parks Authority Development, “The customers and market dealers are well informed about the results of promising technologies and usually collaborate with those farmers who have adopted or a considering adopting the new technology.”

The technologies effects are perceived to be promising – with greater understanding of the use of these technologies it provides the users a greater insight into new modes of thinking and processes in agricultural reform. In Pakistan, the farmers who use technology perceived it to be more valuable than the other farmers who lack in it, but were vaguely aware of it, According to the farmers, “latest technologies make the life easier, save time and make easy and quick approach to other person / organization & departments.”

The accurate information, at precise times, at the exact place is important for the farmers. However in Pakistan mostly there exists no complete set of mobility information sources that travel with farmers. While they are in a field visit or in markets for agriculture buying and selling, they use mobile phone for communications. According to the Expert of Agriculture Research Institute “Phone calls are not made for agriculture purposes. They are just made for normal gossips.” Majority of farmers informed that farmers “use information from TV, radio and newspapers.” One of the farmers who was using internet in field responded as “internet made us aware of what is going around the world.” However, Agriculture Research Officer (Expert) pointed out that farmers who are using this facility are very small in number. According to a farmer, well-informed farmers consider them more confident in discussing those issues which they learnt from media.

The media has created positive and negative impacts on farmers. The negative impact is, the farmers are most of the time unknowingly misled about the

information and most of time they use partial information which put adverse effects on their productivity. The information is needed for agriculture - physical infrastructure, agriculture inputs and market information which make the farmer rethink to look for sources of information rather than personal use. Their ambition shows their future is connected through mobile phones that will provide them in hand information to proactively manage their crops and trading. According to a farmer "we can harvest our crops before the weather changes... rain or heavy storms." Some farmer doubt that this system may not be successful in Pakistan, because of farmer illiteracy and middlemen influences. Farmers were found not happy with existing extension services offered by government and private organizations. Farmer concerns about extension services that "these services are very limited and old fashioned and they are ready to adopt new technology which reduces their time of information searching." Most farmers are looking for more choices if available so they are interested to know about mobile phone affects and its progression in most of the fields of other sectors.

According to a farmer: "Simple! This is very helpful for us. From weather update (information) we can plan our sowing, irrigation, spray of pesticides and use of fertilizers... "We can compare our old varieties of crops with new one if mobile company provide authentic yield of new variety... From market updates I can manage the selling of my agriculture commodities."

It is common behavior to know about people more familiar with new technologies who have more information. They are the ones who are interested in latest technology information and can especially handle high-tech products and services without any further help. As they know a lot about working of technology and face fewer problems as compared to those people who are not innovators. For evaluation of farmer readiness it is necessary for farmers to have an innovative mind. The farmer who intends to take risks is the only one able to use new proposed mobile information systems. In Pakistan, Innovator type farmers prepare other fellow farmers for new technologies. The prior type of farmers observes their surroundings carefully in expectation to get latest ideas. They discover new ways of approaching the technology and try them fitting to their exact situation or to see if that is relevant to solve their specific problems - readiness state. All the way through this procedure, many farmers during the interviews for the technology benefits made up their minds to adopt latest ideas and latest methods of the systems. The similar response from the farmer to urge for new information and their readiness level to act on it can identify "man to man information... we go to different farmers and ask them that what

should we plant and how?... On their provided information we act on the information what they have told us to do.”

Farmer readiness to use technology is activated by causes or problems like pesticide spray prices. Currently, the cost of fertilizer has increased to the level that some farmers may not be able to afford to buy this. Thus, the use of information is productive in different ways, a farmer responded as "the use of information has equipped us with many skills... I would say farmers do not broaden their exposure... otherwise there are lot of opportunities here... from which farmer can easily increase the yield... for example there are some insects... if you use those insects in your crops they kill the insects which are destroyer of the crops... now this technology is available and at free cost... many farmers do not know about this.” In similar case of mobile phones, these trends are proving farmers readiness to use mobile phone in place of old and existing systems due to innovativeness.

Farmers think that when they are connected with agriculture world through mobile phones, it will increase their knowledge about agriculture business and will impact on other regions. The interviews data shows that the farmers want to learn new ways in agriculture. Indeed, most of information transferred to them is only one sided. Until the farmers do not put their wisdoms through innovativeness, the adoption of mobile phone services will not occur. A farmer who was active participant of different agriculture forums argued that “until we have a better communication with other farmers, trainers, experts and organizations... then only we will be able to understand about any new information... what presently is going on?... information is one sided delivered and nobody encourages the discussions... we perceive discussions facilities should be as far provided to us because we need sometimes to clarify and rectify some terms... which we are unable to understand easily in one go.”

Farmers have shown their issues regarding traditional agriculture systems as a weak dispersal mechanism with a long search time, and incomplete levels of information retrieval. There is no certainty of information be delivered on time. During interviews farmers were found complaining about the current agriculture system lacking especially about the technologies in government sector which are not fully supporting them and how uncomfortable they were feeling in obtaining information. Even use of technology by others brings discomfort to them.

According to a farmer, “I go to them for soil test... they give me two weeks time... and after that the results were recommended for the color land... they have interchanged results with other farmer mistakenly.”

One farmer felt uncomfortable because as he stated he does not know exactly whom to call in the case of emergency; who is the best person to get them the relevant information? When farmers tried to call the consultants or advisors, they usually end up with busy calls. Farmers suggest that there must be built in recording facility so that their calls are recorded automatically on the consultant cell phones. According to a farmer, “mostly when we are in field ... we missed some information and not able to completely understand what we missed or even convey concerns to the relevant authorities.”

Farmer does not know exactly to whom to call in case of emergency. Who is the best person to get them the relevant information? According to a farmer, “my crops were attacked by... insects... the climate condition was helping to grow those insects in no time but in this emergency state I was not able to get any help from anywhere. Eventually as a last step I burned my crops. This was a big loss for me”

Most of farmers consider human involvements are too crucial in some farm activities. They are reluctant to give information on mobile phones. Farmers are skeptical in providing information, indeed if it actually gets to the right person in the right location. One farmer said that “they do have to trust middlemen” and not see any secure option to do any type of financial transactions via mobile. Some farmers have put this as their deep concern that any deals, they do by machine should be authenticated afterward in writing, “before this it was done by the middlemen.” Farmers feel insecure shifting from traditional agriculture system to mobile phones, while the limitations are the payment and lack of contact in the market. Farmers perceive that they cannot rely on only mobile information systems; they have doubts on the technology like the technology is too complex that how are we going to get out our payments.

According to a farmer, “we get immediate payments from middleman, we do not know how mobile phone will give us this facility, we cannot trust the services for buying and selling purpose but we can trust in case if it's backed by the government... banks.

The proper information and standards should meet in any case. A number of organizations from the government sectors provide the free information, but most of farmers do not have access to this information sources. There must be some centers which also check the communication flow and how these systems can respond effectively. According to a farmer “most time when we are in the field... we know when we have missed some information and are therefore not able to completely convey the complete information or query... to the concerned authorities.”

Farmers hire people and do not use the technology by themselves in sensitive matters where chances for damage are greater than the chances for enhanced productivity. Few farmers responded as “to get rid of weeds there are special skills required, you have to treat without damaging the main crop... sometime technology is dangerous like you need unique skills to spray... same deficits are in mobile phone... how you can be save from radiation effects.”

In traditional agriculture farmers face middlemen who charge the higher money from them. According to a farmer, “the role of middle man is very dominant in our market system. Sometime middle man earns more than farmers. It will be a great change if we are able to get rid of these intermediaries. Surely the more profit I will get from my produce...”.When farmers were asked about whether they like to minimize or eliminate the role of middleman, few farmers responded as “this will be miracle. The middle man provide us low market rate, take its percentage also. The only creditability is the payment... He paid money within weak. If mobile company opens its own purchase centre, payment guarantee, provide fair market rates, which ultimately increase our profits more than the middleman... we appreciate the elimination of the middleman.” Farmers only go or reach to the middleman when they do not have investment to grow their crops, under hard pack circumstances. Farmers are force to take loans from the middleman on their terms. Most of the farmers have shown their willingness that if the mobile phone technology or the MAITS system is associated with some banks or government department which give them loans on the light terms and conditions they like to have it. According to the expert opinion from the Agriculture Development Bank, “... for farmers who are excited to use this new facility the service should be personalized and superior. The mobile Agriculture should provide the access to farmer consistent, reliable, updated information that is tailored for his use.”

Technology Readiness Indicators (TRI)

The farmer's decisions making factor has to be decided within time while it has been noted through the interviews that farmers were indeed had the greatest concern about information timing. For, instance, deciding which mobile phone function is important; a farmer says "time is critical factor... we perceive that instead of SMS services... bear just little cost and just makes the phone call."

The decision support system in current situation is working around information from government, private companies and middlemen. Due to time factors and other information sources tendency towards media habits are changing. According to a farmer "...there are many agriculture programs aired on TV, radio... but due to our presence in field... we do not have time to see it... now these programs are available on CDs...which we purchase and watch according to our own available time slots... The recording systems are expensive and complicated ... so we just bring CDs and watch it"

Few agriculture experts responded, "time factor varies from region to region, every region has its own set of conditions... The timing of crops is different in each region so mobile services must emphasize these implications on ground realities... depending on region to region requirements."

Most of the farmers which are connected to old modes of information technology have information and time advantages. From the total interview sample, five farmers responded that they through online sources identified the markets which were selling commodities in the offseason "We get it in cheap rates", a farmer stated.

The majority of farmers are showing the lack of trust in the new system suggesting that both systems should run on parallel basis. According to a farmer, "...among choosing old and new systems... I think MAITS should run parallel to traditional systems... We cannot leave the tradition system in very beginning of the technology diffusion... I think the system will be chosen on our goals basis... we can adopt any system we like to facilitate our goals."

Farmer's attitude towards technology acceptance shows that trust plays a vital role in the farmer's decision making process. As stated above farmers trust the media including TV, radio, newspapers but the amount of information provided is not good enough to meet their requirements. Some complaint that they are able to get

only basic information from old media – TV shows them the rate slides, radio inform about specific advertisements and newspapers publish advertisements and incomplete messages. Even personal source contacts fail to get complete information in the name of business secrets, one farmer said “we collect the information from different places but if it is available from a single source ... we will be effectively proceeding to crop planning... sowing to trading... easily.”

Most of the farmers do not agree that mobile phones would give complete information. According to a farmer “...we do not know how a tiny device can cover these all information needs.” According to experts the mobile phone can just provide the immediate information and rest of information will be linked to other technology sources like internet. According to the Expert of Associate Agriculture Chemist, “even they get the information on mobile phone, they will not take the risks and will opt for the other information sources... like as laboratory tests, rates..”

Detail explanation is required to change the understanding level of farmers. In current traditional system farmers are informed about new varieties of crops through seminars arranged by the mill owners. Thus, the information provided is according to their research and requirements to which they can get crops from the farmers. According to a farmer, “we are invited by various sugar making factory owners... They provide us with the information about new varieties and ways for sugarcane productions.”

Farmers know about the mobile phone uses to the extent of making phone calls and some of them use SMS. Majority of them are using it for their personal uses only. There were number of farmers who were using the mobile functions (MMS, internet) more than calling and writing SMS. Farmers take the mobile phone as a convenient technology device that is easy to use, easy to carry and from using it can call any time with little effort as they already know its basic functionality. There are some difficulties while using mobile phone such as many farmers get confused during calls in which they are asked to press several buttons to talk to a customer service representative. Instead of convenience, it becomes a time taking device.

According to some farmers “mobile phone technology is more convenient to talk from any place and could get the information as well as pass on the information... the demerits of mobile phones we cannot see the faces on the other side... some time it is a time taking process to call companies and interact with automated message systems... she ask us to press too many buttons... it just waste our too much time.”

Decision Support System (DSS)

Farmers are willing to interact with technology. According to them “we need interaction with the technology experts... they provide us information about agriculture-related technologies and detailed information of different market access... sometimes over internet... for example.”

Sometimes the infrastructure is available from a different funding agency which aids the agricultural sector free of charge (Siraj, 2011), but farmers unfortunately cannot get any information about these agencies because of lack of awareness of these types of organizations. As one of the farmer responded that “recently, solar cell tube wells (water production unit) were introduced in Pakistan and most of farmers do not know about it or came to know late... it was already installed in other places with other farmers.” Farmers also stated that access to the technological experts will make them more knowledgeable to use the technology in agriculture sector and the linkages with the industry will benefit all stakeholders in one go. Farmers perceive that due to technological support they will be able to produce crops according to the new innovations. A farmer from Khanewal responded as “I like to do the research... I am planning to install a unit (factory) for energy drinks... yes these energy drinks would be produced by natural ways... It contains lot of vitamins and calcium... I need its formula to add flavor... I need the technology to produce it in canned form.... I do not know where from I can take help about these, the mobile phone services you are telling about if help I will adopt it.”

A farmer also pointed out that "the farmers have to go to different agents... the worse of them is middlemen role... they give the loans on this promise made by farmers... they will buy farm inputs from them... they will sell their crops to them on fix rate... middleman is taking more advantages than the farmers... they are getting profits out of farm inputs, standing crops... and where they sell forward... from end buyers they charge this.” It is sometime difficult to get loans from Agriculture Development Bank as there is long queue of farmers standing in the waiting lists. Farmers have complaint that they have not able to get loans on time According to them “they are biased in giving the debt money... they give big loans to big land farmers... we have to always wait... mostly time mobile credit officers are out for recovery in field.” The bank officials argued on this problem differently, according to them they are always at the disposal of the farmer. Expert from Agriculture Development Bank pointed out that “when the farmer come to us they try to give them maximum leverage... sometime problem is face by us that the next

sanction of loans are depended on the previous records of farmer... Farmers with higher recoveries paid get more quickly and the farmers who are still not clear from previous recorded loans have to give the justification to sanction new loans for them... we have the databases but here staff more work manually as they do not have access directly to databases... meanwhile after weeks of fieldwork they come and enter their records through IT experts... which is also time taking factor... if farmers are connected to the bank customer databases... they will be able to request before coming to bank... By then we will check their records.”

Farmers encounter scarcity of labor and technical equipment at times crops are ready for harvesting and sowing. According to some farmers “time management is very important... the weather is not predictable... so the market... we need immediate number of labor and technical assistance at the time of planting and harvesting the crop...”. However, experts from Agriculture Research Institute and Agriculture University informed that “the technical assets and labors are available from scattered places. Farmer has to run after the individual need. This is the big waste of time. Even they are not sure that they will be able to get them.”

Expert from Mobile Operator Company, farmers and expert from Agriculture Development Bank informed that agriculture technical equipment being expensive is not affordable by farmers and they have to rent that from either government bodies or private sector. Farmers desired that there should be a database about renting equipments for them. For better connectivity farmer should remain well-connected through mobile phones with these networks to check the availability of related resources.

Farmers keep changing patterns of producing crops, seeds buying and harvesting as per the market conditions. For example, in case of high demand of sugar cane, maximum number of farmers will produce the sugar cane in next year without predicting the market demands. According to some farmers, “we change our product sales... naturally according to the rate variations. We delay products if prices are not suitable... but in some case we are force to sell it... some grains are perishable which are out of control... so we need other sources... which give us options to decide”.

Thus, farmers need different type of knowledge about the new technology innovations needed in particular agricultural environment. Most of the farmers in interview have recommended that the knowledge can be provided through different sources like mobile social communities network and information mobile centers.

One of the farmers said that “the training of mobile uses should be imparted in schools adjacent to the villages. The children are quick with technology especially new emerging technologies. They will pick the information quickly and educate their elders about its significant uses.”

Overall, farmers have shown willingness to have greater knowledge than before. As one of the farmer state “every day we are learning from our society... the knowledge we retrieve is in raw form... we are unable to process it... if we can get systemized knowledge... we will perform in more better way”.

An educated farmer responded to a question on leadership role in following manner: “I have not faced any kind of problems, I am the member of different committees... we represent farmers and gave suggestions about the current agriculture needs and they consider our valuable suggestions... I have not experienced any kind of problems in respect of technology and other agricultural innovations accessibility.” Other farmers who do not have access to such networks stated: “they are biased and they just provided the agriculture facilities to those with whom they have contacts”.

The day to day processes are long and farmers feel uncomfortable using those. One of the farmers said: “they are such lengthy and time taking processes... irrigation system is one of them, we have to wait for the water and due to non availability of water sometime our crops growth gets affected... same effects come out from fake fertilizers and insect killing sprays available in markets”.

Farmers also see agriculture processes of dealings, transactions, selling, seeding as very complicated as one of the farmer responded: “If information is of the worth which reduces cost and travelling then this will be appraised by the farmers”. Expert from Horticulture informed that farmers can go into more new processes of farming like “tunnel farming is one of the skills related to agriculture technology which farmers need to adopt this process should handle with very careful analysis of land condition that best fit with the seeds this can only be done if the farmer has obtained useful information to how to launch these processes”. Mobile phone should have some packages that support the farmer more in detail to understand the information more specifically. Thus, another farmer reflect like the process can be handle with “...communities involvement in information and knowledge sharing will put better impact” on our day to day engagements and procedures.

Farmers Inclination to Adoption of Mobile Phone Agriculture
Information and Trade Systems in Pakistan

Support for farmers for enhanced execution of processes that could give better productivity or access to new emerging markets is very necessary to help them achieve their goals because far too many bureaucratic blocks prevent some farmers from operating in a free market enterprise like system. A farmer showing his disappointment in information and other processes connectivity says that “we can get information of international market but we are not able to get licenses and fulfill the other requirements which are mostly time consuming, expensive and complicated”.

It is noted with concern that majority of the farmers in Pakistan do not have the potential to use mobile phones services. It is because of their disillusionment about the technology that they have already presumed that is only for personal purposes. In future they expect to change their attitude in adopting those technologies. As expert from agriculture bank reflected that “we are seeing lot of changing pattern of farmers... today farmer is having... of difference than they use to be in 5-6 years ago... today farmer is willing to adopt the technology for their crops production... most of farmers come to us and ask about new innovations of agriculture... we have declared the model villages in all areas and urge farmer to go there... they get the information and apply in their fields... They are now very successful in it”.

The overall readinesses of farmers for technology adoption are surmised in the following table 1.

Table 1. Results of Farmers Readiness for Technology Adoption

Farmers Readiness	Technology Adoption Model (TAM)	Technology Readiness Indicators (TRI)	Decision Support System (DSS)
Farmers Willingness	<p>Discomfort Farmer see lack in current information system: Farmer feel information is not delivered on time: Farmer could not call anyone in case of emergency: Farmer when try to call experience busy calls on</p>	<p>Technological readiness Farmer like to use MAITS if it connects with technical experts: Farmer like to use other networks through MAITS: Farmer want to know more feasible technologies available: Farmers want someone</p>	<p>Timeliness Farmer see in time information is crucial for decision making, use phone calls service instead of doing SMS, presume time factor is changing their media habits, time varies region to region basis, get cheaper</p>

	<p>other side: Farmer touring in field missed a lot of information: Farmers cannot read messages: Farmers do not have record facility to store their messages: Farmer retrieval information is not economical: Farmer got general information which is not of any use: Farmer experience absence of social amenities.</p> <p>Insecurity Farmers doubt and distrust MAITS: Farmers like to interact with humans rather than MAITS: Farmer believe payment methods are not ensure on mobile phones: Farmers feel transactions on MAITS should be authenticate after in writing also: Farmers feels MAITS model is too complex: Farmer feel human presentation skills are more valuable than MAITS: Farmer feel MAITS will not be successful for longer period.</p>	<p>to tell them about new Agri-related technologies.</p> <p>Resource Readiness Farmers like to acquire loans from financial institutions: Farmer feel more feasible sending loan request before they visit the source: Farmer like to have easy access to labor: Farmer have to search labor and technical assets from different places: Farmer require to communicate government bodies or public sector companies for necessary assistance in resources</p> <p>Knowledge Readiness Farmer have the knowledge of current mobile phones working: Farmer do changes in their patterns according to known values: Farmer like to know about different available options in using technology innovations in their field work: Farmer desire to know about the market rates: Farmer can access the basic knowledge of MAITS uses in their nearby training centers</p>	<p>commodities in offseason.</p>
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Farmers Inclination to Adoption of Mobile Phone Agriculture
Information and Trade Systems in Pakistan

Farmers Potential	<p>Innovativeness Farmer want to be a first user of MAITS: Farmer desire more Agri-information than others: Farmer can handle MAITs functions: Farmer creative ability to apply information differently: Farmers are ready to take risk to adopt MAITS: Farmers expect latest ideas: Farmer interact in community: Farmer give advices to other farmers: Farmer are ready for change</p>	<p>Leadership Readiness Farmer have a key role in policy making of Agriculture: Farmer contact different higher management officials in order to register their suggestions and feedback: Farmers feel the officer decisions are biased: Farmer perceive strategy makers must do decisions on the basis of root cause situation</p> <p>Process Readiness Farmer think mobile phone services must be relevant to agricultural processes: Farmer opt for new processes in agriculture sector: Farmer understand processes can be improved through communities involvement: Farmer cannot access international markets due to strict process for licenses and other government approvals</p>	<p>Information Richness Farmers think incomplete information mislead them, believe MAITS system will not convey complete message, Farmer would not like to get immediate information form MAITS: Farmer need a detail explanation to understand information: Farmer like information in form of video, audio and graphic wise</p> <p>Ease of Use Farmer perceive technology will be free of effort, understand MAITS System is easy to carry, experience sometime mobile phone complexities, feel difficulty to talk sometime without face interactions</p>
Farmers Preparedness	<p>Optimism Farmer knows mobile phone benefits: Farmer feel MAITS convenience in use: Farmer can use it in flexible timings: Farmer</p>	<p>End-user readiness Farmer support MAITS system as thinking change is positive: Farmer feel MAITS model is source of relieve to them:</p>	<p>Trust Farmer is resistant to change due to MAITS newness: Farmer do not share relevant knowledge in name of business secret: Farmer</p>

	<p>desire to have a new agriculture technology: Farmer can improve their skills: Farmer's source of knowledge and information: Farmer can mold it easily according to their use: Farmer realize other uses of mobile phones than their personal use: Farmer understand demerits of partial information: Farmer well understand the MAITS proposed model: Farmers can manage their crops using this technology: Farmer can sell and purchase commodities, farm inputs: Farmers are not happy with existing agriculture system.</p>	<p>Farmer do not have potential to use technology due to illiteracy and other factors: Farmer are frequent user of mobile so be for MAITS</p> <p>Values and Goals Farmer believe MAITS will provide ways for profit maximization: Farmer through MAITS will able to sell and purchase their commodities to different markets</p>	<p>do trust in case they got decision choices</p>
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Findings

Mobile phone device perception to connect the other information enables farmer's efficient accessibility to new data and information sources not available easily. The real-time option along with highly tailored information reflected Pakistani farmer readiness to adopt the same system, as they are optimistic to real benefits of mobile phone and well aware of implications these mobile phone will put in agriculture sectors. As a result of the interviews, the views of the farmers tend to suggest use of mobile phones in new ways for advancement in agricultural productivity increases mobile-enabled information services. Pakistani farmers have mobile phones but without agricultural information systems to take full advantage of information sources required in their working life. The farmers want to access the technology which they need the most. The farmers seem to be ready for the technology through

innovation readiness for change. They do not have control over the technology. Extension services do not give details knowledge to understand by farmers. Sometime Extension Service Provider believes that technology uses are not for use by common farmer due to illiteracy factor. Farmers like to have less complex devices and feel discomfort with extra functions. The farmers are unhappy from these extension services as information provided to them is general and it is country or provincial level information but not relevant to their specific local requirements.

Even though the farmers would like to get rid of middlemen and may be biased information providing by companies. They still believe that this is a double ended sword, adhering to a view from buyers' perspective that it is not possible to buy crops or products for the whole year whilst farmers can only provide products on a seasonal basis.

The timely available current and appropriate information helped farmers to make decisions at specific times and locations. Furthermore, source and media trustworthiness guide a farmer's trust in information sources. The information richness will convince farmers to trust the new sources of information.

Farmers perceive that information could be more understandable through mobile phones if supported with audio, video or graphical explanations. Ease of use is important to evaluate farmers' perception towards usefulness of the technology. In agriculture systems there is lack of technical support, physical infrastructure and agricultural technologies related information. Farmer connectivity through mobile phones would be feasible if existing and related networks were well established and interconnected. The agriculture technical equipment being expensive is not affordable by farmers and they have to rent that from either Government bodies or private sector. Farmers desire that a data base be maintained for renting that equipment on merit. For better connectivity farmer should remain well-connected through mobile phones with these networks to check the availability of related resources. Like other sectors, farmers dealing on mobile phone require to get help from financial, human and technical assets providing networks. Due to the lack of connectivity with financial institutions networks and other aiding agencies, farmers some time face severe shortage of money which effects their crop production. Currently farmers are taking loans either from Agriculture Development Bank in Pakistan or they approach to the middlemen. The lack in financial resources is too severe or is on such terms and conditions which is not convenient to farmers' pocket.

Thus, farmers need different type of knowledge about the new technology innovations needed in particular agricultural environment. Most of the farmers in interview have recommended that the knowledge can be provided through different sources like mobile social communities network and information mobile centers.

Farmers take the leadership role while they represent farmers in different networks. Most of farmers state their good relationship and identify their role as policy maker in Organizational level decision making for agricultural purpose. Expert says it is necessary to take farmers on board for framing stable policies in agriculture sector. The management support in decisions of technology adoption is important.

Farmers see the mobile phone information system success only if that fit to agricultural processes. Farmers face long waiting processes like as crop planning, seeding, purchasing of farm inputs, transporting, trading and loaning during connecting different fellow farmers, middlemen or market dealers and sometime mobile credit officers from Agriculture banks. The farmers perceive that in time information helps in sorting out problems faced by them. Farmers consider technology as a source of relieve, farmer will be in very clear position to plan for crops variety, seeding to harvesting and transporting produce for selling.

In the farmer interviews, farmers show their ambition to get access to different markets and mobile agriculture information system to (i) minimize the middle men role and(ii) take maximum part and gain profits. To achieve their specific but different values and goals they are expecting some breakthroughs. The crop insurance facility, technical assets, sustaining competitive advantage, profit maximization, time and cost savings in crop production are the key values for the farmers to develop.

Research Implication

Farmer's readiness to adopt mobile agriculture system revolves around mobile decision making support and accessibility to different networks. Any factor missing is prone to deviation from use of this technology. The analysis of the data retrieved from the interviews has suggested, the evaluation of readiness is not only the final place to decide whether farmers will adopt the new mobile information system or not. It is associated with the attitude which comes from innovativeness, optimism or inhibitor like discomfort which either helps farmers' preparedness or unpreparedness before replacing the existing system with the mobile information system. Thus,

further analysis shows that potential to decide is related to farmers' interaction because of some problem or cause. In particular situation Pakistani farmers have shown their unhappiness about the existing system.

So, to adopt the mobile phone is greatest reason for discontinuing use of the existing system. Although farmers have a primary ability to assess the basic information, but access in depth; the farmers need more prominent information sources which give them the potential to properly assess the value of the new system. Thus, preparedness, potential and generating value are the key factors which lead farmers acquainted with other factors in readiness. Pre training involving demonstration, seminars and other related activities are important to convince farmers for new innovations in the field.

Research limitations

The research is limited to the primary data which has been collected from rural areas adjacent to four cities of Pakistan. The research describes the opinion of different farmers and experts from these four cities only. More suggestions could have been gathered and added for Mobile phones Agriculture and Information systems (MAITS) acceptance by including more farmers and retailers from other cities of Pakistan as well. This research has evaluated the Pakistani farmer readiness for adopting mobile phone information and trade system on the basis of different dimensions quoted in literature. The method used is qualitative in nature. However, a quantitative approach can be carried out using various quantitative methodologies. It would be intriguing to establish a global model for the whole agriculture world with all databases in technologies interconnected.

Conclusion

Pakistani farmers very well perceive the merits/demerits of mobile phone usages. They have begun to realize other usages of mobile phones rather than restricting only to personal uses. Thus, majority of the farmers are ready to manage crops, purchase farm inputs and sell commodities through MAITS. The innovative farmers are recognized because of their outward role advising other farmers. The current amenities and informal communication structures have led the farmers to rethink and opt for alternatives systems which could give value addition.

The overall conclusion is that farmers are ready to embrace new mobile phone information systems. However, it requires maximum level of optimism and innovativeness along with removal of the inhibiting factors which affect the readiness state. The inhibiting factors in MAITS adoption comprised of uncertainty factors and current faulty existing system services. There has been a complete consensus among the farmers to practice MAITS along with mobile decision support system because it can help them in crop planning, farm inputs (seeds, fertilizers, spray etc), harvesting, transporting and trading.

The findings of this study will provide guidance to the relevant organizations when considering readiness and barriers towards implementing of MAITS. The results of the study will give insight to many extension service and policy makers to understand what farmers actually desire.

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Interview Guide

1. How the latest technologies of communication affect your life.
2. At present what type of communication technologies are you using?
3. Do you use mobile phone, what type of merit and demerit of cell phone do you experienced?
4. Do you use mobile phone for only making calls or you also use it for SMS or any other services.
5. From where you get the latest information about new technologies for crop production. Is it easily available or you experiences difficulties?
6. Do you want to adopt new technology by which you can get all latest information about crop production at your door step? How can u compare this new method of getting the information with the old traditional one?
7. Do you like that a mobile company provide you all information starting from sowing to selling, weather forecast, cost of fertilizers and pesticides, new varieties at your door step. How much you will be benefited from this new intervention.
8. Is the way of Government for the dispersal of agricultural related information hinders or favors the adoption of Mobile phone information systems? Do you agree with the government policy about agricultural like supporting price of different crops? Whether you like to take this information on your mobile phones?
9. If a mobile phone company eliminate/minimize the role of middle man and it will increase you profit do you ready to adopt this system.
10. If Mobile phone information system increases the number of buyers of your product and gives your information about, how to increase your profit by going to various markets, what will be your degree of willingness to use the above mentioned Mobile Phone information system?
11. If a mobile company provide you the information of the latest rate of crops of different markets of the country, will it increase your profit and can you able to sell your commodities there.
12. If a mobile company provide you all information at a nominal cost which save your traveling cost to enquire information from different sources do you adopt this, if no why.

(Follow up Questions)

ⁱ Progressive farmers: The farmer who run his form mechanically i.e. mechanized forming by adopting latest agriculture technologies.

Economic Structure in Bartın District of Viransehir Sanjak in late Ottoman Period

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Abstract: *This study aims to look into the economic structure of Bartın province, located in West Black Sea Region in Turkey, in the 19th century. The main resource of the study is the temettuat register no 02824 that belongs to Bartın, which was formed on the basis of the census in 1844-1845. Temettuat registers are significant archive resources that provide statistical information about the period studied as well as the region itself. Moving from data such as the income resources, distribution of land, husbandry and labor, this study examines the economic structure of Bartın, which used to be a District of Viransehir Sanjak during the time. The study will also contribute to the literature by giving insights into the economy of Ottoman rural area in the 19th century. In addition to forestry products, the economy of Bartın depended on agriculture and husbandry during the time period studied. Agricultural production included such main products as wheat and barley while agricultural enterprises were medium-scale businesses.*

Keywords: *Bartın district, Temettuat Registers, 19th Century, Ottoman Empire, Viransehir Sanjak, Economic Structure.*

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Introduction

In the periods before the reign of Ottoman Empire, states used to keep a set of inventories in order to produce social, economic, financial and military policies. It is known that one of these inventories was made in Old Egypt between 2500 – 3000 B.C. (Barkan, 2000, p. 181).

In order to keep the Empire under control, Ottoman Empire developed a set of specific inventory systems (İnalçık, 1996, p.IX). Rapid increase in the number of soldiers with permanent salaries in Ottoman army was putting a serious burden on the budget (Pamuk, 2007a, pp. 119-121). In order to resolve these problems in the financial structure, various measures such as creating lease holding system and transferring resources from the treasure were taken (Genç, 2000, p.101) and as it is known, finally, foreign borrowing was used (Tabakoğlu, 1985, pp. 296-297). Although Ottoman bureaucracy was hesitant about foreign borrowing for a long period, in a short time foreign borrowing turned out to be the most frequently used method for budget deficits (Pamuk, 2007b, pp.144-145). Besides, attempts to devise solutions in financial field continued through reforms in budget and tax issues (Güran, 1989, pp 7-17), and instead of civil tax, a new single tax called “Proportionate Tax” was introduced.

In the 19th century, there had been significant differences in the economic structure of the government and significant changes occurred in traditional Ottoman regime (Pamuk, 2002, p.241). Beginning with Tanzimat, possession inventories were made in Hüdâvendigar (Bursa), Ankara, Aydın, İzmir, Konya and Sivas cities (Çadircı, 1987, p.190). Again in the same period tax resources were determined again by new tax regulations (Tabakoğlu, 2003, p.169), Temettüat inventories were made in order to determine the financial situation of the public, to establish a fair tax system and to increase public revenues; and thus it was attempted to tinker disrupted financial system was tried to be tinkered (Öztürk, 2000, p.550).

After the inventory in 1840, all personal assets, real estate, land, cattle, product etc. information were recorded for each house in 1844 in each residential area like districts and villages. Classification of Temettüat registers were grounded on administrative partition and these registers were alphabetically prepared for each province. Total number of Temettüat

Registers between 1844- 1845 is 17.747 (Başbakanlık Osmanlı Arşivi Rehberi, 2000, p.254).

Bartın, which was a significant coastal city of Ottoman Empire during the period (especially in lumbering) is chosen as the sample field for this study. Bartın, today, is one of Turkey's cities in the West Black Sea Region. Rumor has it that the name Bartın comes from the mythological Greek word "Parthenios", which means "river". Bartın, which had fallen under the domination of various states at different times in history, was annexed to the Ottoman Empire with the conquest of Amasra by Mehmet the Conqueror (Mehmed II) in 1460 (Bartın Guide, 1927, p.8).

After annexed to the Ottoman Empire, Bartın was affiliated to Bolu district of Anatolian Governorship; it became a town in 1867 and its municipal organization was founded in 1876. After Zonguldak became a city in 1924, Bartın turned to be a district of the city and in 1991, Bartın itself became a city.

Today Bartın has 4 districts, namely: Center, Amasra, Ulus and Kurucaşile; 9 municipalities including Arıt, Kozcağız, Kumluca and Abdipaşa towns; and 260 villages (Bartın Valiliği, 2011).

Income Sources

Income sources in an economy differ according to sectors and locations. Villages or if we are to say it with a more general expression, rural areas are small residential areas where there is no specialization in economic life and indeed, it is not necessarily needed, where production is at the level of earning one's keep, and where agriculture and husbandry are important income sources (Öztürk, 1996, p.109). These residential areas also inform us about the agriculture in the Ottoman Empire. The economic structure of Ottoman Empire which was based on agriculture in general also stands out in the 11 residential area we work on. Besides, it is also seen that lumbering ranks high on the top as a source of income.

In this study, the records of 11 villages annexed to Bartın township, selected as the sample field of the study, and registered to Temettüat Register no 02824 recorded at the ML.VRD.TMT. were examined and it was intended to

demonstrate the features of the economic structure in a rural area of the Ottoman Empire in the midst of the nineteenth century. The villages used in this study are: “Mekeçler” (BOA, ML.VRD.TMT No:02824, pp.4-10), “Kurtköy” (BOA, ML.VRD.TMT No:02824, p.11-16), “Receb Beşeoğlu” (BOA, ML.VRD.TMT No:02824, pp. 17-21), “Gedikler” (BOA, ML.VRD.TMT No:02824, pp.22-24), “Çayır” (BOA, ML.VRD.TMT No:02824, pp.25-32), “Bonlar” (BOA, ML.VRD.TMT No:02824, pp.32-34), “Kıran” (BOA, ML.VRD.TMT No:02824, pp.35-39), “Hoşafçılar” (BOA, ML.VRD.TMT No:02824, pp.40-41), “Emiroğlu” (BOA, ML.VRD.TMT No:02824, pp.42-43), “Pınarlı” (BOA, ML.VRD.TMT No:02824, pp.44-49) and “Akmescid” (BOA, ML.VRD.TMT No:02824, pp.49-50). Aforementioned rural area had 154 tax-paying houses and all of the residents of these houses were Muslim.

Income from lumbering has an important share in the distribution of income sources in the rural area and it takes the first place.

We put all lumbering-relevant incomes in Temettüat register under the same topic. Revenue from lumbering within the total product was 59,69% in 1260/1844 in Bartın rural area (graphic 1). This shows that lumbering is an important income source in our study field. Forestland in Bartın is one of the most interesting and among the richest forestlands in Turkey in terms of plant and tree species diversity (Bartın Valiliği, 2011). Agricultural income is the second income source for rural areas. The rate is 33.51%. In this context, income generated from fields, vegetable gardens and grape vines are included in agricultural income sources. The reason for agricultural income to take the second place as an income source can be explained with the economic properties of the region.

Income rate generated from being a laborer is 4.66%. Laborer which means worker (Devellioğlu, 2005, p.31) has been a considerable income source in villages. Income from husbandry, on the other hand, ranks last in income resources in the region with a rate of 2.14%. Due to rich pastures and humid climate, bovine breeding is widespread in the region.

In the distribution of incomes, large amount of income is obtained from lumbering in villages. Lumbering transportation has an important share in all villages. It is 38, 89%. Income obtained from lumber milling has the second place with a ratio of 36,65%. Income from both lumbering and its

transportation takes the third place as an income source. Lumber trading is only done in Akmescid village.

In all village settlements income from lumbering has an important share as a source of income. Mekeçler Village had the highest agricultural income among total product across the villages. Income from lumbering amounted 58.04% in this village. The lowest agricultural income was in Kıran Village with a rate of 30,04%. Income from husbandry among total product was the highest in Akmescid Village with the rate of 2,14% and lowest in Mekeçler village with 0,21%. There was no income obtained from husbandry in Hoşafıllar Village. There was no laborer income in three villages in all sources. Laborer income was the highest in Recep Beşođlu Village. When income from lumbering is looked into in total product in all villages, it has a big share of 59,69%. Among villages, Kıran village had the highest income from lumbering with a rate of 66,52% (Table 1).

Table 1. Distribution of Income Sources by villages

Villages	Agricultural Income (Kurus)	Husbandry Income (Kurus)	Labour Income (Kurus)	Lumbering Income (Kurus)	Total (Kurus)
Mekeçler	5.914	50	450	9.330	15.744
Kurtk�y	4.512	125	500	6.807	11.944
Receb Beşođlu	4.392	144	1.600	6.551	12.687
Karagedikler	2.649	44	700	3.950	7.343
Karaçayır	4.166	59	1.250	6.550	12.025
Bonlar	2.467	36	0	3.700	6.203
Kıran	4.019	111	150	8.901	13.381
Hoşafıllar	761	0	0	1.250	2.011
Emirođlu	2.269	154	0	3.930	6.353
Pınarlı	4.646	132	150	8.900	13.828
Akmescid	11.153	713	1.550	19.870	33.286
TOTAL	46.948	1.568	6.350	79.739	134.805

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50.

Income per house in the rural area was found as 931 kurus (The main currency used in the Ottoman Empire in the first half of the XIX. century). Among the total 11 villages 6 of the villages were recorded to have an income above

the average and 5 of them were recorded to have an income below the average.

Table 2. Total Income of the Villages and Income per House

Village	Number of Houses	Total Income	Income per House	In Village Average
Mekeçler	20	23.426	1.171	+
Kurtköy	18	11.944	664	-
Receb Beşeoğlu	12	12.687	1.057	+
Karagedikler	8	7.343	918	-
Çayır	22	12.025	547	-
Bonlar	6	6.203	1.034	+
Kıran	13	13.381	1.029	+
Hoşafçılar	5	2.011	402	-
Emiroğlu	6	6.353	1.059	+
Pınarlı	17	13.828	813	-
Akmescid	26	33.286	1.280	+
TOTAL	153	142.487	931	

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50

Income per house was the highest in Akmescid Village with an average income of 1,280 kurus per house. And, the lowest average income, on the other hand, was in Hoşafclar Village with 402 kurus per house. The reason behind the high rate of average income in Akmescid village was that lumbering trade was only made in this village. In general, there are no significant differences between the averages of plus and minus income groups. It is possible to say that the income levels of the houses in the same group are close to each other.

Land Distribution

Total area of land recorded for agricultural purposes (as fields and vegetable gardens) in village settlements was 2033 decars (1 decare equals to one thousand square meters, 0,247 acres). These lands are 100% planted areas. All the lands in the villages were used for planting cereals, vineyards, vegetable gardens. 93,21% (1895 decare) of the agricultural lands were fields and 6,79% (138 decare) of the lands were vegetable gardens. This shows that agricultural production was the second source of income in the region after lumbering.

In this section, land shares, amount of planted areas and their shares among the total 2033 decare agricultural area will be emphasized. 100% of the 2033 decare land that villages had were planted areas. There were no lands allowed to lie for fallow. Total land amount per taxpaying houses was 13, 29 decares (Özlu, 2008, p.118).

Akmescid Village had the highest share in land distribution. Total land amount of this village was 422 decares. The village with the lowest amount of land was Hoşafçılar village with 21 decares. When we look into the amount of land per house, Bonlar Village had the highest rate with 20,33 decares per house. Again Hoşafçılar Village had the lowest amount of land with 4,20 decares per house.

In terms of planted area, again Akmescid had the highest amount while Hoşafçılar had the lowest amount of planted area. The amount of planted area in Akmescid Village was 422 decares and the same amount was 21 decares in Hoşafçılar Village. The amount of planted area per house was the highest in Bonlar Village with 20.33 decares per house. The lowest amount was in Hoşafçılar Village with 4.20 decares per house.

The total land amount of all villages, the amount of planted and fallow land, amount of land per house is given in detail in Table 3.

Table 3. Land Distribution

Villages	Nr. of Houses	Total Planted Area (Decare)	Planted Area per House (Decare)	Total Land (Decare)	Land per House (Decare)	Planted Area %	Unplanted land %
Mekeçler	20	280	14,00	280	14,00	100	-
Kurtköy	18	206	11,44	206	11,44	100	-
Receb Beşeoğlu	12	189	15,75	189	15,75	100	-
Karagedikler	8	117	14,63	117	14,63	100	-
Çayır	22	195	8,86	195	8,86	100	-
Bonlar	6	122	20,33	122	20,33	100	-
Kıran	13	186	14,31	186	14,31	100	-
Hoşafçılar Village	5	21	4,20	21	4,20	100	-
Emiroğlu	6	94	15,67	94	15,67	100	-
Pınarlı	17	201	11,82	201	11,82	100	-
Akmescid	26	422	16,23	422	16,23	100	-
TOTAL	153	2033	13,29	2033	13,29	100	-

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50

In their distribution by the type of agricultural production and villages, it is seen that the total land reserved for branches of production is used to full capacity. The usage rate of fields reserved for such products as wheat, barley, oat and flax were close to one another. The largest land use in grains production was in Akmesjid Village with 380 decare while the least land amount was in Hoşafçılar Village with 17 decare. The land distributed for vegetable gardens was the highest again in Akmesjid Village with 42 decare and lowest in Bonlar Village with 5 decare (Table 4).

Table 4. Distribution of Agricultural Production Land

Village	Nr. Of Houses	Fields where grains are planted (Decare)	%	Vineyard, orchard and vegetable production (Decare)	%	Total Production (Decare)	%
Mekeçler	20	273	97,50	7	2,50	280	100
Kurtköy	18	198	96,12	8	3,88	206	100
Receb Beşeoğlu	12	178	94,18	11	5,82	189	100
Karagedikler	8	110	94,02	7	5,98	117	100
Çayır	22	184	94,36	11	5,64	195	100
Bonlar Village	6	117	95,90	5	4,10	122	100
Kıran Village	13	177	95,16	9	4,84	186	100
Hoşafçılar Village	5	17	80,95	4	19,05	21	100
Emiroğlu	6	83	88,30	11	11,70	94	100
Pınarlı	17	178	88,56	23	11,44	201	100
Akmesjid Village	26	380	90,05	42	9,95	422	100
TOTAL	153	1895	93,21	138	6,79	2033	100

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50

In all villages a large amount of the land was reserved for grain production. The income from a 1895-decare-field reserved for field crops was 38.352 kuruş. The highest revenue was obtained in Akmesjid village with 9.155 kuruş. The lowest income level was at Hoşafçılar village with 545 kuruş. An area of 138 decare was left for vineyards, gardens and vegetable gardens. The revenue from this area was 1998 kuruş. The highest revenue was obtained from Kurt Köy with 1.245 kuruş. Again, the lowest revenue was at Hoşafçılar Village with 216 kuruş.

The total area reserved for wheat, barley, oat, flax, vineyard and fruits& vegetable was 2033 decares. 46.948 kuru revenue was made from an area of 2033 decares in all villages (Özlü, 2008, p.118). When we compare this income with Akçakoca on the same period, we find a significant difference between the two. It was figured that 46757 kuru revenue would be earned from 746,5 decares area in Akçakoca rural area (See Özlü, p.188). This means 62,63 kuru per decare. On the other hand, 46948 kuru revenue was generated from 2033 decares in Bartın rural area, and such a low number as 23,09 was found per decare. The highest income was obtained in Akmesicid Village in all villages with 11.153 kuru. The lowest income was obtained in Emiroğlu Village with 2.269 kuru.

Table 5. Distribution of Land by Villages in terms of their usage area and value, 1844

Village	Fields where grain production is made		Vineyard, orchard and vegetable garden		Total	
	Decare	Income (Kuru)	Decare	Income (Kuru)	Decare	Income (Kuru)
Meçeçler	273	4.802	7	1.112	280	5.914
Kurtköy	198	3.267	8	1.245	206	4.512
Receb Beşeoğlu	178	3.681	11	711	189	4.392
Karagedikler	110	2.118	7	531	117	2.649
Çayır	184	3.446	11	720	195	4.166
Bonlar	117	2.125	5	342	122	2.467
Kıran	177	3.407	9	612	186	4.019
Hoşafçılar Village	17	545	4	216	21	761
Emiroğlu	83	2.017	11	252	94	2.269
Pınarlı	178	3.789	23	857	201	4.646
Akmesicid	380	9.155	42	1.998	422	11.153
TOTAL	1895	38.352	138	8.596	2033	46.948

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50

When we compared Bartın rural area with Bilecik, Bursa and Akçakoca rural areas in the same period, we found totally different ratios. Among the three districts, Bilecik had the highest rate. Bartın rural area had the lowest level of productivity among the four districts.

Table 6. Comparison of Bartın rural area with surrounding districts' rural areas in terms of productivity (Kurus)

City	Grain Productivity Level
Bilecik	68,95
Bursa (Öztürk, 1996, p.134)	44,22
Akçakoca (Özlu, 2008, p.207)	38,50
Bartın	20,24

The productivity of crops in agricultural land varies according to the type of product; and geographical properties, on the other hand, effect productivity. Differences in practice in the production phase and use of fertilizers also effect productivity.

When we leave all other factors aside except the geographical factors and make an evaluation; it is possible to set forth in which productive product a residential area should specialize in by determining in which product a village gets the highest revenue per decare (Öztürk, 1996, p.132).

Table 7. Productivity of Agricultural Products by Villages (Kurus)

Village	Grains	Vegetables	Grape vine	Fruit Tree	Miscellaneous Fruits	Total
Mekeçler	4.802	347	765	-	-	5.914
Kurtköy	3.267	253	792	-	-	4.312
Receb Beşeoğlu	3.681	324	351	-	36	4.392
Karagedikler	2.118	189	306	-	36	2.649
Karaçayır	3.446	234	360	126	-	4.166
Bonlar Village	2.125	117	225	-	-	2.467
Kıran Village	3.407	162	387	63	-	4.019
Hoşafçılar Village	545	72	81	63	-	761
Emiroğlu	2.017	162	-	63	27	2.269
Pınarlı	3.789	324	243	290	-	4.646
Akmescid Village	9.155	713	533	702	-	11.103
TOTAL	38.352	2.897	4.043	1.307	99	46.698

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50

The village with the highest productivity in grain production in rural area was Akmescid Village. With a 9.155 kurus revenue Akmescid was the village

with the highest revenue among all villages and it was also the village with the highest revenue in vegetable and fruit growing. Hoşafçılar Village had the lowest revenue in grain production with 545 kuruş revenue.

Highest revenue in vegetables belonged to Akmesicid Village with 713 kuruş revenue. Hoşafçılar village where the lowest revenue was obtained was also the village with the lowest grain and grape revenue.

Kurtköy had the highest grape income with 792 kuruş and Hoşafçılar had the lowest grape income with 81 kuruş. Grapevine and cloth trading income was only obtained in Kurtköy with 100 kuruş each. In miscellaneous fruits 99 kuruş revenue was obtained in three villages in total.

Size of Agricultural Enterprises

In Ottoman agricultural statistics, enterprises were divided into three groups according to their size. Companies with an area below 10 decars were grouped as “imalât-ı sağıre”(small scale enterprise), those with an area between 10-50- decars were grouped as “ imalât-ı mutavassıta”(medium-sized enterprise), and those with an area more than 50 decars are grouped as “imalât-ı cesime (large-scale enterprise)” (Güran, 1998b, p. 242). According to this division the rate of small businesses in Bartın rural area was 18.15% while the rate of medium-sized businesses counts for 81.85%. There were no big-sized enterprises (with an area over 50 decars) among agricultural businesses. And this showed that there were mostly medium-sized enterprises in the villages. According to a study in 2007, when the ratio of the sizes of the agricultural businesses and the area they cover is looked into the total rate of three group business with 50-100 and 100-200 and 200-499 decars (da) size make 60,75%. In Bartın, on the other hand, the number of businesses with 0-20 da make up 29,2%.And the companies with 20-100 da make up the 68,7%. Besides, there are no companies larger than 500 da in Bartın (Sarı, 2007, p.45).

Table 8. Size of Agricultural Enterprises

	1-10 Decare	%	10-50 Decare	%	Over 50 decare	%
Planted field	231	12.19	1664	87.81	-	0
Vegetable garden	138	100	-	0	-	0
TOTAL/AVERAGE	369	18.15	1664	81.85	-	0

Grain Production

We see that grain production, which was the most important source of income for Ottoman Empire (Keyder and Tabak, 1998, p.182), had been an important source of income in Ottoman rural areas, a small reflection of the empire, as well. Moving from the data regarding the grain production of eleven villages chosen, numbers about the type of grain and their amounts (table 8) will be presented.

All the fields in the Temettüat register, the main source of our study, were planted areas. There were no fields allowed to lie for fallow. Wheat, barley and oat were grown in all villages. Besides, reed plant and flax oil grew in Akmesicid too. The highest wheat production was made in Akmesicid village with 880 bushels while the lowest production was made in Hoşafçılar village with 50 bushels.

As is seen, wheat production took the first place in grain production. In the villages we realized our study, a total amount of 3840 bushels wheat production was made. After wheat, the second most produced grain was barley. Barley was most produced in Kıran Village and least produced in Hoşafçılar Village. The total production of field products was 8315 bushels. The highest share was at Akmesicid Village with 1900 bushels and the lowest share was at Hoşafçılar Village with 85 bushels.

Table 9. Distribution of Grain Production according to their amounts (Bushel)

Village	Wheat	Barley	Oat	Reed Plant	Total
Mekeçler	370	390	190	-	950
Kurtköy	310	220	120	-	650
Receb Beşeoğlu	340	270	200	-	810
Karagedikler	230	160	50	-	440
Çayır	480	290	190	-	960
Bonlar Village	240	120	110	-	470
Kıran Village	390	220	80	-	690
Hoşafçılar Village	50	30	5	-	85
Emiroğlu	180	140	30	120	470
Pınarlı	370	190	130	200	890
Akmescid Village	880	390	350	280	1900
TOTAL	3840	2420	1455	600	8315

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50

We can find if there is a surplus product in the total agricultural production amount of the villages. When doing this, we can use the tithe paid for one year in the villages. Total tithe from wheat in the villages was 384 bushels. Since this tax in-kind corresponds to 10% of the total product, moving from this information we can find the total wheat production as 3840 bushels. When 384 bushels, the tithe, is deducted from the total production, the amount of wheat the villagers would consume in a year is found; and this amount corresponds to 3456 bushels (88.354 kg). Does this amount supply the villagers with the necessary amount they need?

When we consider that a person can consume almost 8 bushels (205 kg) of wheat in a year (Güran, 1998 a, p.16), wheat consumption of the villages in the same year is calculated as 6120 bushels (156.978 kg) (Özlu, 2008, pp. 195-196). 153 houses, the population of the village is found as 765 by calculating 5 people living in each house. As it is known that each person consumes 8 bushels of wheat every year, total consumption is found as $765 \times 8 = 6120$ bushels (Barkan, 1953: 1-26).

Ömer Lütfi Barkan's thesis stating that each Ottoman house's population is five people. The same calculation can be made for Akçakoca rural area. There were 294 houses in Akçakoca. And accordingly, the total population is 1470. Total annual wheat consumption is $1470 \times 8 = 11.760$. However, the total wheat production in Akçakoca was 1790 bushels. Thus, all dwellings of Akçakoca produce less wheat than

they need. And this brings in mind that the people in the villages provide their wheat need from the districts in the neighborhood partially (Özlu, 2008: 195-196).

According to this calculation, it is revealed that villagers cannot even supply their own wheat amount for themselves and their families let alone merchandise it (For similar and comparative calculations see Öztürk, 1996: 146; Küçükkalay & Efe, 2006: 252). The required amount of wheat-deficit for aforementioned villages to nourish themselves is 2.280 bushels or in other words 58.482 kg. However, this deficit should be approached with precaution because in those aforementioned villages such supporting products as barley, oat, reed plant, flax and flax oil were also grown.

Husbandry

Husbandry is at the bottom of the list as an income source in the region. Its share in the total revenue was 2.14% (Özlu, 2008: 82). In Özlu's study on Akçakoca, the share of husbandry in Akçakoca rural area was found to have 3% share in total revenue. Between 1811-1864, Akçakoca was a town attached to Bolu-Safranbolu (Viranşehir) Has Voyvodalığı (Özlu, 2008: 32). Existing husbandry, as far as it seems, was for meeting needs. It is not possible to say that production for the market was made and that husbandry was done as an occupation. It appears that only ox among cattle was used in plowing. Such pack animals as bear, horse, donkey and hinny were not found in the villages.

Table 10. Ovine and Cattle Distribution

Village	Ovine (Number)	Income- generating ovine (Number)	Total Revenue	Cattle (Number)	Income- generating cattle (Number)	Total Revenue (Kurus)
Mekeçler	9	3	6	56	2	20
Kurtköy	-	-	-	35	6	75
Receb Beşeoğlu	15	14	14	43	4	40
Karagedikler	-	-	-	26	2	20
Çayır	10	6	12	23	2	50
Bonlar Village	0	-	-	25	3	30
Kıran Village	-	-	-	63	8	80
Hoşafçılar Village	-	-	-	5	-	-
Emiroğlu	3	3	4	32	8	150
Pınarlı	-	-	-	32	5	105
Akmescid Village	24	14	29	110	28	598
TOTAL	61	40	65	450	68	1168

The number of bovine in rural area was 61. Among these 61 animals, 40 of them brought in money; the income generated from these 40 animals was 65 kurus. Akmescid Village ranked in the first place in raising ovine with 24 ovine. Again the highest income from ovine was generated in Akmescid Village with 29 kurus.

The total number of cattle was 450. There were cattle in all rural areas. The highest number of cattle was in Akmescid Village. The number of cattle in this village was 110. The income generated from these 110 cattle was recorded as 1168 kurus. An important part of this revenue was generated from milk cows and milk buffalos.

The rate of ovine among all animals was 11.94% while the rate of cattle was 88.06%. When we grouped the animals raised in rural areas according to their species (Table 10) we saw that cattle species had the highest share. It is seen that ovine breeding did not develop in the villages in rural areas while bovine breeding significantly improved.

Table 11. Total Animal Distribution in Villages by their species

Animal species	Number	%
Goat	15	3,09
Sheep	46	9,48
Cattle	424	87,42

It is seen in the records that goat and sheep were the animal species in which ovine breeding developed. There was no information on poultry so we cannot comment on poultry. The total number of goats and sheep that we assessed in total ovine was 61. Among these 61 ovine, 15 of them were goats and 46 of them were sheep. Among both species sheep had a predominant place.

Annual revenue from 61 ovine was 65 kurus. And 18 kurus of this amount was earned from goats and 47 of it was earned from sheep. It seems that when annual revenue from each animal is considered, sheep was a more productive animal. Among goat species mostly milk goats were raised. Goat was only raised in Emiroğlu (3) and Akmescid (12) villages. And in sheep species again mostly milk sheep were raised. It is seen that these animals were mostly raised in Recep Beşeoğlu village.

The distribution of bovine breeding in the rural area is as follows; Number of cattle was higher than the number of pack animals. Except from milk cow and milk buffalo, no income was generated from the other animals among cattle. The number of draught animals among cattle was high. And among pack animals there were no donkeys in all rural areas except 1 in Emiroğlu village.

When we looked into the animal species used for ploughing and packing and those which should be regarded as capital, we saw ox and water buffalo on the top of the list. Only donkey was recorded carrying and apart from donkey, was no other animal like horse and hinny.

The total number of bovine animals in the rural area raised for various purposes and used in various areas was 370. Among these animals 369 of them were cattle and 1 on them was pack animal.

Annual revenue from 50 milk cows in cattle group was 643 kurus. Average annual revenue per animal was found as 12.86 kurus. In terms of annual revenue, income from milk buffalo took the second place. While income was 10 kurus per milk cow, the same income from each milk buffalo was two and a half times higher than it. The annual revenue from each milk buffalo was 25 kurus (Özlü, 2008, p.165). In a research on Plovdiv city, it was found that 60 kurus income is generated from a buffalo and 5-6 kurus income is generated from a milk cow annually. (Özlü, p.165). The total revenue from cattle was 1193 kurus.

The highest number of milk cows was in Akmescid Village. There were 17 milk cows in the village. There were two milk buffalos in each Çayır, Emiroğlu and Ponar villages, and one in both Kurtköy and Kiran Villages. There were no milk buffalos apart from the mentioned ones. The highest number of cattle used for ploughing was in Akmescid village. The total number of cattle used for ploughing in this village was 30. When the number of houses in this village is considered (a total of 24 houses) it is obvious that there are more than one cattle for each house.

During the times before mechanization and in fields where mechanization did not apply, cattle was the main agricultural tool and there was almost one cattle for each house in the rural area. According to our calculations, there were 1.02 cattle per house. When we accept that each house had one cattle, it

means that all household heads in all villages have a cattle. The rate of cattle, used as draught animal, per house in the rural area is shown in Table 11. In the table, we see that the number of draught animal per house is 1.02. The highest number of cattle per house was in Bonlar Village and the number was 1.67 per house, which means there was more than one cattle for each house in this village. The highest number of cattle was in Mekeçler Village and the total number of cattle was 33. However, since the population of the village was high, the number of cattle per house was 1.65. The lowest number of cattle was in Emiroğlu Village and there were 5 draught animals in the village. In Hoşafçılar Village, where there were only 5 houses, there were no draught animals.

Table 12. Draught Animal per House

Village	Number of Houses	Total cattle number	Cattle per House
Mekeçler	20	33	1.65
Kurtköy	18	19	1.06
Receb Beşeoğlu	12	19	1.58
Karagedikler	8	12	1.50
Çayır	22	16	0.73
Bonlar Village	6	10	1.67
Kıran Village	13	16	1.23
Hoşafçılar Village	5		0.00
Emiroğlu	6	5	0.83
Pınarlı	17	9	0.53
Akmescid Village	26	17	0.65
TOTAL/AVERAGE	153	156	1.02

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50

When we looked into the amount of agricultural land per cattle in our sample study field, we saw quite different numbers. As seen in Table 12, village averages differs. On all planted areas scale, the average land per cattle is 13.03. The highest amount of land per cattle was in Akmescid Village. Pınarlı Village followed Akmescid Village with an average land per cattle among all planted area as 22.33 decare. The village where a cattle had the lowest land was Mekeçler Village. The average land for a cattle among all planted area in this village was 8.48 decare.

According to the calculations made, a couple of horses plough 6-7 decare area while a couple of cattle plough 2-3 decare area (Güran, 1998 a, p.86). Accordingly, it was found that a cattle in Bartın rural area was only used for two work days for ploughing.

Table 13. Land per cattle

Village	Number of Total cattle	Planted area (Decare)	Planted Land per Cattle (Decare)
Mekeçler	33	280	8,48
Kurtköy	19	206	10,84
Receb Beşeoğlu	19	189	9,95
Karagedikler	12	117	9,75
Çayır	16	195	12,19
Bonlar Village	10	122	12,20
Kıran Village	16	186	11,63
Hoşafçılar Village	0	21	0
Emiroğlu	5	94	18,80
Pınarlı	9	201	22,33
Akmescid Village	17	422	24,82
TOTAL/AVERAGE	156	2033	13,03

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50

Although beekeeping was not accounted as a source of living, still some villages were engaged in beekeeping. All villages were engaged in beekeeping except from Hoşafçılar and Emiroğlu villages. The total number of bee hives in all villages was 43 and the total annual revenue from beekeeping was 299 kurus. The annual revenue from each bee hive was 6 kurus in all villages except Pınarlı and Akmescid villages.

Distribution of Labor Force

In village settlements, there were not many occupational diversity as in urban areas. In villages, where main source of income was based on agriculture and husbandry, there was no need for occupational differentiation (Güran, 1985, p.318). However, in rural areas there were reasons to do agricultural and non-agricultural activities together. Because of the density of population in the rural area, not everyone could engage in agriculture (Güran, 1998 b, p.271).

The rate of agricultural revenue in total revenue in the rural area used as the study field was 35.51%, while the same rate for lumbering was 59.69%. In other words, we see that the income rate earned from an occupation other than agriculture and husbandry and which can be regarded as occupational income had a quite high level in total revenue. This shows that Bartın, located in the West Black Sea Region, was rich in terms of forests. According to Forest Management Map Database of General Directorate of Forestry, Bartın city has 98.578 ha forest area and 13.229.029 cubic meter planted forest. Most of the existing forest areas are high forests (Sarı, 2007, p.23). It can be said that the large amount of forest areas in the region developed lumbering activities.

When the occupations of the household heads were specified in the registers their being “erbâb-ı ziraat”(farmer) was indicated clearly. Since almost all of the people engaged in a business other than agriculture had agricultural lands, it is understood that these people were engaged in farming. Recent studies show that almost all of the people living in the villages of Bartın are somehow engaged in agricultural activities (Sarı, 2007, p.44).

It is indicated that 10 household heads among 153 in all villages did not have any income. These people without any income were recorded as “Sa’ile”, “unemployed”, “orphan”, “Lunatic”, “Diseased and Alone” and “Asâkir-i Nizâmiye-i Şâhâne”. Only in Çayır Village there was a record of one person as “Asâkir-i Nizâmiye-i Şâhâne”. This person had no property, land or animals and was engaged in merchandising in Adapazarı and later came to Bartın to attend Asâkir-i Nizâmiye-i Şâhâne”. There were other 9 people without any income and without any kind of property. It is stated that those people live off with the support of other people. Apart from these 10 people, all other household heads have some piece of agricultural lands that they work. Most of these household heads were earning their income from lumbering apart from agricultural activities. The share of income obtained from lumbering among total revenue was 59.15%.

The number of people with an income from an occupation; total and average occupation income breakdown and the share of this income in total revenue will be assessed. In all the villages examined, all household heads earned income from lumbering apart from agricultural activities. The village with the highest occupation income was Akmesicid Village.

Their occupation revenue had 40.70% share in total revenue. The rate of occupational income in total revenue in Akçakoca in the same period was quite higher than Bartın and it was 87 % (Özlü, 2008, p.180). Rural area had a total 54.866 kurus occupation income. The village with the highest occupation income was Akmescid Village, which also had the highest number of household heads having an occupation income. The average revenue in all villages was 386.38 kurus. The highest average was again in Akmescid Village with 536.64 kurus. 25 houses out of a total of 26 had an occupation revenue in this village.

Distribution of Taxes

Tax is transfer of fund to the government from economic resources with a political decision in order to carry on public works (Milliyet Genel Ekonomi Ansiklopedisi I-II, 1988, p.920). And it was the basis of income distribution in pre-industrial economies. This financial system, which was one of the basic dynamics of the empire took its unique place in world finance history with the collapse of the empire (Genç, 1975, p.231).

There had been various implementations of tax in Ottoman Empire in terms of how it was imposed, how it was collected and its diversity. In the period before Tanzimat, there were taxes with different rates and collection methods under the main headings of “Tekâlif-i Şer’iye” and “Tekâlif-i Örfiye”.

19th century had been a totally different period for Ottoman society and economy compared to the previous periods. One of the most significant improvements during the century was the reform movements that the Ottoman executives initiated (Pamuk, 2007a, p.238). With Tanzimat, as in other institutions, many reforms were made in financial structure too. Financial institutions and tax system had been the main focus of Tanzimat reforms (Ortaylı, 1974, p.2).

In tax practice religious taxes were remitted and substituted by tithe at a rate of one of a tenth in agricultural products and “adet-i ağnam” (literally meaning “sheep tax”) in ovine, jizya taken from non-Muslim citizens. And civil tax was also substituted with “vergü-yi mahsusa” (a private tax) (Güran, 1989, p.13). Jizya was a per capita tax levied on non-Muslim citizens in Ottoman Empire (Karaman and Pamuk, 2010, p.599).

Vergü-yi Mahsusa (Private tax)

This tax which was allocated somehow considering the income of the people and which was substituted for civil tax during Tanzimat period began to be implemented as of 1840. The amount of this tax was determined in sanjak scale and the total amount was divided between the districts. Later the members of the town council used to determine the amount that each town or village had to pay in a meeting where, according to the ethnicity of the population, imam and priest were participating; finally the tax was allocated according to the abilities of the people to pay.

In determining the amount of the tax, the total amount of removed civil tax was based on and the ability of the taxpayers to pay which was used when allocating the tax among taxpayers was determined by a census. In this new practice, real estate, land, animal and if the person is engaged, their trade income was grounded on. In order to determine this financial strength fairly and to allocate the tax in a just manner according to people's ability to pay, inventories were taken in 1844 in a large part of the country. And as a result of these inventories "Property, Land, Animal and Temettüat Registers" were prepared.

During the inventories taxman began tax registering from the villages and registered every single person's name and reputation, their property, land and animals, average amount of revenue of the merchants and tradesmen. And a notable person would be appointed by the city council to each town to help the taxman for registry and a secretary would be appointed to them. Registries were to be made on a properly and fairly, and those who make wrong or incomplete register would be punished.

During the collection, the mukhtar of the village or neighborhood, imam or clerk registered the collection they made to the register book with a name of the household head and would bring the book and money to the district. The taxes that people paid were registered to the book at the district and the amount money and date of the payment were written and sealed by the principal and presiding officer. During the collection and the delivery of the tax to the taxman, zaptiah soldiers were also appointed for security reasons.

The collection of this tax was made in two installments as “ruz-ı Hızır” and “ruz-ı kasım” until 1261/1845. And each installment was collected in three other installments. However, since these collection periods were not appropriate for collection, from this date on the tax was to be collected step by step from the farmers from harvest period till the end of the year, and from merchants and tradesmen it was to be collected in a year in installments. With this regulation in 1864, paying the tax in 10 installments was introduced. This tax which was based on identifying property, land and other income resources of the public and taxation according to their ability to pay was abolished in 1860 and instead, land and income taxes were brought (Öztürk, 1996, p.176).

After all these general information about taxes, we will now put an emphasis on the shape of Vergü-yi Mahsusa in Ottoman rural area. From the Temettüat register sequence no: 02824, we know the amount of tax allocated to villages in the rural area. Here we will look into the allocation of taxes in the villages from the registers belonging to the villages.

When we look into the average amount of tax levied per house, it is seen that the amount is 187,10 kuruş in total rural scale. And when we look at village averages we see that 6 villages are above this average and 5 villages are below the averages. Highest average tax was seen in Akmescid Village as 241,73 kuruş. The lowest average tax was seen in Hoşafçılar Village as 98 kuruş. Total vergü-yi mahsusa in all villages is 28.627.

Tithe

The word tithe means a one tenth part of something (Akdağ, 1999, p.408); and in Islam land law it means a land tax at a rate of 1/10 and 1/20 taken from the products raised in lands whose owners converted to Islam with their own will and from the lands which were won after a war and divided among the war veterans.

Tithe taken directly from the producers (Keyder and Tabak, 1998, p.146) is like a religious service and regarded as the zakat of the land and was only taken from Muslims and the owned land. Tithe in the Ottoman Empire was the name of the money taken from demesne. Since the word exaction would not

be approved among the public, it was called as tithe and thus, had been used for centuries.

Tithe was taken from all products in agriculture. It was taken from all grains and grain types, products raised in vegetable gardens, fruits, vineyards and grape products, pastures and other agricultural products; and the collection of this tax was made in three ways: in kind, in cash and fixed.

This tax was not previously transferred to the national treasury but paid to the land owner by rayah working on the land. After the corruption of manorial system the authority of demesne was given to tacksman, taxman and civil servants.

During Tanzimat tithe was collected at a rate of one tenth. Tithe, the most efficient source for the finance of socio-economic development, was remitted in 17 February 1341 (1925) and was replaced by “mahsulat-ı araziye (land income)” (Öztürk, 1996, pp. 184-185).

Following these historical improvement phases of tithe, the tithe per house, its share in total tithe and the rates of tithe in Bartın rural area will be highlighted. Burden of tithe tax varies in each house according to the capacity of agricultural lands in rural area and according to the products.

In all rural areas, the total tithe occurred as 5.366 kuruş. The average tithe burden per house is 35.07 kuruş. The highest tithe average per house was seen in Akmesicid Village. Here the average tithe per house was 47.04 kuruş. The highest tithe tax burden in rural area was also seen in Akmesicid Village which had the highest average tax burden per house. The lowest average was found in Hoşafçılar Village as 84 kuruş. Since the total number of tax payers in Hoşafçılar Village was only 5, the total tax amount was low.

The Share of Taxes in Total Revenue

The share of Vergü-yi Mahsusa in total revenue in rural area was 20.09, and the share of tithe was 3.77.

Among villages, the village with the highest Vergü-yi Mahsusa was Çayır Village. The share of Vergü-yi Mahsusa in total revenue in Çayır Village was

found as 26.25%. And the lowest rate was found in Mekeçler Village. The highest rate of tithe among the total revenue was again found in Çayır Village with 4.94% and the lowest rate was found in Mekeçler Village with 2.84%.

When we looked into rural areas in terms of net revenue, it was found that Mekeçler village had the highest net revenue with 79.54% excluding tithe and tax and Hoşafçılar Village had the lowest revenue with 71.46%. The average of all rural area was 76.14%.

The share of Vergü-yi Mahsusa and tithe in total revenue and the rate of net revenue is given in Table 14 below on village scale.

Table 14. Vergü-yi Mahsusa, Tithe and Net Revenue Rates

Village	Total Revenue (Kurus)	Vergiye Mahsusa (Kuruş)	Tithe (Kuruş)	Net Revenue (Kuruş)	Vergü-yi Mahsusa %	Product Tithe %	Net Revenue %
Mekeçler	23,426	4,128	665	18,633	17.62	2.84	79.54
Kurtköy	11,944	2,660	485	8,799	22.27	4.06	73.67
Receb Beşeoğlu	12,687	2,558	525	9,604	20.16	4.14	75.70
Karagedikler	7,343	1,296	302	5,745	17.65	4.11	78.24
Çayır	12,025	3,156	594	8,275	26.25	4.94	68.81
Bonlar Village	6,203	1,252	277	4,674	20.18	4.47	75.35
Kıran Village	13,381	2,546	434	10,401	19.03	3.24	77.73
Hoşafçılar Village	2,011	490	84	1,437	24.37	4.18	71.46
Emiroğlu	6,353	1,332	254	4,767	20.97	4.00	75.04
Pınarlı	13,828	2,924	523	10,381	21.15	3.78	75.07
Akmescid Village	33,286	6,285	1,223	25,778	18.88	3.67	77.44
TOTAL/ AVERAGE	142,487	28,627	5,366	108,494	20.09	3.77	76.14

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50

Vergü-yi Mahsusa and Tithe in Tax Burden

Vergü-yi Mahsusa and tithe burden in total revenue developed at different levels in different villages. The rate of Vergü-yi Mahsusa and tithe in all tax expenditures in all rural area was 84.21% and 15.79%, respectively.

The highest Vergü-yi Mahsusa was at Mekeçler Village with 86.13% and the lowest was at Karagedikler Village with 81.10%. The situation with tithe regarding the highest and lowest levels was vice versa. It was the lowest in Mekeçler Village and highest in Karagedikler Village.

The rates of Vergü-yi Mahsusa and tithe in total tax burden realized in the villages are given in Table 15 below.

Table 15. The rate of Vergü-yi Mahsusa and Tithe in Total Tax

Village	Vergiyi mahsusa (Kuruş)	Tithe (Kuruş)	Total (Kuruş)	Vergü-yi Mahsusa %	Product Tithe %	Total Tax %
Mekeçler	4,128	665	4,793	86.13	13.87	100
Kurtköy	2,660	485	3,145	84.58	15.42	100
Receb Beşeoğlu	2,558	525	3,083	82.97	17.03	100
Karagedikler	1,296	302	1,598	81.10	18.90	100
Çayır	3,156	594	3,750	84.16	15.84	100
Bonlar Village	1,252	277	1,529	81.88	18.12	100
Kıran Village	2,546	434	2,980	85.44	14.56	100
Hoşafçılar Village	490	84	574	85.37	14.63	100
Emiroğlu	1,332	254	1,586	83.98	16.02	100
Pınarlı	2,924	523	3,447	84.83	15.17	100
Akmescid Village	6,285	1,223	7,508	83.71	16.29	100
TOTAL/ AVERAGE	28,627	5,366	33,993	84.21	15.79	100

Source: BOA, ML. VRD. TMT, 1844, 02824, pp. 4-50

Conclusion

Bartın is a province located in the West Black Sea in Turkey today. The surface area of the province is 2.143 km², while the total population is 188.436 according to the address-based population registration system of Turkey Statistical Institute dated 31.12.2012. The province became an Ottoman land in 1460 and became a town attached to Zonguldak province in 1924 and a province status in 1991. The province today has 4 districts, 8 municipalities and 260 villages.

In the socio-economic development rank among the provinces in Turkey, Bartın ranks the 48th province. The main elements identifying its economic structure are mining, industry, agriculture, tourism and forestry. There are also such handicrafts as embroidery, traditional flattened metal threads (a kind of embroidery), weaving, wood engraving as well as ship building. The most important city in terms of tourism is Amasra. Agricultural and industrial goods make up the domestic and foreign trade of the city. Leading agricultural products are wheat, barley, corn and oat, apple, pear, quince, medlar, cherry, plum, walnut, chestnut, nut, peach, cranberry, strawberry, kiwi and mulberry.

This study examined the economic structure of Bartın province in the mid 19th century and it was found that agriculture, husbandry and forest products were

significant in the economic structure of the city. First of all, income resources of these chosen villages was found to be including 5 items which are agricultural, husbandry, being a laborer, lumbering and unexpected. It was observed that in a rural area chosen as the study field in Ottoman Empire, which was an agrarian state, lumbering was at the top of the list with 59.69% and on the contrary, agricultural income was in the second line of the list with 33.51% and husbandry was at the bottom of the list with 2.14%.

It was found that there were differences in the distribution of income sources in different villages and that average revenue per house was 931 kurus. It was also found that 6 of those 11 villages were above the average and 5 of them were below the average and that there were no big differences in the averages of income groups.

When the agricultural production is looked into, it was found that such grains as wheat, barley, oat and flax were raised as well as vineyards, fruits and vegetables; and the total land amount in village scale was 2033 decare. All those land were planted; 93.21% of the land was used as fields (1895 decare), 6.79% (138 decare) was used as vegetable gardens. The land for each tax-paying house was 13.29 decare, and the land used for grain production was 8315 bushel. Wheat is raised in large part of this grain production area.

In terms of the size of agricultural enterprises, the share of small businesses was 18.15% and share of medium-sized businesses was 81.85%. In those sample eleven villages, it was found that there were mostly medium-sized businesses and that there were no large-scale businesses.

It was seen that husbandry was not practiced as an occupation but as a means to meet the needs. In all villages, bovine breeding was in the forefront (88.06%). The share of ovine breeding was 11.94%. Annual income was obtained from milk cows and milk buffalos. Buffalo oxen were used as draught animals. In 153 houses in the rural area there were 156 oxen; which means there were 1.02 draught animal per house. This rate shows that each household heads had one draught animal. The average amount of land for one ox in planted areas was 13.03 and the days that each ox was used for ploughing was two working days on average.

With regards to occupational income, there are 10 household heads among 153 who did not have any income source. And these people were recorded under “beggar”, “unemployed”, “orphan”, “lunatic”, “diseased and lonely” names. The total occupational income in the rural area was 54.866 kuruş and the income average was 386.38 kuruş. The share of occupational income in total revenue was found as 40.70%.

The total revenue of the rural area was calculated as 142,487 kuruş and the Vergü-yi Mahsusa was calculated as 28.627 kuruş. As a result of the calculations, tax burden imposed per house was found as 187.10 kuruş. It was stated that six villages were taxed above this village average and five villages were taxed below the average. On the other hand, tithe burden in the rural area was 5,366 kuruş and tithe per house was calculated as 35.07 kuruş.

Finally, when the total amount of wheat and the tithe paid in the villages is taken into account, it is determined that there are no surplus product in agricultural production amount. This finding showed that in the sample rural area of Ottoman Empire in this study, the villagers could not even provide themselves with the amount of wheat they need for a year let alone they merchandise it.

In short, Bartın a town of Viranşehir Sanjak in mid-19th century during the Ottoman period was a settlement with an economy based heavily on forestry products, agriculture and husbandry.

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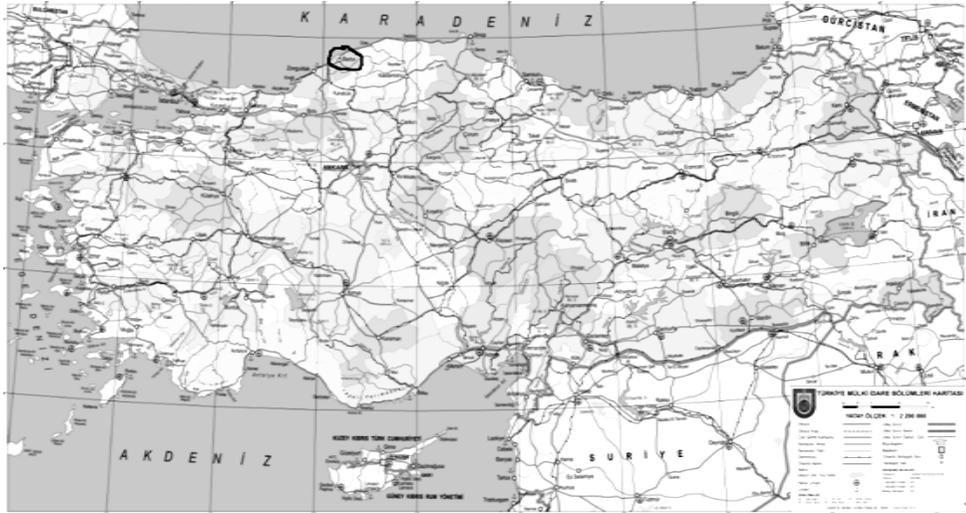
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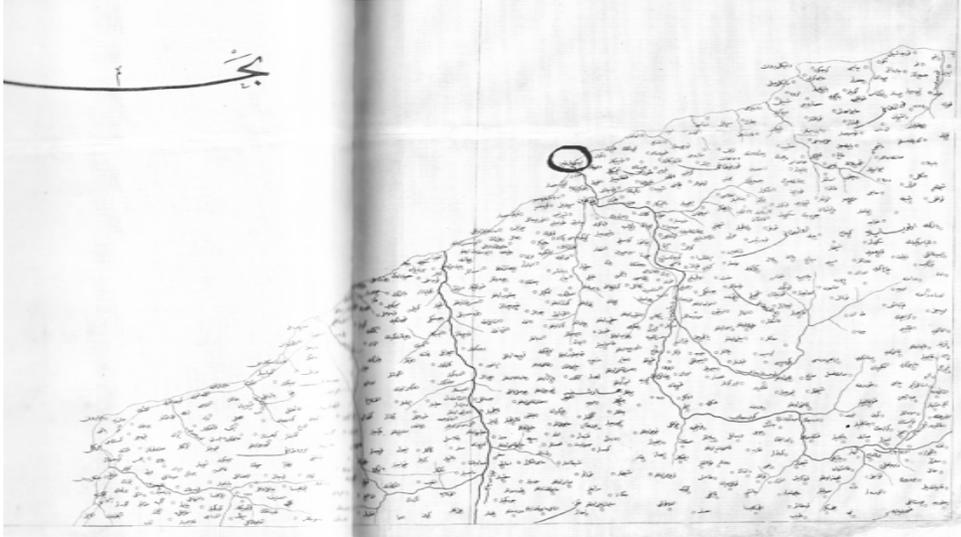
Appendices

Appendix 1. Map of Turkey (Bartın indicated).



Source: <http://www.hgk.msb.gov.tr/english/downloads.php>
Retrieved on October 24, 2013.

Appendix 2. Map of Zonguldak (Bartın indicated).



BDA, HRT, h, 00589-00001 [Zonguldak'ı gösteren harita] Map of Zonguldak 1311/1894

Source: BOA, HRT, h, 00589-00001: Zonguldak'ı gösteren harita, Year: 1311
(Rumi calendar) / 1894 (Julian calendar)



20 Years of Research on Product Placement in Movie, Television and Video Game Media

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Abstract: *The popularity of product placement as a viable alternative to traditional commercials has been increasing rapidly. Latest PQ Media report (2012) noted that global spending on product placement has already reached \$8.25 billion. However, despite its popularity, extant academic research on product placement lags behind its practice. The aim of this paper is to review, categorize and analyze exhaustively the existing product placement literature with the purpose of identifying possible research gaps for academics and guidelines of effective product placements for practitioners interested in the field. 73 academic studies that in particular focus on product placements within movies, television (TV) programmes and video games were examined. The exhaustive review revealed that studies in the US investigating product placement effectiveness through memory related measures and consumer attitudes dominate the product placement literature. However, studies investigating effects of product placement on measures other than memory related and attitudinal ones are extremely scarce. Based on the identified research gaps, an agenda for future studies is suggested. Also, factors that were evidenced to trigger product placement effects throughout the literature are revealed and outlined for practitioners use.*

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Introduction

Product placement can be defined briefly as the inclusion of brand and/or brand identifying items within mass media programming such as cinema and TV (Karrh, 1998). The practice was first seen in the mid-1890sⁱ. Product placement became a subject of interest for academia during the 1980s following the release of Spielberg's blockbuster film *E.T.* (1982). It was suggested that Hershey experienced a 66% increase in sales of their Reese's Pieces candy as a result of product placement in the film (Gupta and Lord, 1998; Gupta and Gould, 1997). Practitioner and scholarly interest in product placement has skyrocketed since then and product placement on the silver screen has spread to other mass media vehicles, particularly, TV.

Product placement on TV was rapidly adopted. The introduction of the DVRⁱⁱ, which is blamed for decreasing the effectiveness of traditional commercials, has encouraged advertisers to constantly search for viable alternatives. Product placement offers an alternative with several advantages over the venerable 30-second commercial.

First, product placement ensures that the advertiser's message is integrated within the program content. Thus, the TV audience, who mostly opt to zap to other channels when commercials begin (Altaş and Öztunç, 2013), cannot easily avoid product placements. Second, product placement is less intrusive. Placed products are perceived as more natural and credible by the audience, generating favorable consumer associations and goodwill. Traditional commercials are liable to activate the Persuasion Knowledge Modelⁱⁱⁱ that is referenced in the marketing literature (Reijmersdal et al., 2007; d'Astous and Chartier, 1998). Third, placements are often more economical than traditional commercials. A season-length placement within a prime-time TV program costs, on average, \$200,000 in the United States; whereas a single 30-second commercial within the same type of prime-time programming costs approximately \$475,000 (Wells, 1996, in Law and Braun, 2000).

Soon, product placements began appearing within media vehicles other than movies and TV programmes. Especially, video games^{iv} started to use very often product placements as a way to add verisimilitude to their virtual worlds. Dole branded bananas in *Super Monkey Ball* (2001), Sony Ericsson phones in *Splinter Cell* (2002), Nike, Adidas, Umbro uniforms, crampons in *Pro Evolution Soccer (PES)* and *FIFA* games (2008) are examples of video game product placements. Notwithstanding this, there are also instances in which product placements appear

within songs (Volvo cars, Aldo shoes in I don't give a named song by Madonna, 2012), music videos (Sony Xperia in Avril Lavigne's music video Rock N Roll), even novels. To illustrate, British writer Fay Weldon accepted financing from Italian jewellery company, Bulgari, in return to prominently mention the firm and its products in her novel. In fact, Weldon did more than merely mention Bulgari; she integrated Bulgari to the plot and named her 2001 book "The Bulgari Connection", thus earning the renown as the first novel with paid product placement.

Prevalence of product placement practice on different media channels has thus been on rise. However, just as Karrh (1998) noted, academic research on product placement could not keep pace with the growth of its practice. Consequently, a review of the extant literature on product placement research that will provide the current status and identify research gaps will be of high value for both scholars and practitioners. This paper aims at fulfilling this purpose through reviewing, categorizing and analyzing studies which investigated product placement practice particularly in movies, TV programmes and video games.

Paper is further organized in four main sections. The next section presents the analysis of the reviewed literature that was adopted for the purposes of this study, with its scope, methodology, and framework detailly explained. While the third section presents results of the analysis, the fourth discusses them exhaustively. Finally, the fifth section concludes, as well as, notes limitations along with suggestions for future product placement studies.

Literature Analysis

The analysis of the product placement literature is conducted as in the following. First, the scope of and the methodology adopted for this literature review study are presented. Next, the framework of the literature analysis is explained.

Scope of the Literature Analysis and the Analysis Methodology

For the purposes of this study, keyword search and reference search were performed. First, keyword search was carried out for full text, peer-reviewed research studies written in English through using keywords like, "product placement", "brand placement", "TV product placement", "video game placement", "advergame" within refereed academic journals of EBSCOHOST database. Only the EBSCOHOST

database was scanned because it is the database that included the most relevant studies for the selected subject amongst those the researcher had full access to.

In addition, to evaluate if all key academic studies within the selected subject area were included, reference search was conducted via the "snowball method" by reviewing the references of the articles found in the database. Again, only published, peer-reviewed articles were selected with the exception of two studies that were necessarily taken into consideration to provide a better picture of the research theme^v. Studies reviewing product placement literature (e.g. Kureshi and Sood, 2010), as well as, those dealing with product placement history (e.g. Newell et al., 2006), regulation (e.g. Gupta et al., 2000) were not considered relevant for the purposes of this review and thus were excluded. Additionally, studies that have investigated product placements within other alternative media such as novels, songs, music videos were scarce^{vi} and thus they were also excluded from this review study.

Description and Framework of the Literature Analysis

A total of 73 out of 266 accessed studies that were published between 1993 and 2013 were considered to be relevant to the selected subject area. Most of them were published in *Journal of Advertising* (n=8, 11%), *Journal of Current Issues and Research in Advertising* (n=5, 6.8%) and *International Journal of Advertising* (n=4, 5.4%). The majority of the studies were focused on the movie medium (n=38, 52%), followed by TV (n=19, 26%) and lastly by the video game medium (n=14, 19%).

Their methodologies, in general, were either experimental research design (n=39, 53 %), or survey (n=20, 27 %) and, in a few cases, content analysis (n=8, 11%). Additionally, sample of the majority of studies involved university students (n=30, 41%). While with the experimental research design the effectiveness of product placement question was investigated, surveys, in general, investigated product placement acceptability and the content analyses, were employed for investigating prevalence and characteristics of the product placements.

Although in partial, findings of the experimental research studies provided invaluable insights for answering the product placement effectiveness question for all three media. Since the majority of the product placement effectiveness studies investigated the effect of placements on consumer memory and attitude in particular, their effects

on behavioural outcomes, such as purchase intention and preference for placed products remained indeterminate.

Surveys, on the other hand, enabled to discover that men are more accepting product placements than women, as well as, that countries do not differ drastically in relation to their acceptability of ethically charged goods.

Finally, researchers that administered content analysis were able to reveal the nature, characteristics and prevalence of product placements for the medium they were interested with their chosen research method.

In the following pages, first results from the analysis of product placement studies on movie medium is given, to be followed by TV and then video game product placements, respectively.

Results of the Analyses

Research on Product Placements in Movies

Movies are the most investigated product placement medium in the literature. 38 out of 73 studies that were reviewed for this study were focused on movie product placements. In most of the studies investigating product placement effectiveness through memory related measures (n=13, 34.2%), attitude (n=4, 10.5%) or both (n=5, 13.15%) was the aim. Practitioners' views (n=5, 13.15 %), ethics and acceptability of product placements and their cross-national comparison (n=7, 18.4%) were other frequently investigated subjects, whereas, brand consciousness (n=2, 5.2%), consumer interpretations (n=2, 5.2%), purchase intention for placed products were seldom examined for movie product placements. Thus, research on movie product placements can be categorized roughly under three streams:

- *Studies on movie placement effectiveness*
- *Studies dealing with ethics, acceptability of movie placements and their cross-national comparison*
- *Studies examining practitioners' views on movie placements*

Discussion of main findings for the above mentioned streams are provided next.

Movie placement effectiveness

Majority of scholars attempted to measure movie placement effectiveness through examining its effect on consumer memory. Recall (Gupta and Lord, 1998; Nelson and Devanathan, 2006; Bressoud and Lehu, 2007; Lehu and Bressoud, 2008; 2009), and recognition (Brennan and Babin, 2004), which are known as explicit memory measures, as well as, brand salience^{vii} (Babin and Carder, 1996a; Johnstone and Dodd, 2000) were the most widely applied memory-related effectiveness measures. Often, together with consumer memory, consumer attitude toward movie product placements and placed products were investigated as well (Panda, 2000; Yang and Roskos-Ewoldsen, 2007; Dens et al., 2012; d'Astous and Chartier, 2000; Cholinski, 2012).

Results of these studies, in general, reported that movie placements do have significant effect on enhancing consumer memory (Gupta and Lord, 1998; Nelson and Devanathan, 2006; Lehu and Bressoud, 2007; 2008; 2009; Brennan and Babin, 2004; Babin and Carder, 1996; Johnstone and Dodd, 2000; Argan et al., 2007) and generating positive consumer attitude for products being placed (Panda, 2000; Yang and Roskos-Ewoldsen, 2007; Dens et al., 2012; d'Astous and Chartier, 2000; Cholinski, 2012). Strong connection of the product placement to the movie plot was found to be vital for ensuring both high recall rates and positive consumer attitude. Even in cases when the strong plot connected placements^{viii} were seen only for a short period (4-6 sec) on the screen, unaided recall rate was reported to reach 86.6% (Argan et al., 2007). Nonetheless, the product placement strategy that involves combination of strong plot connection with high prominence^{ix} was widely acknowledged to generate even better results but only for retrieval of the placed brand in consumer memory (Gupta and Lord, 1998; Bressoud and Lehu, 2007; Lehu and Bressoud, 2008; 2009; Panda, 2010; Yang and Roskos-Ewoldsen, 2007; Brennan and Babin, 2004; d'Astous and Chartier, 2000; Cholinski, 2012). The same combination was not found to generate positive consumer attitude (Dens et al., 2012; d'Astous and Chartier, 2000; Cholinski, 2012) since highly prominent placements were often being criticized by the audience for being irritating and distracting from their viewing experience. Strong plot connected but less prominent placements (Dens et al., 2012; d'Astous and Chartier, 2000) were evidenced to attract positive consumer attitudes, especially when they were embedded within humorous film scenes (Jin and Villegas, 2007),.

Additionally, audio-visual placements were found to generate better memory results than visual-only placements (Brennan and Babin, 2004). However, adding an audio and/or visual reference to an already high prominent and high plot connected placement was found to generate mixed results on consumer memory. Since Cholinski (2012) found that if a highly prominent and plot integrated placement is an audio-visual one, then regardless of all other executional variables, it will generate high recall and recognition rates. Nonetheless, when Gupta and Lord (1998) added an audio reference to an already visual highly prominent and plot connected placement, they did not observe enhanced recall rates, whereas, when Brennan and Babin (2004) did the same, they observed enhanced recognition scores.

Furthermore, other factors that were reported to enhance explicit memory of the placed brand/product were use of the product by the main character (Yang and Roskos-Ewoldsen, 2007), familiarity with the product (Brennan and Babin, 2004; Panda, 2004), first viewing of the film at the cinema as well as its second viewing at home on a large screen, liking of the movie, its genre, its director (Lehu and Bressoud, 2008 ;2009; Bressoud et al., 2010) and brand consciousness (Nelson and Devanathan, 2006) which was also found to be highly effective in generating “the most favourable” consumer attitude towards placements (Nelson and McLeod, 2005). Conditions that were reported to increase brand salience were liking the film and being high self-monitor (Johnstone and Dodd, 2000).

On the other hand, although purchase intention is an important effectiveness measure, it has been seldom considered when tapping movie placement effectiveness (Ong and Meri, 1994; Vollmers and Mizerski, 1994; Morton and Friedman; Jin and Villegas, 2007). Also, the results of the few studies are far from reputing significant effects of movie placement on purchase intention. Since while Ong and Meri (1994), as well as, Vollmers and Mizerski (1994) did not observe enhanced purchase intention for products integrated within a movie, Jin and Villegas (2007) did observe enhanced purchase intention for placed products but in particular for positively pre-evaluated brands/products. Auty and Lewis (2004), who examined preference for placed products by children of ages ranging from 6 to 12, reported that children showed higher preference for placed brands but their preference, in addition to placement, was found to be affected by their prior exposure to the brand as well.

Therefore, it can be concluded that based on the reviewed studies the effect of movie placements on consumer memory and attitude is appreciable but their effect on

behavioural outcomes, such as purchase intention and preference for placed products is as yet indeterminate.

Ethics, acceptability of movie product placements and their cross-national comparison

This stream of scholars opted to investigate placement effectiveness indirectly rather than directly, through dealing with placement acceptability and ethical issues which in turn were assumed to have impact on consumer attitudes (Nebenzahl and Secunda, 1993; Gupta and Gould, 1997; Gould et al., 2000; Brennan et al., 2004; Eisend, 2009; Delorme and Reid, 1999).

Ethical concerns regarding placements are twofold: objecting to product placements in general since they are perceived to have subliminal effects and objecting to placements of specific products.

First, in general, positive attitudes toward movie placements (Nebenzahl and Secunda, 1993) especially by non-students (Sung et al., 2009) and those who value perceived realism, fewer restrictions (Gupta and Gould, 1997) were evidenced. Although subtle placements of familiar brands were perceived as enhancing realism (Delorme and Reid, 1999), there were also those, though in minority, who perceived this subtlety as deceptive and expressed negative attitudes (Nebenzahl and Secunda, 1993). Also excessive placements of generic brands were evaluated as being irritating and distracting from their viewing experience (Delorme and Reid, 1999).

On the other hand, perceived (un)acceptability of movie placements was found to differ based on the nature of products, gender and movie watching frequency of the audience. First with regard to their nature, products in the product placement literature were distinguished by Gupta and Gould (1997) as being ethically charged and non-ethically charged ones. Ethically charged goods were defined as those that arouse ethical concerns and differences across consumers regarding their marketing and consumption, such as alcoholic beverages, guns and tobacco. On the other hand, all goods other than ethically charged ones were called as non-ethically charged goods or neutral goods, such as fatty foods, cars, beverages etc.

Next, it was evidenced consistently across product placement literature that placement of ethically charged goods are less acceptable than placement of neutral products in US (Gupta and Gould, 1997; Brennan et al., 2004). Despite this, US

consumers perceived the regulation need for placement of ethically charged goods only for the sake of non-adult audience members (Sung et al., 2009). Additionally, in US, males and frequent movie watchers were found to tolerate and accept placement of ethically charged goods more than females and infrequent movie watchers.

Thus, it can be noted that the earlier studies dealing with placement ethics and acceptability of placements were mainly based on data gathered from US respondents. Fortunately, Gould et al. (2000) took an initiative and compared their findings generated from a US sample in 1997 with those they had generated from Austrian and French samples. Also, other studies that compared attitudes towards and acceptability of product placement by American consumers to those by Chinese, Australian, Austrian, French (McKehnie and Zhou, 2003) and Italian consumers (Nelli, 2009) emerged. All of these studies revealed that US consumers were more accepting and more likely to purchase placed products (country-based difference) than the French, the Austrian, the Australian, the Italian and the Chinese consumers. Nevertheless, ethically charged goods, regardless of country, were found to be less accepted by females and infrequent moviegoers (product difference). Similarly, regardless of country, males were evidenced to purchase the placed product more than females (gender difference).

Furthermore, data of the above mentioned studies by Gould et al. (2000) and Brennen et al. (2004) McKehnie and Zhou (2003) were combined with the one by Mouskourova et al. (2006) in another study that attempted to generalize acceptability of ethically charged and neutral goods over seven different countries (Eisend, 2009). The seven different countries were USA, France, Austria (Gould et al., 2000), Australia (Brennan et al., 2004), China (McKehnie and Zhou, 2003), Germany and Bulgaria (Mouskourava, 2005). As a result, Eisend (2009) reported that acceptability of ethically charged goods was generalizable and it was described as “indifferent” (between acceptable and unacceptable) consistently across seven countries. Also gender related product placement acceptability was generalizable. However, acceptability of neutral products was not generalizable as its accepting levels differed across seven countries. Finally, Torrano and Flores (2009), who compared attitudes toward product placement by French and Spanish consumers, did not also observe significant differences between the Frenchs and the Spanishs in relation to their product placement attitudes.

So, based on the above mentioned exceptional studies, countries do not differ drastically in relation to their acceptability of ethically charged goods. Nonetheless, there is still a gap regarding the ethical concerns and acceptability of product placements within countries other than US.

Practitioners' views on movie product placements

Some scholars, alternatively, showed a special interest in the practitioners' beliefs when examining product placements on the silver screen (Karrh, 1995; McKee and Pardun, 1996; 2000; Karrh, McKee and Pardun, 2003; Jan and Martina, 2013) .

Karrh (1995) was the first to investigate practitioners' views. His seminal study involved a survey of 23 ERMA^x members, who described the most effective brand placements as those that were “easily recognized”, “portrayed positively in the movie plot”, as well as, “being accompanied by further promotional support”. Moreover, practitioners in his study generally noted recall and recognition as the best measures of brand placement effectiveness.

Subsequently, Pardun and McKee (1996) surveyed 89 advertising agency media directors and examined factors most important in making product placement decision for a feature film. “National viewing potential”, “price of the placement” and “theme of the movie” were noted as the most important ones, while “action in the movie”, “international viewing potential”, “movie producer” as the least important ones out of 10 listed factors. Practitioners noted further positive and long term roles as well as increased use of movie placements in future.

Pardun and McKee (2000) later repeated the same study with 106 public relations (PR) professionals. PR professionals reported “international viewing potential” instead of national one together with “price of the placement” and “theme of the movie” as the most important factors.

Later on, Karrh together with McKee and Pardun (2003) repeated his seminal study conducted in 1995 to reveal the evolution of practitioners' product placement views. The survey items from Karrh's study was responded 28 ERMA members and results revealed that effective placements in 2003 mandated a more expanded set of both executional factors and brand characteristics. Also, the importance attached by practitioners to each executional factor and brand characteristic increased. More practitioners in 2003 believed that product placements have a subliminal dimension

than in 1995. Additionally, practitioners' belief regarding the future rise in product placements was reinforced in 2003.

With the exception of a recent study, in which Jan and Martina (2013) revealed that Czech practitioners are sure of product placement efficiency and regard it as long-term marketing field that involves brand-building efforts, studies investigating practitioners' views, especially those of other than US, are extremely hard-to-come-by.

Research on Product Placements on TV

TV product placements have been attracting scholarly interest especially in the last decade, when 16 out of 19 reviewed TV placement studies were conducted. Studies on TV product placement mostly focused on its effectiveness (n=10, 52.6%) through attitude (n=5, 26.3%), memory related measures (n=3, 15.7%) or both (n=2, 10.5%) at the same time. On the other hand, another stream of studies investigated its prevalence and characteristics (n=7, 36.8%). It can be noted that scholars mainly employed either experiment (n=9, 47.3%) or content analysis (n=7, 36.8%) method to investigate product placement applications on TV programmes. Those who investigated its effectiveness used the experiment method, while those who aimed at shedding light on its nature and characteristics employed the content analysis method.

Academic studies on TV product placements can be examined under two categories:

- *Studies on TV placement effectiveness*
- *Studies investigating prevalence, nature and characteristics of TV placements*

TV placement effectiveness

Just as movie placement effectiveness, effectiveness of TV placements was generally tapped through consumer attitude and memory related measures.

The methodology utilized most frequently was viewing by a sample of students a whole TV programme or an excerpt from it with product placements. This viewing experience was immediately followed by a questionnaire that probed recall, recognition levels and/or attitudes towards the placed products by the sample audience (Law and Braun, 2000; Reijmersdal et al., 2007; Tiwsakul et al., 2005;

Cowley and Barron, 2008; Homer, 2009). In general, overall enhancement of recall and recognition levels for placed products (Law and Braun, 2000) and positive attitudes towards TV placements as well as placed products were noted (Tiwsakul et al., 2005; Schmoll et al., 2006).

Results with regard to effective placement strategies revealed that products that were placed as visual-only were least recalled but mostly preferred, whereas products that were placed central to the plot were most recalled but least preferred ones on the TV screen (Law and Braun, 2000). It was also evidenced that incongruences between modality (visual or audio) and plot connection attracts consumer attention and thus improves memory for placed product. However, persuasion was found to enhance by congruency, therefore the said incongruence was reported to affect consumer attitude negatively (Russell, 2002; d'Astous and Seguin, 1998).

High prominence was not found to be a promising characteristic for TV placement effectiveness as it was for movie placements. Highly prominent TV placements were found to diminish positive consumer attitudes, especially in case of being repeated frequently for known brands and being displayed in favourite programmes. On the contrary, subtle placements were evidenced to generate positive consumer attitudes (Cowley and Barron, 2008; Homer, 2009).

Moreover, placements of ethically charged goods were found to arouse ethical concerns and negative attitudes on TV screen as well. Females were once more found to evaluate placements of ethically charged goods more negatively than males (Tiwsakul et al., 2005; Schmoll et al., 2006). Additionally, subliminal, implicit and passive placements were found to arouse negative attitudes and ethical concerns, especially when they were within information and services TV programme type (Tiwsakul et al., 2005). On the other hand, congruity between placement sponsor and the program was found to generate positive ethical and evaluative reactions for all TV program types except for mini-series and dramas, in which placements were evidenced to generate most negative attitudes (d'Astous and Seguin, 1998).

Additionally, genre of the TV programme was found to influence effectiveness of product placement as well. Russell and Stern (2005a) studied US sitcoms and they found out, based on their Product-Character Association (PCA) model, that US audience associate products placed within sitcoms with the sitcom characters and their attitudes toward placed products was found to be driven by their attitude

toward the characters. The same association was evidenced to occur in case of US soap operas as well (Russell and Stern, 2006).

On the other hand, Gupta and Gould (2007) examined placements within TV game shows in particular. First, they studied how consumers evaluate game shows and products placed in them and subsequently their effectiveness on consumer memory in relation to traditional advertising. While location and price of the product within a game were found to be the factors enhancing recall the most, overall traditional advertisements were recalled better.

Effectiveness studies that do not employ memory based measures are scarce for TV product placements as well. Only one study which investigated the effect of TV product placements on brand image was reviewed. The said study evidenced that brand image starts to change in the direction of the TV programme after -at least- a second exposure (Reijmersdal et al., 2005).

So, there is a need in the literature for more studies that shed light on effectiveness of product placement practice on TV screen through measures other than memory and attitude related ones.

Prevalence, nature and characteristics of TV product placements

This stream of researchers opted to examine characteristics of product placements appearing on the TV screen. Their research method, content analysis, chiefly involved analysis of TV programming on major TV networks of the countries to be studied. Very often prime-time, which represents largest number of viewers in relation to any other time period of the day, was chosen as the period to be analysed (Avery and Ferraro, 2000). Most of these studies were conducted in the US (Ferraro and Avery, 2000a; 2000b; La Ferle and Edwards, 2006) with the notable exceptions by Smit et al. (2006), who examined TV placements on Dutch TV networks and Wouters and Pelsmacker (2011), who provided comparison of placements on US and Flemish TV networks.

The study by Avery and Ferraro (2000a) was among the earliest ones examining prevalence and nature of TV product placements. The authors content analysed 112 hours of US prime-time programming (April, 1997) and reported that brands are prevalent on prime time television (one placement every two-minutes of TV programming) with the majority appearing in real-life events, such as sports, news,

feature magazine and game shows. Moreover, most of them were found to be visually prominent, with extended portrayals (75%) and foreground placements (79%) and almost half of the visual placements involving interaction with the programme character (40%) (Ferraro and Avery, 2000b). In addition, the content analysis of the nature of TV placements revealed that their commercial intent was overshadowing the intent for enhancing realism. Despite this, still 60% of the viewers were found to perceive placements as adding realism to the TV programmes (Schmoll et al., 2006).

Five years later, when La Ferle and Edwards (2006) content analysed US prime time TV programming (January, 2002), they observed relatively less prevalence of brand placements (one placement every three-minutes TV programming) in relation to 1997. Visual TV placements in 2002 were also observed to be less prevalent in relation to 1997 (52.8%). Also, in 2002 the type of US TV programmes that involved most brand appearances was found to be sitcoms and dramas rather than real life events as they were in 1997. Real life events, such as news and feature magazines, took the second place. (La Ferle and Edwards, 2006). On the other hand, in another study, frequency and nature of US TV placements were compared with Flemish TV placements (Wouters and Pelsmacker, 2011). It was found that the difference between placement frequencies on Flemish and US TV programmes was not statistically significant. Nonetheless placements were embedded mostly within non-scripted TV programmes in US, whereas they were integrated generally within scripted TV programmes in Belgium.

Additionally, Pervan and Martin (2002) investigated product placements within soap operas of US and New Zealand. They found that while placements within US soap operas were mainly produced for promotion of leisure and appearance related products, those in New Zealand soap operas were largely promoted transport and food related products. In addition, soap opera viewers in New Zealand found to show more positive emotional outcome towards placements in soap operas than US viewers.

Only two studies that inspected characteristics of TV placements in a country other than US were found (Smit et al., 2005, La Pastina, 2001). First, Smit et al., (2005) focused on Dutch TV placements and observed placements to be more prevalent on commercial Dutch TV networks than on public networks. Additionally, those on commercial networks were found to be more prominent than those displayed on public networks. On the other hand, La Pastina (2001) who studied TV viewers in a

Brazilian rural area revealed that the products placed within soap operas were not perceived as promotional efforts but rather as portrayals of daily life necessities by those in upper class.

Alternatively, a theoretical study conducted by Russell and Puto (1999) content analysed viewers' opinions regarding TV placements expressed via focus groups, internet fan forums, phenomenological interviews and tapped audiences' relationships with TV programs. As a result, a construct named "connectedness" was revealed, which denotes the intense relationships between the audience and a TV program that touches to individuals' personal and social lives.

Research on Product Placements in Video Games

The extant literature on video game placements is currently scarce but promising. Nevertheless, 16 studies on in-game placements, all of which were conducted during the last decade, were examined. The review of the literature revealed that effectiveness was the most investigated subject also for video game placements. The effectiveness studies on in-game placements were also found to be based mostly on explicit memory related measures (Lee and Faber, 2007; Nelson, 2002; Glass, 2007; Walsh et al., 2008; Yang et al., 2006; Winkler, 2006; Kuhn et al., 2007; Chaney et al., 2004; Acar, 2007; Wise et al., 2008) and players' attitudes toward placed products (Nelson, 2002; Nelson et al., 2004; Winkler, 2006).

Moreover, the methodology of video game effectiveness studies was also the same; an experiment followed by a questionnaire. In case of video games, the experiment involved playing of a game that encompasses product placements by participants and following this game session a survey was conducted delving into their memory of and/or attitudes toward placements in the game.

Effectiveness of video game placements

Consistent with the previous literature on the effectiveness of movie and TV product placements, effectiveness of video game placements were also attempted to be tapped through memory related measures mostly.

Main findings illustrate that placements as billboards in video games were recalled better than those in real outdoor billboards (Chaney et al., 2004), however, recall rates for placements in a live sport event outperformed those in a sport game (Walsh

et al., 2008). On the other hand, congruency between the game setting and the brand was found to generate a positive attitude both toward the game and the brand, if it is noticed by the player (Wise et al., 2008). Hence, Lee and Faber (2007) and Nelson (2002) proposed that the placement, which involves high incongruency between the game setting and the placed brand, generated higher recall rate than those in which high congruency is present.

Moreover, it was validated in several studies that the proximity of the product/brand to the focal area in the game scene is vital for its recall and recognition (Acar, 2007; Lee and Faber, 2007). Besides, recall rate was found to be higher when the placed brand is a local one (Nelson, 2002) and the player is an experienced and skilled one who has been acquainted with the game (Kuhn et al., 2007), as well as, being moderately involved at that game play (Lee and Faber, 2008).

However, there were contradictory results for the recall of brands that were new. Nelson (2002) found out that the recall rate of the brand placed in a video game would be enhanced if that brand was a new one. Whereas, Winkler (2006) proposed that placement of a brand that was already known by the player would be better recalled in relation to a new one.

On the other hand, with regard to attitudes, it was found that players in general held positive attitudes toward placements in games and they do not think that placements are deceptive. It was observed that generally players believe placements enhance realism, except for the study conducted by Chaney et al. (2004) who reported only limited support. Moreover, Nelson et al. (2004) evidenced that there was a direct relationship between attitudes toward advertising in general and placements in games, meaning that if a player had positive attitude toward advertising he/she had a positive attitude toward placements in games as well or vice versa. However, Winkler (2006) found that this direct relationship generates stronger outcomes in case of having negative attitudes toward advertising. Furthermore, just as it is with movie and TV media, placements of ethically-charged goods within a video game were found to be less acceptable than placements of non-ethically charged goods among gamers consistently (Kim and McClung, 2009).

Recently, Mackay et al. (2009), who examined whether brand placements in video games can shift pre-existing consumer attitudes towards a specific brand, evidenced that after exposure to a placed product during game-play, positive brand attitudes did not but recall rates did increase for those who had already positive attitude

towards the placed product. Jeong et al. (2011), on the other hand, reported psychological arousal in a game (with violence cues) had positive effect on consumer attitude, but did not on brand logo memory. Rather high engagement in a violent video game enhanced recall rates, but generated negative attitude toward the placed brand logos.

Yang and Wang (2008), alternatively, assert that product placements should take into account the type of product, placement and the game for enhancing effectiveness. They proposed that within shooting/sport games, tool products^{xi} should be placed as feedback placements^{xii}, while within role-playing/strategic games; tool and enhancement products should be placed as operator placements. Goal placements, on the other hand, were proposed to appear when the player passes a new level.

Two studies that did not investigate effectiveness were the ones by Acar (2007) and Choi et al., (2013). Acar (2007) examined the incidental exposure and evidenced that high proximity to the focal area had but message content did not have incidental effects for video game placements. Choi et al., (2013), on the other hand, examined the effect of sensory distractions on implicit memory and they found that while auditory distractions did visual ones did not inhibit implicit memory for the placed brand within a video game.

Discussion

The review of 73 academic studies on product placement yielded invaluable results and implications.

This review study revealed factors that trigger product placement effectiveness for all three media. The extended list of factors that influence product placement effectiveness for all three media vehicles are categorized and outlined within tables that are provided in the following (Table 1, Table 2, Table 3).

In the three tables that follow (Table 1, Table 2 and Table 3), factors that influence product placement effectiveness are categorized as those related with *placed product/brand*, *respective medium*, *product placement execution* and *audience characteristics*. Next, the said factors are outlined, primarily, in relation to their effects on *explicit memory* measures and *attitude*, which were revealed to be the most investigated effectiveness measures in the product placement literature. Nonetheless,

as it was mentioned previously, though being extremely rare, the researcher came across studies that investigated product placement effects on measures other than explicit memory and attitude as well. The findings regarding said rare effectiveness measures are provided under the column named *other effectiveness measures*.

In addition, factors that were evidenced to generate favourable/positive outcomes for those effectiveness measures were denoted with a (+) sign, whereas those that generated unfavourable/negative outcomes were denoted with a (-) sign. To illustrate, *familiarity*, which is determined as a product/brand related factor affecting explicit memory for movie placements (Table 1), has a (+) sign and thus implies that familiarity with the placed product/brand was evidenced to increase explicit memory for the placed product/brand. On the other hand, the *mini-series and drama* are displayed as TV programme genres under the attitude and acceptability column within Table 2. The (-) sign implies that product placements within these TV programme genres generate unfavourable consumer attitudes (Table 2).

Table 1. Factors Influencing Effectiveness of Movie Product Placements

Factors affecting on....	Explicit memory	Attitude and acceptability	Other effectiveness measures
product/brand related	- familiarity (+)	- ethically charged goods(-) - familiarity (+)	
respective medium related	- first viewing of the movie at the cinema (+) - 2. viewing at home on a large home cinema screen (+)	- humorous scenes (+)	
execution related	- strong plot connection (+) - high prominence (+) - used by main character (+) - audio-visual (+)	- used by main character (+) - multiple simultaneous placements (+) - strong plot connection but less prominent (+) - subtlety (+) - high repetition frequency (-)	- brand saliance: repeated display of high prominent placement (+)
audience characteristics	- high film involvement (-) - brand consciousness (+) - liking the film (+) - liking film genre (+) - liking director (+)	- gender (males (+)), movie watching frequency (+) - positive attitudes towards advertisements (+) - appreciating realism and fewer restrictions (+)	- purchase intention: prior brand evaluation (+) - brand saliance: liking the film (+), being high self monitors (+)

In a similar way, in the following tables factors influencing effectiveness of product placements on TV and video game media are presented respectively (Table 2 and Table 3).

Table 2. Factors Influencing Effectiveness of TV Product Placements

Factors affecting on....	Explicit memory	Attitude and acceptability	Other effectiveness measures
product/brand related	- location (central to the scene (+))	- ethically charged goods(-) - familiarity (+)	
respective medium related		- TV programme genre (mini-serie and drama (-)) - program liking (prominent and high repetitive placements in liked TV programmes (-))	
execution related	- explicit, non-integrated placements (-) - high plot integration (+) - visual placements (-) - congruency between plot and the product (+)	- passive and implicit placements in information/services programmes (-) - sponsor-programme congruity, - explicit, non-integrated placements (+) - subliminal; prominent placements in favourite programs (-) - subtlety (+) - high repetition levels (-)	- choice: visual placements (+); - brand image: (when repetition frequency of placement is 2 or more (+))
audience characteristics		- gender (males) - positive attitude toward TV programme characters (+)	

Table 3. Factors influencing Effectiveness of Video Game Product Placements

Factors affecting on...	Explicit memory	Attitude and acceptability	Other effectiveness measures
product/ brand related	product type (symbolic, tool and enhancement) brand origin (local (+))	ethically charged goods(-)	
respective medium related	introductory footage to game (+) game genre (shooting/sport games, role playing/strategic games)		implicit memory: auditory distraction(-)
execution related	incongruity between the product and the game content (+)	strong thematic connection between game and brand (+)	incidental exposure: high proximity (+)
gamers' characteristics	experience (+) game skill (+) moderate game involvement (+) pre-existing positive attitude (+)	positive attitude towards advertising (+) psychological arousal (+)	purchase intention: positive attitudes towards placements (+)

Then based on these results, first for movie placements briefly it can be said that practitioners should formulate strong plot connected and at the same time highly prominent product placements to enhance consumer memory of the placed brand. In order to generate favourable consumer attitudes at the same time, practitioners should be cautious of the prominence dose of the placement since its perceived excessiveness may easily prompt negative consumer attitudes. Also, it can be said that practitioners will most probably not regret executing placements that are audio-visual and involve interaction with the main character of the movie.

Second, for TV placements; practitioners can easily attract consumer attention and enhance the recall of placed brands through use of strong plot integrated placements. However, practitioners should take into consideration that attitude towards and preference for the strong plot integrated and prominently placed brands weakens on

TV screen, especially for known ones within favourite programs, with the exception of those placed in an information and services programmes, where, on the contrary, implicit placements are negatively evaluated (Tiwsakul et al., 2005). Moreover, although product placements were found to be most prevalent within mini-series, sitcoms and dramas (LaFerle and Edwards, 2006), it was also evidenced that these TV programme genres were the ones, in which placement of products generated most negative consumer attitudes (d'Astous and Seguin, 1998). So, practitioners should devote high attention when planning for product placements within the said TV programme genres.

Third, for video game placements; billboard placement strategy can be advised as an effective one for in-game placements. Incongruence between the game plot and the placed brand together with proximity of the placed brand to the focal area will attract consumer attention and enhance his memory of the placed brand. On the other hand, congruence between the game plot and the placed brand, as well as, psychological arousal during the gameplay are the factors that do not enhance the consumer memory on placed brands but generate positive attitudes. So, practitioners should make a detailed assessment of objectives (enhancing consumer memory and awareness of placed brands vs. positive consumer attitudes towards placed brands) before formulating in-game placements.

Lastly, for all three media, formulation of product placements of ethically charged goods, which are less accepted in relation to neutral ones, should be conducted with high care and vigilance.

Conclusion, Limitations of the Study and Suggestions for Future Studies

This study reviewed and analyzed product placement studies of the last two decades exhaustively. Analysis results contributed to the advancement of knowledge for both academicians and practitioners that are interested in the field of product placement. First for practitioners; the presented extended list of factors that influence product placement effectiveness for all three media vehicles will help practitioners in formulating and executing most striking product placements and thus at the same time help saving the financial resources and time of the whole industry that is wasted every year by ineffective marketing communications campaigns all around the world. For researchers; it was revealed that despite its intensified practice, the literature accumulated on the product placement field during the last two decades is far from providing a complete picture of the phenomenon. Nonetheless, this review study

provided a complete picture and the current state-of-the-art of the product placement literature for researchers by its attempt to analyse the to date accumulated literature on product placement.

However, this study, just as most academic studies, was subject to some limitations, which can be classified as direct and indirect ones. Direct limitations were those limitations that stemmed from this study, while indirect ones were those that stemmed from limitations of reviewed studies.

First, with regard to limitations of this study, it should be noted that only product placement studies on movie, TV and video game media vehicles that were accessed from journals available only on the EBSCOHOST database were reviewed since EBSCOHOST database is the one that was most relevant with the selected subject topic amongst those that the researcher had full access to. Moreover, studies regarding product placement history, definitions, review, and its practice on other than the said media were beyond the scope of this study and thus were excluded. Also only the peer reviewed articles were considered, whereas other forms of published materials such as dissertations, conference proceedings etc. were not included in this review study.

With regard to limitations stemming from reviewed studies, it was revealed that majority of to date conducted studies were either concentrated on particular countries or on investigating effects on particular measures.

First, product placement studies on all three media used mostly US based data (n=46, 63%). Only 17.8% (n=13) and 13.7% (n=10) of the reviewed studies were conducted in European countries and rest of the world (e.g. India, Australia, and China) respectively, while 5.4 % (n=4) of the studies were comparing product placement practices in US with other countries (e.g. New Zealand, Belgium) (see Table 4). Although it can be noted that European interest to product placement research, in particular on TV medium, has been on rise, still there is a huge gap in the placement literature regarding its practice in countries other than US. Then, future studies that will concentrate on this issue will also contribute to the academic literature largely.

Table 4. Locations of the Reviewed Product Placement Studies

Location of the Reviewed Studies	US	Europe	Rest of the World	US vs Other Countries
Number/percentage of studies conducted in this location out of 73 reviewed studies	n=46 63%	n= 13 17.8%	n=10 13.7%	n=4 5.4 %

Second, majority of studies, across all three media vehicles were concentrated on tapping product placement effectiveness through either explicit memory related measures, namely recall and recognition, or consumer attitude. Studies to date on effects of product placements on behavioural outcomes, (e.g. purchase intention, preferences), and attention are extremely scarce and inconclusive. Also the effects of demographics, such as age and level of education, were rarely taken into consideration. Therefore, there is a need for academic studies that will investigate effects of product placements on measures other than memory and attitude related ones, as well as, for those that will focus on demographic characteristics and reveal the impact of product placements on different groups in the society.

In addition, especially those studies that had investigated product placement effectiveness, performed experiments as the research methodology and used students as their samples. However, the application of experimental methodology and mainly to student samples has some general limitations that might have influenced the findings. First of all, the artificial setting usually results in more attention to the stimuli, which in turn can generate higher recall and recognition rates, as well as, different behaviours (Van Reijmersdal et al., 2007). Second, the student samples involved mostly young and highly educated respondents, who might have been better at noticing product placements and understanding their commercial intents than less educated ones. Hence, the said methodology might have biased findings. Therefore, future studies which employ a mix of different methods to samples that are more representative of the product placement audience can provide additional insights into brand placement effects.

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ⁱ Product placement in motion pictures is as old as the motion picture industry itself. Both events were generated by the Lumière brothers in the mid-1890s (Karrh, 1998; Newell et al., 2006; Galician and Bourdeau, 2004; Avery and Ferraro, 2000; Hudson and Hudson, 2006; Dens et al., 2013). The Lumière brothers exhibited their newly invented projected motion pictures to the first paying audience ever in the basement lounge of the Grand Café in Paris on December 28, 1895. This event is credited as the world's first public film screening and heralded the birth of the film industry (Pearson, 1996). A few months later, in the spring of 1896, the Lumière brothers conducted an arrangement with the UK soap producer Lever Brothers (today's giant multinational company, Unilever) that would constitute the first prototype of product placement that displayed a Lever Brothers leading product, "Sunlight Soap", in a Lumière brothers' film.

ⁱⁱ DVRs, also known as time-shifting devices, include a hard drive that enables the audience to record their favorite programs for playback at any time. The devices can also fast forward through traditional commercials.

ⁱⁱⁱ According to this widely cited model by Friested and Wright (1995), if consumers perceive that advertising messages have the intent to affect their judgement, then they may generate negative attitudes towards those commercials.

^{iv} Video game term denotes all game genres including, computer and on-line games since most of the time these terms were used interchangeably in the product placement literature (Winkler, 2006; Nelson, 2002; Yang et al., 2006).

^v Two key studies that were not published in refereed academic journals but nonetheless were reviewed in order to provide a complete picture of the "Practitioners' view on movie placements" research theme (see page 7). The said studies were proceeding papers by Karrh (1995), Pardun and McKee (1996).

^{vi} Although its practice in alternative media (those other than movies, TV programmes and games) is not scarce, academic studies that focus on product placements in the said media are extremely rare. To illustrate, with regard to placements in novels, only one study was found in which Nelson (2004) examined the product placement practice within the novel named "The Bulgari Connection".

^{vii} Brand salience is also considered among memory-related measures since it involves the recognition of a brand in relation to other brands in that product category.

^{viii} Plot connection of placements refers to the degree to which the brand/product is integrated into the plot of the story (Russell, 1998).

^{ix} In high prominent placements the product is made conspicuous either through its size, position on the screen or centrality to the plot, integration to the plot, number of mentions, and/or duration on the screen (Gupta and Lord, 1998).

^x Entertainment Resources and Marketing Association is a leading product placement industry group.

^{xi} Tool products are high-utility but low price products such as food and fuel, whereas, symbolic products are high price but low utility such as jewellery and enhancement products are high price and high utility such as white electronic goods (Yang and Wang, 2008).

^{xii} Goal in a videogame describes the milestone that players attempt to achieve. For example, in a shooting game, the goal may be rescuing hostages whereas feedback is a kind of reinforcement. If some predetermined desirable or undesirable player behaviours are demonstrated, a reward or punishment is provided for positive or negative feedback. Operators, on the other hand, indicate those instruments, such as knife, cape, and magic that players can apply to achieve their objectives (Yang and Wang, 2008).



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