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**Articles and Statements**

# The Dynamic Causal Links between Energy Consumption, Trade Openness and Economic Growth: Time Series Evidence from Upper Middle Income Countries

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**Abstract**

This study investigates the dynamic causal links between energy consumption, trade openness and economic growth for upper middle income countries over the period 1971-2014. The ARDL bounds test is used to examine the presence of cointegration between the variables. The VECM Granger causality method is also used to explore causality between the variables. Empirical results indicate that i) the variables are stationary at first differences, ii) there exists cointegration between the variables in Turkey, China, Colombia, Ecuador, Jamaica and Peru, iii) there exists important causal linkages among the variables in the long run, iv) the energy-led-growth and trade-led-growth hypotheses are demonstrated for Turkey, China, Colombia, Jamaica and Peru.

**Keywords:** energy, openness, growth, cointegration, causality.

## 1. Introduction

The energy consumption-income link has been significantly discussed in economic growth literature. Especially, the causal linkages between these variables lead us to the several theoretical approaches. In this context, there exists four hypotheses related with energy-growth link. According to the growth hypothesis, energy is a vital source for production function. This hypothesis implies that energy consumption causes economic growth (Masih and Masih, 1998). The conservation hypothesis expresses that economic growth causes energy consumption. A reduction in energy demand does not affect economic growth very much. The presence of a bi-directional causal linkage between the variables is called as the feedback hypothesis. Finally, the neutrality hypothesis assumes that there exists no causality between energy consumption and economic growth (Kumar et al., 2015).

The growth literature has also discussed the importance of trade opennes on economic growth. The Heckscher-Ohlin model suggests that trade openness can increase productivity and incomes in countries (Stensnes, 2006). According to Krugman (1979), the total output increases in a free trade environment. Grossman and Helpman (1995) explain that free trade can promote the rate of economic growth through the diffusion of knowledge and technology across countries.

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Romer (1991) states that trade openness can stimulate economic growth through innovation, efficiency and technological improvement.

In this context, this study deals with the dynamic causal links between energy consumption, trade openness and economic growth for upper middle income countries over the period 1971-2014. The ARDL bounds test and VECM Granger causality method are employed to examine the presence of cointegration and causal links between the variables.

The remainder of the study is outlined in five sections. Section two deals with the literature. Section three presents the model specification and data. Section four reports the methodology. The empirical results are provided in section five. Finally, the study provides a conclusion and policy implication.

## 2. Literature Review

Kraft and Kraft (1978) analyses the link between energy consumption and economic growth. This study indicates that economic growth causes energy consumption and energy consumption causes economic growth. This finding implies that there exsists empirical evidence supporting the conservation hypothesis for USA.

Using the Granger causality approach, Yu and Choi (1985) examine the link between these variables. In the study, it is found that economic growth causes energy consumption in South Korea. This implies the presence of conservation hypothesis. No causality is found for USA, UK and Poland implying the presence of neutrality hypothesis.

Glasure and Lee (1997) investigate the economies of Singapore and South Korea. The study presents the bi-directional causal linkage between the variables indicating the existence of feedback hypothesis.

Stern (2000) uses a VAR model for USA economy. In 3 of the 5 models, the causality from energy use to economic growth is found. In the other models, the presence of bi-directional causality between the variables is found. The study presents empirical findings supporting the presence of growth and feedback hypotheses.

Asafu-Adjaye (2000) adds energy prices to the analyses in the Asian developing countries. This study uses the Johansen-Juselius test and VECM Granger causality method. In the long run, it is found that energy consumption causes economic growth in India and Indonesia. In the long run, it is also found that economic growth causes energy consumption in Thailand and Phillippines. The results imply the validity of growth hypothesis for India and Indonesia, and conservation hypothesis for Thailand and Phillippines.

Soytas and Sari (2003) test the causal link between energy consumption and GDP in G-7 countries and emerging economies. The VECM Granger causality analysis reveals the existence of the bi-directional causality between these variables in Argentina. It is determined that economic growth causes energy consumption in Italy and Korea. It is also determined that energy consumption causes economic growth in Turkey, France, Germany and Japan. The study supports the presence of feedback hypothesis for Argantina, conservation hypothesis for India and Indonesia. The study also supports growth hypothesis for Turkey, France, Germany and Japan.

Applying a multivariate cointegration analysis, Ghali and El-Sakka (2004) examine the link between energy consumption and growth in case of Canada. The findings reveals the presence of the bi-directional causal linkage between the variables. The result implies the persence of feedback hypothesis for Canada.

Using panel data methodology, Lee (2005) examines the relationship between the variables in developing countries. The results reveal that energy consumption causes economic growth. This is an empirical evidence for the growth hypothesis.

Caraiani et al. (2015) deal with the causal link between the variables by applying a three-step analysis for emerging European countries. The results support the conservation hypothesis for Hungary, Poland and Turkey. The results indicate the existence of growth hypothesis for Romania. The feedback hypothesis is valid for Bulgaria.

Sharmin and Khan (2016) analyze the African caountries using the Johansen-Juselius cointegration test and Granger causality technique. The existence of bi-directional causality between the variables for Ethiopia, Morocco and Mozambique is detected in the long run. This means that the feedback hypothesis is valid for these countries. The results show that

economic growth causes energy consumption. This indicates the validity of conservation hypothesis for Angola.

From the empirical perspective, there exists a wide range of paper dealing with the link between trade openness and growth. Applying the Granger causality analysis, Jung and Marshall (1985) examine the exports-economic growth link for 37 countries. The causality analysis reports that there exists no causality between these variables.

Hsiao (1987) also examines the exports-economic growth link for Asian countries. The study indicates that economic growth causes exports in case of Hong Kong.

Frankel and Romer (1999) deal with the link between trade and economic growth using panel data analysis. The study does not analyze causality between the variables. This study show that trade is not linked with economic growth. Hassan (2005) investigates the link between international trade and economic growth in case of Bangladesh. The empirical results show that there exists the uni-directional causality from trade openness to economic growth.

Gries and Redlin (2012) examine the relationship between trade openness and economic growth through a panel causality analysis. The panel GMM estimation results indicate the peresence of the long run bi-directional causality between the variables. This means that trade openness is a crucial factor of economic growth in the long term.

Okuyan and Ozun (2012) test the relationship between the variables in developing countries. This study usess the ARDL boundst test and Toda-Yamamoto causality method. The Toda-Yamamoto causality analysis revals that in four countries there exists a causal linkage from trade openness to economic growth. The Toda-Yamamoto causality analysis also revals that economic growth causes trade openness in the other countries.

Arif and Ahmad (2012) analyze the link between trade openness and economic growth using the Granger causality approach. The empirical results indicate that there exists the bi-directional causal linkage between trade openness and economic growth.

In recently, there has been an empirical literature investigating the relationship between energy consumption, trade and economic growth. This encompasses the studies of Shahbaz et al. (2013); Kumar et al. (2015); Kyophilavong et al. (2015) and Katırcıoğlu et al. (2016). Shahbaz et al. (2013) explore the link between energy use, trade openness, financial development, capital and economic growth in China. This study uses the ARDL bounds test and VECM Granger causality method. The Granger causality analysis shows that there exists the uni-directional causal link from energy use to economic growth. This indicates that the growth hypothesis is valid for China. In addition, the bi-directional causal link between the variables is determined.

Using the ARDL bounds test, Bayer and Hanck cointegration technique and Toda-Yamamoto causality approach, Kumar et al. (2015) investigate the South African economy. The results reveal that energy consumption causes economic growth. The results also reveal the presence of the bi-directional causal link between these variables. Therefore, the growth and feedback hypotheses are valid for South Africa.

Applying the Bayer and Hanck cointegration method, Kyophilavong et al. (2015) examine the link between energy use, openness and growth in Thailand. The study reveals that the feedback hypothesis is valid for Thailand. The study also reveals that there exists the bi-directional causal linkage between openness and growth in the long run.

Katırcıoğlu et al. (2016) deal with the relationship between energy consumption, trade and real income in case of Canada. This study uses the ARDL bounds test and VECM Granger causality approach. The causality test reveals the existence of the bi-directional causal link between energy consumption and economic growth. The study also reveals the existence of the bi-directional causality between trade and growth. The results support the presence of feedback hypothesis.

The recent studies are based on a single country and do not provide comperative results. The present study empirically examines the causal linkages between energy consumption, trade openness and economic growth for 12 upper middle income countries. For this purpose, the stationarity properties of the variables are analyzed by the Augmented Dickey-Fuller (ADF) and Dickey-Fuller GLS (DF-GLS) tests of Dickey and Fuller (1981) and Phillips-Perron (PP) test of Phillips and Perron (1988). The presence of cointegration between the variables is investigated by the ARDL bounds test presented by Pesaran et al. (2001). Finally, the study examines the causal linkages between the variables through the VECM Granger causality method presented by Engle and Granger (1987).

### 3. Model Specification and Data

The present study aims at dealing with the link between energy use, trade openness and economic growth by employing the log-lineer model. Following Kyophilavong et al. (2015), the relationship between the variables is specified as follows:

$$lnY_t = \alpha_0 + \alpha_1 lnEC_t + \alpha_2 lnTR_t + \varepsilon_t \quad (1)$$

where, $lnY_t$, $lnEC_t$ and $lnTR_t$ represent per capita real GDP (in constant 2010 US dollars), per capita energy consumption (in kg of oil equivalent) and trade openness which is obtained by dividing the sum of exports and imports by GDP. All the variables are transformed into logarithm. $\alpha_o$ is the constant, $\alpha_1$ and $\alpha_2$ denote the elasticity coefficient of energy concumption per capita and trade openness, respectively. The term $\varepsilon_t$ is a random error term. The study covers 12 upper-middle income countries (Turkey, China, Colombia, Costa Rica, South Africa, Malaysia, Thailand, Mexico, Tunusia, Ecuador, Jamaica and Peru). Annual time series from 1971 to 2014 are obtained from World Development Indicators (World Development Indicators, 2016). According to the World Bank classification, the main feature of these countries is that they have the same per capita income level in 2016. Table 1 presents the descriptive statistics.

**Table 1.** Descriptive Statistics

| *Country* | *Variables* | *Mean* | *Median* | *Max.* | *Min.* | *Std. dev.* |
|---|---|---|---|---|---|---|
| Turkey | $lnY_t$ | 8.80 | 8.79 | 9.31 | 8.33 | 0.28 |
| | $lnEC_t$ | 6.87 | 6.88 | 7.35 | 6.30 | 0.28 |
| | $lnTR_t$ | 3.46 | 3.56 | 4.05 | 2.20 | 0.50 |
| China | $lnY_t$ | 6.87 | 6.78 | 8.63 | 5.45 | 1.01 |
| | $lnEC_t$ | 6.74 | 6.64 | 7.70 | 6.14 | 0.43 |
| | $lnTR_t$ | 3.22 | 3.45 | 4.17 | 1.60 | 0.71 |
| Colombia | $lnY_t$ | 8.39 | 8.40 | 8.86 | 7.95 | 0.23 |
| | $lnEC_t$ | 6.48 | 6.46 | 6.61 | 6.37 | 0.06 |
| | $lnTR_t$ | 3.48 | 3.51 | 3.65 | 3.16 | 0.12 |
| Costa Rica | $lnY_t$ | 8.57 | 8.49 | 9.07 | 8.19 | 0.25 |
| | $lnEC_t$ | 6.45 | 6.45 | 6.94 | 6.05 | 0.30 |
| | $lnTR_t$ | 4.33 | 4.35 | 4.64 | 3.98 | 0.18 |
| South Africa | $lnY_t$ | 8.79 | 8.78 | 8.93 | 8.67 | 0.06 |
| | $lnEC_t$ | 7.84 | 7.87 | 7.99 | 7.59 | 0.10 |
| | $lnTR_t$ | 3.95 | 3.95 | 4.28 | 3.65 | 0.14 |
| Malaysia | $lnY_t$ | 8.50 | 8.53 | 9.21 | 7.61 | 0.46 |
| | $lnEC_t$ | 7.23 | 7.35 | 8.01 | 6.25 | 0.55 |
| | $lnTR_t$ | 4.93 | 4.99 | 5.39 | 4.29 | 0.32 |
| Thailand | $lnY_t$ | 7.80 | 7.96 | 8.63 | 8.85 | 0.56 |
| | $lnEC_t$ | 6.68 | 6.73 | 7.59 | 5.88 | 0.56 |
| | $lnTR_t$ | 4.32 | 4.35 | 4.94 | 3.54 | 0.45 |
| Mexico | $lnY_t$ | 8.92 | 8.93 | 9.13 | 8.56 | 0.14 |
| | $lnEC_t$ | 7.19 | 7.25 | 7.36 | 6.68 | 0.17 |
| | $lnTR_t$ | 3.56 | 3.63 | 4.19 | 2.79 | 0.44 |
| Tunusia | $lnY_t$ | 7.82 | 7.79 | 8.34 | 7.20 | 0.31 |
| | $lnEC_t$ | 6.42 | 6.42 | 6.88 | 5.76 | 0.30 |
| | $lnTR_t$ | 4.40 | 4.44 | 4.74 | 3.88 | 0.19 |
| Ecuador | $lnY_t$ | 8.24 | 8.23 | 8.57 | 7.85 | 0.14 |
| | $lnEC_t$ | 6.46 | 6.45 | 6.88 | 5.87 | 0.24 |
| | $lnTR_t$ | 3.76 | 3.78 | 4.22 | 3.30 | 0.24 |
| Jamaica | $lnY_t$ | 8.42 | 8.46 | 8.59 | 8.16 | 0.12 |
| | $lnEC_t$ | 7.06 | 7.09 | 7.36 | 6.61 | 0.20 |
| | $lnTR_t$ | 4.50 | 4.49 | 4.83 | 4.06 | 0.15 |
| Peru | $lnY_t$ | 8.19 | 8.16 | 8.66 | 7.87 | 0.18 |
| | $lnEC_t$ | 6.29 | 6.28 | 6.57 | 6.01 | 0.17 |
| | $lnTR_t$ | 3.47 | 3.49 | 4.03 | 2.57 | 0.35 |

## 4. Econometric Methodology

Firstly, the stationarity properties of the variables are examined through the ADF, DF-GLS and PP tests. Secondly, the cointegration analysis is implemented by the ARDL bounds test. Thirdly, the study investigates the causal links between the variables through the VECM Granger causality test. In this stage, both short-run and long-run causality between the variables is analyzed.

### 4.1. Cointegration Analysis

Several cointegration methods suggested by Engle and Granger (1987), Johansen and Juselius (1990), Phillips and Hansen (1990), Stock and Watson (1993) have been used to investigate the long run relationship among the variables in the empirical studies. These are univariate or multivariate cointegration approaches and require that the variables should be integrated at *I*(1).

This study uses the ARDL bounds test to examine the presence of long run link between energy consumption, trade openness and economic growth. The ARDL bounds test is a single cointegration approach and has several important advantages in comparison with other cointegration techniques. In the ARDL approach, the regressors may be integrated *I*(0) or *I*(1). This method provides efficient results for small sample data. In addition, a dynamic unrestricted error correction model (UECM) can be obtained from the ARDL model. The UECM encompasses both short-run and long-run dynamics (Pesaran, Shin, 1999). In this study, the following ARDL model is employed:

$$\Delta lnY_t = \alpha_0 + \sum_{i=1}^{m} \beta_{1i} \Delta lnY_{t-i} + \sum_{i=0}^{m} \beta_{2i} \Delta lnEC_{t-i} + \sum_{i=0}^{m} \beta_{3i} lnTR_{t-i}$$

$$+\theta_1 lnY_{t-1} + \theta_2 lnEC_{t-1} + \theta_3 lnTR_{t-1} + \theta_4 trend + \varepsilon_t \quad (2)$$

where, $\alpha_o$ is the constant, $\Delta$ is the first difference operator and $\varepsilon_t$ is the random error term. The appropriate lag order is determined by the AIC and SBC. In the bounds testing approach, the computed *F*-statistic is compared with the upper critical bound (UCB) and lower critical bound (LCB). These critical bounds are generated by Pesaran et al. (2001). This cointegration procedure tests the null hypothes $H_0: \theta_1 = \theta_2 = \theta_3 = \theta_4 = 0$ of no cointegration against the alternative hypothesis $H_a: \theta_1 \neq \theta_2 \neq \theta_3 \neq \theta_4 \neq 0$ of cointegration. The null hypothesis can not be rejected if the computed *F*-statistic exceeds the UCB. This means that there exists a cointegration between the variables. The null hypothesis can be rejected if the computed *F*-statistic below the LCB. This indicates that there exists no cointegration between the variables. If computed *F*-statistic falls between the UCB and LCB, the result is uncertain.

Using some diagnostic tests such as serial correlation, functional form, normality of error term and heteroskedasticity, we can investigate the robustness of the ARDL model. In addition, we can examine the stability of the ARDL parameters through the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMsq) tests of Brown et al. (1975).

### 4.2. Causality Analysis

This study employs the VECM Granger causality method to estimate the causal links between the variables. After applying a cointegration approach, the VECM Granger causality method can be used. The empirical specification of this causality method is expressed as follows:

$$(1-L)\begin{bmatrix} \ln Y_t \\ \ln EC_t \\ \ln TR_t \end{bmatrix} = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \end{bmatrix} + \sum_{i=1}^{p} (1-L) \begin{bmatrix} a_{11i} a_{12i} a_{13i} \\ a_{21i} a_{22i} a_{23i} \\ a_{31i} a_{32i} a_{33i} \end{bmatrix} x \begin{bmatrix} \ln Y_{t-1} \\ \ln EC_{t-1} \\ \ln TR_{t-1} \end{bmatrix} + \begin{bmatrix} \alpha \\ \varphi \\ \delta \end{bmatrix} ECT_{t-1} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} (3)$$

where, (1- L) and $ECT_{t-1}$ is the lag operator and the lagged error correction term obtained from the long run relationship. $\varepsilon_{1t}$, $\varepsilon_{2t}$ and $\varepsilon_{3t}$ are error terms. The short-run and long-run causal linkages between the variables can be examined by the VECM causality technique. If *t*-statistic on the coefficient of lagged error correction term is significant, there exists a long-run causality

between the variables. If *F*-statistic on the first differences of the variables is significant, there exists a causal linkage between the variables in the short run.

## 5. Empirical Results

We apply ADF, DF-GLS and PP tests to implement unit root analysis of the variables. The results presented in Table 2 indicate that the variables have an unit root at level but stationary at first difference. The results also indicate that the ARDL bounds test can be employed to analyze the existence of a cointegration between the variables.

**Table 2.** The Results of Unit Root Tests

| Country | Regressor | ADF test | | | DF-GLS test | | | PP test | |
|---|---|---|---|---|---|---|---|---|---|
| | | SIC lag | *t*-stat | Critical value at 5 % | SIC lag | *t*-stat | Critical value at 5 % | *t*-stat | Critical value at 5 % |
| Turkey | $lnY_t$ | 0 | -0.19[a] | -2.93 | 0 | -1.32[a] | -1.94 | 0.14[a] | -2.93 |
| | $lnEC_t$ | 0 | -1.29[a] | -2.93 | 0 | 0.86[a] | -1.94 | -1.30[a] | -2.93 |
| | $lnTR_t$ | 0 | -1.36[a] | -2.93 | 1 | -0.60[a] | -1.94 | -1.37[a] | -2.93 |
| | $\Delta lnY_t$ | 0 | -6.50[a] | -2.93 | 0 | -6.21[a] | -1.94 | -6.51[a] | -2.93 |
| | $\Delta lnEC_t$ | 0 | -6.28[a] | -2.93 | 0 | -4.61[a] | -1.94 | -6.38[a] | -2.93 |
| | $\Delta lnTR_t$ | 0 | -5.48[a] | -2.93 | 0 | -5.51[a] | -1.94 | -5.48[a] | -2.93 |
| China | $lnY_t$ | 2 | 1.04[a] | -2.93 | 1 | 0.15[a] | -1.94 | 2.24 | -2.93 |
| | $lnEC_t$ | 1 | 1.62[a] | -2.93 | 1 | 1.39[a] | -1.94 | 2.38 | -2.93 |
| | $lnTR_t$ | 0 | -1.75[b] | -3.52 | 0 | -1.38[b] | -3.19 | -1.84[b] | -3.52 |
| | $\Delta lnY_t$ | 1 | -2.99[a] | -2.93 | 0 | -2.90a | -1.94 | -4.11[a] | -2.93 |
| | $\Delta lnEC_t$ | 0 | -3.85[a] | -2.93 | 0 | -3.88[a] | -1.94 | -3.84[a] | -2.93 |
| | $\Delta lnTR_t$ | 0 | -5.24[b] | -3.52 | 0 | -5.36[b] | -3.19 | -6.03[b] | -3.52 |
| Colombia | $lnY_t$ | 0 | -1.23[b] | -3.52 | 1 | -1.93[b] | -3.19 | -1.88[b] | -3.52 |
| | $lnEC_t$ | 0 | -1.78[a] | -2.93 | 0 | -1.49[a] | -1.94 | -1.87[a] | -2.93 |
| | $lnTR_t$ | 0 | -1.54[a] | -2.93 | 0 | -1.39[a] | -1.94 | -1.43[a] | -2.93 |
| | $\Delta lnY_t$ | 0 | -4.64[b] | -3.52 | 0 | -4.37[b] | -3.19 | -4.60[b] | -3.52 |
| | $\Delta lnEC_t$ | 0 | -7.07[a] | -2.93 | 1 | -3.36[a] | -1.94 | -7.03[a] | -2.93 |
| | $\Delta lnTR_t$ | 0 | -7.33[a] | -2.93 | 0 | -7.17[a] | -1.94 | -7.50[a] | -2.93 |
| Costa Rica | $lnY_t$ | 1 | 0.28[a] | -2.93 | 1 | 0.79[a] | -1.94 | 0.40 | -2.93 |
| | $lnEC_t$ | 0 | -0.32[a] | -2.93 | 0 | 0.52[a] | -1.94 | -0.38[a] | -2.93 |
| | $lnTR_t$ | 0 | -1.93[a] | -2.93 | 0 | -1.75[a] | -1.94 | -2.02[a] | -2.93 |
| | $\Delta lnY_t$ | 0 | -3.99[a] | -2.93 | 0 | -3.61[a] | -1.94 | -3.77[a] | -2.93 |
| | $\Delta lnEC_t$ | 0 | -5.54[a] | -2.93 | 0 | -5.53[a] | -1.94 | -5.54[a] | -2.93 |
| | $\Delta lnTR_t$ | 1 | -5.44[a] | -2.93 | 1 | -5.40[a] | -1.94 | -5.96[a] | -2.93 |
| Malaysia | $lnY_t$ | 0 | -1.58[a] | -2.93 | 1 | 0.82[a] | -1.94 | -1.54[a] | -2.93 |
| | $lnEC_t$ | 0 | -1.00[a] | -2.93 | 0 | 1.00[a] | -1.94 | -1.55[a] | -2.93 |
| | $lnTR_t$ | 1 | -2.28[a] | -2.93 | 1 | -1.04[a] | -1.94 | -1.77[a] | -2.93 |
| | $\Delta lnY_t$ | 0 | -5.56[a] | -2.93 | 0 | -5.22[a] | -1.94 | -5.53[a] | -2.93 |
| | $\Delta lnEC_t$ | 0 | -6.70[a] | -2.93 | 0 | -6.31[a] | -1.94 | -6.91[a] | -2.93 |
| | $\Delta lnTR_t$ | 0 | -5.05[a] | -2.93 | 0 | -3.97[a] | -1.94 | -5.05[a] | -2.93 |
| Thailand | $lnY_t$ | 1 | -1.26[a] | -2.93 | 1 | 0.14[a] | -1.94 | -0.97[a] | -2.93 |
| | $lnEC_t$ | 0 | 0.26[a] | -2.93 | 1 | 0.78[a] | -1.94 | 0.05[a] | -2.93 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | $lnTR_t$ | 0 | -1.20[a] | -2.93 | 0 | 0.27[a] | -1.94 | -1.21[a] | -2.93 |
| | $\Delta lnY_t$ | 0 | -3.93[a] | -2.93 | 0 | -3.63[a] | -1.94 | -3.93[a] | -2.93 |
| | $\Delta lnEC_t$ | 0 | -4.82[a] | -2.93 | 0 | -4.78[a] | -1.94 | -4.92[a] | -2.93 |
| | $\Delta lnTR_t$ | 0 | -6.91[a] | -2.93 | 0 | -6.83[a] | -1.94 | -6.91[a] | -2.93 |
| Mexico | $lnY_t$ | 0 | -2.21[a] | -2.93 | 0 | 0.08[a] | -1.94 | -2.14[a] | -2.93 |
| | $lnEC_t$ | 0 | -3.07[b] | -3.52 | 0 | -1.36[b] | -3.19 | -2.99[b] | -3.52 |
| | $lnTR_t$ | 0 | -1.19[a] | -2.93 | 0 | -0.03[a] | -1.94 | -1.21[a] | -2.93 |
| | $\Delta lnY_t$ | 0 | -5.06[a] | -2.93 | 0 | -4.58[a] | -1.94 | -4.99[a] | -2.93 |
| | $\Delta lnEC_t$ | 0 | -5.07[b] | -3.52 | 0 | -5.05[b] | -3.19 | -5.09[b] | -3.52 |
| | $\Delta lnTR_t$ | 1 | -5.86[a] | -2.93 | 1 | -5.92[a] | -1.94 | -7.62[a] | -2.93 |
| Tunusia | $lnY_t$ | 0 | -2.70[b] | -3.52 | 0 | -2.16[b] | -3.19 | -2.84[b] | -3.52 |
| | $lnEC_t$ | 0 | -3.34[b] | -3.52 | 1 | -1.37[b] | -3.19 | -3.24[b] | -3.52 |
| | $lnTR_t$ | 0 | -2.53[a] | -2.93 | 0 | -0.71[a] | -1.94 | -2.55[a] | -2.93 |
| | $\Delta lnY_t$ | 0 | -8.95[b] | -3.52 | 0 | -4.98[b] | -3.19 | -8.70[b] | -3.52 |
| | $\Delta lnEC_t$ | 0 | -10.52[b] | -3.52 | 0 | -10.27[b] | -3.19 | -10.53[b] | -3.52 |
| | $\Delta lnTR_t$ | 0 | -5.96[a] | -2.93 | 0 | -6.03[a] | -1.94 | -5.99[a] | -2.93 |
| Ecuador | $lnY_t$ | 0 | -1.65[a] | -2.93 | 0 | 1.12[a] | -1.94 | -1.66[a] | -2.93 |
| | $lnEC_t$ | 0 | -1.75[a] | -2.93 | 0 | 0.31[a] | -1.94 | -1.76[a] | -2.93 |
| | $lnTR_t$ | 0 | -1.64[a] | -2.93 | 0 | -0.68 | -1.94 | -1.54[a] | -2.93 |
| | $\Delta lnY_t$ | 0 | -4.24[a] | -2.93 | 0 | -4.28[a] | -1.94 | -4.21[a] | -2.93 |
| | $\Delta lnEC_t$ | 0 | -6.46[a] | -2.93 | 0 | -6.47[a] | -1.94 | -6.46[a] | -2.93 |
| | $\Delta lnTR_t$ | 0 | -7.04[a] | -2.93 | 0 | -7.01[a] | -1.94 | -8.66[a] | -2.93 |
| Jamaica | $lnY_t$ | 1 | -1.67[a] | -2.93 | 1 | -1.60[a] | -1.94 | -1.28[a] | -2.93 |
| | $lnEC_t$ | 1 | -2.31[b] | -3.52 | 1 | -2.35[b] | -3.19 | -1.82[b] | -3.52 |
| | $lnTR_t$ | 0 | -2.90[b] | -3.52 | 0 | -2.90[b] | -3.19 | -2.75[b] | -3.52 |
| | $\Delta lnY_t$ | 0 | -6.14[a] | -2.93 | 0 | -2.41[a] | -1.94 | -6.18[a] | -2.93 |
| | $\Delta lnEC_t$ | 0 | -4.77[b] | -3.52 | 0 | -3.87[b] | -3.19 | -4.76[b] | -3.52 |
| | $\Delta lnTR_t$ | 1 | -6.53[b] | -3.52 | 1 | -6.62[b] | -3.19 | -13.68[b] | -3.52 |
| Peru | $lnY_t$ | 1 | -0.41[a] | -2.93 | 1 | -0.58[a] | -1.94 | 0.87[a] | -2.93 |
| | $lnEC_t$ | 1 | -1.05[a] | -2.93 | 1 | -1.00[a] | -1.94 | -1.10[a] | -2.93 |
| | $lnTR_t$ | 0 | -1.45[a] | -2.93 | 0 | -1.45[a] | -1.94 | -1.44[a] | -2.93 |
| | $\Delta lnY_t$ | 0 | -3.79[a] | -2.93 | 0 | -3.83[a] | -1.94 | -3.77[a] | -2.93 |
| | $\Delta lnEC_t$ | 0 | -4.34[a] | -2.93 | 0 | -4.20[a] | -1.94 | -4.35[a] | -2.93 |
| | $\Delta lnTR_t$ | 0 | -5.53[a] | -2.93 | 0 | -5.55[a] | -1.94 | -5.88[a] | -2.93 |

*Notes*: [a] and [b] show the model with constant and constant-trend, respectively. The optimal lag length is selected using SBC.

In order to empirically examine the existence of a long run relationship between the variables, the ARDL cointegration method is applied. The bounds test uses the joint *F*-statistic. The optimal lag selection is based on SBC. The cointegration results are reported in Table 3. The bounds-*F* test results show that there exists the long-run relationship among the variables because *F*-statistic (6.71) is higher than the UCB value (5.85) at the 5 % level in China. In addition, the results also show that that there exists the long-run relationship betweent the variables because *F*-statistics (5.70; 5.23; 5.16; 5.61; 5.56) are higher than the UCB value (5.06) at the 10 % level in Turkey, Colombia, Ecuador, Jamaica and Peru, respectively. The results imply that there exists cointegration between the variables in these countries. The results also imply that there exists no cointegration between the varaibles in Costa Rica, South Africa, Malaysia, Thailand and Mexico. The diagnostic tests are also reported in Table 3.

**Table 3.** The Results of Bounds *F*-test for Cointegration

| Panel A: Bounds testing to cointegration | | |
|---|---|---|
| Country | *F*-statistics | Cointegration |
| Turkey | 5.70* | Yes |
| China | 6.71** | Yes |
| Colombia | 5.23* | Yes |
| Costa Rica | 4.69 | No |
| South Africa | 4.90 | No |
| Malaysia | 2.72 | No |
| Thailand | 4.82 | No |
| Mexico | 2.60 | No |
| Ecuador | 5.16* | Yes |
| Jamaica | 5.61* | Yes |
| Peru | 5.56* | Yes |

| Panel B: Peseran et al. (2001) critical value bounds of the *F*-statistic: unristricted intercept and unrestrected trend | | |
|---|---|---|
| Significance level | Lower bounds, I(0) | Upper bounds, I(1) |
| 1% | 6.34 | 7.52 |
| 5% | 4.87 | 5.85 |
| 10% | 4.19 | 5.06 |

| Panel C: Diagnostic tests | $R^2$ | *F*-statistics | J-B normality | Ramsey RESET | ARCH LM | B-G LM |
|---|---|---|---|---|---|---|
| Turkey | 0.82 | 10.98*** | 2.24 (0.32) | [2]: 0.14 | [1]: 0.11 | [2]: 0.12 |
| China | 0.72 | 2.72** | 5.23 (0.07) | [1]: 0.69 | [1]: 0.13 | [1]: 0.18 |
| Colombia | 0.68 | 2.33** | 1.72 (0.42) | [1]: 0.05 | [1]: 0.54 | [4]: 0.13 |
| Costa Rica | 0.85 | 4.16*** | 1.26 (0.53) | [1]: 0.00 | [1]: 0.59 | [1]: 0.46 |
| South Africa | 0.74 | 4.39** | 3.82 (0.14) | [1]: 0.84 | [1]: 0.72 | [1]: 0.85 |
| Malaysia | 0.41 | 2.40** | 1.54 (0.46) | [1]: 0.00 | [1]: 0.34 | [1]: 0.38 |
| Thailand | 0.84 | 5.88*** | 3.06 (0.21) | [2]: 0.18 | [1]: 0.84 | [1]: 0.71 |
| Mexico | 0.79 | 7.49** | 3.47 (0.17) | [1]: 0.88 | [1]: 0.95 | [1]: 0.97 |
| Tunusia | 0.58 | 3.14*** | 1.44 (0.48) | [1]: 0.37 | [3]: 0.16 | [1]: 0.51 |
| Ecuador | 0.79 | 2.81** | 0.75 (0.68) | [1]: 0.63 | [1]: 0.27 | [1]: 0.55 |
| Jamaica | 0.81 | 4.60*** | 7.93 (0.01) | [1]: 0.79 | [1]: 0.29 | [1]: 0.88 |
| Peru | 0.68 | 7.35*** | 1.52 (0.46) | [3]: 0.05 | [1]: 0.27 | [1]: 0.25 |

*Notes:* Figures in parentheses are probabilities. ***, ** and * denote the significant at 1 %, 5 % and 10 % level of significance, respectively.

The results of cointegration test used in the study indicate that the VECM Granger causality method can be used to examine the causal linkages between the variables for Turkey, China, Colombia, Malaysia, Ecuador, Jamaica and Peru.

The results of VECM Granger causality method are reported in Table 4. The results indicate that there exists the long-run bi-directional causality between economic growth and energy consumption in Turkey. In the long run, trade openness causes energy consumption and economic growth in Turkey. The results also indicate the presence of the long-run uni-directional causality from energy consumption and trade openness to economic growth in China, Colombia, Jamaica and Peru. For Ecuador, the bi-directional causality between energy consumption and trade openness is determined in the long run. It is also found that in the long run economic growth causes energy consumption and trade openness in Ecuador.

The study also presents the short-run causal links between the variables. Economic growth causes energy consumption and trade openness in Peru. Energy consumption causes economic growth in Colombia.

**Table 4.** The Results of VECM Granger Causality Analysis

| Country | Short run causality (*F*-statistics) | | | Long run causality |
|---|---|---|---|---|
| | $\Delta lnY_t$ | $\Delta lnEC_t$ | $\Delta lnTR_t$ | $ECT_{t-1}$ (*t*-statistics) |
| Turkey | | | | |
| $\Delta lnY_t$ | - | 0.87 | 0.58 | -1.76* |
| $\Delta lnEC_t$ | 0.98 | - | 0.97 | -1.77* |
| $\Delta lnTR_t$ | 1.20 | 0.30 | - | 1.128 |
| China | | | | |
| $\Delta lnY_t$ | - | 0.16 | 0.03 | -4.06*** |
| $\Delta lnEC_t$ | 1.08 | - | 0.08 | 0.07 |
| $\Delta lnTR_t$ | 0.71 | 0.15 | - | -0.68 |
| Colombia | | | | |
| $\Delta lnY_t$ | - | 3.84** | 0.69 | -2.06** |
| $\Delta lnEC_t$ | 1.49 | - | 0.06 | 0.45 |
| $\Delta lnTR_t$ | 1.55 | 1.07 | - | 1.50 |
| Ecuador | | | | |
| $\Delta lnY_t$ | - | 0.08 | 1.08 | -0.56 |
| $\Delta lnEC_t$ | 0.45 | - | 1.03 | 2.22** |
| $\Delta lnTR_t$ | 0.97 | 1.56 | - | 1.76* |
| Jamaica | | | | |
| $\Delta lnY_t$ | - | 0.65 | 0.62 | -3.42*** |
| $\Delta lnEC_t$ | 1.68 | - | 1.01 | -0.51 |
| $\Delta lnTR_t$ | 0.37 | 0.63 | | -1.38 |
| Peru | | | | |
| $\Delta lnY_t$ | - | 0.53 | 1.54 | -4.79*** |
| $\Delta lnEC_t$ | 2.04** | - | 0.04 | -0.72 |
| $\Delta lnTR_t$ | 2.28** | 1.39 | - | 0.91 |

*Notes:* The model with constant is used for causality analysis. The optimal lag length is selected using SBC. ***, ** and * denote the significant at 1 %, 5 % and 10 % level of significance, respectively.

## 6. Conclusion

In recent years, the relationship between energy, trade and economic growth has been significantly discussed by theoretical and empirical studies. This study intensifies on the dynamic causal links among energy consumption, trade openness and economic growth for upper middle income countries over the period 1971-2014. After examining the unit root analysis, The ARDL bounds test is used to investigate cointegration between the variables. The Granger causality test based on VECM approach is also applied to examine the causal links between the variables.

The unit root test results show that the variables used in the study are integrated at $I(1)$. This implies that the ARDL bounds test can be employed to examine the presence of long run relationship between the variables. The ARDL bounds test results show that there exists cointegration between the variables in Turkey, China, Colombia, Ecuador, Jamaica and Peru. The VECM Granger causality results show that there exists the long-run bi-directional causality between economic growth and energy consumption in Turkey. In the long run, trade openness causes energy consumption and economic growth in Turkey. The results also indicate the presence of the long-run uni-directional causality from energy consumption and trade openness to economic growth in China, Colombia, Jamaica and Peru. For Ecuador, the bi-directional causality between energy consumption and trade openness is determined in the long run. It is also found that in the long run economic growth causes energy consumption and trade openness in Ecuador.

The results can present several implications for policymakers in these countries. The long-run causality from energy use and trade openness to economic growth corroborates the energy-led-growth and trade-led-growth hypotheses for Turkey, China, Colombia, Jamaica and Peru. In this

context, the governments should diversify energy resources and export partners to raise and sustain the rate of economic growth. For future research on the links between energy consumption, trade openness and economic growth, the number of countries and independent variables used in the study can be increased. In addition, more comparative analyses can be conducted. Finally, the long-run and short-run coefficients can be estimated through several econometric methods.

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# Reward System Effects on Employees in Small And Medium Enterprises – Case of Federation Bosnia and Herzegovina

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**Abstract**

In this project, we will research impact of rewards on motivation of employees. Outcome of the organization is profoundly dependable on the achievement of their workers. Aim of this research is to show how rewards impact motivation keeping in mind the goal to improve the general performance of the organization. It is crucial for the organization to comprehend what drive the employees and how to expand their employment fulfillment. It may however be hard for an organization to discover what motivates employees, particularly on the grounds that distinctive individuals are motivated by various things. Well composed and useful reward system is an effective approach to build employee work motivation. This research embarks to investigate obviously what factors exist in ascribing the right reward structure to an individual representative or group. Reward management is both perplexing and involved and exceptionally exposed to outside impacts, for example, financial situations, culture and individual worker inclinations and recognition.

**Keywords:** motivation, employee motivation, reward system, employee satisfaction, SMEs, Balkans, Bosnia, leadership, wages and bonuses.

## 1. Introduction

In this research, we will research about impact of rewards on motivation of employees. Outcome of the organization is profoundly dependable on the achievement of their workers. Aim of this research is to show how rewards impact motivation keeping in mind the goal to improve the general performance of the organization. There are many ways in which job satisfaction is defined. This is complex topic, and many theorists and authors gave their contribution to further develop and broad this area. To research this topic, we need to adequately explore all influencing factors which are related to the job satisfaction. Those include environmental factors psychological factors and individual factors. It is crucial for the organization to comprehend what drive the employees and how to expand their employment fulfillment. It may however be hard for an organization to discover what motivates employees, particularly on the grounds that distinctive individuals are motivated by various things.

Well composed and useful reward system is an effective approach to build employee work motivation. This research embarks to investigate obviously what factors exist in ascribing the right reward structure to an individual representative or group. Reward management is both perplexing

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and involved and exceptionally exposed to outside impacts, for example, financial situations, culture and individual worker inclinations and recognition.

Motivating the workforce of a company to work all the more viably towards the company's objectives is maybe the most crucial assignment of management. Companies persuade their workforce to perform adequately by offering them rewards for agreeable execution and maybe rebuffing them for unacceptable work. Over the past hundred years there has been a development in the perspective of what the expression "rewards" really implies in an authoritative setting.

**2. Literature review**

In this research, we will present different ideas about job satisfaction and motivation techniques. Job satisfaction is one of the most researched topic regarding job environment and among the most broadly investigated subjects in Industrial/Organizational Psychology (Judge, Church, 2000).

Intrinsic and extrinsic sorts of motivation have been generally contemplated, and the qualification between them has revealed vital insight into both formative and instructive practices. Extrinsic motivation is a build that relates at whatever point a movement is done keeping in mind the end goal to achieve some detachable result. Extrinsic motivation consequently diverges from intrinsic motivation, which alludes to doing an activity basically for the happiness regarding the action itself, instead of its instrumental esteem (Ryan, Deci, 2000).

Managers can motivate employees through strategies, for example, pay advancement and acclaim. Employees can likewise rouse themselves by looking for work where singular objectives, needs furthermore will be achieved. Intrinsic motivation alludes to the motivation that originates from inside a person. The motivation is created through fulfillment or satisfaction that one gets in finishing or notwithstanding at an errand. Extrinsic motivation is something that is done for individuals to persuade them. It emerges from elements outside an individual, for example, cash, evaluations, feedback or disciplines (Armstrong, Taylor, 2014). Job satisfaction is a perspective achieved from employees' impression of their job or environment in which they work and alludes to the degree to which an employee like the actual job (Arokiasamy, Abdullah, 2013). Payment systems are effective but they cannot ultimately achieve satisfaction of employees. Managers needs to weigh up the most favorable circumstances and disservices of every reward systems and choose which system to put the priority on and give it the most attention (Torringtonet al., 2009) Armstrong and Taylor (2014) insists that there are also other types of incentives such as reward by the result. Incentive by Result is one of the most broadly utilized motivating force, which compensate representatives as per the quantity of things or units they deliver or the time they take to deliver them. This plan has been condemned because of its inclination to reward amount of yield as opposed to quality which can prompt diminished nature of the item or administration. There is an awesome need to alter and assess the adequacy of this plan in the event that it is to hold the effect of profitability (Daley, 2012).

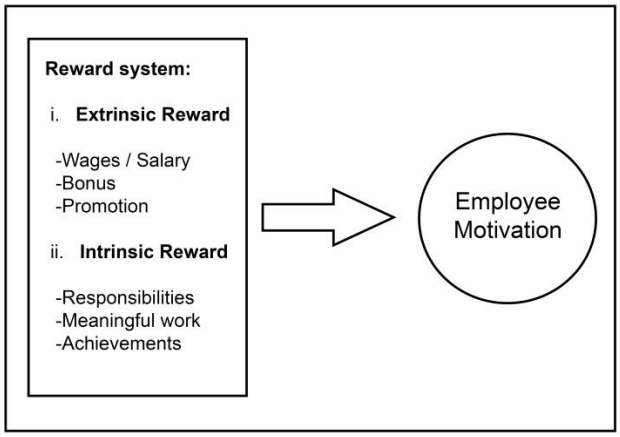
The subjects presented to the associates who made positive remarks evaluated the employment errands as more charming than the subjects presented to the negative remarks by the associates. This further approve social data handling hypothesis (Aamodt, 2009)

Medina (2012) highlights that job fulfillment was firmly contrarily connected with turnover expectation and this relationship was intervened by fulfillment in work environment culture. The review gives prove that ought to be additionally investigated to help in the comprehension of worker turnover and occupation fulfillment; especially in how job fulfillment and representative turnover identify with work environment culture.

L. Deckers (2010) insists that motivation is a persons' inward inclination to be worried with and approach constructive impetuses and keep away from adverse stimulation. To further this, a motivator is the expected reward or unpleasant occasion accessible in the environment.

Reward is the benefit achieved for performing expected assignment. It is a positive boost or motivating force that can be displayed during the time spent fortifying conduct. As per Decenzo and Robbins (2002), today's specialists expect something other than a time-based compensation or pay from their boss; they need extra contemplation that will advance their lives. This contemplation in a business setting is called employee benefits. Benefits are the program a business uses to supplement money compensation that employee gets (Pinder, 2014).

## 3. Methodology
### Research model representation




Source: Author

In the theoretical part of this research, we will present different ideas from various researchers and present collected literature. In the beginning, we will introduce reward systems and motivation and describe it thoroughly. Different systems of the motivation will be explored and presented.

Speaking of instruments for data collection in this research, we will use quantitative research survey. We decided to use survey because of costs and structured technique with large number of samples. This survey will be constructed in order to get feedback from employees from different Small and Medium Enterprises in Federation of Bosnia and Herzegovina. We will analyze different reward systems and methods used to motivate the employees. Statistical data will be analyzed using IBM SPSS software.

In the end of the questionnaire we would make one question open where respondents of this survey can express their own opinion and say in own words, what would they do to improve satisfaction of employees and how to motivate them properly.

For purpose of hypothesis testing, linear regression method will be used. Other important conclusions will be generated after descriptive statistics analysis. Based on the literature reviewed, we learned that there are two types of reward, extrinsic and intrinsic. According to this classification, we have identified following hypothesis:

H1: Wages are positively related to the motivation of employees
H2: Bonus is positively related to the motivation of employees
H3: Meaningful work is positively related to the motivation of employees
H4: Achievement is positively related to the motivation of employees

The following research questions have been made according to the hypothesis stated:
RQ1: Are wages positively related to the motivation of employees?
RQ2: Is bonus positively related to the motivation of employees?
RQ3: Is meaningful work positively related to the motivation of employees?
RQ4: Is achievement positively related to the motivation of employees?

## 4. Analysis

For every organization, it is important to keep their employees satisfied, because the result is dependent on their performance. Therefore, we plan to find results what drives motivation of employees. What positively influence their performance and what negatively reduce their performance. Primary data would be collected from the survey distributed online via e-mail to the respondents.

A typical hypothesis inside the exploration has been that, to a degree, the emotional condition of an individual is influenced by associations with their workplace. Individuals

distinguish themselves by their calling, for example, a specialist, legal counselor, or instructor. Consequently, an individual's close to home prosperity at work is a critical part of research (Judge, Klinger, 2007).

We want to find which areas of motivation of employees function well and which areas need to be improved. With collected data and personal opinions of employees from different organizations and companies, we intend to build a solid research. Feedback of employees will give us necessary data which will be analyzed and commented in this research. Positive linear relationship is expected to be gathered for all hypotheses.

This research was directed in order to contribute to the examination of the attitudes of the employees towards the reward systems of the organization. Particularly, it will help the organizations to explore which of the reward systems is most favored and what different benefits motivate the employees.

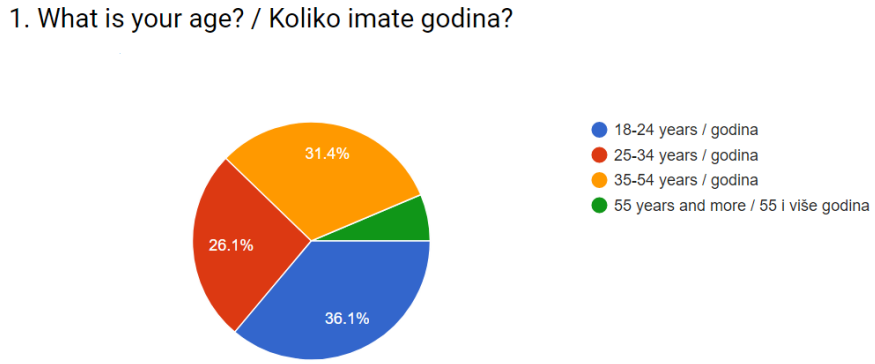



**Fig. 1.** Age of respondents
Source: SPSS

On Figure 1, we can see the age of respondents. The biggest number of respondents belongs to the first category variable. That means those employees have age range 18-24 years. The next biggest proportion is the range group with the employees having age 35-54 years. Than we have a group of employees having 25-34 years. In the end, we have employees with the 55 years and more. Those are seniors, managers and owners of the respected companies taken into consideration for this survey.

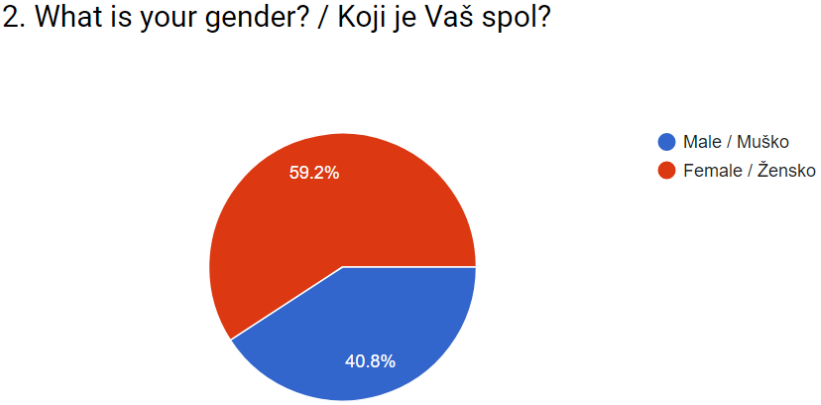



**Fig. 2.** Gender of responders
Source: SPSS

On the Figure 2, we have taken into account gender of the respondents. In this survey 59,2 % of women are respondents, and 40,8 % of men are respondents. This is interesting for the country of Bosnia and Herzegovina, since the majority of the working force is male.

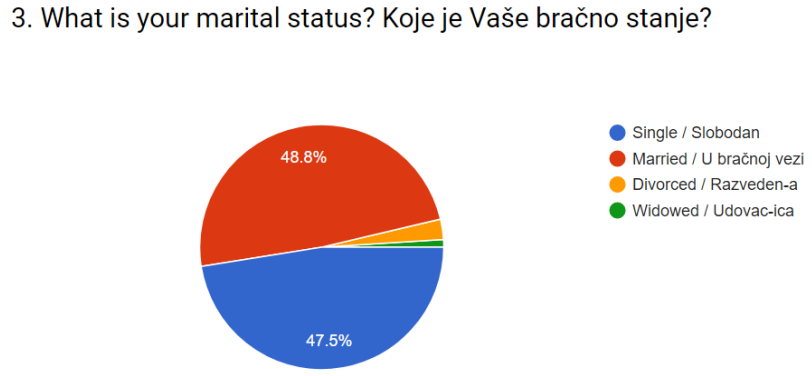



**Fig. 3.** Marital status
Source:SPSS

On the Figure 3, we can see marital status of the respondents. We asked this question since it is important for this research to evaluate what impact marriage have on the motivation of the respondents and what effects can it cause.

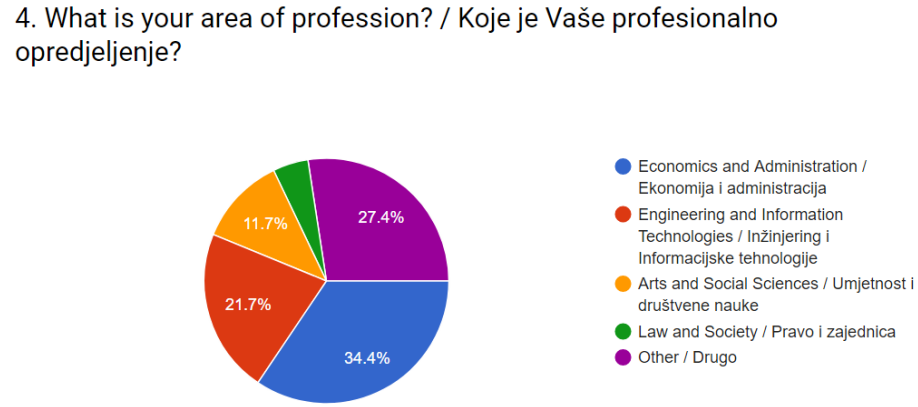



**Fig. 4.** Area of profession
Source: SPSS

In this question, we asked respondents what is there area of profession. We have found out that the most of respondents have Economical and Administrative background or 34,4 % of them. Other areas of profession are covered respectively as shown on the Figure 4.

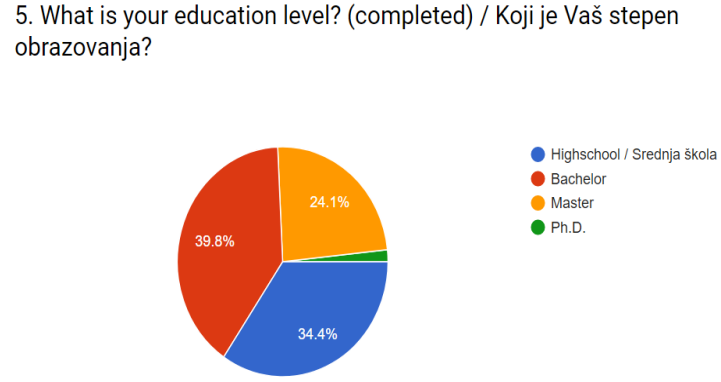



**Fig. 5.** Education level
Source:SPSS

On the Figure 5, we analyzed education level of the respondents since it is very important for the motivation of employees. We can see that the biggest number of respondents have a faculty degree or bachelor with the number of 39,8 % of overall.

Reward systems in your company motivate you? / Da li Vas sistem nagrađivanja u Vašoj firmi motiviše?

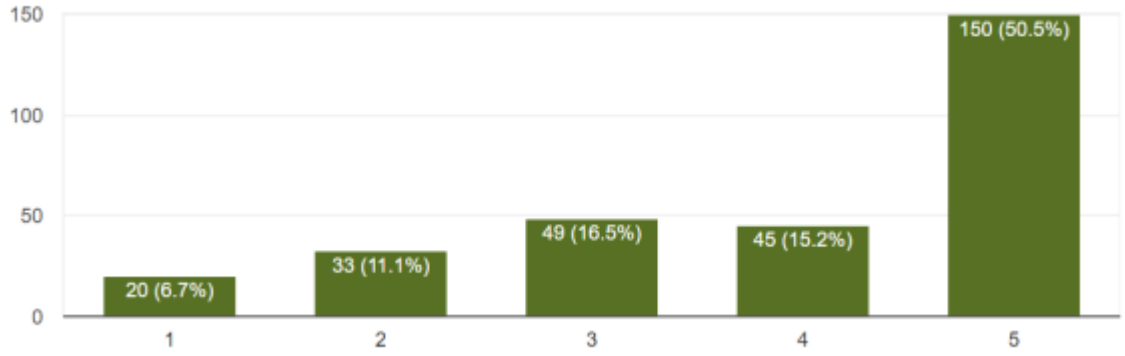



**Fig. 6.** Reward system
Source: SPSS

In our questionnaire we wanted to analyze does current reward system in the respected companies motivates their employees. The given options were from 1 strongly disagree to 5 strongly agree. According to our respondents, we can see that more than half of them, precisely 50,5 % thinks that reward system is motivating in their companies.

Wages are positively related to the motivation of employees? / Plate su pozitivno povezane sa motivacijom radnika?

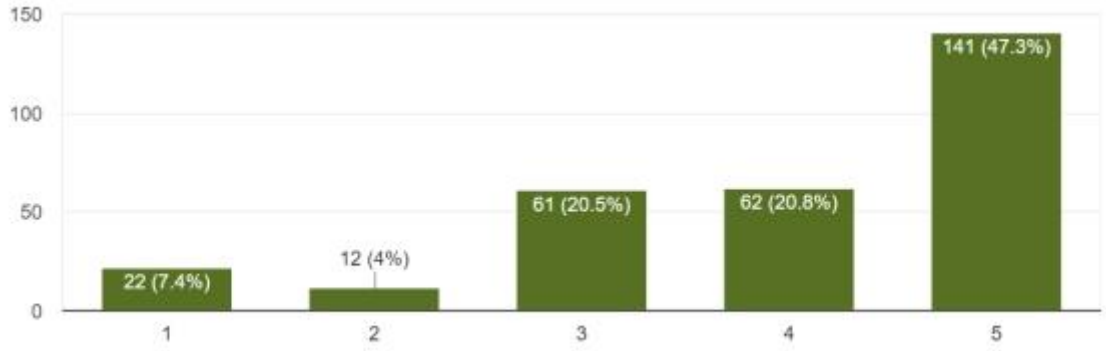



**Fig. 7.** Wages
Source:SPSS

On the Figure 7 we have analyzed whether if wages are connected with the motivation of employees. The given options were from 1 strongly disagree to 5 strongly agree. The biggest number of respondents 47,3 % of them thinks that wages are positively related with the motivation of employees.

Responsibilities are positively related to the motivation of employees? / Odgovornost je pozitivno povezana sa motivacijom radnika?

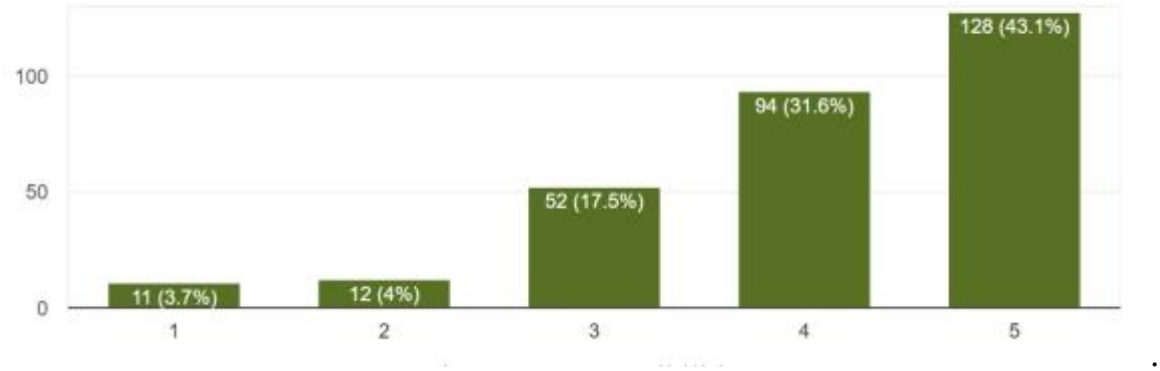



**Fig. 8.** Responsibilities
Source: SPSS

On the Figure 8 we can see how employees have answered on our question whether responsibilities are positively related with the motivation of employees. We can see that the 43,1 % of the respondents thinks that responsibilities are positively related with the motivation of employees

## 5. Conclusion

Employees want to be recognized for their work and they want to be appreciated. It usually doesn't take an extra effort to achieve satisfied employees. This research aims to emphasize the importance of the individual needs of the employees. There are many ways in which job satisfaction is defined. This is complex topic, and many theorists and authors gave their contribution to further develop and broad this area. To research this topic, we need to adequately explore all influencing factors which are related to the job satisfaction. Those include environmental factors psychological factors and individual factors.

This research was directed in order to contribute to the examination of the attitudes of the employees towards the reward systems of the organization. Particularly, it will help the organizations to explore which of the reward systems is most favored and what different benefits motivate the employees.

Well composed and useful reward system is an effective approach to build employee work motivation. This research embarks to investigate obviously what factors exist in ascribing the right reward structure to an individual representative or group. Reward management is both perplexing and involved and exceptionally exposed to outside impacts, for example, financial situations, culture and individual worker inclinations and recognition. Further researches would include developing new model which will include analyzing of motivation regarding the sociographic and demographic environments. Also, what should be considered in the future are cultural differences and its impact on the motivation of employees.

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# Discovering and Reviewing the Internal and External Drivers of Innovation and Localized Cultivation of an Innovation Culture in the Public Sector: The Case of Kosovo

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**Abstract**

This research looks at the main drivers of public sector innovation and localized cultivation of an innovation culture in the public sector of Kosovo. This study is exploratory and a mixed methodology is used, while the findings are compared with the most recent literature in the field of public sector innovation. Findings clearly indicate that the introduction of new laws and regulations have been found to be the most prevalent driver of innovation in the public sector of Kosovo. In addition to that, mandated increase/decrease in the organization's budget has had an important role in the overall innovation processes. The public sector of Kosovo has made some progress in cultivating an innovation culture. Public sector managers support experimentation of new ideas and take an active role in the development and implementation of innovations. However, interestingly enough the introduction of e-government or online services has not been of paramount importance in driving innovation in the public sector of Kosovo. Moreover, the public sector of Kosovo has failed to engage service users in the designing, planning and evaluating new or improved services, which is an element that the literature supports. In addition to the findings, this research enriches and extends the current knowledge of innovation in the public sector domain. Finally, it is a unique contribution to Kosovo's academics and practitioners.

**Keywords:** public sector innovation, drivers of public sector innovation, innovation culture, Kosovo.

## 1. Introduction

### 1.1. Introduction to public sector innovation

Innovation in the public sector domain has gained great interest from both professionals and scholars (Hartley, 2005; Moore, 2005; Albury, 2005). Financial challenges and growing service needs in the public sector are some of the reasons that have fostered the need to study innovation in the public sector domain (Townsend, 2013; Kallio, 2013; Bason, 2013).

The importance of innovation lies upon the change in the overall efficiency, effectiveness and responsiveness of governments and public service organizations. Moreover, innovations in the public sector domain can range from organizational improvements to the use of new technologies, it can be instigated by external and internal parties, and it can occur as a result of top-down, sideways and bottom-up approaches (Carstensen, Bason, 2012).

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### 1.2. Definition of the main problem and significance

European governments are acknowledging the prerequisite for innovation in the paradigm of the public sector, they require more productivity with less resources, and continuously promote to foster the creation of more public values and better response to new challenges. Governments worldwide are under pressure to reduce their costs and become more efficient due to the lack of resources, while demand for public services is increasing. Thus, in this paper, the main drivers of innovation and the cultivation of an innovation culture in the public sector of Kosovo will be studied.

### 1.3. Literature research gaps

Financial challenges and growing service needs in the public sector have increased the need for public managers to find new alternatives to achieving their work goals, which in default has led to study innovation in the public sector domain (Townsend, 2013; Kallio, 2013; Bason, 2013).

In the era we are living, economic growth is uncertain, public services must be produced with fewer resources, but retain the quality, whereby public stakeholders face challenges in developing, producing and diffusing innovation (Albury, 2005; Hartley, 2005). In the public sector domain, many innovation topics remain unfamiliar (Kallio, 2013), for instance: Innovation targets and the radicalness of innovation outcomes have remained under researched (Bessant, Maher, 2009; Albury, 2005; Hartley, 2005); processes of producing innovation and the integration of users in these processes have been rarely studied (Sundbo and Toivonen, 2011; Hennala et al., 2012; Brand, 2005). The literature is limited regarding public sector innovation, in particular concerning the public sector in transition economies (Batalli, 2011).

In this paper, the factors that driver innovation in the public sector of Kosovo and the localized cultivation of an innovation culture are thoroughly researched and discussed.

### 1.4. Research query and research objectives

Innovation is crucial in today's environment. It is not of importance only to organizations that continuously compete; rather, it is of great importance to economies at large (Kallio et al., 2013). In addition, innovation not only increases the capabilities of private organizations to remain competitive in the global market, nevertheless, it is of prime importance to today's public sector excessively (Goyal and Pitt, 2007; Blahus, 2012; Bason et al., 2013).

It is an indispensable need to address the issue of public sector innovation, especially in transitional countries like Kosovo. Supporting innovation in the public sector enables achieving economic advantages, poverty reduction, harmony and institutional stability (Batalli, 2011). In this study, however, the focus is on the drivers/enablers of public sector innovation in transitional countries and the adoption/cultivation of an innovation culture, with focus on the case of Kosovo.

The research objectives for analyzing the query are:

- O1. Discover and review the main internal and external drivers of innovation in the public sector of Kosovo.
- O2. Evaluate the localized cultivation of an innovation culture in the public sector of Kosovo
- O3. Compare and contrast the drivers of innovation and localized cultivation of an innovation culture in the public sector of Kosovo, with the existing literature.

## 2. Literature review

Innovation in the public sector domain has gained great interest from both professionals and scholars (Hartley, 2005; Moore, 2005; Albury, 2005). Financial challenges and growing service needs in the public sector are some of the reasons that have fostered the need to study innovation in the public sector domain (Townsend, 2013; Kallio, 2013; Bason, 2013).

Therefore, based on the topic of study, it is vital and compulsory to discuss the key drivers of innovation and localized cultivation of an innovation culture. It is necessary to explore the academic literature on the factors that have the most significance in creating an innovation culture in the public sector. This is justified by the fact that managers in the public sector, especially those who are directly in touch with innovation have to elaborately know what makes innovation possible. In order to know how to create an institutional culture that drives innovation, public sector managers and public policy analysts have to study and understand the key factors that drive innovation and the factors that cultivate an innovation culture in the public sector (Ariss, Deilami, 2012).

Public sector innovation researchers have identified eight features that contribute to the development and adoption of a culture of innovation. The eight defining features are:

1. Support from the top;
2. Rewards and awards;
3. Resources (including time, space, and money);
4. Diversity of staff;
5. Learning from the outside;
6. Innovation is everyone's responsibility;
7. Experiment and evaluation;
8. Use of teams (Albury, 2005; Hartley, 2005; Moore, 2005; Borins, 2001).

### 2.1. Support from the top

Research has entitled the prerequisite of organizations to be more flexible, adaptive, and innovative in meeting the changing demands of today's environment (Sarros et al., 2008). The change within the organization must come from an individual or group, however top-managements support to change plays a crucial role in achieving a successful alteration (Fernandez, Rainey, 2006).

Researchers agree that support from the top, in either the political or public sector domain, is vital to successfully developing a culture of innovation (Adams et al., 2006; Gadot et al., 2005). It is a fact that the top management is responsible for whether an organization becomes more innovative or not. Damanpour and Schneider (2006) state that top managers are those who influence the outcomes of an organization, the climate for innovation is a direct result of top manager's commitment. Therefore, an innovation culture is successfully achieved through top management's commitment and by supporting and positively influencing their employees, by giving them space and time to brainstorm with colleagues and as a result foster creativity and innovation (Lin, 2007). Top management's attitude, positively affects all aspects of innovation adoption; their support is a breaking stone in adopting an innovation culture within the public sector (Sarros et al., 2008).

### 2.2. Rewards and awards

The importance of rewards and awards in the enrichment of innovation in the public and private sector is highlighted by a pool of authors (Kopelman et al., 2011; Rosenblatt, 2011; Hood et al., 2006). When comparing the two sectors, we come to know that in the private sector, rewards such as: financial incentives, promotion opportunities and organizational prestige are the factors that generate successful innovation, whereas in the public sector; recognition and relations with the supervisor and with peers were significant predictors of a public employee psychological empowerment (Fernandez, Moldogaziev, 2011; Gkorezis, Petridou, 2012). Rosenblat (2011) notes that recognition, awards and top management support play a decisive role in encouraging employees to be innovative. The difference between public sector employees and private sector employees is that, private-sector employees focus more on extrinsic rewards in the form of higher pay, status and prestige, whereas people who work in the public sector are more service-oriented and their behaviors are consistent with the public interest (Brewer et al., 2000). Kopelman et al. (2011) have stated that recognition and reward intervention improve service excellence in the public sector.

A predominant factor of successful innovation is the availability of resources for innovation. Joyce (2007) states that small innovation may precede even with existing funds while large-scale projects need new funding. Murray et al. (2010) confirms that the public sector often lacks on innovation enablers in terms of money, people and processes that are easy to be found in the private sector. The public sector is by nature centralized, episodic and structurally limited. Furthermore, due to year-on-year budgets with no possibilities to go for larger-term investments, public managers and personnel are forced to be short-term thinkers (Bason, 2011).

### 2.3. Diversity of Staff

The prevalence of diversity within an organization is critical to innovation. Mulgan and Albury (2003) state that innovations are the consequence of the ability of employees to see things differently. Authors agree that people with different backgrounds who work together are more likely to be

innovative, as well as diversity helps to enhance creativity, which is an instrument that paves new ideas to the surface (Yang, Konrad, 2011; Albury, 2005). For an organization to be successful, job descriptions should be defined less narrowly, by so creating a pool of candidates of diverse backgrounds to apply for a job, which as a result will give the selected individuals the freedom to consider a variety of approaches for the tasks they encounter (Armstrong et al., 2010). Harrison and Humphrey (2010) approve that staff diversity is crucial to the implementation of new ideas in an organization.

### 2.4. Innovation is everyone's responsibility

Innovations are the responsibility of employees throughout the organization. Hartley (2005) states that "innovation is as much bottom-up and sideways-in process as a top-down one", meaning that the traditional forms of sharing information, decision making, etc. are archaic and not appropriate for developing an innovation culture within the organization, especially in today's environment. A culture of innovation is when all employees share the same responsibility for the scope of innovation, they have to take the initiative to innovate, by generating ideas, exploring opportunities, identifying performance gaps or producing solutions to problems (Jong, Hartog, 2007). It is proven that 50 percent of innovations within the public sector come from mid-level managers and front-line staff. Frontline staff and mid-level managers shape employees attitude toward work, and thus influence their productivity and shape the entire organization (Gobble, 2012; Janssen, 2005). However, achieving successful innovations within the public sector, top-managements support for change often requires top-level career civil servants, which in addition give us the means to believe that recruiting young and new employees who may have a better grasp of technology and cutting-edge issues is essential for successful innovations (Esterhuizen et al., 2012; Fernandez and Rainey, 2006; Albury, 2005; Borins, 2001).

Organizations need to understand in depth the organizational processes of innovation development, which come through 'top-down policy' development, through 'bottom-up' innovation, which comprise of the activities of managers and staff in organizations, and through 'lateral' innovations, which means adopting good practices (Hartley, 2005).

### 2.5. Experiment and evaluation

Researchers pointed out that the public sector has an innovation deficit. This innovation deficit is explained as bias against risk and uncertainty, thus explaining why governments find service innovation so difficult. Public entities consider as waste the resources spend on experimentation, thus they struggle to minimize the "misuse" of public resources (Potts, 2009). Evaluations and experimentations are viewed as hazardous actions, although it is proven that trial and error are essential components to the innovation process (Borins, 2001). However, organizations have to create space and provide the necessary tools to their employees to experiment; it is essential for initiating innovation. Experimentation in the context of the public sector is about taking a calculated risk, and evaluations is about testing the results and use the finding to "expand, modify, or scrap the innovation" (Borins, 2001).

Authors have divided innovation evaluation in internal and external evaluation. The internal evaluation is about learning from successes as well as from failures (Joyce, 2007; Hartley, 2005; Borins, 2001), whereas external evaluation is related to the process of generating ideas. Organizations are encouraged to benchmark themselves against a best practice (Mulgan, Albury, 2003). Experimentation and evaluation are both important for innovative organizations oriented to maximize successful ideas over unsuccessful ideas (Moore, 2005).

The above building blocks serve as bases for cultivating a culture of innovation within the public sector. Support from the top is considered the catalyst of innovation. Rewards and awards are incentives, which motivate employees to consider new ways of doing things. A diverse staff brings new perspectives. Experimentation and evaluation provide the tools for testing new possible innovations. It is important to study the enablers of innovation in order to create a culture of innovation within the public sector domain.

## 3. Methodology

### 3.1. Mixed methods

Mixed method is a convergence of quantitative and qualitative methods (Driscoll et al., 2007). Complex phenomena such as organizational processes, change processes over time are difficult

to measure quantitatively (Curry et al., 2009). Quantitative methods are viewed as descriptive, because correlations between variables alone cannot drive to uncover the causes that generate the actual event that is being observed (Zachariadis et al., 2013). Researchers have described, quantitative methods as unsatisfactory and problematic. In contracts to the quantitative approach, qualitative methods are more capable of describing a phenomenon, in identifying interaction between complex mechanisms (Volkoff et al., 2007). However, findings through the use of qualitative methods may be unique to few people included in the research study; the results are easily influenced by the researcher's personal biases (Johnson, Onwuegbuzie, 2004). As a result, mixed methodology brings together the strengths of both quantitative and qualitative approaches, by generating more complete data, deeper understanding of the phenomenon, although it is time-consuming and costly (Johnson, Onwuegbuzie, 2004).

### 3.2. Sample

In order to achieve a better understanding of the main drivers/enablers of innovation in the public sector of Kosovo, most of the institutions from which consists the public sector are included in the sample. The study is spread across the public sector, which includes the central government, the local government and public corporations. Due to the potential of the study, we have focused our research in gathering information from the middle and top-level management employees, who are actively involved in decision making.

### 3.3. Sample structure and size

The structure of the sample includes local governments, central governments, and public corporations. These institutions are taken as a whole in the study. The institutions of study conceive general government activities or finance, education, social services, health and other areas. The questionnaire is distributed to 52 public sector managers. Regarding the qualitative approach, we have successfully completed 8 interviews in accordance with the criteria set to achieve a balance between the methods and to achieve a more comprehensive view of the findings.

**Table 1.** Participation of public institutions, according to activities

| Activities | Distribution |
|---|---|
| General government activities or finance | 15.40 % |
| Education | 15.40 % |
| Social services | 25 % |
| Health | 5.80 % |
| Other | 34.60 % |
| [Refusal] | 3.80 % |
| TOTAL | 100 % |

### 3.4. Targeted personnel and geographic sample

The targeted personnel on the topic of research are public sector managers, who are actively involved in decision-making, which affect the innovation processes. The managerial level affects all aspects of innovation in the public sector (Sarros et al., 2008). For resulting to concise and definite conclusions, both research methods, the quantitative and qualitative instruments are targeted to the managerial level employees for data collection. The questionnaires are delivered to the middle-level public sector managers (head of department), or in smaller organizations where such functions do not exist, supervisor or project managers are the target group, and interviews with senior managers or general managers responsible for strategic-decision-making are conducted.

### 3.5. Draft of data collection questioning routes

For the purpose of achieving the objectives set by the researcher, two methods of collecting primary data are considered. In principle, there is a structured survey questionnaire, the "Innobarometer 2010" developed by "The Gallup Organization", and an open-ended questionnaire for interviews conceived through the use of the questionnaire mentioned above.

### 3.6. Quantitative research instrument

The quantitative instrument, which is used in this study, is the "Innobarometer 2010", developed by "The Gallup Organization", and used for studying the innovation strategies of the European public administration sector in response to changing constraints and opportunities. The Innobarometer brings the attention of the public on a regular basis, by a series of publications regarding innovation (Onisor, 2012). Furthermore, the development of public services is now a priority on the agendas of all policies on the European level. The European Commission proposed the use of "European Public Sector Innovation Scoreboard", which instrument is achieved through the use of the "Innobarometer 2010", which is devoted to an analytical study of innovation in the public administration.

This questionnaire was the most appropriate one since it is related directly with the aim of the study and research objectives. Some minor changes have been made in order to adapt it to the specific objectives of the study.

Main sections of the quantitative questionnaire include:

- Demographics and organization structure – general information about the participant's organization is marked as D questions, which are (D1, D2, D3).
- And (Q1 and Q2) will cover the drivers of public sector innovation and localized cultivation of an innovation culture, which are appropriate for accommodating objective O1 and O2.

### 3.7. Qualitative research instrument

The qualitative research instrument is an open-ended questionnaire for deriving information from senior managers of the public sector, which questionnaire is in line with the topic of research and with the objectives set by the researcher. The qualitative research instrument is derived from the original questionnaire used for quantitative data collection. The interview section or qualitative research questionnaire is comprised of a total of six questions, which relate to the understanding of the key drivers of public sector innovation and localized cultivation of an innovation culture. The outline is comprised of four questions, which are more focused, while the last three questions, give the space for participants to express their views freely on innovation within their respected institution and workplace.

### 3.8. Sampling procedure and data collection

Due to limited information and lack of public data availability, random sampling for quantitative analysis was questionable; therefore our sample is based on convenient factors (contact details) and snowball sampling strategy (networks) to find participants.

The data of employees working in the public sector were obtained from the Kosovo Agency of Statistics. However, there is not any significant statistic, which indicates the exact number of employees working in different levels of positions. The data were used to diversify our study approach. Names of each institution, telephone numbers and emails of senior management were obtained using public data available. This has served as a basis to create a list of general managers who work in the public sector. Using these data, and through network, we created a list of managers working in the middle level of management in the public sector to whom we distributed the questionnaire.

### 3.9. Data analysis methods

Data collected from the questionnaires are analyzed by using Statistical Package for Social Sciences (SPSS). Due to the topic of study, the analysis is mainly descriptive which relates to other studies done in this field. Then, qualitative data derived from the interviews are analyzed through a thematic analysis. Based on the methodological approach, data will be analyzed through comparison between both types of measurement tools; the quantitative analysis offers a statistical view while the qualitative analysis provides a more exploratory understanding of the topic under research.

## 4. Data Analysis and Findings

This section looks at internal and external drivers of innovations and localized cultivation of an innovation culture in the public sector.

### 4.1. Drivers of innovation

The single most important driver of innovation was the introduction of new laws and regulations. (35 %) of respondents indicated that new laws and regulations were very important factors in fostering innovation. New policy priorities were important innovation drivers for (67 %) of respondents, while only (29 %) said that such priorities were not important. The introduction of e-government or other online services played an innovative role, (58 %) of respondents indicated that they implemented new solutions related to mandated implementation of the online service provision. A mandated increase in the organization's budget was also a very important factor in fostering innovation (27 %). Furthermore, (27 %) of respondents said that a decrease in the organization's budget did play a role in fostering innovation.

Regarding the qualitative data derived from interviews, it can be said that former laws and regulations were essential in driving innovation. Interviewee P4 states: *"The main driver of innovation in my institution is the inheritance of problems, we had to face these problems with innovative actions, by introducing new regulations"*. While interviewee P1 and P5 consider *"financial constraints"* as an important factor in driving innovation. They consider that institutions are forced to become more effective and work more efficiently when they encounter financial constraints. The other five interviewees mentioned that only when they face problems, they tend to be innovative; they also stated that new laws and regulations forced them somehow to be more innovative in their working environment. So, in general, the interviewees consider the inheritance of problems, new laws – regulations and financial constraints to be main drivers of innovation.

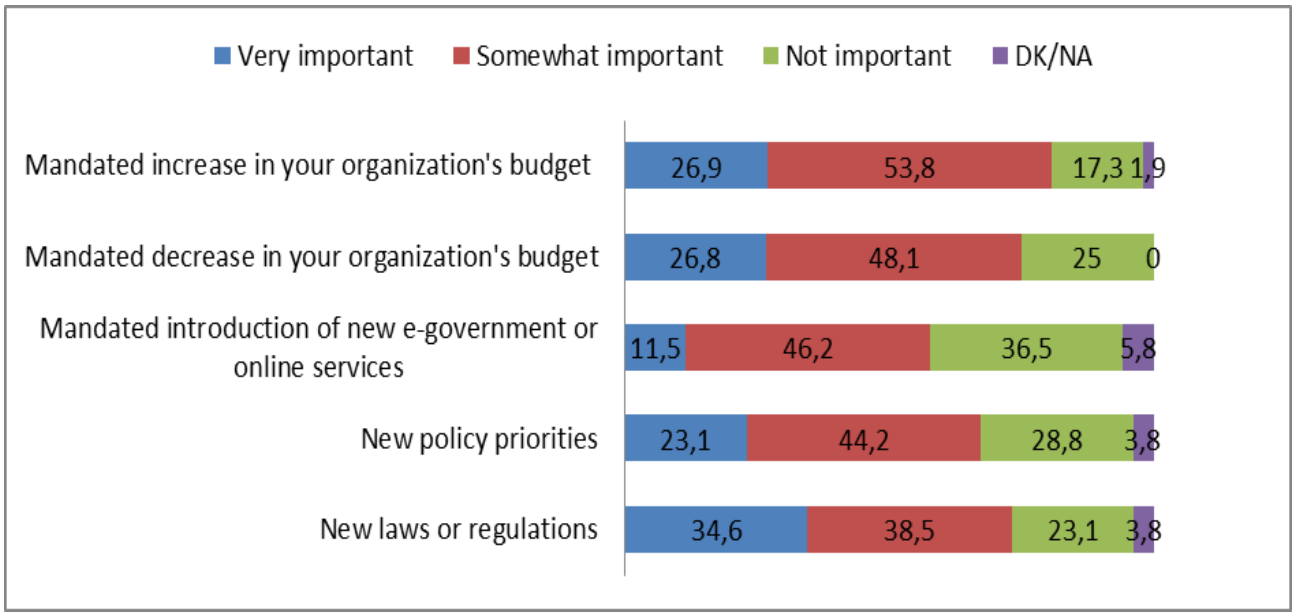


**Fig. 1.** Importance of various political or legislative factors in driving the development and introduction of innovations

Regarding the scope of activities, new laws and policy priorities were most likely to drive innovation in local level public institutions (new laws: 45 % and policy priorities: 31 %), while in the regional and national level, the introduction of new laws and policy priorities did not play and excessive role in fostering innovation (41 % and 18 %). Concerning the sectorial area, those who work on general government activities or finance and those who provide social services were more likely to implement innovations due to new laws (75 % of respondents in the sector of general activities or finance and 33 % of respondents in the sector of social services said that new laws were very important in fostering innovation).

**Table 7.** Very important' drivers of innovation, % by organizational background

| | Mandated decrease in your organization 's budget | Mandated increase in your organization 's budget | New laws or regulations | New policy priorities | Mandated introduction of new e-government or online services |
|---|---|---|---|---|---|
| | | | | | |
| **Size** | | | | | |
| Less than 10 employees | 20 | 20 | 0 | 0 | 0 |
| 10-49 employees | 19 | 28.6 | 47.6 | 28.6 | 0 |
| 50-99 employees | 75 | 50 | 12.5 | 25 | 12.5 |
| 100-249 employees | 33 | 22.2 | 22.2 | 22.2 | 22.2 |
| 250-499 employees | 0 | 16.7 | 66.7 | 33.3 | 0 |
| 500-999 employees | 0 | 0 | 50 | 0 | 0 |
| 1000 or more | 0 | 0 | 0 | 0 | 0 |
| **Geographic areas** | | | | | |
| Local | 31 | 34.5 | 44.8 | 31 | 17.2 |
| Regional | 17.6 | 17.6 | 23.5 | 17.6 | 5.9 |
| National | 33.3 | 16.7 | 16.7 | 0 | 0 |
| **Sector** | | | | | |
| General gov't activities | 25 | 25 | 75 | 50 | 37.5 |
| Education | 0 | 0 | 25 | 25 | 12.5 |
| Health | 66.7 | 15.4 | 30.8 | 15.4 | 0 |
| Social services | 7.7 | 66.7 | 33.3 | 33.3 | 33.3 |
| Other | 38.9 | 38.9 | 22.2 | 11.1 | 5.6 |

### 4.2. Innovation culture

The public sector innovation culture is a top-down approach of innovation (managers take an active role in developing and implementing innovations: 31 %), rather than a bottom-up innovation practice (staff has the necessary incentives to think of new ideas and take part in their development: 20 %). Innovations are partially evaluated after completion (14 %) and users are partially involved in designing or planning the implementation of new or improved services (54 % respondents indicated that).

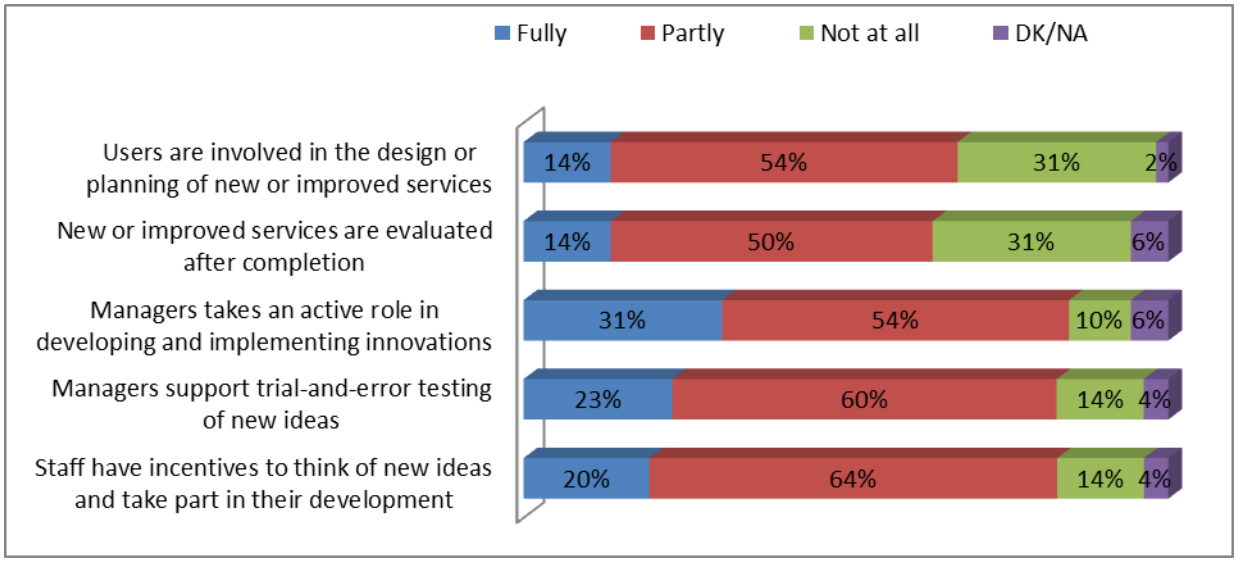

**Fig. 2.** Organisational attributes

Regarding the qualitative data analysis, interviewee P2 states that: *"Employees have the space to give ideas which can be incorporated in advancing the working environment, their ideas are welcomed to us as managers."* However, when the final decision is taken about implementing or not an innovative idea, interviewees with consensus indicate that it is the management, which has the last word, and staff has no direct authority in decision-making. Concerning the evaluation and experimenting of innovative ideas, interviewee P4 states as follows: *"We lack on financial resources to experiment new ideas, although when funds exist, we foremost participate actively in testing new ideas."* Concerning citizen participation in designing or planning new or improved services, interviewee P3 states: *"Citizens have the tools to proclaim their concerns and give recommendations, however, these recommendations are rarely incorporated in the decision making process."* Thus, when analyzing the information given from the eight interviewees in total, findings indicate that it is the management which takes the final decision and the staff is not motivated or incorporated in the decision making process. Another consensus among the interviewees was about the incorporation of recommendations coming from citizens, which recommendations are rarely taken in consideration.

## 5. Discussion and Findings

### 5.1. Drivers of innovation

Findings suggest that the most important driver of innovation in Kosovo's public sector was the introduction of new laws and regulations. This finding suggests that Kosovo's public sector has become more aware of the importance that laws and regulation have on innovation. However, an interesting fact found through data analysis is that the mandated introduction of e-government or online services has not been very important in driving innovation. Although, the literature suggests that the current condition of the public sector has to go beyond the e-government paradigm, and to accept open innovation, which model considers external collaboration and innovation between citizens and public administration (Munksgaard et al., 2012). Other findings are that the mandated increase/decrease in the organization's budget have played an innovative role. This is interesting, because the literature suggests that resources are essential to innovation, but when there is lack of resources, it is the role of a leader that motivates employees to be innovative (Weiss et al., 2011).

### 5.2. Innovation culture

The public sector of Kosovo has made some progress in adopting an innovation culture. Data analysis shows that managers do support experimentation of new ideas; they also take an active role in developing and implementing innovations. Experimentation is a very important factor in the innovation process; it is about taking a calculated risk (Borins, 2001). Moreover, managers take an active role in developing and implementing innovations, which is considered a very important factor in the innovation process overall (Sarros et al., 2008).

However, data analysis also indicates that the public sector has shown independence in engaging users in the designing or planning of new or improved services, also in evaluating the new or improved services after completion.

Regarding the literature, evaluation comes after experimentation, and it is important in testing the results and using the findings to expand or modify the final outcome (Moore, 2005; Borins, 2001). In addition to that, the most recent literature consistently indicates that the public sector has to engage citizens actively in designing and planning of new services (Hasu et al., 2011; Sundbo and Toivonen, 2011).

## 6. Conclusion

Concerning the drivers of innovation in Kosovo's public sector, the most important drivers found were the introduction of new laws and regulations. Regarding the introduction of online services, they have not been of paramount importance in driving innovation. Nonetheless, mandated increase and decrease in the budget have both played a role in the overall innovation processes.

The public sector of Kosovo has made some progress in developing an innovation culture. Managers do support experimentation of new ideas and do take an active role in developing and implementing innovations. However, they have failed to consider the most important factor in developing an innovation culture, which is user integration and participation in designing and planning of new or improved services. Therefore, public sector managers in Kosovo have to work on understanding the importance that the integration of service users has in cultivating an innovation culture.

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# Exploring the Micro Foundations of Absorptive Capacity in Knowledge Transfer Projects: an Operations Management Perspective

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**Abstract**

Planning and executing effective knowledge transfer with external organizations is increasingly relevant for most companies. However its complexity determines high failure rates. By taking the perspective of the recipient organization in knowledge transfer projects, this paper explores the project management & organization antecedents underlying the development of a firm-level capacity in absorbing external knowledge. A conceptual framework is developed and illustrated through a case study of a multinational energy company transferring technical and organizational knowledge from its English to its Swedish subsidiary. Combining evidence from the case study and findings from prior studies, research propositions are developed.

**Keywords:** knowledge transfer; absorptive capacity, project management, antecedents of capacity, ambidexterity, planning.

## 1. Introduction

Planning and executing effective knowledge transfer with external organizations is increasingly relevant for most companies (Argote, 1999, Kogut and Zander, 1992). Benefits from successful knowledge transfer include reduction of research and development (R&D) costs and risks, enhanced proficiency and speed in new product development, leverage of multidisciplinary technologies and know-how that allow for flexible manufacturing strategies. The world largest consumer goods company Procter & Gamble, for instance, has recently launched a new strategy named Connect & Develop, calling for 50 percent of all new products incorporating externally acquired technological knowledge (Huston, Sakkab, 2006).

Notwithstanding its increased relevance in firms' operations, knowledge transfer is a highly complex activity. According to a field study, 10 out of 32 knowledge transfer projects failed mainly because of inadequate pre-transfer planning and post-transfer control (Galbraith, 1990). In the light of this complexity, there is a need for appropriate management and organization of knowledge transfer between units, both at the donor and at the recipient side (Easterby-Smith et al., 2008, Argote et al., 2003). In this paper we take the perspective of the recipient side and we draw on the theoretical concept of absorptive capacity.

Cohen and Levinthal, 1990 define absorptive capacity as the ability to recognize the value of new knowledge, assimilate it and apply it for commercial ends. According to the authors, absorptive capacity is mainly built upon previous investments in internal R&D. Absorptive capacity of the receiver has a key role for the successful outcome of knowledge transfer (Tsai, 2001; Gupta,

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Govindarajan, 2000). A review of the literature on absorptive capacity (Lewin et al., 2011, Volberda et al., 2010) has revealed two recurrent characteristics of previous studies: first, they focus on the firm level of analysis, proxying absorptive capacity with aggregate variables like R&D expenditures or size of patent portfolios e.g., (Mowery et al., 1996); second, they take a strategic management perspective as they explore the strategic mechanisms to develop absorptive capacity and its effect on competitive advantage e.g., (Van Den Bosch et al., 1999). Therefore, the problem with prior research is that it fails to capture the micro dynamics of absorptive capacity, which builds on the knowledge and skills of individuals, on their interaction and on the micro-activities executed to transfer knowledge in well-defined projects.

In the light of the above limitation, the purpose of this paper is study absorptive capacity at a micro and operational level. More specifically, the paper aims to bring absorptive capacity into the realm of operations management by exploring the micro foundations of absorptive capacity at the project level, which has been almost completely neglected by prior research (Jansen et al., 2005). This, in our opinion, represents an interesting and useful research effort for the following reasons. First, knowledge transfer between units usually occurs through the execution of day-to-day operational activities that are part of well-defined projects in terms of start point and end state, goals and resource allocation; second, real world observation shows that managers attempt to foster knowledge transfer by making use of operations and project management tools; third, knowledge transfer heavily builds on interactions between project team members, in whose minds resides predominantly tacit knowledge.

To achieve its goals, the paper develops a conceptual framework, which aims to identify the project management & organization antecedents underlying the development of a firm-level capacity in absorbing external knowledge. The model is then illustrated through a case study of a multinational energy company, which is active in transferring technological knowledge across its local subsidiaries. Combining evidence from the case study and results of prior studies on technology management, research propositions are developed.

## 2. Literature review

Absorptive capacity (AC) has recently emerged as a central theme in strategy and organization research (Lane et al., 2001). AC-related issues have been discussed in several streams of research, e.g. economics and management of innovation, business performance, knowledge transfer and organizational learning (Tsai, 2001; Lane et al., 2001; Gupta, Govindarajan, 2000).

Seminal papers have conceptualized the multidimensional nature of AC (Cohen, Levinthal, 1990; Zahra, George, 2002). In their renowned article, (Cohen and Levinthal, 1990) distinguish the recognition, assimilation and exploitation components of absorptive capacity and advance that AC is not resident in any single individual but consist of links across a mosaic of individuals' absorptive capacities. Later, (Zahra, George, 2002) conceptualize AC as a dynamic ability characterized by two dimensions. The former, potential AC, captures the firm ability and effort to identify external knowledge useful for the firm and to assimilate it inside its routines. The latter, realized AC, consists of transforming and exploiting of newly acquired knowledge. In particular, key activities of realized AC encompass adaptation, combination of new and existing knowledge in the firm and further incorporation of new knowledge into ongoing operations (Zahra, George, 2002).

In reviewing AC literature we found two gaps. First, much of the literature has tried to capture AC through different firm level variables using proxies such as R&D expenditure, number of employee in R&D department (Meeus et al., 2001; Tsai, 2001) or the size of patent portfolio (Ahuja, Katila, 2001; Mowery et al., 1996). The rationale behind these choices is that firms with a larger and richer endowment of knowledge resources have developed appropriate routines and processes that facilitate the acquisition and the use of knowledge from external sources, thus resulting in higher levels of AC (Mowery et al., 1996, Rao and Drazin, 2002).

Second, most studies have focused on the competitive benefits of AC, i.e. on the impact of AC on other organizational and financial performance. For instance, AC has been found to enhance the learning ability of a firm (Lane, Lubatkin, 1998) and to improve the speed and frequency of innovation, as well as its incremental nature(Helfat, 1997). Furthermore, (Lane et al., 2001) show that through AC, firms apply new knowledge to commercial ends and thus achieve superior financial performance. By assessing the role of AC as a source of competitive advantage, prior research has mostly adopted a strategic management perspective to AC (Mowery et al., 1996; Lyles

and Salk, 1996). Conversely, an operations management approach to AC is lacking: only few studies have analyzed the managerial antecedents of AC, i.e. those managerial and organizational practices that underlie the development of the ability to absorb and exploit external knowledge. The most notable of these is the paper by (Jansen et al., 2005), which analyzes the differing effects of managerial antecedents on the different dimensions of AC, potential and realized. The authors show that coordination mechanisms like cross-functional interfaces and job rotation are positively linked to potential AC while more systematization practices, e.g., formalization, as well as socialization practices, e.g., connectedness, enhances realized AC. However, no empirical evidence is provided about the micro foundations of AC at the project level, notwithstanding the fact that knowledge transfer occur through the execution of day-to-day operational activities, which are part of well-defined projects, and AC is built through interactions between project team members and the combination of their tacit knowledge.

To overcome this limitation in prior research, this paper takes a project level perspective and search for managerial micro foundations of AC in the realm of operations and project management. To this aim, it develops a conceptual framework consisting of two major building blocks: project management antecedents and absorptive capacity, distinguished between potential and realized AC. The framework will be presented in the next section.

**Conceptual framework**

Figure 1 shows the conceptual framework of the paper. The rationale behind the framework is that appropriate management of the different aspects of a knowledge transfer project enhances the ability to identify, assimilate, transform and exploit new external knowledge. Consistent with (Zahra and George, 2002) conceptualization, AC is thus intended as a dynamic capability which is built and enhanced through managerial actions that influence individual learning as well as redefine and deploy organization's knowledge-based assets (Floyd and Lane, 2000, Argote et al., 2003).

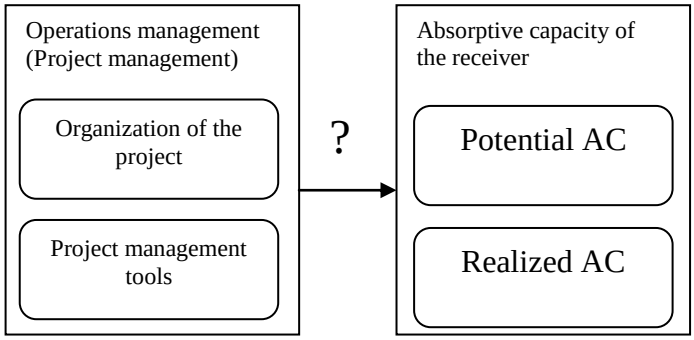


**Fig. 1.** Framework for studying project management practices as antecedents of AC

The dependent construct is AC, divided into its potential and realized components (Zahra, George, 2002). Potential AC consists of acquisition and assimilation of external knowledge and realized AC consists of transformation and exploitation of assimilated knowledge. Though being closely related, potential and realized AC are different in nature: the former is mostly intended to enrich a firm's knowledge base through outside-in acquisition of new external knowledge and its relation with internal existing one, whereas the latter is concerned with turning the knowledge potential into commercialized products and ultimately profits. Through realized AC, firms can effectively use assimilated knowledge in structured way, by incorporating it into existing processes and routines of the firm.

Potential AC and realized AC have complementary roles and both have to be in place for AC to exist in a firm. Firms focusing only in acquiring new knowledge will increase their knowledge base but without gaining benefits from its exploitation. On the contrary, firms that focus only on the realized part of AC, run the risk of lacking competence and technologies in the long term (Ahuja, Lampert, 2001).

The independent block includes the operations and project management micro foundations, i.e. the decisions and activities performed by the recipient organization in terms of knowledge transfer project planning, execution, monitoring and organization. We divide project management

antecedents in two dimensions: project organization and project managerial tools. Both are deemed to be the most influential instruments that project managers use to manage and execute the project. The organization of the project includes decisions regarding the organizational structure of the project, from pure functional to pure project forms (Köster, 2010), and the mechanisms through which the project is related to the existing organization of a firm. Depending on the organizational solution of the project, the firm signals whether it is the functions that contribute to the knowledge absorption or the knowledge transfer project itself, that dominate the way the transfer activity is managed and executed (Meredith, Mantel, 2010).

The project management tools employed to manage and execute a project can be divided into planning and controlling. Planning includes identifying the activities needed to accomplish the desired outcome, estimating time schedule and allocating resources within given constraints and ascertaining the relationships and dependencies between activities within the project. Basically, to do planning is to predict and foresee what should be done and when (Meredith, Mantel, 2010).

Controlling involves monitoring the project in order to check its progress, measuring project performance against its plan and, in case of need, take necessary actions to minimize the gap (Köster, 2010). Controlling is the act of dealing with inconsistencies between plan and reality. Evaluating why these inconsistencies have occurred is also part of the controlling and the evaluation can lead to re-planning or termination of some activities (Meredith, Mantel, 2010)

## 3. Methodology

Consistent with the exploratory nature of this study, our empirical analysis is based on a single case study methodology. We report and discuss the experience in a deliberate and organized knowledge transfer project of a firm that we have investigated in the scope of our research. Of course major limitations of a single case study method are validity and reliability (Yin, 2008). However, this methodology gives us the opportunity to gain an in-depth understanding of a complex phenomenon under particularly insightful circumstances, allowing us to identify the still elusive relationships between project management antecedents and AC.

The case study has an illustrative purpose. As (Siggelkow, 2007) argues, this use of the case study allows the reader to see a practical example of the constructs in the theoretical framework, of their relationships, and to understand how the conceptual argument might be applied to other empirical settings. In order to pursue this illustrative goal, the selected firm must be “special”, i.e. must provide empirical insights that other cases would not provide (Siggelkow, 2007).

Therefore we have carefully chosen a case where we have had full access in terms of meetings and documents and we had the possibility to interview project members without restrictions. The case at issue is a knowledge transfer project where a multinational company operating in energy, health, building and industrial sectors divested a foreign subsidiary in England and aimed at transferring relevant technological and organizational knowledge back to the division’s headquarters in Sweden. Specifically, the knowledge to be transferred, regarded information and competencies about how to design and manufacture small gas turbines for industrial power generation. The project lasted for 20 months, during which we have observed and analyzed the project longitudinally. This has allowed us to track cause and effect dynamics between project management antecedents and the dimensions of AC in real time (Leonard-Barton, 1990).

The recipient organization was organized in a project team with members covering disciplines such as engineering (sub-divided in electrical and mechanical), purchasing, quality assessment, logistics, documentation, assembling and manufacturing. These disciplines were the criteria used to divide the main project into constituting sub-projects. All sub-project managers were reporting to the head project manager whose responsibility was to coordinate the transfer of technical and organizational knowledge from the English and to transform it into Swedish headquarters’ existing routines.

Information and data were collected through three sources: semi-structured interviews, participation in project meetings and internal documentation. It is important to point out that one of the authors of this paper spent every second week in the receiving organization with full access to the project documentation, meetings and team members for questions and clarification. We interviewed all members in the project in order to get perspectives from project managerial side, sub-project managerial side and as well from engineers. This multi-perspective approach is beneficial to the understanding of the relation between project management and AC, given the multidisciplinary

nature of the project, and helped reduce the risk of retrospective and personal interpretation biases, which might undermine the construct validity of the case study research (Yin, 2008).

Semi-structured interviews lasted around one hour and were documented through notes. Other spontaneous informal interviews lasted on average 15 minutes and used to reveal details and small fractions behind relations. After gathering initial understanding from the interviews, the members were contacted once more in order to confirm our interpretation of the information they provided us. Furthermore, by participating in the project meetings, we could gain particular insights about the interpersonal relationships among project members and about coordination mechanisms, which did not emerged in the preliminary interviews but were confirmed in a second round of interviews with interested members. Through the examination of internal documentation, e.g., minutes of meetings, exchanged e-mails, manuals, we managed to triangulate information so to avoid post hoc rationalization and to ensure construct validity (Yin, 2008).

## 4. Results and discussion

The empirical evidence that we gathered shows that a pure project organization in the form of a task force separated from the rest of the organization enhances the project team's ability to absorb knowledge. This emerges when comparing the project team's proficiency in the initial phases of the knowledge transfer project and in later phases. At the beginning, the project was organized as a matrix structure. We observed that the level of knowledge absorption was poor since members tended to fall back to their routine activities and dedicated little time to the project tasks. Later, it was decided to move to a pure project organization with task force members dedicated 100 % to the knowledge transfer project. According to managers interviewed, AC was improved since team members could fully concentrate on the task and could better coordinate among each other. Stronger interaction between staff with heterogeneous background fostered the incorporation of different competencies: electrical and mechanical engineers were pushed to cooperate in the common understanding of the functioning of different auxiliary systems of the turbines, instead of approaching the system individually. This empirical result can be explained considering the complex and cognitive nature of AC. Knowledge transfer is a one-off activity, which may be felt as overwhelming by team members, whose natural reaction is to prioritize known and routine tasks. A pure project organization can contrast such behavior. Moreover, other benefits from this dedicated organizational structure include more effective coordination and exploitation of each other's competencies (Henderson, Cockburn, 1994), which is particularly important in the light of the cross-disciplinary nature of AC. Indeed, (Van Den Bosch et al., 1999) find that mixing different competencies in the project is positive for AC. In the light of empirical findings, which only refer to the recognition and assimilation phases of AC, we posit the following proposition:

*P1: Pure organization of the project team improves potential AC.*

The empirical study suggests that establishing a steering committee for directing the knowledge transfer project is particular beneficial for potential AC. At the beginning of the project, it was unclear what should have been transferred between the sender and the receiver. The two parties involved in the project had different opinions about this, as well as different motivations and objectives. An imperfect alignment between sender and receiver hampered the transfer of knowledge. A steering committee was thus created, including representatives from the two parties, with the aim to achieve a single approach to the project and a shared direction. These findings descend from the collaborative nature of knowledge transfer projects, whereby people from distinct entities/firms work together to share knowledge. An organizational mechanism such as steering body is important to deal with contradictory views about the management and execution of knowledge transfer project, which may end up in disputes and conflicts that hinder the absorption of new knowledge. This is consistent with the work by (Lane, Lubatkin, 1998), who show that by reducing differences and deviations between parties a single overarching organizational body enhances inter-organizational learning. Furthermore, the interaction between sender and receiver is more pronounced in the initial phases of the project, when the knowledge held by the sender has to be identified, transferred and assimilated by the recipient. In the subsequent transformation and exploitation phase, the recipient acts in a more independent way with the goal to implement the newly in sourced knowledge into the internal existing processes and routines. As a consequence, the role of the steering committee as a mechanism to ensure unity of intents is less critical. Our empirical observation leads us to posit the following proposition:

*P2: The establishment of a steering committee in knowledge transfer projects has a more positive influence on potential AC than on realized AC.*

The empirical analysis indicates that planning of the knowledge transfer project differently affect the two dimensions of AC, potential and realized. At first, the planning of the project was done in a way that reflected the product structure of other turbines at the recipient organization. Following this criterion, a work breakdown structure of the project was developed with work packages corresponding to the different components of the turbine. It was soon realized that this planning approach hindered the team members' ability to explore and investigate the sender's knowledge that was not documented or codified. First, the turbines whose technical knowledge was to be transferred had a different structure than the ones being designed in Sweden. Second, the planned activities of the project regarded explicit knowledge, drawings and documents held by the sender but completely missed to capture the tacit part of the knowledge at the recipient, i.e., "how" engineers in England were able to design and manufacture that particular type of turbine. In the light of these difficulties, the project management decided to relax the plan and gave more freedom to the team members in terms of what activities to perform, what tests to run, how to interact with the English engineers. One team member recalls that he stopped spending time searching for documents about the design of the lube oil system and started to question his peer in English subsidiary about the procedure he personally used to engineer the lube oil system. As a consequence, the proficiency of knowledge assimilation increased. On the other hand, once the critical knowledge was transferred from the sender, accurate planning helped the project team to efficiently adapt the acquired knowledge to the routines and the structures existing at the recipient. Planning made easier for the team members, and for the project manager alike, to arrange the activities needed to exploit the knowledge in the right sequence and in the right timing.

This dissimilar impact of planning on the two dimensions of AC can be explained with the different nature of potential and realized AC. Potential AC has an exploratory nature stemming from the fact that it is difficult to know in advance which knowledge is important to transfer and who possess that, whereas realized AC is about being efficient in capitalizing new knowledge and making sure it provides commercial benefits to the firm. Therefore, formalized and structured planning may act as a constraint to the development of potential AC, possibly paralyzing the team and hindering improvisation and creativity. When it comes to exploitation instead, systematic planning creates the optimal path that the team can follow to achieve the project goal in the most efficient way. This path can be confidently planned in advance given the lower level of uncertainty characterizing activities in realized AC. efficiency of knowledge exploitation. Indeed, according to (Charles Galunic and Rodan, 1998), creating excessive rules and procedures in the project work impede knowledge acquisition and assimilation while a structured and formalized environment improves knowledge transformation and exploitation. We thus posit the following propositions:

*P3: Planning of the project impede potential AC.*

*P4: Planning of the project facilitate realized AC.*

The empirical evidence that we gathered reveals that granting decision making power to team members has positive effects on potential AC. Delegating operational decisions to sub-project managers, e.g. electrical sub-project manager had full authority to decide the approach to understand the function of motor control center auxiliary system, either through drawings and documents or by spending time in assembling workshop watching the assembly of the system, pushed them to freely exert their creativity and to use their skills to find proficient solutions to identify and assimilate needed knowledge at the sender's. The project manager in charge of the overall project acknowledges that involving subordinates in the decision making process was important to leverage their heterogeneous expertise, which helped him understanding the overall scope of the new knowledge to be absorbed. This result can be interpreted in the light of the Decentralization of Incentives Theory (Geanakoplos, Milgrom, 1991), according to which, in a context of high uncertainty and unpredictability as it is for potential AC in knowledge transfer projects, delegation of responsibilities allows a better decision making because local experts, i.e. sub-projects managers, enjoy a larger information advantage vis-à-vis top managers. Participation in decision making means not only an increase of quantity and quality of ideas and proposals but also that those ideas and proposals are implemented and pursued (Sheremata, 2000). Therefore we posit following proposition.

In contrast, we find that delegation has negative impact on realized AC. Our empirical

analysis suggests that in the exploitation phase, a plethora of decision makers following their opinions about the best way to transform and use externally acquired knowledge may be sub-optimal in terms of time and resource consumption. As the project manager pointed out, the key performance objective in realized AC is efficiency, which is more easily achieved by sticking to a top-down devised plan than by consuming time to reach consensus. This result descends from the executive nature of realized AC. Developing a consistent way of working during implementation creates a predictable working environment for team members. According to (Atuahene-Gima, 2003), delegation necessitates consensus on the decision taken, which may have a negative effect on the efficiency of knowledge transformation and exploitation. We thus posit the following propositions:

*P5: Team members' participation in decision making enhances potential AC.*

*P6: Team members' participation in decision making hinders realized AC.*

## 5. Conclusion

This paper represents a first exploratory attempt to bridge the gap between the increasingly relevant topic of absorptive capacity and the field of operations management. It provides an interpretative conceptual framework that sheds new light on absorptive capacity at the project level, and a set of research propositions that represent a promising starting point for future confirmatory research.

Our findings show that a set of project management and organization practices, like pure project organization, steering committees, planning and delegation are key antecedents to the development of absorptive capacity. According to the empirical evidence gathered, different project management tools affect the two dimensions of absorptive capacity varyingly. These results point to the extremely different nature of potential AC vis-à-vis realized AC, and the consequent need for different managerial systems. From this point of view, AC may resemble the multidimensional concept of ambidexterity, which is achieved by balancing exploration and exploitation. Consistent with (Tushman and O'reilly Iii, 1996) structural view of ambidexterity, we argue that dual structures and management, one focusing on recognition and assimilation and the other focusing on transformation and exploitation, may be beneficial for the development of overall AC. A natural question arising from this study is whether the potential and realized dimensions should be part of the same overarching concept of AC.

As regards managerial implications, this paper provides managers with a number of recommendations to improve the absorption of new technological knowledge from external units. These suggestions should be better conceived by managers as input to identify the solutions that are more appropriate to the needs of their companies, rather than best practices or blueprints for success. In particular, our study shows that one-size-fits-all approach to the knowledge transfer project management should be avoided.

The study has obvious limitations. Because of single case study, results cannot be generalized. Future research should be aimed at enriching the conceptual framework that is put forward here through the analysis of other representative projects in different contexts and at validating the relationships encompassed through large-scale empirical analyses.

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# The Sustainable Food Self-Sufficiency Achievement Strategy in East Java Province, Indonesia

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**Abstract**

This study aims at identifying the characteristic of the local resources regarding to the sustainable food self-sufficiency in East Java as well as arranging policy strategy of regional government of East Java to achieve the sustainable food self-sufficiency. The study is carried out in Madiun and Nganjuk regencies in East Java. The two regencies are chosen as they are the food buffering area for other regencies in East Java. The study is conducted in eight months, from March to October 2015. The research finding shows that the regional characteristic in the local resources-based sustainable food self-sufficiency in East Java has been surplus in terms of rice which is 4.403.553 tons; corn which is 6.095.325 tons; meat which is 146.448 tons; and egg which is 29.147 tons. The availability of energy total consumed by East Java citizens in 2014 is 3.589 kcal/cap/day or 149.54 % out of the Recommended Dietary Allowance which is 2.400 kcal/cap/day. The availability of energy in 2014 is dominated by vegetable (96.91 %) and animals (3.09 %). If compared to the Recommended Dietary Allowance in 2012, the decrease is 967 kcal/cap/day or 21.22 %. The strategy of the regional government to maintain the local food security to be the imported-rice free is encouraging the food reserve development, enhancing the food distribution system, fostering the consumption diversification, monitoring fresh food, conducting citizen empowerment action program to solve the food security issue, and synchronizing the action program funding among the state budget, regional government budget, and citizen fund in East Java.

**Keywords**: the sustainable food self-sufficiency, food distribution system, local resources, the regional characteristic, strategy of the regional.

## 1. Introduction

Food is a basic need of human beings whose fulfillment is the part of basic human right for every Indonesian citizen. Its fulfillment is to meet the basic need of human being which is fairly, equally, and sustainably according to the principle of food sovereignty, self-sufficiency, and security. It means that in order to meet the food need of the citizen to the individual level, the country has a freedom to determine their food policy independently without any pressure from any parties. Food business actors are free to determine and run their business according to the resources they have. Hence, the development of food security is also the national priority in the *Rencana Pembangunan Jangka Menengah Nasional* (RPJMN) or National Mid-Term Development Planning in 2010 to 2014 focusing to increase the food availability, food distribution stabilization, food diversification acceleration, and fresh food security monitoring based on the

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regional characteristic. The food security development is carried out through various attempts in order to improve the economic growth and decrease the poverty level as a form of social, cultural, and economic development which is the part of the overall development.

The food consumption fulfillment has to prioritize the local production by utilizing the local resources and wisdom optimally (Nasikh, et al. 2015). To achieve it, there are three fundamental things to be paid attention to: (1) the food availability is based on the utilization of local resources optimally, (2) the food is affordable and easy to access by all citizen in terms of the physical and economic aspects, and (3) the food and nutrient are meant to consumed for healthy, active, and productive life. The local resources-based food can be available optimally through food diversification and local food production priority. The affordability in terms of the physical and economic aspects is undertaken by stabilizing the staple food's s price, managing the staple food reserve, and distributing the staple food well (Nasikh, et al., 2015; Das, et al., 2012; García et al., 2014).

Therefore, the implementation of the food security development program is done by referring to the food security sub-system: (a) in terms of food availability, the program is conducted by increasing production, fostering the availability, and handling the food insecurity issue, (b) in terms of food distribution, it is undertaken by stabilizing the food distribution and reserve, and (c) in terms of food consumption, it is done by improving the quality of food consumption and security. Consequently, the agricultural development program and the food security are directed to encourage the conducive social, cultural, and economic condition which leads to the stable and sustainable food security.

In terms of the national rice production contribution, East Java is in the second place after West Java. There are two regencies which become the rice producers in East Java and they are the research setting of this study: Madiun and Nganjuk regencies (according to Figure 1 below). Thus, those two regencies become the location of this study. Despite the fact that they are not the biggest rice producers, they can support the rice production of other regencies in East Java as displayed in Figure 1 below.

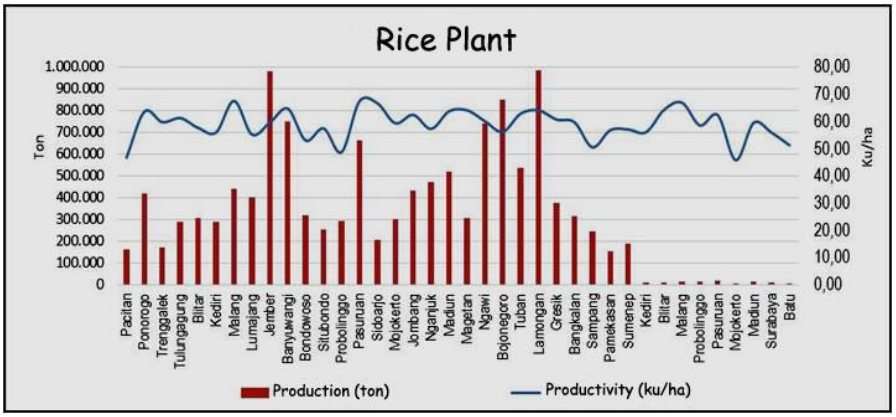



**Fig. 1.** Production and Productivity of Rice Plants of East Java
Source: Agricultural Bureau of East Java 2015

The sustainability of the food sovereignty, self-sufficiency, and security depends on the country or regional's capability to create food technology innovation and disseminate it to the food business actors. Therefore, a food institution which has an authority and policy in the sustainable food security is required so that they can coordinate, integrate, and synergize with a lot of sectors (Carolyn, Stephanie, 2014). The regional government has to conduct food research and development continually as well as encourage the institutions under the regional government, educational institution, research institution, food business actors, and citizens to conduct food research and development activities. Based on the background of study stated above, the research problem of this study is as follows: "How is the characteristic of the local resources regarding to the sustainable food self-sufficiency in Madiun and Nganjuk regencies?" and "What is the policy strategy of Madiun and Nganjuk regencies to achieve the sustainable food self-sufficiency?"

**Local Resources-Based Product Technology Innovation to Achieve the Sustainable Food Self-Sufficiency**

The Indonesian's local food potential is very high. However, its contribution to support the food security is still low. This is caused by the lack of local food's technology innovation so that the Indonesian consumers are not interested in buying the food product. Thus, the local food's technology innovation has to be absolutely invented. Welli (2007), in his research, has given an illustration of how to create innovation in the local food product. He mentions creating added value to the local food product so that it has higher value or at least equal to the rice or wheat-based food product which dominate the menu of Indonesian citizens. The creation of the local food product has to be able to meet the demand of the developing globalization era. It is not only the taste aspect of the food product, but the consumer also wish to have healthy and safe food.

The innovation should not only concern the nutrient, quality, and food safety aspects, but it also needs to consider the consumer's preference. Thus, the local food industry with high ethnicity and special characteristic will always ensure their food safety. As the local food product has the specific characteristic, they need to be handled properly. The appropriate knowledge of food technology is also required. Other than innovation, the other important factor is the role of the regional government to support and develop the local food product (Degye et al., 2013; Francis et al., 2015; Nasikh, 2016).

The number of Indonesian local food products is very abundant. It is usually closely related to the local culture. Hence, the product is often named after the place where it is from, such as *dodol garut, jenang kudus, gudek jogja,* and etcetera. The various local food products are very potential to achieve the national food self-sufficiency. Its achievement will accelerate the national food security (Onakuse, 205; Sheryl, 2015; Anastasia, Alex, 2015; Yangui et al., 2014).

However, up to now, the local food product has not been able to replace rice and flour which dominate the food in Indonesia. One of the reasons is because of the low technology innovation in the local food product. Some creations of local food product are cassava vruitpao (*bakpao* made of cassava), steak kampong Mucuna Crispy (steak made of *kara benguk*), rasi (rice made of cassava), and brownies made of cassava. Yet, these products are still less popular than rice and flour.

On the other hand, in this globalization era, the consumer's demand towards food is growing up. In other words, the consumer's taste is very important for the food producers. The researcher suggests that the technology innovation in the local food product must be invented as soon as possible. The technology innovation not only concern the quality, nutrient, and food safety aspects which are popularized by many people, but it also consider the consumer's preference. Particularly in terms of food diversification, the food technology is expected to be able to play its role to increase the added value of the local food product. Consequently, the consumer is interested in buying the local food product (Vishwambhar, 2015; Ekin, *et al.*, 2015). Innovation is not the only factor; the role of the regional government to support and develop the local food product is also highly required.

**Farmer's Empowerment to Improve the Sustainable Food Self-Sufficiency**

In the context of human's life, food resources are definitely required. However, in the present days, the issue of food insecurity often happens in some parts of the country. Therefore, the regional government as mandated in the decentralization has to be able to establish farmer's empowerment program to achieve the food security. The study by Sean et al. (2012) used the qualitative research method and descriptive approach done by observation, interview, and documentation. The data analysis was conducted by the model adopted from Miles and Huberman (1984). The finding of his study shows that the farmer's empowerment program is considered good to achieve the food security as the product is better and improved. This better and improved product is due to the improved knowledge and skill of the farmer in agriculture. The main supporting factor in the successful food security is the support from the regional government as well as the support in the form of subsidy and seeds. While the obstacle is the low human resources quality as well as the limited farming equipment. The synergy among farmers, society, and government is required to support the farmer's empowerment program to improve the food security (Nasikh, 2014).

The farmer's and rural society's welfare is considered quite low. This is because the harvest selling price is not worth the working capital (Vishwambhar, 2015; Duncan et al., 2014; Nasikh, 2013; Mostafa et al., 2016). The study by Sean et al. (2012) shows the lack of farmer's knowledge

and skill. Seeing this phenomenon, as mandated in the regional autonomy, the regional government of Nganjuk regency has its authority to develop its agriculture by empowering their farmers. One of the areas in Nganjuk regency with the farmer's empowerment program is Betet village, Ngronggot district. The empowerment is done by counselling. The counselling aims at delivering information about the new technology and the way of better farming to the farmer group or *Gabungan Kelompok Tani (Gapoktan)* or Farmers Group Association done by *Penyuluh Pertanian Lapangan (PPL)* or Field Agricultural Counsellor. The counselling is conducted to improve the farmer's capability and skill in utilizing their agricultural work to obtain better and more varied results. The better result will lead to the food security achievement. The conclusion that is drawn is as follows. First, the internal obstacle factor is the low quality of human resources and lack of agricultural machinery. Second, the external obstacle factor is the unstable weather and the limited capacity of agricultural resources. Next, the internal supporting factor is the farmer's empowerment program and the support from the regional government of Nganjuk regency. And last but not least, the external supporting factor is the subsidy to lower the farmer's burden.

**The Food Reserve in East Java Province**

In order to fulfil the food need for all Indonesian citizens, the existence of food is very beneficial. Its availability comes from three resources, which are (1) production; (2) food intake; and (2) food reserve. The food reserve is one of the significant components in the food availability whose function is to balance the gap between the food production and need. It can also be used to anticipate the temporary shortage of food due to the disturbance of staple food stock, for instance because of the transportation facilities issue in the natural disaster.

There are some reasons underlying the importance of the food reserve development. First, there are still 11.37 % poor families in Indonesia (BPS March 2013) and 19.46 % of food insecurity (in 2012). Second, the effect of climate anomaly is very unpredictable which leads to the uncertainty of product (crop failure, flood, long drought) and natural disaster. Next, the harvesting period is uneven in each the period and area. Another reason is there are a lot of regionals which belong to the food insecurity category. Last but not least, there are a lot of urgent situations which require food reserve to resolve the post-disaster, food insecurity, and regional food assistance issues. The paragraph 2 of Food Law number 18 in 2012 mandates that the Central and Regional Governments have to facilitate the food reserve development based on the local wisdom.

The food reserve development is carried out in order to empower and prevent the society from the food insecurity. It is done by facilitating the physical development of barns, filling in the food reserve, and strengthening the group institution. By having the empowerment activity, it is expected that the society able to manage their food reserve within their group and improve their role in running the economic function so that they are able to maintain and develop their own food reserve. The food reserve development has been carried out since 2009 through the food reserve development activity which consists of three stages, namely growing stage, developing stage, and self-sufficiency stage (Nasikh et al., 2015; Rosmery et al., 2016; García et al., 2012).

The growing stage involves the location identification and physical development of barns funded by the *Dana Alokasi Khusus* (DAK) or the Specific Allocation Fund in the agricultural field. While the development stage is a step to identify the Food Barn Group and fill in the food reserve funded by the Social Assistance Fund. The last stage, the self-sufficiency stage is the time to strengthen the group institution through the allocation of Social Assistance Fund so that they are able to develop their business for the sustainability of the food barn institution.

## 2. Methods

This study employs descriptive qualitative method. It is descriptive method as it is a research method which attempts to describe the phenomenon or the relationship between phenomena systematically, factually, and accurately (Miles, Huberman, 1984). Its purpose is to make better illustration about the existing characteristics as well as relevant picture with the studied variables. While the quantitative approach is used to identify the regional government policy in order to achieve the local resources-based sustainable food self-sufficiency. The study takes place in Madiun and Nganjuk regencies, East Java Province, Indonesia. It is conducted in eight months, from January to December 2015. The population of this study is the regional government of East Java Province. The sample is drawn from two regional regencies in the level of *Satuan Kerja Perangkat Daerah* (SKPD)

which is relevant to handle the issue of food security in the research setting. The sample is taken purposively from each relevant department, thus, the result can represent this study.

The data collection method which is employed in this study is divided into two, namely (1) Primary Data; it is an activity done to obtain authentic or direct data. The technique used is as follows; (a) Observation. The observation technique that is conducted by the researcher is direct observation in the research location in order to cross-check the data that he obtains from the other data collection technique. This observation is done in the implementation of the sustainable food self-sufficiency; (b) Questionnaire. The data collection by filling in questionnaire is done by the citizen in the planning area. In this study, the questionnaire is spread to several SKPDs which become the sample representing all research data; (c) Interview. In this study, the researcher employs a led interview pattern, in which the interviewer brings a set of complete and detailed questions which is meant in the structural interview. The interviewee is the regional government staff in the research location who recognize the development of food security in the research setting as well as related institutions. (2) Secondary Data; it is an activity done to obtain authentic or direct data from Laws, Government Regulation, Governor Regulation, as well as reports made by the regional government or food security agency, and data from certain websites or the Internet. After that, the obtained data are proceeded through data grouping, classification of problem rank, and classification of internal and external factors. The analysis model of quantitative data used in this research is relevant with the interactive model which involves the reduction, data display, and verification processes.

The research finding is analyzed quantitatively and qualitatively. Thus, the data are needed to be tested their validity. Validity is the degree of preciseness in the research object compared to the obtained data. While reliability is related to the degree of consistency and the data stability. In the view of quantitative research, data are considered reliable if there are two or more researchers produce similar data in the same object, or the same researcher produce similar data in different period. The objectivity is related to the interpersonal agreement among a lot of people towards one set of data. In the standard qualitative research, it is called data validity. The validity of the data in this study is tested through the implementation of criteria proposed by Lincoln (1990). They proposed four criteria to test the data validity, namely credibility, transferability, dependability, and conformability.

## 3. Results and Discussion

In order to accelerate the food consumption diversification, an action was required to excel the food consumption diversification in each related agricultural institution under the coordination of Food Security Board. It was to encourage the availability of various staple food and improve the local resource-based food consumption. Therefore, a Governor Regulation was required to be established as a reference which triggered the local resources-based food consumption diversification. It involved the synergic coordination between the stakeholders in the central and regional levels.

In 2014, the East Java governor and regents as well as mayors in all around East Java committed to accelerate the self-sufficiency of five types of strategic food, namely rice, corn, soybean, sugar, and meat. Related to this achievement target, the regional government of East Java would focus more on the productivity and plant index. The rice production's target in East Java is displayed in Figure 2 below.

In Figure 2 the total area of *Lahan Pertanian Pangan Berkelanjutan* (henceforth LP2B) or the Sustainable Food Agricultural Area of East Java was 1.017.549,73 hectares which consisted of 802.357,90 hectares of irrigated LP2B and 215.191,83 hectares of non-irrigated LP2B. The policy of food self-sufficiency in East Java could improve the availability and resolve the issue of food insecurity, enhance the distribution system, stabilize the staple food price, foster the fulfilment of food consumption and security, as well as improve the development of LP2B in East Java. Thus, the East Java Governor expected that every regency/city issued regional government related to the Sustainable Food Agricultural Area (Nasikh, 2015).

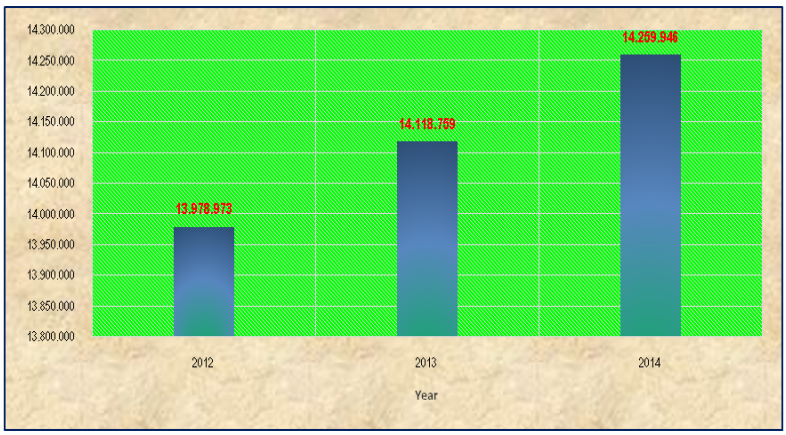



**Fig. 2.** *Rice Production Target of East Java Province*
Source: Agricultural Bureau of East Java 2015

**Regional Characteristic in the Local Resources-Based Sustainable Food Self-Sufficiency**

Food self-sufficiency was an important and strategic factor, regarding to the fact that food was the basic need of human being. The right of food was the significant part of the basic human right. Figure 3 below was the condition of Rice Production and Contribution Target of Madiun regency which was explained according the result in the field.

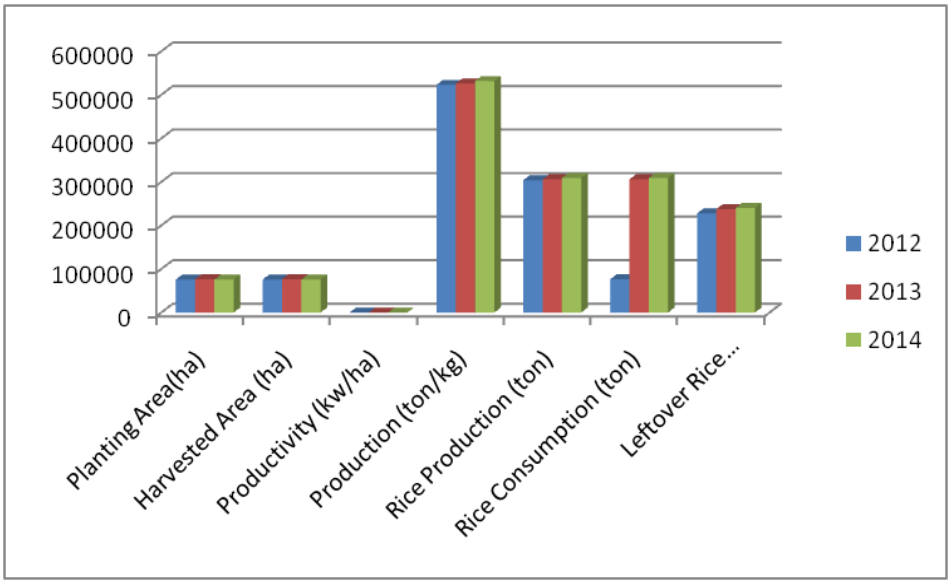
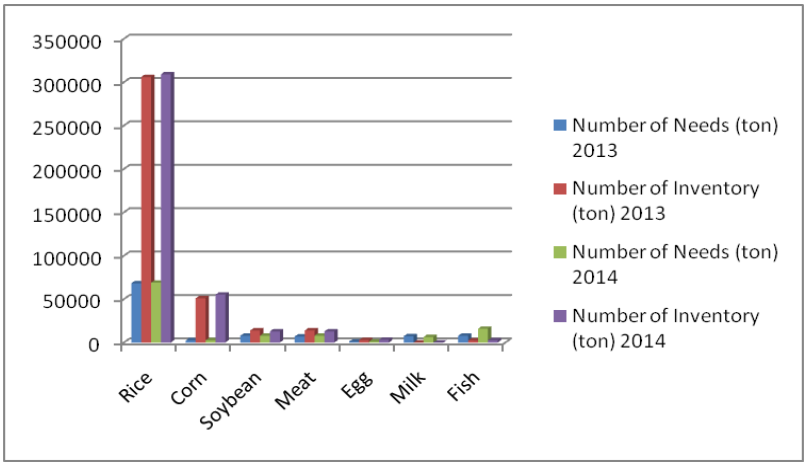



**Fig. 3.** Rice Production Targets and Contributions Rice Of Madiun Regency
Source: Food Security Agency Madiun 2015

Madiun regency had surplus of rice consumption which gradually increased from year to year. In 2012, the surplus was 227.727/tons. In 2013 it increased to 237.622/tons. The amount increased to 240.185/tons in 2014. The surplus was only number as the rice was difficult to track physically. It was in the farmer, *bulog,* whole seller, village barn, or even outside Madiun regency. While the food consumption of Madiun regency citizen during 2010 to 2014 was as follows in Figure 4.




**Figu. 4.** Food Needs Consumption of Madiun Population
Source: Food Security Agency of Madiun 2015

According in figure 4. during 2010 to 2014 the amount of rice was enough to fulfil the need of rice of Madiun regency citizen. In 2014, the rice availability level was 429,90 kg/cap/year and the consumption level was 95,7 kg/cap/year. It became the highest achievement in the food fulfillment. It meant that the availability of rice was four times higher than the consumption level. This number was so satisfying that the Madiun regency became the Food Barn of East Java and they obtained achievement of *Adikarya Pangan Nasional* in 2012.

The need and availability of staple food of Nganjuk regency was displayed in Figure 5 below.

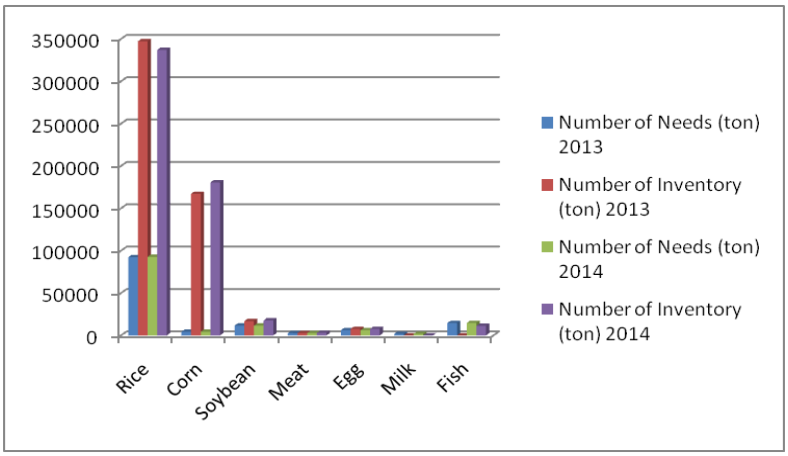



**Fig. 5.** Food Needs Consumption of Nganjuk Population
Source: Food Security Agency of Nganjuk 2015

Based on the Figure 5, it was shown that from seven types of staple food in Nganjuk regency, only one kind of food whose availability was lower than the need of the citizen. It was fish. While the availability of other six staple food was exceed the need of the Nganjuk regency citizen.

In East Java, the food availability was to guarantee the food supply to meet the need of the citizen in terms of quality and quantity as well as variety and safety. The availability could be fulfilled from three sources, namely production, supply, and food reserve management. It could be observed in various levels, including the household, regional, province, and national levels. Nevertheless, the appropriate food was the biggest issue. The issue was related to the amount and quality of the food. The situation of regional food availability was reflected from the amount of food availability and the quality of food diversification. This was illustrated in the *Pola Pangan Harapan* (PPH) or the desired food pattern score. The food availability condition could be used as

one of the references to plan the policy related to the food and nutrient availability to achieve the food stabilization and self-sufficiency.

**The Appropriate Strategic Policy Model to Achieve the Local Resources-Based Sustainable Food Self-Sufficiency**

The direction of food and agricultural policy of East Java in 2005 to 20125 was to develop the agribusiness-based modern economy. It encouraged the shift of agribusiness from the comparative advantage to the competitive advantage through the capital development and advanced technology improvement in its sub-system and the quality of human resources improvement. While the direction of food and agricultural policy of East Java in 2009 to 2014 was to revitalize the agriculture and develop the agribusiness and agroindustry to improve the farmer's empowerment and its supporting institutions, enhance the productivity, competitiveness, and added value of the agricultural product, foster the agroindustry and agribusiness development to empower the economy, as well as improve the food security protection.

There were three strategic policy models implemented by the regional government of East Java to maintain the food security. First, they implemented the synergic coordination among the regency/city governments to arrange the policy related to availability, distribution, consumption, and safety of fresh food. Second, they developed food reserve, distribution system, and consumption diversification. Last but not least was they monitored the fresh food safety. The role of private party, citizens, and other citizen institutions had to be enhanced to monitor the availability, distribution, consumption, and fresh food safety. Their role could be implemented in the empowerment action program to resolve the issue of food security in East Java.

The strategic target of the regional government in maintaining the local food security was as follows (1) the formulation of the sectorial policy and price which supported the improvement of *Nilai Tukar Petani* (NTP) or farmer exchange value so that it could be the incentive for the business actors in the agricultural field, (2) the policy to limit the import partially or wholly should be balanced by the attempt to improve the local commodity productivity, (3) the distribution monitoring to reduce the illegal export as well as the implementation of regulation for the foreign food company to sell their product partially or wholly in the domestic market, (4) the enhancement of the warehouse utilization to reduce the price fluctuation inter season, (5) the improvement of regional government's role in authorizing food commodity stock and its role in arranging food stock data and information accurately, (6) acceleration of infrastructure development, including the irrigation facilities, road, market, and harbor to encourage the goods distribution as well as the incentive to increase the products, (7) the limitation of the productive land conversion and slower the population growth level, and (8) the citizen's expectation management, particularly those which were related to the administration price to isolate or limit its effect to the rising price of goods and service (Nasikh, *et al.*, 2015; Sans and López 2015).

The Citizen Food Barn Development was carried out in three years within three stages, namely growing stage, developing stage, and self-sufficiency stage. With the process, it was expected that the citizen able to manage and develop the food reserve stock volume to meet the need of all citizen when they were challenged by the food shortage or food insecurity. In the growing stage, identification of groups and location, determination of target group, and utilization of DAK to build the food barn, and the physical building of the barn were facilitated by the DAK in the agricultural field. While in the developing stage, the activity was about supplying the food for the barn and developing the group capacity. Last but not least, in the self-sufficiency stage, the activity included the attempt to strengthen the institution and stabilize the food reserve and the citizen food reserve institution.

## 4. Conclusion

The regional characteristic of East Java in the local resources-based sustainable food self-sufficiency has been surplus in some staple food, such as rice (4.403.553 tons), corn (6.095.325 tons), meat (146.448 tons), and egg (29.147 tons). The availability of energy total to consume in East Java in 2014 was 3.589 kcal/cap/day or 149.54 % out of the Recommended Dietary Allowance which was 2.400 kcal/cap/day. The availability of the energy in 2014 was dominated by the vegetable (96.91 %) and animal (3.09 %). If compared to Recommended Dietary Allowance in 2012, the decrease is 967 kcal/cap/day (21.22 %). The strategic policy model applied by the

regional government to maintain the local food security to achieve the imported rice-free is to encourage the food reserve development, enhance the food distribution system, improve the consumption diversification, monitor the fresh food security, implement the citizen empowerment action program to resolve the issue of food security, as well as support the funding synchronization among the state budget, regional government budget, and citizen fund in East Java.

To strengthen the food reserve of the regional government of East Java, the manifestation of the iron stock concept or the endless reserve is supposed to be implemented. It is especially to face the urgent situation. Thus, it is suggested that rice monitoring and controlling are strict so that no stock of rice is rid out of the province. If they find any violations, the penalty is applied.

To guarantee the management of staple food distribution, the central and regional governments have to attempt to keep the stabilization of staple food price by improving the trading policy management in the country and outside the country. In challenging the urgent situation, the government is expected to mobilize the government and citizen's food reserve as well as involve the national food industry.

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# Catching Up and Catch-Up Effect: Economic Growth in Post-Communist Europe (Lessons from the European Union and the Eastern Partnership States)

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**Abstract**

The article discusses the economic growth models in post-Communist countries of European Union and Eastern Partnership states. According to the combinatorial augmentation concept, there are new combinations for which the resources for old combinations are practically useless as they require the usage of qualitatively new resources. The combinatorial augmentation process revealed itself in the EU's post-Communist countries in a special way when new technologies are mainly concentrated in some Western European and other developed countries while older technologies were mostly left for the EU's post-Communist countries. For the EU's post-Communist countries, falling behind are more characteristic than catching up which is a result of the unfortunate fact that the national innovation systems in these countries are weakly developed. Economic growth types of Eastern Partnership are based on the extremely falling behind model. Excluding the catch-up effect is of special importance in making a quantitative assessment of the differences between the economic growth indicators. The economic growth types of the Eastern Partnership states are not satisfactory – the characteristic to these countries are falling behind (or, more accurately, extremely falling behind) and coat-tail growth.

**Keywords:** economic growth models, catching up, catch-up effect, falling behind, post-Communist countries, European Union, Eastern Partnership.

## 1. Introduction

The economic growth model a country chooses to implement is very important for its economic development. This is the challenge primarily faced by countries with developing economies which place the process of increasing their level of economic development as one of their main goals in order to advance to the category of countries with developed economies. This problem is quite relevant for the relatively new member states of the European Union (EU) as well, including Bulgaria, the Czech Republic, Croatia, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. According to the established terminology, Central and Eastern Europe is the geographic term for the group of these countries. For the purposes of our study, however, their geographic location is not as important as their economic (and general social and political) origins, including their economic past (meaning the command economy and the process of transition to a market economy).

In order to broaden the scope of comparison between the EU in general with European post-Communist countries, this study also includes six Eastern Partnership (EP) states – Armenia, Azerbaijan, Belarus, Georgia, Moldova and Ukraine which are also post-Communist countries.

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The EU's post-Communist countries and EP states have common economic (and not just economic) pasts. More specifically, these countries (as well as those of any other post-Communist country) were characterized by their command economies. On the other hand, after the collapse of the Communist-type governance and the command economy, the countries of Central and Eastern Europe and the former Soviet Union were forced to face a severe reality: most of their enterprises (especially in manufacturing) were unable to produce competitive production. Hence, a so-called necroeconomy (Papava, 2002) was formed in these countries whose existence is largely sustained by government support provided to necroenterprises.

It should be noted that in the EU's post-Communist countries as well as those formerly members of the USSR, investments result (and continue to do so) in the imports of older and out-of-date technologies rather than anything high-tech and cutting-edge which facilitates the maintenance of an overall technological backwardness in these countries. As a result, a retroeconomy is formed (Papava, 2017a, 2017b).

For the EU's post-Communist countries and the EU in general, it is characteristic to move towards innovative development based upon the establishment of a knowledge-based economy (Berulava, Gogokhia, 2016; Burduli, Abesadze 2017) as put forward in the Lisbon Strategy (Meshaikina, 2013: 14). In this sense, it is interesting to know how useful the experience of the EU's post-Communist countries will be for EP states.

The purpose of this study is to analyze those models of economic development which are used by the EU's post-Communist countries and apply them to the EP states (if appropriate). At the same in this study we will try to find out the quantitative difference between the economic growth of the EU members states with a non-Communist past and that of the Central and Eastern European states with a Communist past.

## 2. On the Economic Growth Models

There are multiple models of and economic growth (Acemoglu, 2009; Barro, Sala-i-Martin, 2004; Hudson, 2015; Weil, 2005) in the field of economics. According to one modern classification, there are three different types of economic growth (Hudson, 2015: 34-35):

I. "Frontier growth" which is characteristic to countries (for example, the United States) which create qualitatively new products and new production based on new technologies (it should be noted that instead of the term "frontier," one can also use "forging ahead" (Abramovitz, 1986) or "getting ahead" (Gottinger, 2005));

II. "Coat-tail growth" which is characteristic to countries exporting oil or food products whose economic growth is dependent on the supply of these products;

III. "Catch-up growth" which is characteristic to countries that use existing technologies with minimum spending so that they can export their products to high-income countries.

It is difficult to agree with the given definition of *catching up*[*] as the existing technologies may not include cutting-edge technologies at all; without such technologies, it is impossible to catch-up with the economic development levels of the top developed countries (Matthews, 2006: 314) which is further confirmed by the experience of South Korea (Kim, 1997). Hence, *catching up* should not only mean growth based upon existing technologies but also on cutting-edge technologies (Abramovitz, 1986; Matthews, 2006).

It is also known that *catching up*, in itself, facilitates a convergence between countries with developed economies and those with economies which are still developing (Korotayev et al., 2011; Lim, McAleer, 2004).

The aim of the *catching up* model is to develop a country in a way when a relatively economically backward country is able to catch up to those at the top. This model is based upon finding the resources for one's own development for which principled improvements in a country's educational system is very important as well as the facilitation of scientific and engineering research (Åslund, Djankov, 2017: 143-145). This is necessary in order for highly-skilled personnel to be able to not only use the imported technologies from developed countries and use them successfully but also become actively involved in the process of creating these technologies.

[*] It is very important to underline, that *catching up* type of economic growth does not simply imply a "catch-up effect."

Based upon the *catching up* model, respective countries develop sectors of the economy where more value added is being created and which facilitates the expansion of exports of the production output of these particular sectors of the economy.

The *falling behind* model (Abramovitz, 1986; Dunford, Smith, 2000; Gottinger, 2005; Kim, 2007; Nassif et al., 2013; Record et al., 2018; Stokey, 2012) of economic growth is principally different from the *catching up* model as it facilitates a divergence of developed and developing countries and not a convergence.

When the share of the production of labor-intensive and resource-based goods holds a dominant position in the national economy of a country, then we have a trend of *falling behind* (Nassif et al., 2013).

It is well-known that the de-industrialization (Rowthorn, Wells, 1987) of the economy causes the pace of *catching up* to slow down and, in the worst case scenario, facilitates the transfer of the economy to the *falling behind* model (Palma, 2005; Rowthorn, Ramaswamy, 1999).

The *falling behind* model must be differentiated from the abovementioned *coat-tail growth* model as, according to the former, economic growth is determined by the usage of existing, non-cutting-edge technologies at their maximum while the latter purports that economic growth is based upon the exports of oil products and/or food products. Theoretically, it is absolutely possible for the *falling behind* and *coat-tail growth* models to co-exist.

In order to move from the *falling behind* model to the *catching up* model, human resources are of vital importance. More specifically, this concerns those specialists who must become the main creators of the process of *catching up*. As a rule, they must have obtained their education in developed countries where development is based upon cutting-edge technologies (Kim, 2007). Their role is vital in the creation and development of the national educational and scientific systems when the country will be able to move to the *catching up* model using its own resources.

## 2. From the "New Combinations" and "Creative Destruction" to the "Combinatorial Augmentation"

Joseph Schumpeter's interpretation of economic development in his *Theory of Economic Development* is useful for obtaining a better understanding of economic growth models. More specifically, Schumpeter states that economic development is a process of implementing "new combinations" (Schumpeter, 2012: 139). This means creating new production, new services and new means of production, finding new markets and new sources for supply of raw materials and also carrying out a new organization of industry (Schumpeter, 2012: 66).

At first glance, the impression is that the implementation of an innovation merely requires that resources be redistributed in favor of the innovator. The reality, however, is much more complicated. Specifically, Schumpeter justly remarks that the new combinations, as a rule, form side-by-side with the old ones (Schumpeter, 1987: 219).*

In a certain sense, this statement contradicts the economic dynamics theory also proposed by Schumpeter in another book, *Capitalism, Socialism and Democracy*, which says that the essence of capitalism is the process of "creative destruction" or a process of economic mutation which almost constantly destroys old structures from within and creates new ones (Schumpeter, 2008: 83). The nature of this contradiction is that according to creative destruction, new combinations must only be replacing the old ones while Schumpeter himself, in the abovementioned *Economic Development Theory*, does not exclude the existence of new combinations in the presence of older ones when the new combinations use principally new resources and not the ones already being used by the older combinations (Tatarkin et al., 2017: 7-8).

As a rule, the truth must lie somewhere in between and the nature of this "between" is that the new combinations and creative destruction happen in the same economic space; again, side-by-side and meaning that they co-exist. This is possible in the cases when some older combinations are replaced by new ones through the creative destruction process while other old combinations continue in their existence and are not so much replaced but, rather, witness the creation of new combinations next to them.

* Here, it must be pointed out that this idea was appropriately translated into Russian (Schumpeter, 1982: 288) in Schumpeter's original work (in German) (Schumpeter, 1987: 219) although it is unfortunately missing in the English edition (Schumpeter, 2012: 83).

In the modern era, when new sectors of the economy such as space exploration, the nuclear industry and electronics are operating successfully, a significant part of the resources used by the older combinations are even useless for the new ones (Sukharev, 2013: 9).

It is clear that given the economic realities, the old and new technologies, as already pointed out above, co-exist not so rarely which means they are represented at the same time. Often, this co-existence of old and new technologies is also guaranteed by the fact that they are found in different sectors (or sub-sectors) of the economy of one country which is mainly due to the usage of the means of production carrying differing content which is because of the technical and technological differences between these means.

It should be pointed out that an economic crisis, as shown by international experience, hinders the development of techniques and technologies (Sukharev, 2013: 2) which is not at all surprising as both the fundamental as well as applied sciences suffer the most under an economic crisis (Sukharev, 2013: 6). Hence, we definitely cannot exclude the fact that in order to overcome a crisis and ensure the post-crisis growth of the economy, special emphasis must be made on the older combinations (Sukharev, 2013: 9). This is not very surprising as under the conditions of an economic crisis, the availability of the resources necessary for the implementation of new combinations is much more limited. As a result, the implementation of new combinations in such a situation, if not completely excluded, is at least difficult to achieve.

The concept of "combinatorial augmentation" must also be considered to be a continuation of Schumpeter's economic development theory according to which the combinatorial augmentation is a new combination which does not require resources from old combinations as it is based upon qualitatively new resources (Sukharev, 2013: 9; 2014).

The process of encouraging combinatorial augmentation does not need to mean refusing creative destruction – on the contrary, where possible, new combinations must replace the old ones.

Hence, within the margins of possibility, the facilitation of the replacement of old technologies with new ones or creative destruction, together with the stimulation of the combinatorial augmentation, must become an important tool for economic development.

If we take the recommendations of the *Evolutionary Theory of Economic Change* (Nelson, Winter, 1982) into account, a country's economic policy needs to facilitate the process of combinatorial augmentation, on the one hand, while creating an environment where the process of creative destruction does not face any artificial obstacles, on the other hand, in order to stimulate economic development. For the latter of the two processes, it is important for the government to utilize active and complex measures (qualitative improvement of the education system, budgetary stimulation of innovative technologies, perfecting the legal norms of bankruptcy and others) (Papava, 2017b).

It is noteworthy that theoretically the realization of *catching up* can be achieved most quickly through Schumpeter's creative destruction process; however, in this case the biggest opposition comes from the forces standing behind the old combinations (more specifically, the political forces supporting them).

In the case of combinatorial augmentation, such opposition is weaker as the old and the new combinations can co-exist as they exist in different sectors (or sub-sectors) of the economy of a single country. For the creative destruction of these old combinations, on the other hand, it is important for the government to facilitate the process of combinatorial augmentation as in this case a relatively high level of economic growth can be achieved which will, in its own right, facilitate in overcoming "technology traps" (Balackij, 2012: 57) which exist on the basis of the old combinations.

In order to further explain this phenomenon, let us remember that a technology trap is a condition when a company favors older, less-effective technologies even when there is a possibility of moving to a newer, more modern technology (Balackij, 2003). The technology trap itself is created by a situation when the companies favor resolving short-term rather than long-term tasks. The primacy of short-term interests, as opposed to long-term ones, is mostly due to political, legal and macroeconomic instability (Balackij, 2012). In order for the escape from the technology trap to be possible, it is important to take a whole range of complex steps. Specifically and first of all, the government must facilitate the creation of economic optimism (Balackij, 2010) in society as an optimist, as is well known, aspires to achieve maximum benefits, having become used to the idea of

a high risk, while a pessimist tries to minimize the risks given some acceptable levels of guaranteed benefits (Keselman, Matskevich, 1998). In its own right, the high pace of economic growth in a country facilitates increased economic optimism. Hence, in order to overcome the technology trap, it is important to make a "technology leap" which is possible through the government's facilitation of the combinatorial augmentation process.

Creating economic optimism is very important in countries where companies favor resolving short-term rather than long-term tasks due to political, legal and macroeconomic instability (Balackij, 2012). This shows that a government's facilitating of the combinatorial augmentation process is especially important for such countries.

### 3. On the Innovative National Systems and Extremely Falling Behind

Today, the prevalent idea is that post-Communist countries have fully overcome the difficult heritage of their Communist past, manifested in a necroeconomy while a retroeconomy is still the main powering sector of the economy. The situation in these countries, in reality, is not so simple.

The economic development of these countries was seriously influenced by the preparation period for EU membership. Specifically, for almost a decade, there was a purposeful restructuring of their individual economies aimed at reducing the spending of enterprises and a qualitative renewal of production processes to be in line with both European and international quality assessment standards (ISO – International Organization for Standardization) (Vlaskin, Lenchuk, 2005: 66). As a result, the necroeconomy is no longer a major problem for the EU's post-Communist countries.

Under a command economy, the majority of the EU's post-Communist members which were also Warsaw Pact members at the time (except Slovenia and Croatia) had rather important scientific and technological systems which were mainly focused on the necessities of the military-industrial complex. When we talk about the initial innovative potential of these countries, the existence of highly-qualified scientists and engineers should be taken into account first and foremost as they were involved in this scientific and technological work (Abukhovich, 2011). This, unto itself, made these countries especially attractive (first of all, in the aero-cosmic and electronic manufacturing industry, the production of telecommunications and their instruments and in the fields of chemistry and pharmacy (Vlaskin, Lenchuk, 2005: 66)) for transnational corporations even before they became EU members. This must be especially underlined as the domestic markets of these countries, before joining the EU, were limited with their own external state border which created the relatively small size of these markets. Consequently, as is well known, the small size of the domestic market of a country, all things being equal, significantly reduces the attractiveness of making investments in any real sector of the economy. We should also emphasize that apart from the small sizes of domestic markets, the abovementioned post-Communist countries bordered the EU directly which, in certain ways, increased the attractiveness of these countries for Western European investors (Shah, 2002: 6).

It was a mistake to rely on the idea that, given neo-liberal and neo-classical expectations, integration into the large economic space of the EU was enough for the newly-integrated member countries to adopt the *catch-up* model of growth (Dunford, Smith, 2000: 192).

It is noteworthy that the abovementioned highly-qualified scientists and engineers had lower wages as compared to their colleagues from Western Europe and the ratio of the nominal wage to labor productivity was clearly in favor of the EU's post-Communist countries.

It was the investment attractiveness caused by the initial innovation potential of these countries that outweighed the problems caused by the relatively small size of the domestic markets of these countries. This turned the EU's post-Communist countries into mainly producing countries rather than consuming countries.

In these member countries (specifically, Poland, Slovakia, the Czech Republic and especially Hungary), the participation of Western European capital in the economy is very important (Vlaskin, Lenchuk, 2005: 69). Such capital, on the other hand, was mostly attracted through the privatization of state assets. The process was also facilitated by respective tax breaks.

As a result, the EU's post-Communist countries managed to achieve more-or-less stable economic growth and an expansion of their export potential. At the same time, it is practically impossible to say that these countries also managed to create their own innovative national systems as the innovative potential inherited from the former command economy was practically

"used-up" by the transnational corporations in their own interests rather than in the interests of the country (Vlaskin, Lenchuk, 2005: 66).

Under the conditions of the domination of transnational corporations, the EU's post-Communist countries had small resources (if any at all) left to develop innovative national systems of their own which is why these countries are economically and technologically fully dependent on the developed states (including the Western European ones) (Vlaskin, Lenchuk, 2005: 66). It is well known that in the case of having a small amount of resources, the chances of success in innovation is rather small which is evidenced by the fact that, for example, the level of unsuccessfulness of innovative activities in the United States is estimated to be about 90 % (Mindeli, 2002: 82).

It is a fact that the EU has fallen behind the US and some parts of Asia in terms of innovations (Åslund, Djankov, 2017: 133-135). Today, the EU (and mostly Luxembourg, Sweden, Finland, Germany, Denmark and the Netherlands) has a real potential for catching up (Åslund, Djankov, 2017: 135).

As a result of the combinatorial augmentation processes taking place in some Western European countries, it has become a clear priority for these countries to facilitate the development of companies based upon cutting-edge technologies and moving traditional manufacturing, based upon the so-called old technologies, to the EU's post-Communist members (and some Western European countries as well). In other words, if the combinatorial augmentation process is mostly characterized by the co-existence of the old and new combinations in various sectors or sub-sectors of a single country in the case of the EU's single economic area, the older combinations were mostly shipped off to the post-Communist member states while some Western European members mainly prioritized cutting-edge technologies.

As a result, the applied research conducted in the EU's post-Communist countries is mostly oriented on the adaptation of technologies created in Western and some Asian countries. This, in its own right, facilitates the migration of the few remaining highly-qualified scientists and engineers from the EU's post-Communist countries to the Western European members or the US and developed Asian countries in search of better remuneration.

In addition, for the better adaptation of the technologies created in other countries, the EU's post-Communist countries are becoming more and more dependent on imports of some raw materials, machinery and technologies from these countries.

Taking all of these conditions into account, it can be inferred that the phenomenon of retroeconomy is clearly present in the economies of the EU's post-Communist (and not only post-Communist) states.

It is an unfortunate fact that innovative national systems are weakly developed in the EU's post-Communist states (Vlaskin, Lenchuk, 2005) which is why these countries are characterized not so much by *catching up* but, rather, by *falling behind* when the economic development of these countries is clearly technologically behind the standards of the economic development of the US and some Asian and Western European countries.

The creation of the EU single market for innovative products is very important for the transition to *catching up* for the EU member-countries (Åslund, Djankov, 2017: 139-141).

From the aforementioned types of economic growth, practically none can be found in the EP states which is a result of a clearly primitive plans.

Unfortunately, chronic poverty and the lack of the development of export potential is characteristic for the EP states economies.

The economic growth type which is characteristic to the EP states, I believe, can be assessed as *extremely falling behind* (Papava, 2018) when, unfortunately, the national innovation system is practically non-existent (at best it is in an extremely embryonic state) and where not only the usage of innovative technologies but also imitation, which is the copying and usage of already existing technologies, is almost impossible.

Taking all of the abovementioned into account, it is necessary for EP states to formulate the strategies which will enable it to move from *extremely falling behind* to *catching up* even if that means going through a period of *falling behind* as an intermediate step.

## 4. On the Catch-Up Effect Problem

In order to assess the economic growth indicators more or less objectively, we will use the data of the World Bank from before the start of the global financial and economic crisis and from a period maximally removed from that point. More specifically, the analysis will be done for the years 2006 and 2016. With this approach, we tried to maximally exclude the influence of the crisis on the economic growth of the countries included in the study. It should also be pointed out that the gross domestic product (GDP) data of various countries is in international dollars, taking its purchasing power parity (PPP) into account.

As is well known, the indicator ($r$) is used in order to measure economic growth which expresses the ratio of the real GDP change (meaning the difference between the reporting period ($Y^1$) of the GDP and the base-period ($Y^0$) of the GDP or $\Delta Y = Y^1 - Y^0$) to the real GDP base-period:

$$r = \frac{\Delta Y}{Y^0}$$

This indicator is used by economists to measure the economic growth of a given country and also how the economic growth indicator changes over the years.

Using these indicators, it is impossible to compare two or more countries. More specifically, in this case, due to diminishing returns on capital and with all other things being equal, it is possible to achieve a higher economic growth rate in countries with a lower level of economic development than in countries with higher levels of economic development. This fact is called the *Catch-Up Effect* (Mankiw, 2004: 546-547).

If we consider the economic growth rates (WB, 2018a) of the EU post-Communist member states as well as those of the EP states, it is easy to notice that generally in the post-Communist countries and especially in 2006, just before the global crisis, their economic growth was clearly higher than in the EU (see Table 1).

**Table 1.** Economic Growth and Economic Development Indicators in EU Post-Communist Countries and EP States in 2006 and 2016

| No. | **Countries** | **Indicators of Economic Growth** (in percentage terms) | | **GDP per capita, PPP** (in current international $) | |
|---|---|---|---|---|---|
| | | **Year** | | **Year** | |
| | | **2006** | **2016** | **2006** | **2016** |
| | **EU Post-Communist Countries** | | | | |
| 1 | Bulgaria | 6.8 | 3.9 | 11,377.90 | 19,509.00 |
| 2 | Croatia | 4.8 | 3 | 16,934.70 | 23,731.80 |
| 3 | Czech Republic | 6.9 | 2.6 | 23,790.20 | 35,139.60 |
| 4 | Estonia | 10.3 | 2.1 | 19,269.10 | 29,620.00 |
| 5 | Hungary | 3.9 | 2.2 | 18,308.50 | 26,996.80 |
| 6 | Latvia | 11.9 | 2.1 | 15,761.60 | 25,932.50 |
| 7 | Lithuania | 7.4 | 2.3 | 16,494.00 | 29,966.10 |
| 8 | Poland | 6.2 | 2.9 | 15,150.90 | 27,922.70 |
| 9 | Romania | 8.1 | 4.6 | 11,694.30 | 23,626.40 |
| 10 | Slovak Republic | 8.5 | 3.3 | 18,875.50 | 30,706.10 |
| 11 | Slovenia | 5.7 | 3.1 | 25,778.00 | 33,421.20 |
| | **Eastern Partnership Countries** | | | | |
| 12 | Armenia | 13.2 | 0.2 | 5,607.60 | 8,849.90 |

| | | | | | |
|---|---|---|---|---|---|
| 13 | Azerbaijan | 34.5 | -3.1 | 9,830.20 | 17,282.20 |
| 14 | Belarus | 10 | -2.6 | 11,389.60 | 18,090.70 |
| 15 | Georgia | 9.4 | 2.8 | 4,985.30 | 10,024.00 |
| 16 | Moldova | 4.8 | 4.1 | 3,190.10 | 5,342.60 |
| 17 | Ukraine | 7.3 | 2.3 | 7,184.20 | 8,271.80 |
| | **European Union** | 3.3 | 1.9 | 29,783.10 | 39,838.20 |

Based upon Table 1 and due to the *catch-up effect*, it is practically impossible to determine which countries are characterized with catching up growth with regard to EU economic growth and which have the *coat-tail growth* or are *falling behind*. For example, the fact that Azerbaijan had the highest actual economic growth in 2006 (34.5 %) does not mean that Azerbaijan necessarily had *frontier growth*.

It is quite clear that the economic development levels of the countries presented in Table 1 are different, for example, by the fact that the past (and in some cases the present, too) of the post-Communist countries is burdened with a *necroeconomy* (Papava, 2002). Hence, given a lower starting point (in which the post-Communist states found themselves due to their level of economic development), it is easier for post-Communist countries to achieve high economic growth due to the catch-up effect than it is for non-post-Communist countries.

The level of economic development is usually assessed through the GDP per capita. It is clear that this indicator is very different if we compare the EU member states to the EP countries (see Table 1) (WB, 2018b).

Hence, in order to be able to compare the economic growth indicators of the countries with different starting points in terms of economic development, it is necessary to exclude the *catch-up effect* which can be achieved, for example, by using the method based upon the *hypothesis of proportional overlap* (Papava, 2012, 2014). More specifically, let us agree on the level of hypothesis that the more economically developed a country is as compared to another one, the more difficult it is for the first country to achieve the same level of economic growth which is achieved by the second country.

If we use $N$ to signify the population of a given country, then the GDP per capita ($y$) will be

$$y = \frac{Y}{N}$$

Stemming from the essence of the *hypothesis of proportional overlap of the catch-up effect*, the proportional overlap coefficient of the catch-up effect $\alpha_{ij}$ shows how many times the GDP per capita for $i$ country ($y_i$) exceeds the same indicator of a $j$ country ($y_j$):

$$\alpha_{ij} = \frac{y_i}{y_j}$$

At first glance, it is better to take a country with the biggest GDP per capita (in our case, Luxembourg) as the $i$ country (or, provisionally, the *Etalon* country), making it more difficult for this country to achieve a high level of economic growth. It must be noted that it is also acceptable to take the respective indicators of any other country to set as the *Etalon* country as the ratio of the final results (meaning the adjusted economic growth indicators) does not change due to the *invariance theorem* (Papava, 2016).

Given the goals of this study, it is logical to take the GDP per capita of the EU ($\bar{y}$) as the *Etalon* indicator as in this case it will enable us to compare both the EU post-Communist member states as well as those of the EP to the EU's economic growth and its level of economic development. Hence, for the goals of this study, the proportional overlap coefficient ($\bar{\alpha}_j$) will be

$$\bar{\alpha}_j = \frac{\bar{y}}{y_j}$$

These coefficients are presented in Table 2. The parameters given in this table show how many times the GDP per capita of the EU is more or less as compared to the respective indicators of the individual countries.

**Table 2.** Proportional Overlap Coefficients of the Catch-Up Effect (Ratio of the GDP per capita of the EU with the Same Indicators of Individual Countries)

| No. | Countries | Years | |
|---|---|---|---|
| | | 2006 | 2016 |
| | **EU Post-Communist Countries** | | |
| 1 | Bulgaria | 2.617627 | 2.042042 |
| 2 | Croatia | 1.758703 | 1.678684 |
| 3 | Czech Republic | 1.251906 | 1.133712 |
| 4 | Estonia | 1.54564 | 1.344976 |
| 5 | Hungary | 1.626736 | 1.475664 |
| 6 | Latvia | 1.889599 | 1.536227 |
| 7 | Lithuania | 1.805693 | 1.329442 |
| 8 | Poland | 1.965764 | 1.426732 |
| 9 | Romania | 2.546805 | 1.686173 |
| 10 | Slovak Republic | 1.577871 | 1.297403 |
| 11 | Slovenia | 1.155369 | 1.192004 |
| | **Eastern Partnership Countries** | | |
| 12 | Armenia | 5.311203 | 4.501542 |
| 13 | Azerbaijan | 3.029755 | 2.305158 |
| 14 | Belarus | 2.614938 | 2.202137 |
| 15 | Georgia | 5.974184 | 3.974282 |
| 16 | Moldova | 9.336102 | 7.456706 |
| 17 | Ukraine | 4.145639 | 4.816146 |
| | **European Union** | 1 | 1 |

Taking into account that the actual economic growth of a country $j$ was $r_j$, while the ratio of the economic development level of the EU with that of the country $j$ is $\bar{\alpha}_j$, it follows that the adjusted economic growth of the country $j$ ($\bar{r}_j^*$), taking the proportional overlap hypothesis of the catch-up effect into account, will be

$$\bar{r}_j^* = \frac{r_j}{\bar{\alpha}_j}$$

In other words, $\bar{r}_j^*$ does not show the actual economic growth of a country $j$ but, rather, its adjusted indicator, taking into account the difference between the economic development levels of the EU and the country $j$. The adjusted economic growth data are presented in Table 3.

**Table 3.** Adjusted Economic Growth Data

| No. | Countries | Years | |
|---|---|---|---|
| | | 2006 | 2016 |
| | **EU Post-Communist Countries** | | |
| 1 | Bulgaria | 2.597773 | 1.909853 |
| 2 | Croatia | 2.729285 | 1.787114 |
| 3 | Czech Republic | 5.511595 | 2.293351 |
| 4 | Estonia | 6.663904 | 1.561366 |
| 5 | Hungary | 2.397438 | 1.490855 |
| 6 | Latvia | 6.297633 | 1.366986 |
| 7 | Lithuania | 4.09815 | 1.730049 |
| 8 | Poland | 3.153989 | 2.032618 |
| 9 | Romania | 3.180456 | 2.728071 |
| 10 | Slovak Republic | 5.387006 | 2.543542 |
| 11 | Slovenia | 4.933489 | 2.600663 |

| | **Eastern Partnership Countries** | | |
|---|---|---|---|
| 12 | Armenia | 2.485313 | 0.044429 |
| 13 | Azerbaijan | 11.38706 | -1.34481 |
| 14 | Belarus | 3.824182 | -1.18067 |
| 15 | Georgia | 1.573437 | 0.70453 |
| 16 | Moldova | 0.514133 | 0.549841 |
| 17 | Ukraine | 1.760887 | 0.47756 |
| | **European Union** | 3.3 | 1.9 |

If we compare the adjusted economic growth data in Table 3 with the actual economic growth data in Table 1, we will find essential differences.

Basing upon the adjusted economic growth indicators, in order to clearly imagine the quantitative differences between the EU, the post-Communist countries of the EU and the EP states, it is advisable to present these indicators graphically. For this, it is necessary to rank the levels of the economic developments of each given country with regard to the level of the EU's economic development. For this purpose, we will divide the GDP per capita by individual country by the respective EU indicator ($\bar{\beta}_j$)

$$\bar{\beta}_j = \frac{y_j}{\bar{y}}$$

The appropriate indicators are presented in Table 4.

**Table 4.** Ratio of the GDP per capita by Individual Country to the Same Indicator of the EU

| No. | **Countries** | **Years** | |
|---|---|---|---|
| | | **2006** | **2016** |
| | **Post-Communist Countries** | | |
| 1 | Bulgaria | 0.382025 | 0.489706 |
| 2 | Croatia | 0.568601 | 0.595705 |
| 3 | Czech Republic | 0.798782 | 0.882058 |
| 4 | Estonia | 0.646981 | 0.743507 |
| 5 | Hungary | 0.614728 | 0.677661 |
| 6 | Latvia | 0.529213 | 0.650946 |
| 7 | Lithuania | 0.553804 | 0.752195 |
| 8 | Poland | 0.508708 | 0.700903 |
| 9 | Romania | 0.392649 | 0.593059 |
| 10 | Slovak Republic | 0.633765 | 0.77077 |
| 11 | Slovenia | 0.865524 | 0.838923 |
| | **Eastern Partnership Countries** | | |
| 12 | Armenia | 0.188281 | 0.222146 |
| 13 | Azerbaijan | 0.33006 | 0.43381 |
| 14 | Belarus | 0.382418 | 0.454104 |
| 15 | Georgia | 0.167387 | 0.251618 |
| 16 | Moldova | 0.107111 | 0.134107 |
| 17 | Ukraine | 0.241217 | 0.207635 |
| | **European Union** | 1 | 1 |

In order to represent the adjusted economic growth data of the countries as well as their level of economic development on a graph, we will take the ratio of the GDP per capita by country to the same indicator of the EU $\bar{\beta}_j$ on the abscissa axis and the data adjusted basing upon the proportional overlap hypothesis of economic growth ($\bar{r}_j^*$) on the ordinate axis. On every graph presented below, 1 on the abscissa axis corresponds with the GDP per capita of the EU according to

which the same indicators of every country are ranked while for the 2006 graphs we see the EU economic growth rate – 3.3 and for 2016 – 1.9 on the ordinate axis (see Tables 1 and 3).

After excluding the catch-up effect in the post-Communist countries of the EU (Figures 1 and 2) as well as the EP states (Figuress 3 and 4), we have an interesting picture.

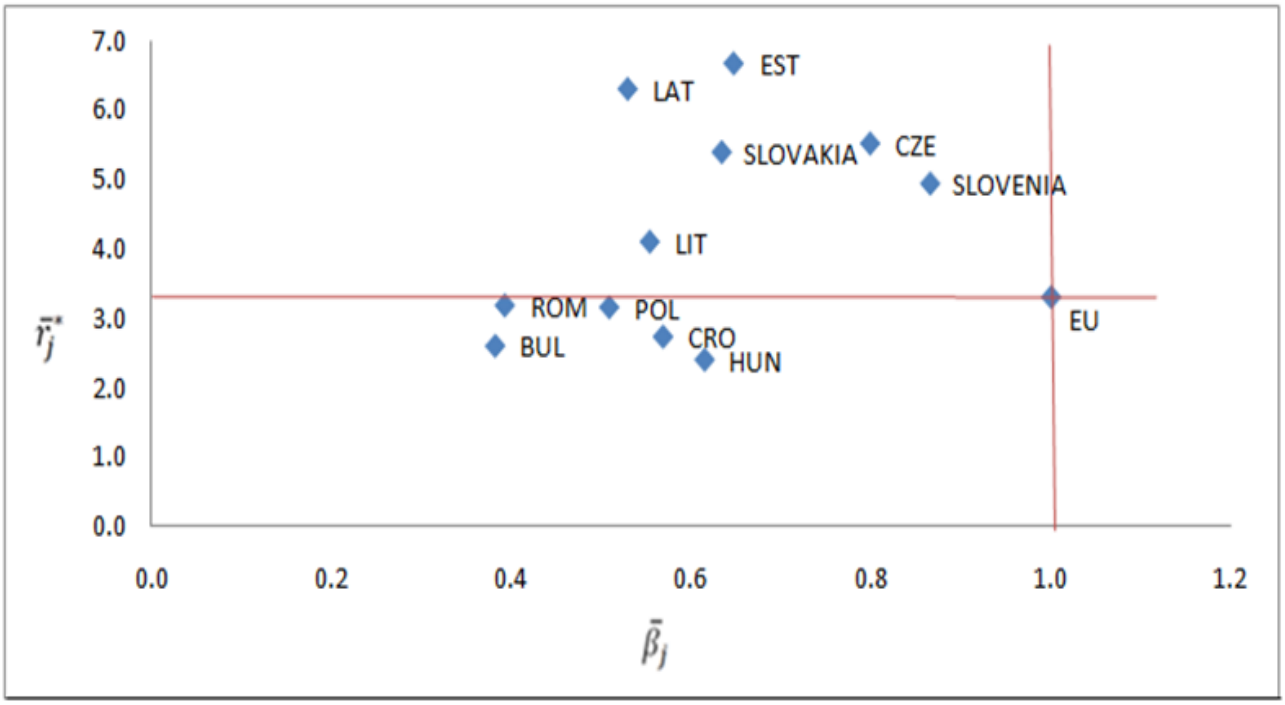


**Fig. 1.** Adjusted Economic Growth of the Post-Communist Countries of the EU and their Economic Development Level as Compared to that of the EU in 2006

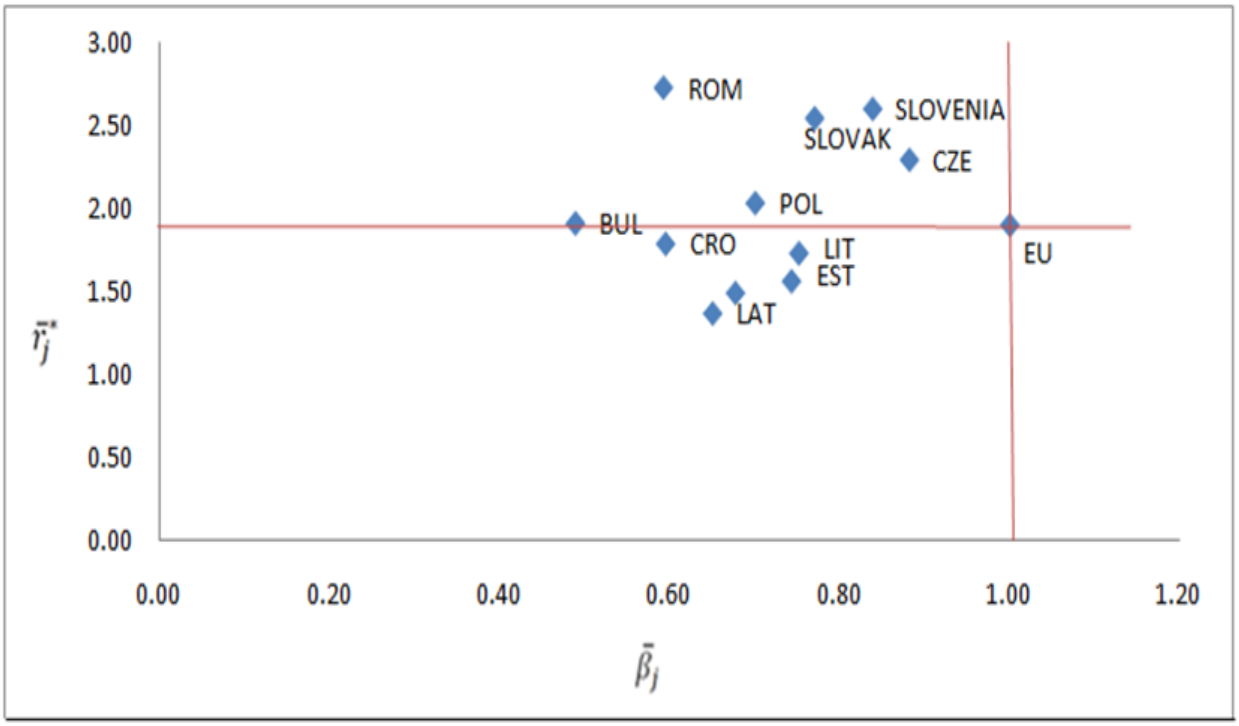


**Fig. 2.** Adjusted Economic Growth of the Post-Communist Countries of the EU and their Economic Development Level as Compared to that of the EU in 2006

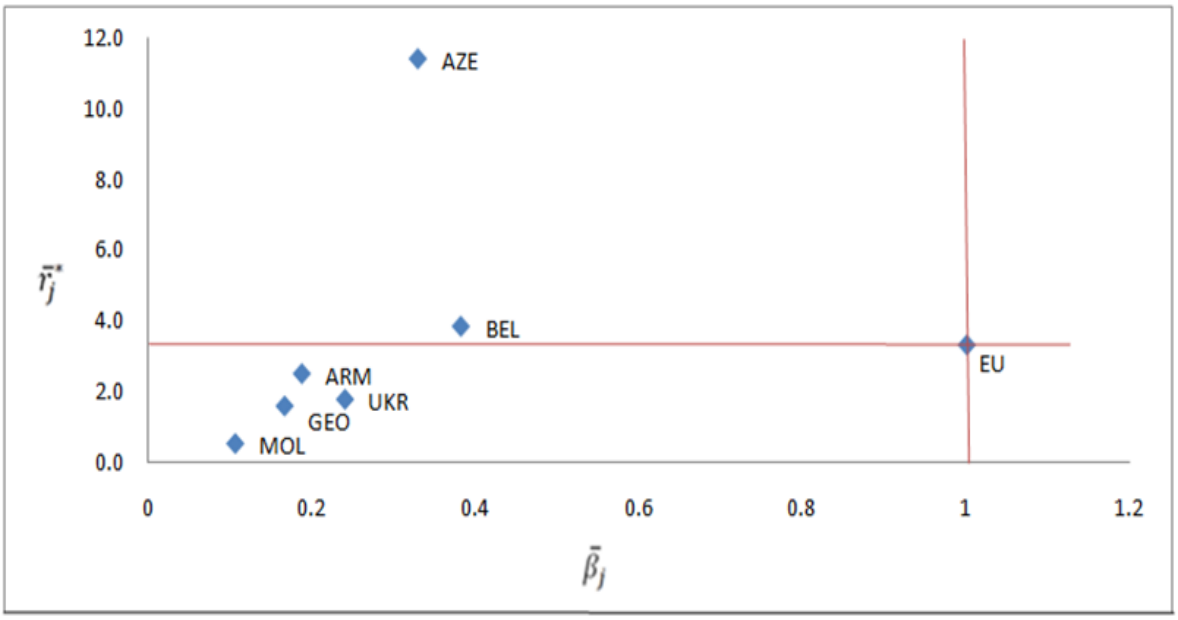


**Fig. 3.** Adjusted Economic Growth of the EP States and their Economic Development Level as Compared to that of the EU in 2006

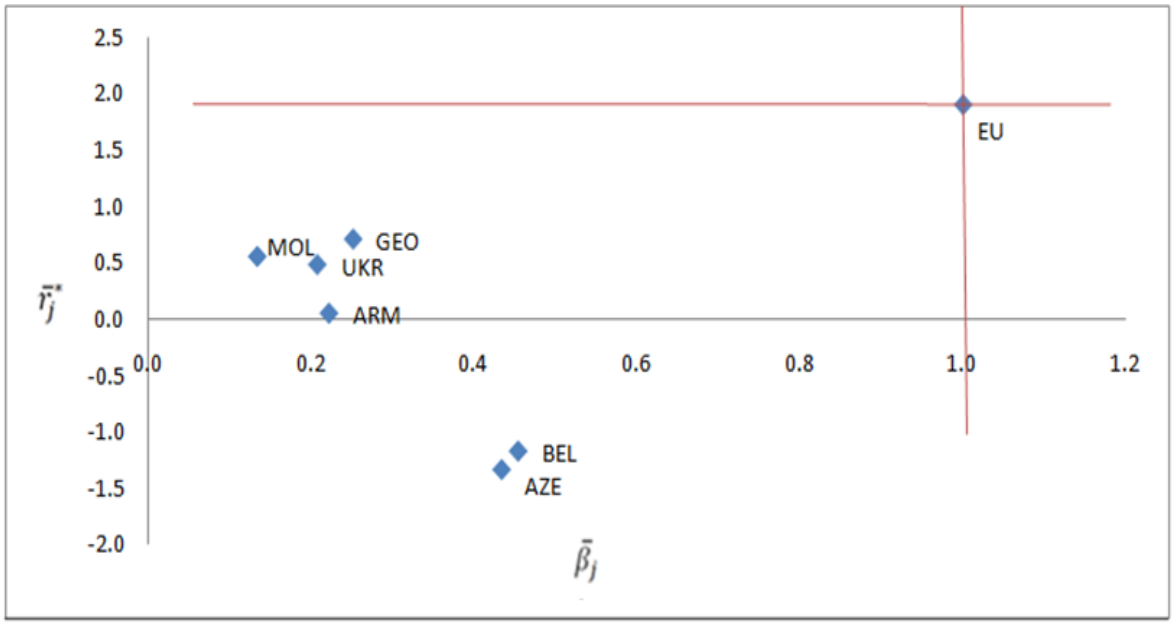


**Fig. 4.** Adjusted Economic Growth of the EP States and their Economic Development Level as Compared to that of the EU in 2016

Figures 1 and 2 make it clear that based on a ten year interval, in 2006 and 2016, only Slovakia, Slovenia and the Czech Republic from the post-Communist countries of the EU had clearly defined and relatively high economic growth while other countries showed no such stability with the economic growth indicators of Hungary and Croatia pointing to a clearly defined *falling behind*.

It is clear that in order to diagnose what type of economic growth the abovementioned countries have, it is not enough to merely exclude the catch-up effect – it is necessary to use a whole system of indicators (UNIDO, 2005). In addition, it is advisable to take a more-or-less lengthy time period in order for the economic growth trends to be better revealed. It is no less important that from this time period, the points of global or regional economic and crisis periods be excluded so that the crisis does not distort the image of the economic growth type under consideration.

In this regard, the adjusted economic growth indicators of the EP states are even more troubling (see Figures 3 and 4).

Both in 2006 as well as in 2016, the EP states seriously lag behind the indicators of the EU when it comes to the level of economic development.

Even after excluding the catch-up effect for 2006, only Azerbaijan can be singled out due to its high level of economic growth; however, this does not mean that this country can be characterized by *catching up*. If we remember that the economy of Azerbaijan is characterized by the production and exports of oil and gas (in which terms 2006 was also a special year (Papava et al. 2009: 50)), it is undeniable that the economic growth type of this country is *coat-tail growth*. The reduction of oil prices on the world market had quite painful results for the economy of Azerbaijan which was one of the important reasons for the economic recession of 2016.

It can be concluded unequivocally that the EP states are not characterized by *catching up* at all and, unfortunately, the type of their economic growth is either *falling behind* (maybe even *extreme falling behind*) or *coat-tail growth*. In order to tell which one has which, it is necessary to study the main features of individual economies.

## 5. Conclusion

The EU's post-Communist countries as well as the EU in general are participating in the implementation of the Lisbon Strategy which aims to create an economy of knowledge. The usage of *catching up* is extremely important in achieving this strategy's goals as it will ensure a convergence between economically developed countries and developing countries.

*Falling behind*, on the other hand, facilitates a divergence between developed countries and developing countries as labor-intensive and resource-based goods hold the dominant place in the national economy in this model.

Based on practice, it is a fact that both modern as well as old technologies are often simultaneously present in the differing sectors or sub-sectors of a country's economy.

The combinatorial augmentation concept is a continuation of Schumpeter's economic development theory if we take modern realities into account.

Almost a decade of preparation for EU membership has had a very important influence on the EU's post-Communist countries. This period was allocated for the restructuring of the individual economies in order to reduce production expenditures and qualitatively reform production processes.

Starting from the 1990s, the EU began investing in the geographically neighboring post-Communist countries on or near its borders. More specifically, the relative low wages required by highly-qualified scientists and engineers from these countries, as compared to those from Western Europe, was beneficial for transnational corporations. In this way, it became possible for the EU's post-Communist countries to achieve a more-or-less stable economic growth and expand their export potential.

Unfortunately, these countries failed to create their own national innovation systems as transnational corporations used up the innovative potential inherited by these countries from the command economy solely according to their interests.

The combinatorial augmentation process revealed itself in the EU's post-Communist countries in a special way when old and new technologies not only co-exist in different sectors or sub-sectors but have also been distanced in terms of geography: new technologies are mainly concentrated in some Western European and other developed countries while older technologies were mostly left for the EU's post-Communist countries.

As a result, the dependence of the EU's post-Communist countries on imports, especially machinery, from some Western European countries (and, in general, from the developed world) is growing. It is clear that the economies of the EU's post-Communist countries are a good polygon for maintaining a retroeconomy and implementing the combinatorial augmentation process in this way.

For the EU's post-Communist countries, *falling behind* are more characteristic than *catching up* which is a result of the unfortunate fact that the national innovation systems in these countries are weakly developed.

Unfortunately, economic growth types of Eastern Partnership are based on the *extremely falling behind* model.

Excluding the catch-up effect is of special importance in making a quantitative assessment of the differences between the economic growth of the states of Central and Eastern Europe that did have a Communist past. For this purpose, the method based upon the proportional overlap hypothesis can be used.

After excluding the catch-up effect, the most promising economic growth in the post-Communist countries of the EU can be found in Slovakia, Slovenia and the Czech Republic.

Unfortunately, the economic growth types of the EP states are not satisfactory. It is clear that characteristic to these countries are *falling behind* (or, more accurately, *extremely falling behind*) and *coat-tail growth*.

In order to study the economic growth type for each country with more precision, after the catch-up effect is excluded, the use of a special system of indicators is necessary.

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# The Impact of Volunteering in the Economy of Mega-Events

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**Abstract**

Major local and international events require significant financial and labour investments. Modernization of infrastructure and marketing activities are largest part of organizational and holding expenditures. However, the share of the wages fund is also significant, that's why the practice of engaging the unpaid volunteers is becoming more and more popularity. Despite the relatively short history of development the event-volunteer's movement in Russia specialized centers for the volunteer's training has already been formed and actively operating now. Tens of thousands of volunteers pass a qualification every time before the events, and the economic and social contribution of volunteer activities to the event industry and country's economy is constantly growing. Volunteering is a source of self-development and improvement of professional skills for both young and older generations. And in many developed countries it is also an impressive share of gross domestic product. The aim of the study is to assess the impact of volunteering in the economy of mega-events.

**Keywords:** volunteerism, event volunteering, mega events, economic impact.

## 1. Introduction

In the modern world volunteerism is very popular and has a long history of formation and development. According to statistics, every third German is a volunteer, more than a quarter of Japanese have a volunteer past. The undoubted leaders in the number of citizens involved in the volunteering (more than 50 % of the population) are Norway, Luxemburg and Cameroon. The volunteer movement in Russia has started development recently, mostly due to the implementation of the volunteer program of organizing Committee "Sochi 2014". Today, event volunteering is the most massive and crowded form of volunteer activities. The engagement of volunteers in large-scale events allows to reduce its cost value; to decrease the organizational burden on specialists and thus to improve the potential of the region, state or country as a venue for events of various level and scale.

## 2. Study Area

In the specialized scientific and publicist literature special attention pays to the study of popularity of volunteer movement in the modern world and event volunteering in particular as the most numerous one. Many Russian and foreign scientists devote their works to research of history and prospects of volunteering, great number of works aimes at studying its social aspects (Getz, 2008; Smith, Lockstone, 2013; Tarasova, 2012). Not enough attention is paid to the economic side

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of the issue. This is largely due to the lack of an information base for analysis of statistical data on volunteer activities.

## 3. Discussion

In the modern scientific and journalistic literature great attention is paid to the assessment of the role and importance of volunteering as a source of enhancing social responsibility of young people, education of healthy, active and patriotic generation. In addition to improvement of the moral character of the nation, volunteering also contributes to socio-economic development of the country. All of the mentioned above characteristics and aspects explain the rapid growth of such movements around the world, and consideration of the development of volunteering as a priority area of social and youth policy of the country. Socio-educational significance of voluntary participation (volunteering) underlined in the studies of Reshetnikov O.V., Tarasova N.V. and others. Reshetnikov O.V. defines volunteering as "a form of social service", stimulating the personal growth of all participants (Reshetnikov, 2005). Tarasova N. D. under the volunteer understands "a form of civic participation in public benefit duties" and "effective mechanism for solving actual social problems" (Tarasova, 2012). In a more general understanding volunteering is unpaid, conscious, voluntary activities for the benefit of others.

In recent years the most popular form of volunteering among young people is considered to be event volunteering. Today, practically none of the massive event cannot be hold without engaging volunteers. The most of them are young students, focused on finding new social contacts (networking), recognition in society, with its capacity and self-development. Event volunteering includes participation in organization and holding of various types of events: business, cultural, sports, educational, military-patriotic, official and other. This kind of volunteering refers to contemporary forms of volunteering, based on the intention of self-realization, the pursuit of personal interests and participation in the modern and "trendy" areas. Features of event volunteering are:

- The presence of the temporary framework – limited duration of activities;
- The need for some training for volunteers before engagement;
- Organizational nature of volunteering: attracting of volunteers is carried out through specialized volunteer centers, or event organizations;
- Competitive character of the volunteers approval;
- There is certain mutually beneficial cooperation between volunteers and organizers of the event – reduction of altruism share in volunteer activities.

Event volunteers are often assigned to certain event-organizations. Some of them fully supervise the activities of volunteers, and some appear only at certain stages. These organizations are responsible for training of volunteers, organizing and control of their activities. The involvement of volunteer centers and specialized organizations in the process depends on the level and scale of events. The events, which require volunteer activities, can be classified by type, scope, frequency and venue. Volunteers can be involved in any events (sports, cultural, and business), but studies show that the most frequently volunteer activities is carried out at sport and business events, but less often in the organisation of cultural ones. The most common classifications of activities that are serviced by volunteers are presented in Table 1.

**Table 1.** Classifications of events with the involvement of volunteers

| According to... | | | |
|---|---|---|---|
| Size | Sphere | Form | Frequency |
| • International (mega-events)<br>• National (medium scale)<br>• Local (regional) | • Cultural<br>• Sports<br>• Business | • Public<br>• Private<br>• Non-profit | • Constant<br>• One-time<br>• Spontaneous |

The most significant impact of volunteering associations is in organization and holding of large-scale events, including international and world ones. Mega-events as global events in

politics, economics, culture and sport fully reflect the effects of globalization in the modern world: the participants and audience of today's mega-events do not have quantitative and territorial boundaries. Sport mega-events becomes special popular nowadays, most notably the Olympic Games and World Championships, going beyond the actual sporting events due to the growth of their political, socio-economic and cultural the significance (Smith, Lockstone, 2013). The frequency and duration of events has a direct impact on the involvement of volunteers and managing of their activities. Events taking place once bring one-time experience for volunteers. Long-term events, in contrast, occur on a regular basis and allow to learn from mistakes and develop. Event-organization and agencies organizing such events are characterized by rapidity of the structure transformation, steady growth of the staff and volunteers at the period of events (Hallmann, Harms, 2012).

Venue of the event can be fixed and non-fixed. Events belonging to the first group, often have the same location from year to year. In literature for such events there is the term "hallmark" (Getz, 2008). Events held on a regular basis and at a certain place, often result in creation of communities of volunteers who carry out the activity every time the event is held. This allows to avoid additional expenditures for the training of volunteers.

Recruiting volunteers for the event also brings certain costs for the organizers. The cost of volunteer support activities includes equipment, training, food, and in certain cases accommodation of nonresident volunteers. However, these cost significantly less than wage of paid employees.

The most large-scale events that have took place yet and only in preparation stage in Russia are the Olympic and Paralympic games in 2014 in Sochi and the World Football Championship in 2018. These events entailed a major expenditure, both the Federal and regional budgets and private investors. According to data from 06.02.2017 for preparation and holding of the Olympics in 2014 it was planned to spend little less than 639 billion rubles (Raskhody na Chempionat...), 55 % of the amount is direct investments from the federal budget, 14 % – contribution of regional budgets and 31 %-the share of private investors. However, according to data of March 2018, the total cost exceeded 1.5 trillion rubles (Skol'ko stoila Olimpiada).

The overall cost for the preparation of another one mega-event – the World Cup has exceeded 1.3 trillion rubles (Raskhody na podgotovku k ChM-2018...). Most of these funds were directed to the formation and reconstruction of infrastructure facilities, but the share of the wage fund of workers is also high. In comparison with foreign countries, Russia leads in the value of cost for similar events.

The recruitment of volunteers for support and service during the games allowed to avoid an even high material costs. Consider the substituting approximate cost of the volunteer work on the example of the Olympic games 2014 in Sochi. Table 2 presents the main function of volunteers at the Games and calculation of the approximate substituting cost based on average wage and effort.

**Table 2.** Calculation of the average substituting cost of volunteers' work at the Olympic Winter Games in Sochi

| № | Function | Number of people | Average wage rates, person/month | Labor costs, person/day | Duration (days) | Labor costs, rub. |
|---|---|---|---|---|---|---|
| 1 | Interaction with the IOC/NOC and IPC/RPC | 1900 | 21333 | 969.68 | 9 | 16 581 559,09 |
| 2 | Arrivals and departures | 400 | 21333 | 969.68 | 9 | 3 490 854,55 |
| 3 | Ceremony | 1500 | 26621 | 1 210,05 | 2 | 3 630 136,36 |
| 4 | Protocol | 300 | 21333 | 969.68 | 9 | 2 618 140,91 |
| 5 | Olympic village management | 4900 | 26621 | 1 210,05 | 9 | 53 363 004,55 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 6 | Medical care | 600 | 22346 | 1 015,73 | 9 | 5 484 927,27 |
| 7 | Doping control | 500 | 21333 | 969.68 | 9 | 4 363 568,18 |
| 8 | Technology | 1000 | 26621 | 1 210,05 | 9 | 10 890 409,09 |
| 9 | Press work | 1000 | 26621 | 1 210,05 | 9 | 10 890 409,09 |
| 10 | Transport | 3300 | 31557 | 1 434,41 | 9 | 42 601 950,00 |
| 11 | Accreditation | 900 | 21333 | 969.68 | 102 | 89 016 790,91 |
| 12 | Maintenance activities for OG and POG | 7500 | 21333 | 969.68 | 9 | 65 453 522,73 |
| 13 | Language services | 1200 | 26621 | 1 210,05 | 9 | 13 068 490,91 |
| **Total cost:** | | | | | | **321 453 763,64** |

Source: calculated by the author

The estimated average wage based on the official data on the average level of wages in Russia by types of economic activities and professions in 2014. The Olympic games lasted for 18 days. However, considering the changeable nature of the work of most volunteers, for assessment we take rate of 9 days per 1 person. Issuing accreditations/fans passports was continuing from September 2013 till January 2014, this period includes 102 work days. The function "Ceremony" includes volunteers who participated in the Ceremonies of opening and closing of the Olympic games.

According to the official data, 25 thousand volunteers were involved in the games. According to presented above calculations, the average labor cost of the volunteer day was about 1100 rubles. The final payroll of the volunteers involved in the games is more than 321 billion rubles. It is worth noting that the official involvement of the paid workforce, this amount would have been increased because of fiscal and insurance payments.

For the World Football Championship of 2018 nearly 15 thousand of volunteers were engaged. About 90 % of all attendants of this event are volunteers. Even without taking into account changes in the average wage of specialists from 2014 to 2018, and calculate the approximate replacement cost of volunteer work at the FIFA world Cup based on the data from 2014, the sum is very significant. The average wage in areas selected for analysis in Table 2, has been increased by 10% since 2014 (Official site upravlenie...). To update the data of the replacement cost of volunteer labour during the FIFA championship in 2018, we index the average value of a volunteer day in 2014. Thus, the estimation of the working day of a volunteer in 2018 is 1,200 rubles.

A comparison of the volunteers' contribution to the economy of mega-events on the example the Olympic games and the World Footbal Championship are presented in Table 3.

On average, for both considered events the share of the substitute cost of volunteer labor was more than 20 %, so involvement of volunteers allows to reduce the costs by almost a quarter. Despite the fact that in addition to volunteering there are the selections for the paid positions, the popularity of volunteering is constantly growing. For the Olympic games 2014, there were more than 200 thousand volunteer applications. At the World Cup and Confederation Cup more than 117 thousands of volunteers have applied, the competition amounted to 116 people per place (FIFA, 2018). At the same time selection criteria become stricter, increasing qualification requirements for volunteers. For example, 4171 volunteer applied for the option "Protocol" at the world footbal championship in 2018, but only 2495 ones have passed the interview stage, 1205 volunteers were recommended, and in the end approved only 606 people, that is less than 25 % of the candidates.

**Table 3.** Economic aspects of volunteering at mega-events

| | Total cost, bln. rub. | The number of volunteers, people. | The average labor cost of the volunteer day, rub. | The total substitute cost of volunteer activities, bln.rub. | The ratio of the value of volunteering and total cost, % |
|---|---|---|---|---|---|
| Olympic Games 2014 | 1500 | 25000 | 1100 | 321 | 21.4 |
| Championship FIFA 2018 | 1300 | 15000 | 1200 | 288 | 22.2 |

Source: calculated by the author

In journalistic literature authors often note about the cost of training procedures and uniforms for volunteers. For example, the standard set for volunteer at the Olympic games 2014 in Sochi cost about 28 thousand rubles, considering the total number of volunteers (25 thousand people) it is a very impressive sum. However, it is worth noting that in the case of recruitment of paid employees, these costs could not be avoided, as an integral element of such events is the use of symbols and standardized uniforms for staff.

The economic advantage of engaging volunteers to the mega-events is affected by the following factors:

1. The number of guests and required personnel – volunteers: the greater the number of employees required for the event, the more significant the savings from the engagement of volunteers;
2. The required level of personnel qualification: the hiring of highly qualified personnel (for example, with the knowledge of foreign languages) on a paid basis can become a major item of expenditure, and the involvement of volunteers in this case brings tangible positive effect;
3. Availability of volunteer centers in the region of the event: the involvement of local volunteers reduces costs on transport and accommodation of them during the event;
4. The services of the centers of volunteer's preparation: the possibility of involving trained volunteers with experience of performing at similar functions allows to save time and money, because they do not need complex training.

Insufficient level of control and organization of volunteer work can lead to a reduction in the quality of services and therefore ruin the positive impression the guests. Therefore, in the pursuit of savings, it is important not to forget about quality. In the organization of volunteer groups for mega-events they attract approved specialized centers which are professionally involved in the selection and training of candidates.

## 4. Conclusion

Thus, event volunteering brings huge socio-economic impact, both for organizers and for participants. There is a forecast that in the near future, the total economic impact of volunteer activities will reach 125 billion rubles (Tsena bestsennogo). Share of event-volunteering in that indicators depends exclusively on the number of large-scale events held in the country. Evaluation of the economic components of volunteer programs within the framework of certain events showed that the volunteers can significantly reduce organizational costs.

Often at such events as Olympic games and World Championships in the cumulative assessment expenses exceed income. This is primarily due to the need for infrastructural improvements and redesigns. But in the future, if similar events will repeat in the region and there will no need of serious renovations, recruiting volunteers to the organization and maintenance will save budget of events from deficit.

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