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OPEN ACCESS ARTICLE

# INTERNATIONAL REMITTANCES AND POVERTY REDUCTION IN NIGERIA

**Dennis Ewubare, Godspower Ebimotimi Okpoi**

Department of Agriculture and Applied Economics, Rivers State University, Port Harcourt, Rivers State Nigeria

**Abstract**

The study examined the impact of international remittances on poverty reduction in Nigeria. Using time series data on poverty incidence, inward and outward remittances, ODA and technical cooperation grants in Nigeria and applying the ARDL method in analyzing the data, the result indicates that: inward and outward remittances have diverse effects on poverty reduction in Nigeria in the short run. Also in the short run, inward remittances impact was significant while outward remittance was not. ODA and technical cooperation grants also have conflicting effect on poverty in the short run. In the long run, inward remittances intensified poverty while outward remittances, ODA and technical cooperation grants all reduced poverty incidence in Nigeria given their negative coefficients. All the explanatory variables were insignificant in the long run. Based on this result, the study recommended for investment in foreign countries in order to diversify the income source of the economy, create conducive atmosphere for inflow of grants and reduce bottlenecks that hinder inflows of foreign funds as possible ways of reducing poverty in Nigeria.

*Key words*: Poverty; Inward remittances; Outward remittances; Development assistance; Technical cooperation grants.

## INTRODUCTION

In developing countries, there have been increasing attention on remittances as critical sources of foreign exchange earnings for their economies and income for households. In relation to the proportion of labor migration as advocated in the New Economics of Labor Migration (NELM), the amount of international remittances flows has increased substantially in recent times. For instance, the World Bank (2013) reported that foreign remittances constituted the single largest source of external fund, surpassing export earnings, foreign direct investments (FDI) and other types of private capital flows. Also the practice of remitting money by migrants to their countries of origin has continued to rise in pace and magnitude at national, regional and international levels. The official flows of remittances for developing countries as

reported by the World Bank (2014) increased from USD 200 billion in 2003 to USD 404 billion in 2013. The World Bank also reported that remittance inflows to sub-Saharan Africa increased to about USD 18.6 billion constituting about 3.7% of the gross domestic product (GDP).

From both theoretical and empirical views, remittances have been identified to have impacts on the economy through their effects on growth and development. Remittances provide opportunities for poverty alleviation through increase in the recipients' income and standard of living (Adams & Page, 2005; Siddiqui & Kemal, 2006; and Gupta et al., 2009). Similarly, Iheke (2012) remarked that international remittances are very important for reductions in poverty and inequality as well as overall development. Other channels through which remittances influence macroeconomic outcomes are through their impacts on economy wide aggregate, especially output, exchange rate human capital amongst others.

Hnatkouska and Louyza (2003) and Chaimi et al. (2009) argued that constant inflows of remittances reduce macroeconomic shocks, especially volatility in output. This enhances rapid growth of the economy. More so, Ratha et al., (2009) remarked that remittances are important for the development of the financial sector which help in reducing credit constraints for investment purposes and in turn stimulates rapid economic growth. Furthermore, remittances inflows also cause the domestic currency of the recipient country to appreciate. This appreciation in the exchange rate is perceived by Acosta et al., (2007) as growth-retarding. The net effects of remittances on human capital as identified in existing literature are mixed. On one hand, remittances are expected to boost human capital formation through the investment of the remitted funds on education. This tends to increase employment opportunities and in turn reduce poverty. However, skill shortages and fall in net stock of human capital on the other hand, are the obvious negative outcomes of labor emigration in the remittance recipient countries. These controversies on the macroeconomic impacts of remittances have among others remained the major source of surge in the literature on the economics of remittances in the recipient countries.

It is noteworthy that over the years, Nigeria has remained outstanding in terms of inflows of remittances at both regional and global levels but has not really utilize it as a major sources of foreign exchange. For instance, Hernandez-Coss and Bun (2006) opined that Nigeria is the highest recipient of remittances in the sub-Saharan Africa as the country accounts for approximately 65 % of the officially remitted funds in the region and 2% at the global level. Similarly, Iheke (2012) remarked that Nigeria received nearly USD 2.26 billion remittances in 2004. According to the World Bank (2008), about twenty million Nigerians in the diaspora remitted about USD 7 billion in 2008.

Despite the huge income remitted to Nigeria by her nationals oversea, it is worrisome to the country still faces tremendous challenges in addressing the problems of poverty

and inequality as well as stimulating the growth potentials of the domestic economy. Unarguably, the macroeconomic impacts of remittances are mostly captured through economic growth and socio-economic indicators, especially poverty reduction and fall in inequality amongst others. Whilst these macroeconomic impacts of remittances have received considerable attention in other countries, the effects of remittances at various levels in Nigeria seem not to be adequately explored even as numerous reports and empirical evidence indicate that Nigeria surpasses other countries in Africa in terms of inflows of remittances. It is in light of these scenarios that this paper seeks to examine the effect of international remittances on poverty reduction in Nigeria.

## LITERATURE REVIEW

Scholars have explored motives behind movement of persons across national borders and remittances by migrants. The views of these scholars are examined under the theoretical underpinning for movement of persons and remittances and case studies. Theoretically, the Neo-classical theory of migration pioneered by Hicks (1932) and expanded by Lewis (1954) and Harris and Todaro (1970) explained international labor migration in the light of economic development. According to the theory, the decision to migrate is solely a function of the migrant welfare and not the social welfare of the migrant's household. From the macroeconomic stance, the neo-classical economic theory argues that real wage differences among different economies are the driving force of migration and flow of capital (Lewis, 1954).

The developmentalists position on migration and remittances championed by Todaro (1969) is in consonance with the argument of the remittance-optimist school which posits that migration is an important agent of change and innovation. For instance, Englama (2009) argued that developing economies encouraged emigration as it is perceived as engine of national development and migrants are described as change agents, innovators and inventors. Again, it is expected that labor migrants would re-invest their earnings substantially in enterprises in their home economies to boost rapid economic growth and development.

Based on the neo-classical theory and developmental view on migration, Lucas and Stark developed three motives behind migrants' remittances. Lucas and Stark (1985), in their pure altruism motive argued that the basis for remitting money is based on the selfless and concern of migrants to support their households in their home country. The proponents of pure altruism are of the view that the drive for migrants to remit money is the care they have for their households and the decision to provide them with additional income. According to Lucas and Stark (1985), migrants optimize their social welfare by remitting funds because they are concerned about the welfare and consumption behavior of their household.

The self-interest motive (Lucas & Stark, 1985) assumes that the tendency to remit is purely based on selfish motivations. The first motivation is the ambition to inherit property in the home country of the migrant. With this motivation, the money is sent home with intentions of using it for investments in the current period, which the migrant can inherit in the future. The second motivation is related to the intention of investing in the home area with the remitted money and that the family will maintain the property until the period the migrant returns. The last one is based on making the transition home easier for the migrant so the remitted money is used to invest in either fixed capital such as real estate or livestock, in public assets such as political influence, or in social assets (Lucas & Stark, 1985). According to Vargas-Silva and Huang (2006), some emigrants send money to their home countries with the intent of returning home in the future and can equally enjoy the gratitude of family members for sending some money home while working in the diaspora.

The theory of tempered altruism proposed by Lukas and Start (1985), assumes that remittances are mutually beneficial to a migrant and the family members he/she left behind in the country of origin. This mutually beneficial arrangement is mainly characterized by both investment and risk motives. According to Van-Dalen et al, (2005), remittances are perceived as a repayment package embarked upon by a migrant with the core objective of repaying the fund invested by the household in his/her education.

Though the three motives discussed above attempted to explained why people remits funds to their home countries, however, it should be noted that the ability of a migrant to remit fund to his/her home country depends on the natural, legal and macroeconomic environments both in the host and home countries of the migrants. For instance, the legal provision in the host country determine the volume of fund to be remitted by a migrant. Also, the macroeconomic environment, tax laws, skills/earning capacity of the migrant, among other factors also determine the frequency and volume of funds that could be remitted and how such funds may affect the wellbeing of the people in particular and the economy at large.

Empirical studies also abound on the relationship between remittances and the performance of an economy with emphasis on poverty alleviation in countries of the world. For instance, Ziesemer (2007) studied the relationship between funds remitted and economic growth through the physical and human capital links using the Generalized method of moment with heteroscedasticity correlation (GMM-HAC), investigating the implications of gross national product as share of gross domestic product, savings as share of GDP interest rate, gross capital formation as a ratio of GDP, primary school enrolment, literacy and remittances as a ratio of GDP on gross domestic product per capita, they discovered from their results that countries with per capita income below USD 1,200 gained more from funds remitted in the long run because they have the largest impact of remittances on savings.

In the study by Yadav (2006) in which both the descriptive and simple analytical approaches drawing inferences from data and literature were used to investigate the contributions of funds remitted by citizens of Nepal compared to FDI and grants on its economic development, the findings from the study indicated that remitted funds by the nationals of Nepal living abroad and grants had serious implications on foreign exchange earnings in the country. The study further found that remitted funds could be a reliable source of national income and economic growth if jobs are guaranteed for workers with the wage level equal to the nationals in their host countries.

Jongwanich (2007) explored the simultaneous effects of remittances on economic growth and poverty level in both Asia and the Pacific economies from 1993-2003. Employing the Generalized Methods of Moment (GMM) and the results show strong evidence that remittances have a significant effect on poverty reduction in the region. However, the impact of remittances on economic growth was marginal. The result reveals that the channels through which remittances influence poverty reduction are through increased income, consumption smoothing and easing capital constraints while the effects on economic growth are mainly mirrored through domestic capital and human capita development. Based on the findings, the study concludes that while remittances could have a significant impact on poverty reduction, governments in both countries- resident and home countries should aim to sharpen the impacts of such international flows, especially with a focus on the welfare of the poor.

Olowa and Adebayo (2012) studied the effect of remittances on inequality in rural Nigeria using the Nigeria Living standard survey elicited in 2004 by National Bureau of Statistics. The study segmented income inequality in rural Nigeria using the Gini-decomposition and regression-based methodologies to capture the impact of remittance on income inequality in rural Nigeria. It was evident from the empirical analysis that domestic remittances tend the potentially reduce income inequality than international remittances. Another finding associated with the study is that the level of educational attainment is linked to poor domestic remittances and higher foreign remittances. It is evident in the result that rising education levels increases inequality through domestic remittances and contracts inequality via foreign remittances.

Fonta et al. (2011) critically explored the link between remittance inflows, poverty and income inequality in Nigeria. The study employed poverty and Gini decomposable techniques for the empirical analysis. The study finds evidence to support the claim that remittances and household poverty are indirectly related in the sampled geopolitical zones. Additionally, the result of the Gini decomposition reveals that increase in remittances produces more robust result in urban than in rural area with regard to reduction in inequality. The study however recommended for the provision of policy actions that will enhance the opportunities for inflows of remittances.

Okodua Ewetan and Urhie (2015) appraised the connection between remittance expenditure patterns and human development implications in migrant sending communities of Nigeria. The study specifically investigates the extent to which human development outcomes in migrant sending communities of Nigeria is related with remittance expenditure patterns in the economy. Evidence from World Bank Migration and Remittances Household Surveys for the period 2009/2010 indicated that the remittance expenditure patterns across the economy seem not to vary for the period investigated. The study therefore recommends for the channeling of household remittance receipts into higher productive activities like human capital development.

Gonzalez-Konig and Wodon (2005) studied the effect of remittances on inequality in Honduras using the decomposition method. They first developed a simple model to show that remittances are more unequalizing or less equalizing in low income areas than in high income areas. The study utilized nationally representative data for the empirical analysis and discovered that remittances on the margin increases inequality at national level whereas clear disparity exists between rural and urban areas. In rural areas where income is low, remittances widens the income gap and by extension increases inequality, but in urban areas where income is relatively higher, remittances seems to reduce equality.

In analyzing the effect of remittances on poverty, Adelman and Taylor (1990) discovered in their study that each dollar remitted by Mexican migrants stimulates the Mexican GNP by about USD 3. In a similar study Duran et al. (1996) observed that an increase in funds sent by USD 2 billion increased growth in output by USD 6.5 billion. The results are however different in cross-sectional studies. For instance, Stark and Lucas (1988) in their study found a positive relation between remittances and growth in the home countries, however, in a similar study, Chami and al. (2003) found that remittances have a negative effect on the supply of labor by households. They also reported that if remittances are specifically used to fund basic consumption, they tend to reduced poverty even if their effect on economic growth is marginal.

In a study by Wallsten and Clarke (2003), they examined the extent remittances enhance households to insure against the environmental shocks. Using cross sectional data from Jamaican households, they analyzed how remittances provided a soft ground for the effect of hurricane Gilbert in 1988. Their result indicated that remittances provided an insurance role against natural disasters, but only partly. That is remittances increase by 25% for every additional dollar of damages.

In a related study by Yang and Choi (2006) in which they analyzed if the uncertainty sharing allowed by the flow of remittances is adequate or otherwise and also on how funds remitted by migrants of Philippine origin interact with the shocks of revenue in Philippines families. Their findings indicated that for every household which a member has migrated, remittances can cushion for 60% of the local income losses. Mishra (2005) study revealed that funds remitted to the Caribbean appeared to rise

after an unfavorable shock of product, but with little delay. According to the author, a decline of GDP by 1% may occur two years after by a rise of remitted funds by 3%.

Adams and Page (2005) used cross sectional data from 71 developing economies to study how international remittances affect poverty in these countries. Their result indicated that remittances reduced the level, depth, and severity of poverty in the developing countries significantly. Using cross sectional data from 24 Asian and Pacific countries. Imai et al. (2014) also carried out a study to determine the impact of remitted funds on the growth of GDP per capita. Their result indicated that remittances conform with both theoretical and empirical expectation by having positive impact on economic growth and poverty reduction.

In another study by Anyanwu and Erhijakpor (2010) in which they used panel data to analyzed the impact of international remittances on poverty reduction in African countries over the period 1990-2005. Their result indicated that remitted funds have strong implication on reducing poverty in Africa.

Using micro data from 1,782 families, Taylor et al. (2005) examined the nexus between international remittances and poverty and inequality in 14 Mexican states. Their findings indicated that as the number of migrants increases, remittances from foreign migrants are very significant and effective in minimizing poverty.

Semyonov and Gorodzeisky (2008) also used data from 2,346 families from 1990-2000 to study the effect of funds remitted by Filipino working in foreign countries affect the income and living standard of families in the Philippines. Their findings indicated that remitted funds from citizens working in foreign countries are used mostly for household consumption and to train family members in school. Their findings further show that there exist an income and living standard gaps between family members in home and host countries of migrants which may widen the degree of income inequality among family members in Philippines.

Hein's (2005) used the survey approach to study the relationship between remittances and living condition of households in home country. The result of the study revealed that money sent by migrants did not actually account for an improvement in the welfare in migrants' home countries as a result of unfavorable investment climate and strict immigration laws which most time disrupt circular migration patterns and constitute a bulwark to the realization of the full development potential of migrants.

Azam and Gubert (2006) studied the household effect of migration and remittances in Africa. Using cross sectional data, they concluded that: movement of persons from Africa is viewed as a decision collectively made by household, thus it is seen as a means of diversifying the household's income sources required for assisting the household's consumption. The authors also found that remitted funds by migrants

have potential of causing some moral hazard problems in Africa. To the authors, family members in home countries (Africa) tend to be less interested in working with a lower salary compared to those family members living oversea because they feel that migrant's family members will fill their income gap through remitted funds.

World Bank (2006) in its International Migration and Development Research Program investigated how remittances affect poverty and the living conditions of the migrants' home countries. The research reported that the level and incidence of poverty could be eradicated through international remittances. The report shows that a 10% rise in remitted funds could account for a 3.5% fall in the proportion of poor people. The report however, noted that poor countries tend to receive less remittances because they may not be able to produce many foreign migrants hence will receive less remittances compare to rich countries.

Papanek (1972) in his study on the effect of foreign assistance and growth reported a relatively weak and negative relationship between foreign assistance and growth. This implies that foreign assistance stimulated poverty. Subsequent studies by Lockwood (1990), Duc (2006) and Malik (2008) also found that development assistance retarded economic growth and increased poverty. Though the authors reported a positive relationship between development assistance and growth in the short run which implies that it can reduced poverty, the negative relationship between development assistance and growth in the long run suggests that the long-run negative impacts greatly overshadow most short-term benefits of development assistance.

The above review revealed that a lot of studies have been done on the relationship/effect of remittances on poverty. The studies examined the effect of remittances on both household and the national economies of countries hence both micro and macro data were used. Also most of the studies consulted employed panel analysis and were done outside Nigeria. This appears to support the claim that policy makers and scholars in Nigeria give less attention to the gains of international migration and remittances in the development of the country. Given that more than 5 million Nigerians are currently living outside the shore of the country as established by the UNDP statistics of 2015, it is necessary we examine how funds remitted to Nigeria by her citizens living abroad have affected poverty and improve the living conditions of household members in the country.

## METHODOLOGY

Katz and Stark (1986) argued that decision making is crucial role of the household hence migration by a household member is necessary when it enhances the minimization of total household risk through diversification of sources of financial earnings. Thus, Stark and Bloom (1985) posited that an exchange of intention to share income provides coinsurance for both migrant and non-migrants household members. Thus migration of a household member is viewed as a veritable tool of not just providing an alternative source of income but also to increase household income

capacity which will help increase consumption and alleviate poverty. Chenery and Strout (1966) in their The Two-Gap model argued that developing countries are faced with low level of savings due to low level of income. This leads to the savings-investment gap. To close the gap in income and savings-investment an additional earnings is required. Remittances by household members provide additional income to household members in home countries hence help improve their welfare via increase in consumption and household investment. This help to reduce the depth and incidence of poverty both at the family and national levels. Given this theoretical relationship and link, we specific a model that relate poverty reduction to remittances, official development assistance and technical cooperation grant in a model or functional relationship thus:

POV = f(ORT, IRT, ODA, TCG) *(1)*

The above equation was further expressed in mathematical form below to enhance estimation. We also introduced the error term $U_t$ to capture those variables that influence poverty but are not specified in equation 1.

$$POV_t = \delta_0 + \delta_1 IRT_t + \delta_2 ORT_t + \delta_3 ODA_t + \delta_4 TCG_t + U_t \quad (2)$$

Where: $POV_t$ = poverty headcount, $IRT_t$ = inward remittances, $ORT_t$ = outward remittances, $ODA_t$ = official development assistance, $TCG_t$ = technical cooperation grants, $\delta_0$ = autonomous component of poverty, $\delta_1 - \delta_4$ = coefficients of the explanatory variables and $U_t$ = disturbance term.

## RESULTS

We started the analysis of data by examining the behavior of the data using descriptive statistics and graph. This analysis provided a picture of the trend in the variables.

TABLE 1. DESCRIPTIVE STATISTICS

| Statistic | POV | IRT | ORT | ODA | TCG |
|---|---|---|---|---|---|
| Mean | 57.65 | 6276.50 | 99.38 | 1253.37 | 129.19 |
| Median | 60.67 | 1114.70 | 42.87 | 372.51 | 89.29 |
| Maximum | 88.00 | 21060.21 | 523.06 | 12665.80 | 358.34 |
| Minimum | 28.10 | 2.00 | 0.59 | 82.10 | 38.23 |
| Std. Dev. | 15.28 | 8753.19 | 149.42 | 2381.13 | 96.89 |
| Skewness | -0.02 | 0.88 | 1.78 | 3.63 | 1.09 |
| Kurtosis | 1.99 | 1.84 | 4.75 | 16.77 | 2.96 |
| Jarque-Bera | 1.51 | 6.61 | 23.69 | 363.64 | 7.17 |
| Probability | 0.47 | 0.04 | 0.00 | 0.00 | 0.03 |
| Sum | 2075.49 | 225953.80 | 3577.61 | 45121.18 | 4650.86 |
| Sum Sq. Dev. | 8174.56 | 2.68E+09 | 781424.2 | 1.98E+08 | 328539.1 |
| Observations | 36 | 36 | 36 | 36 | 36 |

The result in Table 1, shows that poverty headcount was 57.65% on an average, inward remittance was USD 99.38 billion on an average, outward remittance had an average of USD 6276.50 billion. Official Development Assistance grew to an average of USD 1,253.37 billion while technical corporate grant over the period in Nigeria was USD 129.19 billion on an average. Poverty level grew to a maximum of 88%, outward remittances grew to a peak value of USD 523.06 billion, inward remittance has maximum value of USD 21,060.21 billion while technical cooperation grants and official development assistance have maximum values of USD 358.3 billion and USD 12,665.80 respectively in Nigeria during the period under review. The result also indicates that poverty declined to a minimum rate of 28.10 %, outward remittance declined to a minimum USD 0.59 billion, inward remittance declined to USD 2.0 billion, official development assistance declined to USD 82.10 billion while technical cooperation grants dropped to USD 38.2 billion in Nigeria over the period under investigation. Poverty has standard deviation of 15.28%, outward remittances has standard deviation of USD 149.42 billion, inward remittances standard deviation was USD 8,753.19 billion, official development assistance has standard deviation of USD 2,381.13 while technical cooperation grant standard deviation was USD 96.89 billion. The descriptive statistics shows that standard deviation was high in inward remittances, outward remittances and official development assistance while poverty level and technical cooperation grants have low standard deviation. This implies that poverty level and technical cooperation grants have consistent trend over the period.

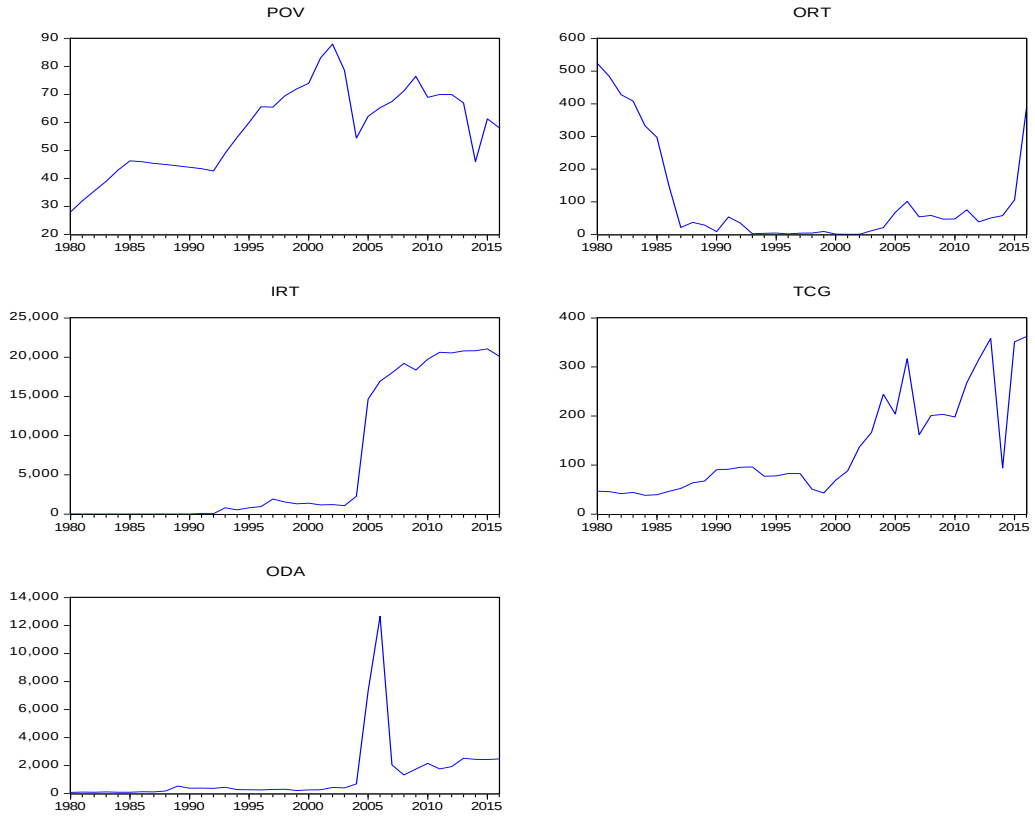



FIGURE 1. TREND IN POVERTY, INWARD REMITTANCES, OUTWARD REMITTANCES, TECHNICAL COOPERATION GRANTS AND OFFICIAL DEVELOPMENT ASSISTANCE

Figure 1 indicates that poverty level, inward remittance and technical cooperation grants have increasing trend whereas outward remittances has a decreasing trend in the early period of the study but increased from the year 2000. ODA rise slowly during the period but has a sharp increase between 2004-2006, before a decline in 2008 and marginal increase again. This revealed that inward remittances and poverty have been increasing while outward remittance has been fluctuating in Nigeria.

The result in Table 2 indicates that inward remittances, official development assistance and technical cooperation grants have positive but weak correlation with poverty level. Outward remittances have negative and strong correlation with poverty. Official development assistance and technical cooperation grants have strong and positive relationship with inward remittances while outward remittance has negative but weak correlation with inward remittances. Official development assistance and technical cooperation grants both have negative and weak correlation with outward remittances. All the explanatory variables have weak correlation with poverty level except outward remittances.

TABLE 2. CORRELATION RESULT

| Variable | POV | IRT | ORT | ODA | TCG |
|---|---|---|---|---|---|
| POV | 1 | | | | |
| IRT | 0.41 | 1 | | | |
| ORT | -0.65 | -0.19 | 1 | | |
| ODA | 0.21 | 0.56 | -0.10 | 1 | |
| TCG | 0.47 | 0.81 | -0.29 | 0.59 | 1 |

## REGRESSION MODEL RESULT

We started our regression analysis by examining the characteristics of the data used for this study. To ensure the data conform with the basic assumptions of ordinary least squares estimation, we conducted the diagnostic tests. The result as reported in Table 3 indicates that we accepted the null hypotheses of absence of serial correlation, no specification error, the distribution is normally distributed, absence or no heteroscedasticity given that their probability values. This implies that the data utilized for this study are reliable for prediction.

TABLE 3. DIAGNOSTICS TEST RESULTS

| Test | F-statistic | Degree of Freedom | Probability |
|---|---|---|---|
| Breusch-Godfrey serial correlation LM test | 2.93 | F(2,12) | 0.10 |
| Ramsey Reset Test | 1.08 | F(1, 13) | 0.32 |
| Normality test(Jarque-Bera) | 0.71 | F(3,30) | 0.70 |
| Heteroscedasticity(ARCH) | 0.90 | F(1,28) | 0.35 |
| Heteroscedasticity(Breusch-Pagan-Godfrey) | 0.75 | F(16,14) | 0.71 |

The unit roots test result reported in Table 4 using the Augmented Dickey Fuller (ADF) and Philip-Perron approaches shows that outward remittances is stationary at level. This implies that the null hypothesis of presence of unit root was rejected without differencing. On the other hand, poverty level, inward remittances, official development assistance and technical cooperation grants attained stationarity at first difference. This implies that the null hypotheses of presence of unit roots were rejected after differencing the variables (POV, IRT, ODA & TCG) once. The attainment of stationarity of variables in a model is a pre-condition for testing the long run relationship among the variables.

TABLE 4. UNIT ROOTS TEST RESULTS

| Variable | ADF Statistic | 1% | 5% | Order of integration | Decision | PP Statistic | 1% | 5% | Order of integration | Decision |
|---|---|---|---|---|---|---|---|---|---|---|
| POV | -5.49 | -3.64 | -2.95 | I(1) | Stationary | -5.49 | -3.64 | -2.95 | I(1) | Stationary |
| IRT | -4.57 | -3.64 | -2.95 | I(1) | Stationary | -4.57 | -3.64 | -2.95 | I(1) | Stationary |
| ORT | -3.93 | -3.63 | -2.95 | I(0) | Stationary | -3.72 | -3.63 | -2.95 | I(0) | Stationary |
| ODA | -6.29 | -3.64 | -2.95 | I(1) | Stationary | -14.13 | -3.64 | -2.95 | I(1) | Stationary |
| TCG | -8.16 | -3.64 | -2.95 | I(1) | Stationary | -12.35 | -3.64 | -2.95 | I(1) | Stationary |

However, given that the result of the unit roots tests give different order of stationarity in the variables, the study adopted the ARDL methodology in our analysis. Feridun (2016) argues that in case where the presence of structural breaks introduces uncertainty as to the true order of stability of the variables, the autoregressive distributed lag (ARDL) bounds testing procedure introduced by Pesaran and Pesaran (1997), Pesaran and Shin (1999), and Pesaran et al (2001) is applicable. The merit of this technique is that it yields valid results regardless of whether the underlying variables are stationary at level or first difference or a combination of both.

In order to estimate the effect of remittances on poverty level, the ARDL model of poverty and the interacting variables (independent variables) is stated below.

$$\Delta POV_{t-1} = \sum_{i=1}^{n} \delta_0 \Delta POV_{t-1} + \sum_{i=1}^{n} \delta_1 \Delta \mathrm{IRT}_{t-1} + \sum_{i=1}^{n} \delta_2 \Delta \mathrm{ORT}_{t-1} + \sum_{i=1}^{n} \delta_3 \Delta ODA_{t-1} + \sum_{i=1}^{n} \delta_4 \Delta TCG_{t-1} + \varphi_0 \Delta POV_{t-1} + \varphi_1 \Delta IRT_{t-1} + \varphi_2 \Delta ORT_{t-1} + \varphi_3 \Delta ODA_{t-1} + \varphi_4 \Delta TCG_{t-1} + \varepsilon_t \quad (3)$$

In estimating the short-run dynamics, the ARDL error correction equation with model selection (4,4,3,1,4) using Akaike Information Criterion (AIC) is stated thus:

$$\Delta POV_{t-1} = \sum_{i=1}^{n} \rho_0 \Delta POV_{t-1} + \sum_{i=1}^{n} \rho_1 \Delta IRT_{t-1} + \sum_{i=1}^{n} \rho_2 \Delta ORT_{t-1} + \sum_{i=1}^{n} \rho_3 \Delta ODA_{t-1} + \sum_{i=1}^{n} \rho_4 \Delta TCG_{t-1} + \sum ECM_{t-1} + \varepsilon_t \quad (4)$$

To test for a possible long run relationship between the dependent and explanatory variables, we conducted the ARDL bounds test. The result of the bound test reported in Table 5 indicates that long run relationship exist between poverty and the interacting independent variables given the F-statistic value of 7.18 which is greater than the critical value bounds at the various levels of significance.

TABLE 5. ARDL BOUNDS TEST FOR ARDL MODEL SELECTION (4, 4, 3, 1, 4)

| Test Statistic | Value | K |
|---|---|---|
| F-statistic | 7.18 | 4 |
| Critical Value Bounds | | |
| Significance | I0 Bound | I1 Bound |
| 10% | 2.45 | 3.52 |
| 5% | 2.86 | 4.01 |
| 2.5% | 3.25 | 4.49 |
| 1% | 3.74 | 5.06 |

TABLE 6. ARDL COINTEGRATING AND LONG RUN FORM OF MODEL SELECTION (4, 4, 3, 1, 4)

| Variable | Coefficient | t-Statistic | Prob. |
|---|---|---|---|
| D(POV(-1)) | 0.49 | 1.37 | 0.20 |
| D(POV(-2)) | 0.03 | 0.05 | 0.96 |
| D(POV(-3)) | -0.94 | -1.75 | 0.11 |
| D(IRT) | 0.05 | 3.37 | 0.01 |
| D(IRT(-1)) | 0.002 | 0.49 | 0.63 |
| D(IRT(-2)) | 0.005 | 1.51 | 0.16 |
| D(IRT(-3)) | -0.003 | -1.21 | 0.25 |
| D(ORT) | 0.020 | 0.612 | 0.55 |
| D(ORT(-1)) | -0.046 | -1.11 | 0.29 |
| D(ORT(-2)) | 0.041 | 1.59 | 0.14 |
| D(TCG) | -0.021 | -0.91 | 0.38 |
| D(ODA) | -0.003 | -0.88 | 0.40 |
| D(ODA(-1)) | -0.002 | -0.51 | 0.62 |
| D(ODA(-2)) | -0.001 | -1.61 | 0.14 |
| D(ODA(-3)) | 0.001 | 1.90 | 0.08 |
| CointEq(-1) | -0.055 | -0.36 | 0.73 |
| Long Run Coefficients | | | |
| Variable | Coefficient | t-Statistic | Prob. |
| IRT | 0.03 | 0.35 | 0.73 |
| ORT | -0.13 | -0.42 | 0.68 |
| TCG | -3.00 | -0.35 | 0.74 |
| ODA | -0.100 | -0.30 | 0.77 |
| C | 358.03 | 0.40 | 0.70 |

The long run result reported in Table 6 indicates that inward remittances is positively related to poverty level. This implies that inward remittances spurred poverty in Nigeria in the long run. The long run result also shows that outward remittances, official development assistance and technical development assistance all have negative relationship with poverty. This implies that increases in these variables (ORT, ODA & TCG) reduced poverty. In the long run all the explanatory variables were insignificant at 5% level.

Table 7. Parsimonious Error Correction ARDL model (4, 4, 3, 1, 4)

| Variable | Coefficient | t-Statistic | Prob. |
|---|---|---|---|
| POV(-1) | 1.95 | 9.86 | 0.00 |
| POV(-2) | -0.93 | -3.62 | 0.00 |
| POV(-3) | -0.64 | -2.76 | 0.02 |
| POV(-4) | 0.46 | 2.10 | 0.05 |
| IRT | 0.01 | 7.18 | 0.00 |
| IRT(-1) | -0.01 | -5.24 | 0.00 |
| IRT(-3) | -0.003 | -3.15 | 0.01 |
| IRT(-4) | 0.004 | 4.01 | 0.00 |
| ORT(-1) | -0.04 | -1.61 | 0.13 |
| ORT(-2) | 0.05 | 1.61 | 0.13 |
| ORT(-3) | -0.04 | -1.94 | 0.07 |
| TCG(-1) | -0.16 | -9.48 | 0.00 |
| ODA(-2) | 0.002 | 2.20 | 0.05 |
| ODA(-3) | 0.002 | 4.48 | 0.00 |
| ODA(-4) | -0.002 | -4.73 | 0.00 |
| C | 20.50 | 4.29 | 0.00 |
| ECM(-1) | -0.77 | -2.92 | 0.01 |
| $R^2$= 0.96, $R^2$ –adjusted = 0.93, F-stat = 26.31, F-prob = 0.00, AIC=5.62, SC = 5.9, DW = 2.4 | | | |

The result in Table 7 indicates that inward remittances is positively related to poverty at level and lag 4. This implies that increase in inward remittances spurred poverty. At lags 1 and 3, inward remittances negatively influenced poverty. The significance of inward remittances implies that it has serious implication on either reducing or increasing poverty incidence at all the levels. Outward remittances from the result is negatively related to poverty at lags 1 and 3. This implies that the variable retarded poverty at these levels but was positively related to poverty at lag 2 implying that outward remittances stimulated poverty at this level. Outward remittances were also significant at lag 3 but insignificant at lags 1 and 2. Technical cooperation grants from the result is negatively and significantly related to poverty level. This implies that it significantly decreased poverty. Official development assistance is significant in supporting poverty given its positive coefficient at lags 2 and 3 but significantly reduced poverty at lag 4 given its negative coefficient also. This implies that ODA has mixed effects on poverty reduction. The result further revealed that the variables investigated adjust speedily to changes in long run dynamics given the negative coefficient of the ECM and its significance at 5 % level. The goodness of fit of 0.93 implies that 93% of the total variation in poverty is accounted for by changes in inward and outward remittances, official development assistances and technical cooperation grants in Nigeria.

## DISCUSSION OF RESULTS

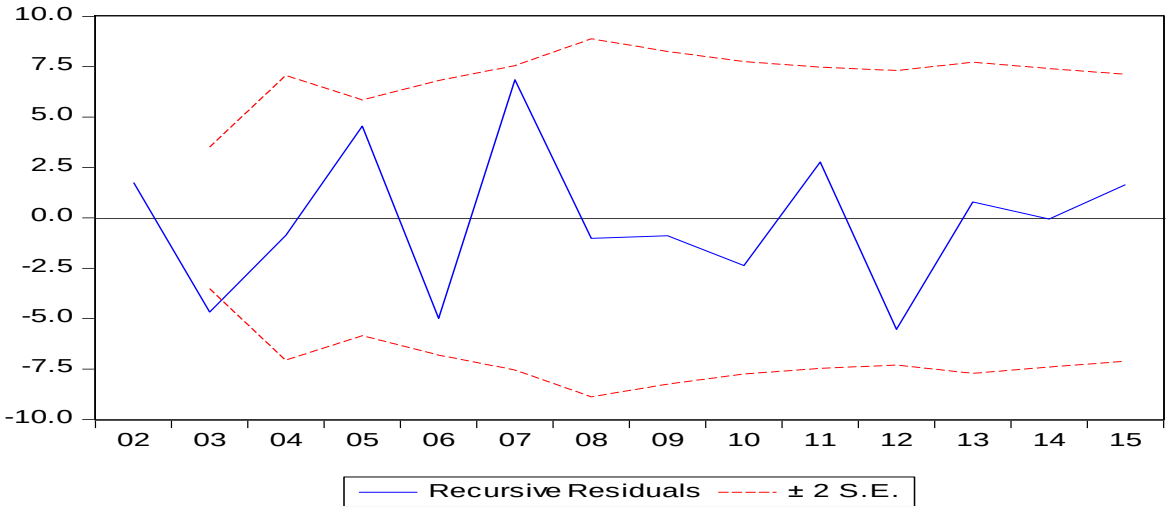
Inward remittances conform to theoretical expectation at lags 1 and 3 with a negative coefficient. This implies that funds remitted by Nigerians living overseas significantly retarded poverty in the country. This result corroborates the earlier findings (Adam

& Page, 2005; Anyanwu & Erhijakpor, 2010; Semyonov & Gorodzeisky, 2008; and World Bank, 2006). Funds remitted by citizens of a country living abroad could serve as a veritable tool for poverty alleviation by increasing consumption, providing resources for training of family members and providing alternative source of funds for investment in the local/home economy.

However, at level and lag 4, inward remittances significantly spurred poverty given its positive sign. This result is in tandem with the findings of Hein (2005) and Azam and Gubert (2006). Inward remittances could lead to brain drain and stimulate poverty by reducing manpower availability and productivity of an economy. Nigeria has suffered shortages of skilled manpower due to migration of most of her citizen to the western World in search for greener pasture. This may account for the behaviour of this variable in the model. The significance of outward remittances at lag 3 and its negative coefficient implies that it has serious implication on poverty reduction. Outward remittances could reduce poverty when citizens whose such funds are spent on return to their home country to work and contributes to the productivity and development of the country. Also investments made abroad could serve as alternative source of revenue for household and the parent economy. Hence increased income level and reduced poverty.

The positive relationship between poverty and development assistance (ODA) in lags 2 and 3 implies that it did not reduced poverty in Nigeria during the period of this study. This result deviated from the theoretical expectation but conformed with the earlier studies by Papanek (1972) Lockwood (1990), Duc (2006) and Malik (2008). Development assistance is a source of finance for development in developing economies hence could serve as avenue for poverty reduction as evidenced in our result at lag 4. However, most developing countries like Nigeria mismanaged such funds hence the poor effect of ODA on poverty in the country. The compliance of technical cooperation grants with theoretical expectation and its significance at 5% level indicates that it has serious negative impact on poverty reduction in Nigeria.

In order to determine the stability of the parameter used in this study, we applied the Bahmani-Oskooee and Shin (2002) method in examining the stability of the variables. The Cumulative Sum of Recursive Residual (CUSUM) and the Recursive Residuals were applied to the parsimonious ARDL poverty equation to capture the stability of the parameters. The stability of variables in the ARDL poverty equation requires that, the Recursive Residuals and CUSUM value of squares stay within the 5% critical bound represented by two straight lines whose equation is detailed in Brown et al. (1975). As shown in Figures 2(a) and 2(b), the CUSUM and recursive residuals plots do not cross the 5% critical lines in the ARDL poverty model. This implies that the variables suffer less from instability over the period of study.



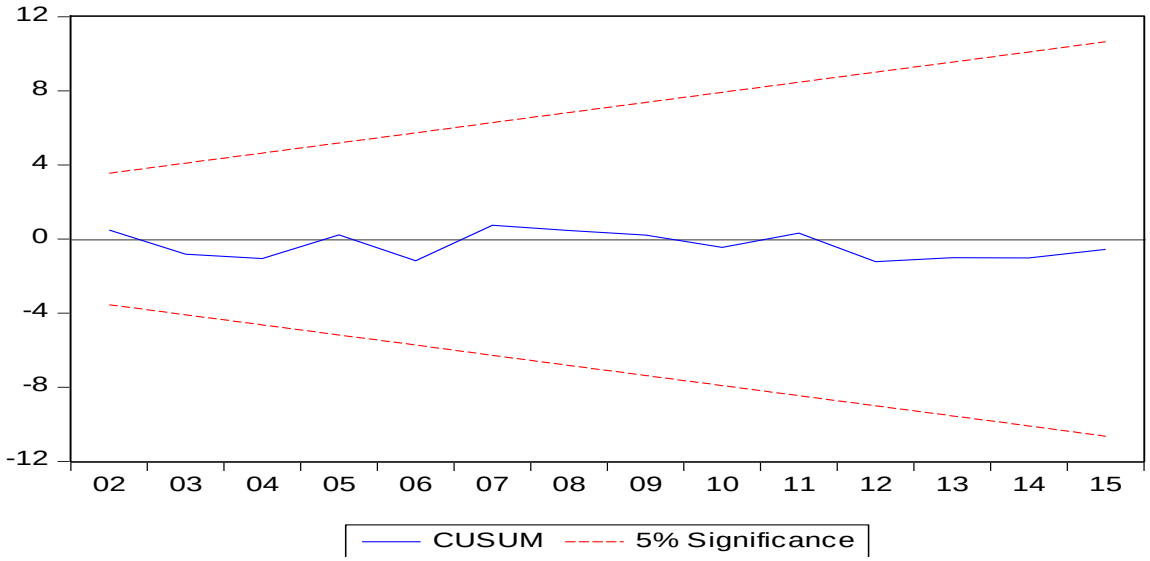




FIGURE 2. STABILITY TEST RESULT: RECURSIVE RESIDUALS AND CUSUM GRAPHS

## CONCLUSION

Consequent upon the results of this study, the following conclusion are made: inward and outward remittances have mixed effects on poverty reduction in Nigeria in the short run. Also in the short run, inward remittances impact was significant while outward remittance was not significant. ODA and technical cooperation grants also have conflicting effect on poverty. The mixed result in the effects of remittances on poverty reduction in the short run is in tandem with the earlier study by Mishra (2005). In the long run, inward remittances stimulated poverty while outward remittances, ODA and technical cooperation grants all reduced poverty incidence in Nigeria given their negative coefficients. All the explanatory variables were however, insignificant in the long run. This implies that their impacts were not significant. Based on this result, the study recommends: investing in foreign countries in order to diversify the income source of the economy, creation of conditions that will enhance inflow of

grants and reductions of bottlenecks on inflows of foreign funds as possible ways of reducing poverty in Nigeria.

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OPEN ACCESS ARTICLE

# MANAGING STRATEGIC APPROACHES FOR TOURISM DEVELOPMENT: TOURIST PERCEPTION OF OHRID, MACEDONIA

**Biljana Petrevska[1*], Margarita Matlievska[2]**

[1]Faculty of Tourism and Business Logistics, Goce Delcev University - Stip, Macedonia

[2]Faculty of Management, MIT University - Skopje, Macedonia

*corresponding author: biljana.petrevska@ugd.edu.mk

**ABSTRACT**

Development of tourism requires managing strategic approaches. Part of achieving this is to determine the factors that affect tourists on creating their images and perceptions. The study is focused on identifying some of the factors, while tourists experiencing Ohrid, the most famous tourist destination in Macedonia. The analysis is based on face-to-face survey conducted among 500 tourists in June-August 2016. Generally, the findings indicate many suggestions and recommendations for tourism-policy makers, which may serve as a valuable starting point in creating new strategic planning approaches that may support managing tourism development in Ohrid and Macedonia.

**Keywords:** Management; Tourist motives; Local development; Tourism policy.

## INTRODUCTION

As a result of its potential for regional economic development, in more than fifty years, tourism has acknowledged noticeable debate (Barucci & Becheri 1990; Christaller, 1964; Friedmann, 1966). As one of the fastest growing industries in the world, tourism provides an implicit possibility that can accelerate the development of many countries, especially of those that have limited alternatives for economic growth (Wanhill, 1997). This is important for Macedonia since tourism can contribute towards its economic growth. In this regard, the issue of perception of tourists and visitors is highly important since it enables tourism policy-makers to create new insights and

tailor new strategic management approaches that may increase the number of visits and night spent in the destination. While tourist motivation is widely explored topic, determining the factors that affect tourists on creating images and perceptions has been somewhat unexplored research topics.

The primary objective of the study is to provide evidence on prevailing perceptions to create tourist image. This issue will be studied on the case of Ohrid, Macedonia. Ohrid represents a suitable test ground for investigating tourist perception since it is the most famous tourist destination in Macedonia with 234,361 tourists and 830,333 overnights in 2016, this encompassed 27% of all arrivals and 34% of all overnight in Macedonia that year (State Statistical Office, 2017). Additionally, to our best knowledge, no academic studies have dealt with this topic. Hence, this is the first attempt to identify the presence and affection of factors that affect tourists to create tourist image of Ohrid. The practical contribution of the paper lies in the recommendations that may serve as a valuable starting point in planning new strategic management approaches that may support tourism development in Ohrid and Macedonia.

As for the organization of the paper, after the introduction, section two provides a snapshot on the literature review on tourist typology, as a background material. The applied methodology is presented in section three, while the findings and discussion are noted in section four. Section five presents the conclusion and recommendations, while the main limitation of the research and some future steps to be addressed, are noted in the last section of the paper.

## BACKGROUND MATERIAL

Managing tourism in strategic manner provides maintenance of competitiveness and efficiency of tourist destinations. Moreover, tourism competition has intensified between destinations, regardless they are cities, regions or countries (Medeiros Barbosa et al., 2010). Hence, there are many opportunities where management may improve and enhance tourism as a system offering strategic competitive advantages. One of it is to reveal factors that determine destinations for tourist visits (Barišic & Maric, 2012).

It is more than obvious that the tourist will create certain image about the destination depending on the preferences. Although may sound fragile, but the vast majority of today's tourists know exactly what they are looking for. Yet, they are very demanding and have complex, multi-layered desires and needs. Today's so called "postmodern tourists" have specific interests and individual motives which results in tailored made tourist products according to their particular preferences. They are often highly experienced in travelling and demand perfect tourism products rather than standardized ones.

The literature contains a large body of work discussing tourist roles in order to define their considerable variations. Mostly, the behavior is related to specific demographic and background characteristics emphasizing the life course as the leading component for investigating tourist role preferences. Yet, attention should be paid to a variety of social structures and processes, including psychological needs and life-course stage. Cohen (1972) was one of the first sociologists who proposed a typology to conceptually clarify the term "tourist" by developing a four-fold typology. Few years later, Cohen (1979) expended the list by suggesting a five-group classification of tourists, based on the type of experience they were seeking.

Pearce (1982) identified specific behavior linking the evolutionary nature of tourist role preference and the psychological needs. Moreover, he developed 15 different tourist types which allowed creation of several measurement scales. In this respect, the Tourist Roles Preference Scale (Yiannakis & Gibson, 1992) presents a comprehensive classification of leisure tourists. Additional work resulted in adding two more tourist types to the tourist categorization (Gibson & Yiannakis, 2002). A prior work that is related to the typology of Yiannakis and Gibson (1992), is noted by Mo et al., (1992) by designing International Tourist Role scale. Upon this scale, Keng and Cheng (1999) and Jiang et al., (2000) found that novelty seeking is related to choice of tourist role. Furthermore, a cluster analysis is offered by Ryan and Glendon (1998) being derived from the Leisure Motivation Scale previously introduced by Beard and Ragheb (1983).

Further on, researchers focused on exploring the experience of tourists as well as the importance of the tourist experience for tourists (Yfantidou et al., 2008), along with classification of tourists according to the degree of novelty and familiarity sought (Lepp & Gibson, 2003).

## METHODOLOGY

In order to identify the main factors that affect tourists on creating images and perceptions while experiencing Ohrid, the research took qualitative and quantitative methods. The qualitative approach included review of literature and analysis of relevant publications. The quantitative approach covered data obtained from a face-to-face survey conducted among 500 tourists in June-August 2016. A questionnaire was developed for foreign and domestic tourists that visited Ohrid on two locations: the monastery of St. Naum (30 km from Ohrid near the border with Albania) and the church of Ss. Clement and Panteleimon at Plaosnik (located in the old part of the city center). The tourists were previously well informed about the survey's aim in order to avoid any attempt to manipulate the survey process and possibly bias the results. A schedule was established whereby data were collected during different days of the

week and at different times of the day to maximize the chances of obtaining a representative sample. Prior to entering the field survey, the piloting was performed in order to check the validity of the questionnaire. The survey instrument was a self-administered fixed-choice questionnaire. Respondents used a five point Likert scale (1=strongly disagree to 5=strongly agree) to judge the importance of each factor. The questions were structured in six section, as follows:

- Section I contained nine questions referring general data of the respondents (gender, age, marital status, country of origin, education, type of visitor, type of holiday and frequency of visit);
- Section II comprised of three questions defining the perception of place;
- Section III comprised of three questions identifying the 'pull' motives;
- Section IV encompassed three questions diagnosing tourist perception of safety;
- Section V had a set of five questions defining tourist type (based on classification proposed by Cohen (1979); and
- Section VI included three questions describing fulfilled expectations.

A total of 500 copies of the questionnaire were distributed, out of which 382 were deemed complete and usable, thus having response rate of 76.4%. The collected data were transferred to a common scorecard database in SPSS 24.0 in order to perform the statistical evaluation. Some descriptive statistics and nonparametric statistical tests were used for creating an initial tourist type for Ohrid among domestic and foreign tourists. In order to identify the possible relationship between the variables, the Chi-Square test ($\chi^2$) for independence was calculated.

## FINDINGS AND DISCUSSION

The findings are presented in a twofold manner. The first part discusses the general findings and discussion on the specific data. This means that each of the 26 questions that comprised the questionnaire was separately analyzed, whereas, the general data in accordance to the suggested categorization, while the specific data (17 questions) in accordance to a five-point Likert scale. The second part discusses findings based on cross-tabulations of general data versus specific data in order to discover a presence of association between the variables.

### *Specific data findings*

Table 1 presents the demographic attributes of respondents according to nine questions from the first section of the questionnaire (gender, age, marital status, country of origin, education, type of visitor, type of holiday and frequency of visit). It is noticeable a slight difference in favor of female respondents (54% vs. 45%). According to the age classification, most of the respondents (43%) belong to the group 30-49 years, followed by the elderly tourists of 50years and over (32%), while the younger tourists (age 20-29) represent 25%. With regards to the marital status, the vast majority of respondents are married (63%). As per country of origin, 57% of the

surveyed tourists are domestic, while 43% are foreigners. According to the level of education, the dominant group of respondents (69%) hold university diploma, and the same percentage stands for being employed. Having in mind that the survey was conducted at two very famous and top-visited tourist location in Ohrid, which simultaneously represent religious places, the questionnaire contained a question on the type of visitor. Unsurprisingly, it was found that 71% are tourists, but surprisingly 19% of the respondents declared to be pilgrims, and even 10% replied to belong to the category "other" without specifying the meaning. Majority of the respondents are individual tourists who came by a self-organized visit (70%), vs. 30% who came on arranged tour by a travel agency. According to the frequency of visit, 45% of the respondents visited Ohrid more than five times so far. Yet, it is interesting to note that one/third (33%) of the visitors are newcomers meaning they visited Ohrid for the first time.

TABLE 1. DESCRIPTIVE STATISTICS ON GENERAL DATA (∑=382)

| Item | % | | Item | % |
|---|---|---|---|---|
| Gender | | | Occupation status | |
| Male | 46.1 | | Student | 12.6 |
| Female | 53.9 | | Employed | 68.6 |
| Age | | | Unemployed | 6.3 |
| 20-29 | 24.6 | | Retired | 12.6 |
| 30-49 | 42.9 | | Type of visitor | |
| 50+ | 32.5 | | Pilgrim | 18.8 |
| Marital status | | | Tourist | 71.2 |
| Married | 62.3 | | Other | 9.9 |
| Single | 13.6 | | Type of holiday | |
| Divorced | 4.7 | | Individual (self-organized) | 69.6 |
| With partner | 15.7 | | Group (by travel agency) | 30.4 |
| Other | 3.7 | | Frequency of visit | |
| Country of origin | | | First time | 33.0 |
| Domestic tourist | 56.5 | | Second time | 8.4 |
| Foreign tourist | 43.5 | | 3-5 times | 13.6 |
| Education | | | More than 5 times | 45.0 |
| Elementary | 4.2 | | | |
| High | 27.2 | | | |
| Graduate | 68.6 | | | |

*Source*: Authors' calculations

The second section comprised of three questions defining the perception of place.The summarized findings are presented in Table 2. It may be concluded that tourists found the sampled locations to be historic, legendary and religious places, which do not serve just as tourist places for sightseeing. This supports other complementary findings about the tourist types and pull motives.

TABLE 2. SUMMARIZED FINDINGS ON PERCEPTION OF PLACE

| Question | Specific questions | % | | | | | SE Mean | Std. Deviation |
|---|---|---|---|---|---|---|---|---|
| | | Strongly disagree | Disagree | Neutral | Agree | Strongly agree | | |
| Perception of place | Q1. This is a religious place | 1.6 | 6.3 | 12.6 | 34.6 | *45.0* | .04982 | .97366 |
| | Q2. This is just a tourist place for sightseeing | 14.1 | *30.9* | 19.9 | 18.3 | 16.8 | .06724 | 1.3141 |
| | Q3. This is a historic and legendary place | 2.1 | 1.6 | 11.0 | 29.8 | *55.5* | .04563 | .89177 |

*Source*: Authors' calculations

Section three of the questionnaire comprised of three questions identifying the 'pull' motives. Based on the experiential approach, we identified three factors that may attract tourists to visit Ohrid: cultural heritage, religion and sightseeing. After analyzing the results, it was found that the cultural heritage was perceived as attraction that brought tourists to the surveyed locations. This finding stands along with the second most tourist type being identified for Ohrid.

There are many academic investigations that have identified political instability as a factor that may increase the perception of a risk at a destination (Gartner & Shen, 1992; Hollier, 1991; Ioannides & Apostolopoulos, 1999; Mansfeld, 1996 and 1999; Richter, 1992 and 1999; Seddighi et al., 2001; Teye, 1986; Wall, 1996). In this line, the fourth section of the questionnaire encompassed three questions diagnosing tourist perception for safety. Ohrid (as tourist place) and Macedonia (as a country) were perceived as fully safe and secure for tourism. Even more, the total of 75% of the respondents disagree (39% strongly disagree and 36% disagree) that they hesitated to come because it appeared in the news that this is a country with security problems.

TABLE 3. SUMMARIZED RESULTS REFERRING TOURIST TYPOLOGY

| Question | Specific questions | % | | | | | SE Mean | Std. Deviation |
|---|---|---|---|---|---|---|---|---|
| | | Strongly disagree | Disagree | Neutral | Agree | Strongly agree | | |
| Type of tourist | Q10. I came here to enjoy myself (recreational tourist) | 1.0 | 11.5 | 22.5 | 26.7 | *38.2* | .05497 | 1.0744 |
| | Q11. I feel as if this visit has changed my life (diversionary tourist) | 11.5 | 21.5 | 33.0 | 21.5 | 12.6 | .06045 | 1.1814 |
| | Q12. I feel motivated and inspired here (experiential tourist) | 2.6 | 8.9 | 25.1 | 37.2 | 26.2 | .05235 | 1.0231 |
| | Q13. I came here to learn something about local people (experimental tourist) | 4.2 | 14.1 | 30.9 | 27.7 | 23.0 | .05715 | 1.1170 |
| | Q14. I came here to learn more about the lifestyle and culture of this place (existential tourist) | 4.7 | 7.3 | 26.7 | 31.4 | 29.8 | .05652 | 1.1045 |

*Source*: Authors' calculations

Section five of the questionnaire had a set of five questions defining tourist type (based on classification proposed by Cohen (1979). Table 3 presents summarized findings. The results revealed that recreational tourists are by far the dominant group visiting Ohrid. Namely, 38.2% of the respondents strongly agree that came to enjoy themselves. Having in mind that this type of tourists put the emphasis on physical recreation, it is fully expectable that they will dominate due to the type of tourism Ohrid offers (sun, lake and leisure).

This is followed by the existential type of tourists whose main characteristic is that they want to become totally immerse in the lifestyle of the vacation destination. In this line, 29.8% responded that strongly agreed that they came to Ohrid to learn more about the culture of Ohrid. This finding confirms the already acknowledged fact that Ohrid is a cultural cradle and with the cultural heritage it possesses, attracts cultural tourists in large portion.

A light step behind are the experiential type of tourists, whereas 26.2% of respondents strongly agree that they feel motivated and inspired at the place of survey. This is also expected finding since experiential tourists look for authentic experiences, and the sampled locations (St. Naum and Plaosnik) are really unique spots.

Experimental tourists, whose main desire is to be in contact with local people, responded that they visited Ohrid in order to learn something about local people (23%). Having in mind the rich history of the city, the specific artistic spirit along with numerous crafts (woodcarving, jewelry, pearl making, pottering, coppersmiths, shoemakers, etc.), still being performed in a traditional and original manner, attracts this type of tourists as well.

As the final tourist type, the research investigated whether Ohrid attracts diversionary tourists. It was found that they were virtually absent due to insignificant presence of only 12.6%. This type of tourists seek way of forgetting their everyday life at home.

The last, sixth section of the questionnaire included three questions describing fulfilled expectations. The respondents found highly fulfilled expectations, thus evaluating Ohrid as a destination worth visiting which gave a value to their money. Namely, 72% strongly agreed that the sampled location was worth visiting and if adding the responses "agreed" (22%), it may be concluded that 94% actually were delighted and enchanted of Ohrid. Furthermore, 42% strongly agreed and 29% agreed, meaning that 71% of the respondents got more than expected. Finally, 61% strongly agreed and 27% agreed, or all together 88% of respondents would like to come back again and visit Ohrid. This supports the previous fact where it was noted that 45%

visited Ohrid form more than five times. Simultaneously, it gives good prospects that the newcomers would come again.

### *Cross-tabulations*

This part discusses the main findings upon the cross-tabulations of general data versus specific data (Table 4). It illustrates the association between categorical variables i.e. whether the variables are mutually independent or correlated. Due to fact that the calculated p-value is lower than the standard significance level ($\alpha = 0.05$), we reject the null hypothesis. Therefore, we conclude that there is enough evidence to suggest that there is statistically significant association between the variables. Yet, no inferences about the causation can be provided.

TABLE 4. CROSS-TABULATIONS SUMMARIZED RESULTS, GENERAL VS. SPECIFIC DATA

| General data | Question | $\chi^2$ (p-value) |
|---|---|---|
| Gender | Q4. I came here… cultural heritage attractions | .012 |
| | Q6. I came here just for sightseeing | .054 |
| | Q15. This place is worth visiting | .012 |
| | Q16. I've got more than expected from this place | .004 |
| | Q17. I would like to visit this place again | .001 |
| Age | Q1. This is a religious place | .001 |
| | Q2. This is just a tourist place for sightseeing | .000 |
| | Q3. This is a historic and legendary place | .000 |
| | Q4.I came here… cultural heritage attractions | .000 |
| | Q5. I came here for religious reasons | .015 |
| | Q6. I came here just for sightseeing | .041 |
| | Q7. The place is fully safe and secure for tourism | .000 |
| | Q8. The country is fully safe and secure for tourism | .000 |
| | Q9. I hesitated to come … security problems | .015 |
| | Q10. Recreational tourist | .005 |
| | Q11. Diversionary tourist | .000 |
| | Q12. Experiential tourist | .000 |
| | Q13. Experimental tourist | .013 |
| | Q15. This place is worth visiting | .001 |
| | Q17. I would like to visit this place again | .000 |
| Marital status | Q1. This is a religious place | .009 |
| | Q2. This is just a tourist place for sightseeing | .000 |
| | Q3. This is a historic and legendary place | .000 |
| | Q4. I came here… cultural heritage attractions | .003 |
| | Q5. I came here for religious reasons | .000 |
| | Q6. I came here just for sightseeing | .002 |
| | Q7. The place is fully safe and secure for tourism | .004 |
| | Q8. The country is fully safe and secure for tourism | .000 |
| | Q9. I hesitated to come … security problems | .000 |
| | Q10. Recreational tourist | .000 |
| | Q11. Diversionary tourist | .000 |
| | Q12. Experiential tourist | .000 |
| | Q13. Experimental tourist | .000 |
| | Q14. Existential tourist | .002 |
| | Q15. This place is worth visiting | .000 |
| | Q17. I would like to visit this place again | .000 |
| Country | Q1. This is a religious place | .026 |

| | | |
|---|---|---|
| | Q5. I came here for religious reasons | .000 |
| | Q6. I came here just for sightseeing | .000 |
| | Q9. I hesitated to come … security problems | .000 |
| | Q10. Recreational tourist | .000 |
| | Q11. Diversionary tourist | .022 |
| | Q12. Experiential tourist | .000 |
| | Q13. Experimental tourist | .000 |
| | Q14. Existential tourist | .000 |
| | Q16. I've got more than expected from this place | .043 |
| | Q17. I would like to visit this place again | .001 |
| Education | Q2. This is just a tourist place for sightseeing | .021 |
| | Q3. This is a historic and legendary place | .021 |
| | Q4. I came here… cultural heritage attractions | .004 |
| | Q7. The place is fully safe and secure for tourism | .010 |
| | Q10. Recreational tourist | .000 |
| | Q11. Diversionary tourist | .048 |
| | Q12. Experiential tourist | .003 |
| Status | Q1. This is a religious place | .001 |
| | Q2. This is just a tourist place for sightseeing | .000 |
| | Q3. This is a historic and legendary place | .000 |
| | Q4. I came here… cultural heritage attractions | .004 |
| | Q5. I came here for religious reasons | .001 |
| | Q6. I came here just for sightseeing | .040 |
| | Q7. The place is fully safe and secure for tourism | .001 |
| | Q10. Recreational tourist | .042 |
| | Q11. Diversionary tourist | .000 |
| | Q12. Experiential tourist | .000 |
| | Q13. Experimental tourist | .038 |
| | Q14. Existential tourist | .004 |
| | Q15.This place is worth visiting | .004 |
| | Q16.I've got more than expected from this place | .003 |
| Type of visitor | Q1. This is a religious place | .000 |
| | Q2. This is just a tourist place for sightseeing | .005 |
| | Q3.This is a historic and legendary place | .009 |
| | Q4.I came here… cultural heritage attractions | .000 |
| | Q5.I came here for religious reasons | .000 |
| | Q6.I came here just for sightseeing | .000 |
| | Q7.The place is fully safe and secure for tourism | .001 |
| | Q8.The country is fully safe and secure for tourism | .001 |
| | Q10. Recreational tourist | .000 |
| | Q11. Diversionary tourist | .000 |
| | Q12. Experiential tourist | .000 |
| | Q13. Experimental tourist | .042 |
| | Q14. Existential tourist | .001 |
| | Q15.This place is worth visiting | .002 |
| | Q17.I would like to visit this place again | .000 |
| Holiday | Q1.This is a religious place | .035 |
| | Q2.This is just a tourist place for sightseeing | .044 |
| | Q5.I came here for religious reasons | .000 |
| | Q6.I came here just for sightseeing | .016 |
| | Q9.I hesitated to come … security problems | .022 |

| | | |
|---|---|---|
| | Q10. Recreational tourist | .000 |
| | Q12. Experiential tourist | .011 |
| | Q13. Experimental tourist | .004 |
| | Q14. Existential tourist | .031 |
| | Q16.I've got more than expected from this place | .019 |
| Frequency | Q1.This is a religious place | .000 |
| | Q3.This is a historic and legendary place | .001 |
| | Q4.I came here… cultural heritage attractions | .007 |
| | Q5.I came here for religious reasons | .000 |
| | Q6.I came here just for sightseeing | .000 |
| | Q7.The place is fully safe and secure for tourism | .000 |
| | Q8.The country is fully safe and secure for tourism | .000 |
| | Q9.I hesitated to come … security problems | .003 |
| | Q10. Recreational tourist | .000 |
| | Q11. Diversionary tourist | .001 |
| | Q12. Experiential tourist | .000 |
| | Q13. Experimental tourist | .031 |
| | Q14. Existential tourist | .000 |
| | Q15. This place is worth visiting | .000 |
| | Q17. I would like to visit this place again | .000 |

*Source*: Authors' calculations
Note: Only data with a significance $p<0.05$ are presented

Based upon the calculations presented in Table 4, we find enough evidence to suggest that there is association between the nine variables of general data (gender, age, marital status, country of origin, education, occupational status, type of visitor, type of holiday, and frequency of visit) and some specific data. In this line, statistically significant association is found as follows:

- With regards to the gender, both male, and female tourists not equally prefer the same pull motivesand fulfilled expectations;
- As per age, the association is found almost in all investigated issues. This means that the age makes difference, since all three categories (younger tourists between 20-29 years, mature tourists between 30-49 years, and older tourists being over 50 years) responded differently. There are only two exceptions noted. Namely, there is no correlation between age and the existential type of tourist (Q14) as well as between age and the return to place (Q16);
- Presence ofassociation is assessed between marital status and all, but one questioned issue (Q16). So, whether the tourist is married, single, divorced, live with a partner, or even replied as 'other', makes a difference to all investigated issues,with the exception of'getting more than expected from the place'. This means that the marital status is not correlated only to this specific aspect defining the returning to the place;
- Being domestic or a foreign tourist (as per country of origin)makes statistically significant relations to perceiving the sampled location as a religious place, being attracted by religious or sightseeing motives, tourist typology, and return

to the destination. However being domestic or a foreign tourist does not make a difference to the perception for safety;

- Education (tourists with elementary, high school or faculty education) is related to seven out of seventeen investigated queries. The type of education is correlated with the majority of tourist types (recreational, diversionary and experiential) along with the motives that create a perception of place. The education is associated to the cultural heritage as a pull motive that attracts tourists to visit the destination, the same as the destination's perception for safety;
- Occupational status is correlated with all the specific investigated issues, except for the perception on the safety of the country (Q8 and Q9). So, students, employed, unemployed and retired tourists equally perceive Macedonia as safe tourist destination;
- The type of visitor is generally related to all the specific issues. The exception is noted with regards the 'hesitation to come because it appears in the news that Macedonia has security problems' (Q9) and 'got more than expected' (Q16). So, whether respondents declared as pilgrims, tourists or'other', makes no difference only in these two queries;
- Visiting Ohrid individually (self-organized) or in a group (by travel agency) is related to perceiving Ohrid as religious and tourist place, but not as historic and legendary place. The type of holiday makes no difference when it comes to the safety perception of Ohrid (place) and Macedonia (country), the same as in the case of creating an image for fulfilled expectations; and
- Frequency of visit i.e. visiting Ohrid for the first time, second time, 3-5 times, or more than five times, has an influence when creating a tourist image for Ohrid. Generally, there is an association between the variables, with just only one exception. According to the frequency of visit, tourists equally find to get more than expected.

More general conclusions from the cross tabulations are presented in Table 5 referring to independency of the variables. It is noticeable that gender is by far the most independent variable, followed by education, country of origin, type of holiday and occupational status. Namely, as presented in Table 5, it can be concluded that 'perception for safety' is a strongly independent factor when creating tourism image.

On the other side, it was found that:

- Gender matters when it comes to the fulfilled expectations (return to place);

- Country of origin matters when it comes to the pull motives, tourist type and fulfilled expectations;
- Type of education matters when it comes to the perception of place and tourist type;
- Occupational status matters when it comes to perception of place, pull motives, tourist type and return to place; and
- Type of holiday matters when it comes to perception of place, pull motives and tourist type.

TABLE 5. SUMMARIZED RESULTS ON PRESENCE OF INDEPENDENCY, GENERAL VS. SPECIFIC DATA

| General data | Specific data (grouped queries) |
|---|---|
| Gender | Perception of place (Q1-Q3) |
| | Pull motives (Q4-Q6) |
| | Perception for safety (Q7-Q9) |
| | Tourist type (Q10-Q14) |
| Country of origin | Perception of place (Q1-Q3) |
| | Perception for safety (Q7-Q9) |
| Education | Pull motives (Q4-Q6) |
| | Perception for safety (Q7-Q9) |
| | Return to place (Q15-Q17) |
| Occupational status | Perception for safety (Q7-Q9) |
| Type of holiday | Perception for safety (Q7-Q9) |
| | Return to place (Q15-Q17) |

*Source*: Authors' calculations
Note: Summarized results for data with a significance p>0.05

Furthermore, based on the established correlation patterns, it can be summarized that the variables like: age, marital status, type of visitor and frequency are statistically dependent categories. This means that tourism policy makers should have in mind to make tourism segmentation particularly taking into consideration these criteria when creating tourism policy and development strategy.

## CONCLUSION AND RECOMMENDATIONS

The study recommends some future actions in the line of creating new strategic management approaches that may support tourism development in Ohrid.

- First, efforts should be made to make tourism fully recognizable and to improve the current marketing strategy. The focus should be on promotion, mainly through the introduction of new innovative approaches.
- The second strategic measure recommended for improving tourism competitiveness is to strengthen the coordination between the central and local governments, in addition to other tourism players from the private sector.

The objectives and aims delineated by the tourism development plans and programs must be fully implemented, regardless of the level of implementation. The

expectations of all tourism suppliers must conform to the expectations of tourists and travelers who visit Ohrid.

By combining the insights from earlier works, the study identified and explored the presence of five factors, upon which tourists create images and perceptions for Ohrid. It was found that Ohrid is perceived as historic, legendary and religious place and not just as a plane tourist destination, whereas the cultural heritage is the main pull factor for attracting tourists. Towards the perception for safety, both, Ohrid (as tourist place) and Macedonia (as a country), were perceived as fully safe and secure for tourism. According to the type of experience, the recreational tourists are by far the most present. Being described as destination worth visiting which gave a value to their money, tourists found to have highly fulfilled expectations from Ohrid as a destination.

Furthermore, it was found that gender is by far the most independent variable meaning that generally both male, and female tourists equally create tourism image of Ohrid. This is followed by education, whereas it was found that it is irrelevant where the tourist has elementary, high school or faculty diploma. What is especially interesting is that both, domestic and foreign tourists in general perceive equally Ohrid as a destination when it comes to its perception of place and safety.

Likewise, variables like: age, marital status, type of visitor and frequency, are totally statistically dependent, pointing to be used as segmentation criteria when defining tourism development strategy. So, younger tourists create different perception for Ohrid, compared to mature and older tourists. This is also the case if tourists replied as married, single, divorced, live with a partner, or even 'other'. If respondents declared as pilgrims, tourists or 'other', makes difference to creating a tourist image of Ohrid. According to the frequency of visit, tourists does not equally experience Ohrid. Yet, due to fact that the calculated values of the nonparametric tests assess only association between the variables without providing inferences about the causation, it is up to tourism experts to interpret them accordingly.

## LIMITATIONS AND FUTURE WORK

The research was limited by several factors that can also serve as productive starting points for future work. First, it employed a relatively small set of indicators and could be enhanced by the addition of additional significant indicators to better assess tourist perception. Because data was collected using only a questionnaire survey, the research may also suffer from the common method variance effect. As the research was characterized by a relatively small sample size, future work could focus on increasing the number of respondents and other aspects of investigation. Finally, instead of using

one model, future research could employ multiple models and theories relevant to tourism imaging.

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OPEN ACCESS ARTICLE

# A CORRELATION ANALYSIS OF AMENITIES AND PRICE FROM COWORKING OFFICES IN EUROPE

András Lévai

RGDI, Széchenyi István University, Győr, Hungary

info@tudasmenedzsment.hu

***Abstract***

The purpose of this paper is to examine the concept of coworking on the basis analyzing amenities and price data from coworking offices. Coworking spaces providing more flexible working style, diverse member to interact. Although coworking is a hot topic there is still few empirical research that discusses the actual conditions of coworking spaces in Europe. I attempt to have a deeper insight of amenities and prices of coworking using a dataset collected with web crawlers.

***Key words:***

*Coworking; Coworker; Coworking space; Web crawler.*

## INTRODUCTION

The purpose of this paper is to examine the concept of coworking on the basis analyzing amenities data from coworking offices. Specifically, I created a web crawler robot to collect data online from Sharedesk.net[1] (in 2015), parse it, store it into a database and show the result of the correlation analysis relating to the detailed items.

Personal computing allowed white collar work to leave the workshop (Spinuzzi, 2012), but working alone removed the possibility to access better infrastructure, connect and network with other people. This lead to cowork and coworking, Gandini (2015, 194) defines as "Coworking spaces are shared workplaces utilized by different

[1] This is a webpage where people can meet desks at coworking spaces. It was created by Enrico Icardi, Kia Rahmani and Dario Aschero in 2009, to connect spaces and members. Enrico had the experience and a motivation to create this kind of site, because he was travelling back and forth between Torino and Berlin and he needed a place where he could work on his freelancing projects. The site is free to use, only after a successful meeting there is a commission of 15% for the desk owners.

sorts of knowledge professionals, mostly freelancers, working in various degrees of specialization in the vast domain of the knowledge industry."

Coworking spaces spreading in many countries, there are 19,000 worldwide (Foertsch, 2018) today, and 29% of all coworking spaces were opened over the last year. A coworking space today is serving 83 members and 23% of the coworking spaces has more than 150 members. This shows us that the flexible working style and new way of working is a hot topic, however the number of member and the number of spaces is insufficient to describe this phenomenon. This paper dives deeper of the attributes of a coworking space, what amenities are offered by coworking spaces to attract members.

The paper from the next section comprises the following structure. In Section 2, the phenomenon of coworking is overviewed; in Section 3 explains the method used in this paper. Section 4 describes the results of a correlation analysis of the dataset using the web crawling method described in Section 3. Section 5 summarizes the discussion, presents the significance of this paper, and suggests future research issues.

## PHENOMENON OF COWORKING

The first step to the coworking concept was the hackerspace (Foertsch & Cagnol, 2013), in 1995 the German Chaos Computer Club (CCC) created "c-base", where computer professionals could met, work together and build a community. Meanwhile in New York under the name of 42 West 24 opened an office where people could rent desks for short term. Coworking and coworking spaces mixed these two ideas, short term rent and community building for creative people, in 2005 a freelance engineer called Brad Neuberg, who had enough working alone from home and opened a place at Spiral Muse in San Francisco to work with his friends (BCNewt, 2015). Actually it was not a commercial success, however ten years later, according my crawling to Sharedesk.net, in San Francisco there were 86 coworking offices, 1255 in the whole USA.

One of the factor of this success was the transformation of work. The 1980s' office (Laing, 1991) or the Fordist office limitations, like the nine- to five-day are not supporting the knowledge economy. Creative ideas are not born between walls or command, you need space and freedom.

Another factor was that the digital transformation supports the flexible work (Moriset, 2013). Creative people nowadays working using laptops and tablet, they transmit their data, reach their desktop through wireless network. The creativity and the technology gave freedom to the worker, removed the fix structure, satisfied the needs for non-uniform time use. The main issue was that people (digital nomads) felt themselves alone (Kenline, 2012). Coworking spaces solved this. They offered office infrastructure (like scanner, printers, internet, Wi-Fi, fax, meeting rooms) and creating community for the members. Aguiton and Cardon (2007) discovered, such week ties improve

innovation. Lange (2011) founded that 'scene knowledge' become increasingly relevant for entrepreneurial practices.

Thus, the phenomenon of coworking and coworking space is steadily spreading not only in the United States. There are coworking offices in the big cities of Europe. Unlike this big growing that is happening in this economical market there are only few studies about coworking and even fewer studies that focus on condition of coworking spaces.

Spinuzzi (2012) made a 2-year study of coworking at nine coworking spaces in Austin. His research questions were coworking spaces membership fees what services are in the practice and how they describe that service, the finding was that coworking offices want to create a "creative, functional and affordable workplace community" (Spinuzzi, 2012: 412).

## RESEARCH METHOD

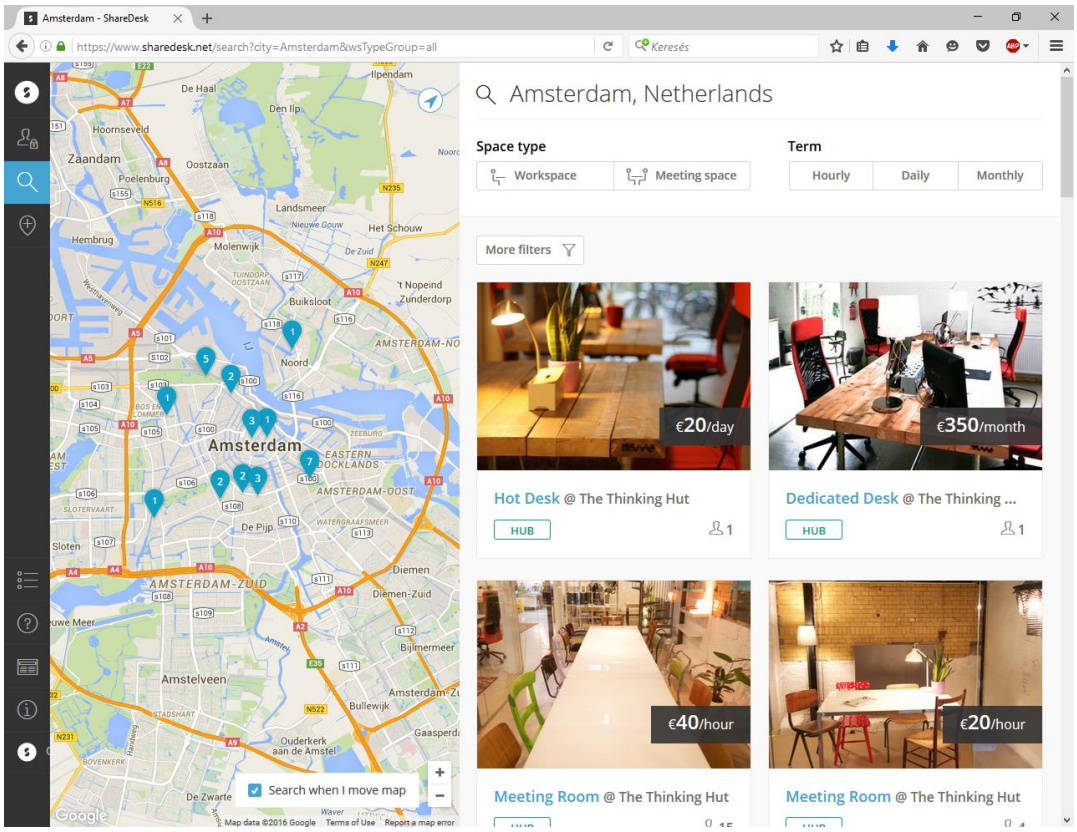


FIGURE 1. SHAREDESK MAIN SCREEN

Any content that can be viewed on a webpage can be scraped, so the dataset used in this paper is based on data obtained from coworking spaces using web crawlers. Scrapy is an open source Python framework made for large scale web scraping. Websites are diverse so there was no ready to use solution, so it needed time and ad hoc approaches how to create the dataset for the research.

The main idea was to create two web spiders: one that extracts the urls for the crawling and another for the invidual webpages. However, the main screen of Sharedesk.net (Figure 1.) contains all the coworking offices in the area, but the area is limited isn't possible to zoom out to see the whole world. So I needed to think differently to get the individual webpages. In the url is www.sharedesk.net/search?city= so there will be possible to add city names from a dictionary but it sounded complicated.

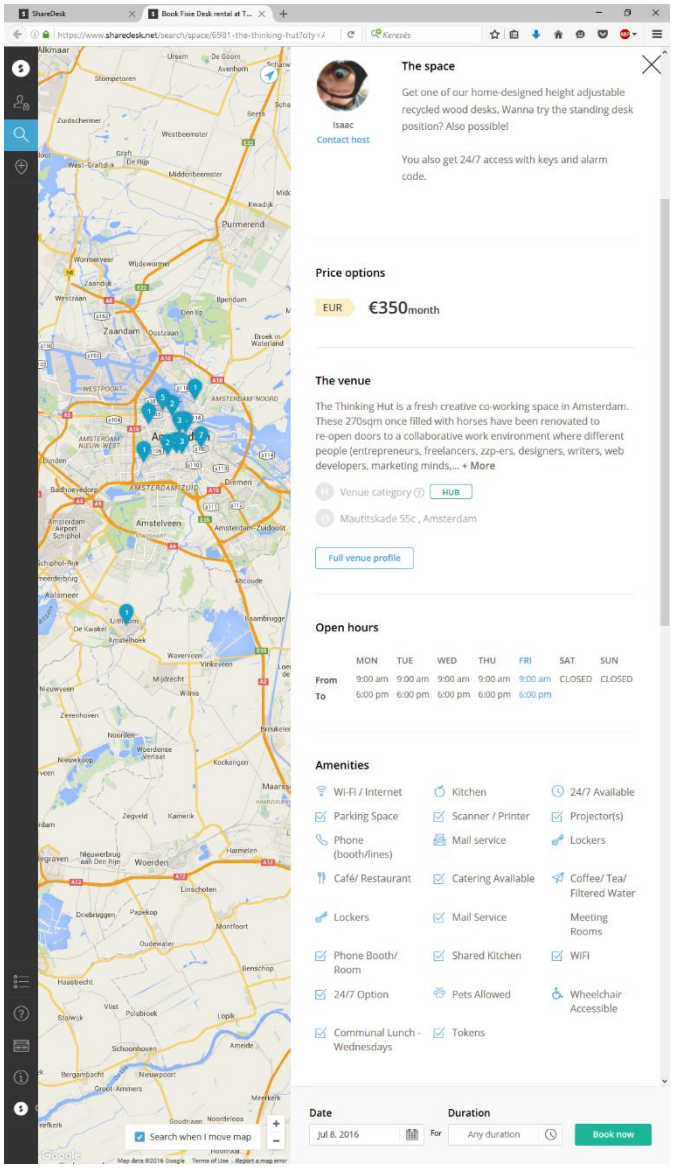


FIGURE 2. WEBPAGE OF A COWORKING OFFICE ON THE SHAREDESK.NET SITE

If I clicked on an item I saw that the url changed like this: https://www.sharedesk.net/search/space/6983-the-thinkinghut?city=amsterdam&wsTypeGroup=all and this gave me the idea, why not to check is there an unique ID for the venues. It worked so I created a url generator script instead the first web crawler, which created the url with growing id number from 0 to 10,000 in a csv file. According the computer processing capacity, it was no issue to have this number and it was quicker, if an ID is no longer used there will be a 404 page, which I removed during

the processing from the extract file.

I made the real web crawler really simply, it red the csv file with the urls and extracted a JSON code from the webpages. The web crawling was conducted in 2015 summer. It took two days to finished, because I used artificial delay between two webpage requests, to avoid IP address banning for Denial of Service (DoS) attack.

TABLE 1. DATASET

| | **Items** |
|---|---|
| Social media | • The number of Facebook followers<br>• The number of Facebook check-ins<br>• The number of Facebook events<br>• The Facebook review score<br>• The number of Facebook reviewers<br>• Foursquare followers<br>• Foursquare check-ins |
| Services | • Coworking Visa<br>• Pet friendly<br>• Business services<br>• Community<br>• Community lunch<br>• Open lectures<br>• Catering<br>• Free coffee, tea<br>• Free fruit<br>• Safe<br>• Postal Services |
| Building | • Wheelchair Accessible<br>• AC<br>• 0-24<br>• Pong |
| Hardware | • Wi-Fi<br>• Projector<br>• TV, Monitor<br>• Fax<br>• White table<br>• Scanner, printer |
| Extra spaces | • Kitchen<br>• Restaurant, Coffee, Bar<br>• Meeting Room<br>• Photo studio<br>• Phone booth<br>• Relaxing rooms<br>• Shower<br>• Parking place<br>• Bicycle parking |

The crawled data was heavily processed. First I created a script to change a JSON to

CSV, the header of the table was the keys of the JSON file. It was too big to handle so I used SQLite instead Open Office to store the data in preferred structure and format.

To explore the dataset I used Pandas[2], which is a popular Python package for data science and IPython Notebook[3]. It is so effective, to load the data from the database and create a correlation matrix on the data needs only 5 lines of coding.

To focus on Europe, I took a sample population from the coworking offices from Amsterdam and Budapest, as representing Eastern and Western Europe. I collected extra data manually from social media like Facebook followers, check-ins, event, reviewers, review score and foursquare followers, check-ins. I divided the collected items into five parts: social media items, services, building, hardware, extra spaces. However, Gandini (2015: 194) said "practically conceived as office-renting facilities where workers hire a desk and a Wi-Fi connection these are" if we look in the items from the collected dataset (listed in Table 1) there are much more amenities.

## RESULTS

The correlation analysis results are presented below in the order shown in Table 2. The correlation analysis relative to all the other items is not always discussed for every item in each part. Results are described selectively according to the discussion point.

The findings were in the social media part: There were coworking offices without Facebook page, but the highest number of Facebook followers was 6184. The mean for the examined 31 offices were 1211.4. User can check-in in Facebook, if they are visiting a place. Of course if a page is not existing, they could not check-in, so there were 0 check-ins, the maximum value for Facebook check-ins was 1832, the mean was 302.47. The number of Facebook events: With Facebook is possible to organize events, invite users to event. The maximum value was 151, the mean was 20.33. The number of Facebook reviewers maxed in 52 people with the mean of 10.7. with a review score between 0 and 5. Foursquare followers were between 0 and 943 with a mean of 124.97 and the number of check-ins were between 0 and 2602 with a mean of 519.5.

According the correlation matrix all social media item has a positive correlation with other social media item. This means if a venue has a Facebook page, it will have followers, who make check-ins, reviews, participate on events and they used Foursquare too. Only one item was not from the social media, the photo studio. I think the reason for this that if a venue has a place to shoot professional photos, they will use it immediately on social media.

[2] https://github.com/pandas-dev/pandas
[3] https://ipython.org

TABLE 2. AMENITIES CORRELATION MATRIX

| Item 1 | Item 2 | The significance level of correlation values is 1% |
|---|---|---|
| Coworking Visa | AC | 1.000 |
| Fax | Relaxing rooms | 1.000 |
| Fax | Open lectures | 1.000 |
| Relaxing rooms | Open lectures | 1.000 |
| Postal services | Catering | 0.850 |
| Facebook followers | Facebook check-ins | 0.828 |
| Foursquare followers | Foursquare check-ins | 0.827 |
| Free coffee, tea | Catering | 0.784 |
| Kitchen | Free coffee, tea | 0.764 |
| Facebook followers | Facebook events | 0.699 |
| Price | Pet friendly | 0.697 |
| Pong | Community | 0.695 |
| Fax | Community | 0.695 |
| Fax | AC | 0.695 |
| Relaxing rooms | Community | 0.695 |
| Relaxing rooms | AC | 0.695 |
| Open lectures | Community | 0.695 |
| Open lectures | AC | 0.695 |
| Coworking Visa | Fax | 0.694 |
| Coworking Visa | Relaxing rooms | 0.694 |
| Coworking Visa | Open lectures | 0.694 |
| Kitchen | 0-24 | 0.683 |
| Coworking Visa | Wheelchair accessible | 0.680 |
| Wheelchair accessible | AC | 0.680 |
| Facebook events | Photo studio | 0.668 |
| Projector | 0-24 | 0.667 |
| Postal Services | Free coffee, tea | 0.667 |
| Facebook check-ins | Facebook events | 0.656 |
| Restaurant, coffee, bar | Phone booth | 0.630 |
| Restaurant, coffee, bar | Parking place | 0.630 |
| Postal services | Phone booth | 0.630 |
| Phone booth | Parking place | 0.630 |
| Facebook check-ins | Facebook review score | 0.621 |
| Facebook followers | Foursquare followers | 0.608 |
| Projector | Restaurant, coffee, bar | 0.602 |
| Projector | White table | 0.602 |

In the item group services we can find the Coworking Visa, which allows to the digital nomads to use coworking spaces in the whole world. A pet friendly coworking spaces allows members to bring their pet. This is beneficial for the member, because it reduces their stress level ("Manager's Best Friend | The Economist." 2010), petting animals grows oxytocin hormone production (Barker et al., 2012). Improves the relation with other coworkers, the whole milieu is when someone steps in an office and sees instead

people in suits a smiling golden retriever. It is also reducing the negative effect of sitting, and walking improves creative thinking (Oppezzo & Schwartz, 2014). Business services are services to help solve business administrations, postal services to help sending mails and packages. Community means a proactive attitude from the venue owner, to help in creating and organizing a community. Community lunch has the same motivation, team building with eating together and the open lectures too with sharing knowledge between the community members. With empty belly working is less effective catering, free coffee, tea or fruits helps to solve this problem. The last item in the services is the safe, when people could lock their stuff somewhere in the building, so they can leave expensive gear there.

In the correlation matrix Coworking Visa is the most often visible item. According to my understanding if someone want to work somewhere in the world in a coworking office, the office should have a minimum level of amenities. Community and open lectures are also connected to different other items.

The third item group is the "building". In a wheelchair accessible office there are no barriers for people using wheelchair and the signs are written in Braille on the wall or the button for the elevator is low so everybody can reach it. AC is a must have to have fresh, cold and clean air inside the building. Pong is like a ping pong table, to play games. 0-24 means that the building is open night and day. The AC had a strong correlation with other items, as I mentioned it is a must have and buildings of the coworking offices has it.

The fourth group named hardware. Wi-Fi is the most important amenity in a coworking office, wireless internet is a must have. Projector is hardware that projects the screen to a white wall, it is a good to have for presentation, visualize ideas on meetings. White table is the same. TVs, monitors help people to have a screen with bigger and better resolution as their notebook screen has. Scanner and printer are tools for document managing. The most interesting equipment is the last item in this group the fax. However, it is no longer used as sending documents it the most often from this group on the correlation matrix table, because there was only one venue with fax, so it is just a sampling error.

The last item group is the extra space. It is good when a coworking space is a vibrant downtown of a city with cool restaurants, but people like to bring their own food and eat not front of a monitor. To bring this to a next level, some of the venues have their own restaurant, coffee, bar. In a bar you can drink alcohol beverages, so it allows to make program for the community after work. The goal is change ideas instead of getting drunk. Meeting room is also a must have feature of a coworking space, this takes the members life to the next level, if you have meeting room you are no longer a garage company. Photo studio is a space where you can create professional's photos. Phone booth the room where people can speak on their phone without disturbing the others in the office. Relaxing room restores member's energy level after heavy work

session. Shower gives possibility to do some sport during the days and have a fresh shower before sitting back to the desk. The last two item is parking, parking for cars and parking. I made a second correlation analysis with the items and the price (Table 3.).

TABLE 3. PRICE AND AMENITIES CORRELATION MATRIX

| Price | Item | The significance level of correlation values is 1% |
|---|---|---|
| Price | Pet friendly | 0.697 |
| Price | Parking place | 0.553 |
| Price | Kitchen | 0.525 |
| Price | Meeting room | -.586 |

This was my main finding, if we do not count the pet friendliness, that price has only effect with extra spaces. If we think about the services, social media it is not about cost, it is about putting effort, work as a host of a coworking space. Hardware and building are something that was a starting investment in a place. Parking place and kitchen has no direct revenue like restaurant, coffee, bar or a photo studio, but it needs extra land or space from a building, which is a huge cost, especially in big cities. However meeting rooms have negative correlation with the price. According to the dataset, more expensive venues did not list meeting room as an amenity, they got in the package already.

## CONCLUSION

In this paper, I have performed a correlation analysis to explicate the relationships among the items. Table 3 summarized the major findings of this paper, which has presented the results of a correlation analysis on the operational features of coworking space divided into five groups. According to the dataset amenities are connected with the land needed to include in the price of renting a coworking desks.

Concerning the way of collecting data, one problem is that this study consisted only one aggregating websites data. Better algorithm needed to get more venue data.

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OPEN ACCESS ARTICLE

# FORECASTING EXCHANGE RATE BETWEEN MACEDONIAN DENAR AND EURO USING DEEP LEARNING

Aleksandar Dodevski, Natasa Koceska, Saso Koceski

Faculty of Computer Science, University Goce Delcev, Stip, Macedonia

***Abstract***

Modelling and forecasting foreign exchange rate fluctuations represents a big challenge in today's global economy. The main objective of this research is to explore the capacity of deep learning approach for forecasting changes in exchange rates of Macedonian Denar against Euro. The model developed has been empirically validated over a publicly available dataset collected from the web site of the National Bank of the Republic of Macedonia. Obtained results show good correspondence between real and forecasted data. This implies that deep learning can be potentially useful method for forecasting the Euro vs Denar exchange rate fluctuations.

***Keywords:***

*Exchange rate, Forecasting, Macro economy, Modeling, Neural Networks, LSTM, Deep learning.*

## INTRODUCTION

According to Merriam-Webster dictionary the term exchange rate is defined as "the ratio at which the principal unit of two currencies may be traded". Many scientific studies consider the exchange rate as the most important macroeconomic variable in an open economy that might be used as a health indicator of the economy of an individual country. This consideration is becoming even more evident in the current environment of deregulation and globalization of financial markets.

Due to the trading purposes, currencies can be converted on the foreign exchange market. Therefore, the foreign exchange market plays a fundamental role in today`s international trade, without which it will be practically impossible.

In the literature two main types of exchange rates are distinguished: floating (flexible) and fixed regime. A floating exchange rate is influenced by the free market forces. It may increase or decrease following the laws of supply and demand. The government in this case does not intervene. A fixed exchange rate is a type of regime where a

currency's value is fixed against either the value of another single currency to a basket of other currencies or to another measure of value, such as gold.

When a government selects a fixed exchange rate regime it actually subordinates its monetary policy to the exchange rate objective and thus it is becoming difficult to target different nominal variable on a longer perspective. The Central Bank that adopts the fixed exchange rate regime, simultaneously accepts that it will not conduct monetary policy that is independent from the anchor currency country. This means that the domestic country money supply becomes endogenous variable determined by the money supply in the anchor currency country, in order to keep the stability of the exchange rate (Bisev & Boskov, 2016).

Countries that select the fixed exchange regime usually tight their currency to US dollar or euro. Like many countries in the early stages of transition, many South-Eastern European countries rely mainly on fixed exchange rates. Since gaining its monetary independence in 1992, the National Bank of the Republic of Macedonia (NBRM) has changed its monetary policy regime once. From the initial period of transition until the end of 1995, the monetary policy regime was oriented towards money supply targeting (Trajkovic, 2006). At the end of 1995, policy makers switched to a fixed exchange rate by pegging the domestic currency to the German mark and later on to the euro (Trajkovic, 2006).

Macedonian`s economy today is characterized as a small and open economy with ambition to integrate to the European Union. The process of integration supports the single currency with argument that it is in favor of international trade and stability of exchange rate. Exchange rate is directly influencing the exports and imports of every country as well as Macedonian, and they on the other side are influencing the country`s lower or higher balance of trade. The exchange rate is considered important determinant not only for countries but, also for businesses as well as for individuals, and consequently, it is becoming very important subject for analysis and research by economist and others (like for e.g. borrowers, corporate treasurers, fund managers, specialist traders, etc.).

Many scientific papers and studies reported that foreign exchange (FX) rates fluctuations are highly unpredictable and, due to the difficulties involved in forecasting, only 3 out of 10 spot foreign exchange dealers make a profit in any given year (Carney and Cunningham 1996).

For a long period of time, economists have supported a random walk hypothesis, implying that exchange rate changes have independent and identical statistical distributions. The presence of a random walk in currency markets is a sufficient but not necessary condition for the existence of weak form efficiency according to the efficient market hypothesis, which suggests that past movements in exchange rates cannot be used to predict its future movements (Li et al., 2015). However, the empirical

literature shows strong evidence that exchange rates are not independent of the past changes (Ca'Zorzi et al., 2016).

In the last two decades many scientists have conducted empirical studies in order to determine a suitable model that reflects the fluctuations of FX rates between most influent currencies (Engel et al., 2015; Pilbeam & Kjell, 2015). It is scientifically proven and reported in various studies that FX rates are influenced by different co-integrated, macro-economic, political and even psychological factors. Up to date, there is no universal model that entirely encompass all those factors and their complex interactions.

Therefore, modeling and forecasting FX rate fluctuations represents a big challenge in today's global economy. Since financial time series, such as exchange rates, are complex and typically nonlinear, we can analyze the processes, that change the time series data as a black box and then study the dynamic movements of the series (Anastasakis & Neil, 2009). Considering this nonlinearity of FX rates we believe that the best model for their fluctuations prediction are the neural networks that by definition are nonlinear in nature. There are two main categories of neural networks, feed forward and recurrent networks.

This paper explores the capacity of recurrent neural networks (RNN) for forecasting changes in exchange rates of the Macedonian Denar versus the Euro. The model developed has been empirically validated over a publicly available dataset, results are presented, discussed and the conclusions are drawn.

## RELATED WORK

Since the beginning of 90's many research studies focused their interest in modeling and forecasting exchange rates. In their study (Meese & Rogoff, 1983) empirically derived a conclusion that a random walk model outperforms a range of time series and structural models. Alexander and Thomas (1987) and Wolff (1987) independently from each other proved that the random walk model is superior over econometric models, even in the case when these models are implementing time-varying parameters. The same conclusion has been derived using time varying autoregressive models.

Many negative comments and reviews were published regarding the scientific works of Sweeney (1986) and Lukac et al., (1988) due to using less than rigorous methods for predicting exchange rates. In his paper, Hsieh (1989) derived another useful conclusion that proves linear dependency of exchange rate changes. Having in mind that all the derived conclusions and results in above mentioned studies rely mainly on linear time series models, one may easily conclude that the impossibility to accurately predict the exchange rates may be due to the limitations of linear models.

Many scientists in their studies have developed nonparametric models that try to encompass nonlinearities in FX rates (Diebold & Nason, 1990; Meese & Rose, 1990; Engel & Hamilton, 1990; Engel, 1994). In addition, other studies (Engel & Hamilton, 1990; De Grauwe et al., 1995; Fang et al., 1994) have provided scientific proof of models giving good results in nonlinear predictions of FX rates. Likewise, several studies have reported the nonlinearities in FX rate series but, have also shown that changes of exchange rates are nonlinearly dependent, although they are often serially uncorrelated (Medeiros et a., 2001; Hong & Lee, 2003). Similarly, Zhang and Hu (1998) in their study showed that nonlinear models outperformed the linear model they estimated.

The growing popularity of the Artificial Intelligence (AI) and its application in various fields (Loshkovska & Koceski, 2015), starting from tourism (Koceski & Petrevska, 2012), through medicine (Trajkovik et al., 2014; Stojanov & Koceski, 2014; Koceski & Koceska, 2016), biology (Stojanov et al., 2012), education (Koceski & Koceska, 2013), robotics (Koceski et al., 2012; Koceski et al., 2014; Serafimov et al., 2012; Koceska et al., 2013), and also in economics (Koceski & Koceska, 2014), is mainly due to the apparatus i.e. the models and techniques used to mimic the human reasoning, learn and improve during time. One of these models that has been proven to give optimal results in solving various problems is the model of Artificial Neural Networks (ANNs). They are statistical models directly inspired by, and partially modeled on biological neural networks. They are capable of modeling and processing nonlinear relationships between inputs and outputs in parallel. The capabilities for exchange rate prediction using Multilayer Perceptron (MLP) neural networks has been successfully used for time series prediction but, they use computationally intensive training algorithms and can easily stuck in local minima (Galeshchuk, 2016).

Radial Basis Function (RBF) neural networks have also been used for FX rates prediction (Chaudhuri & Ghosh, 2016), but, these networks have problems in dealing with large amounts of training data, while demonstrating poor interpolation properties, when using reduced training sets. In the case of RBFs, the networks are trained only once on a large example set taken from the signal such that the dynamics of the underlying system can be captured. Therefore, the networks produce sequential outputs in response for newly arriving data. This means that such a system can be used when the dynamics of the time series does not change considerably over time, a condition which is usually contravened in practice (Lee & Haykin, 1993).

Many other AI models have been recently applied and used for FX rates prediction. Shen et al., (2016), have proposed deep belief network (DBN) for forecasting of exchange rates. They have applied conjugate gradient method to accelerate the learning for DBN. The theory of fuzzy logic has also been applied for FX rates forecasting (Korol, 2014). Hybrid method of multiple kernel learning and genetic algorithm for forecasting short-term foreign exchange rates has been presented with

good results (Deng et al., 2015). Recurrent neural network nave been proven to give very good results in forecasting of economic time series data such as stock returns (Rather et al., 2015).

Therefore, in this paper, we are exploring the capability and potential of RNN, for prediction of FX rates between the Macedonian Denar and the Euro.

## EMPIRICAL MODEL

FX rate prediction is sequencing problem that in machine learning is usually solved using various models. Probably the simplest problem based on a sequential data is a one to one problem. In this case, the model has one input (tensor) and the model generates prediction based on that input. In order to use the previous values i.e. to take into consideration the past of the sequence this model should be extended and transformed in a sort of one to many problem. The one to many problem starts like the one to one problem where we have an input to the model and the model generates one output. However, the output of the model is now fed back to the model as a new input.

A recurrent neural network deals with sequence problems because their connections form a directed cycle. In other words, they can retain state from one iteration to the next by using their own output as input for the next step. In programming terms this is like running a fixed program with certain inputs and some internal variables. The simplest recurrent neural network can be viewed as a fully connected neural network if we unroll the time axes (Fig. 1).

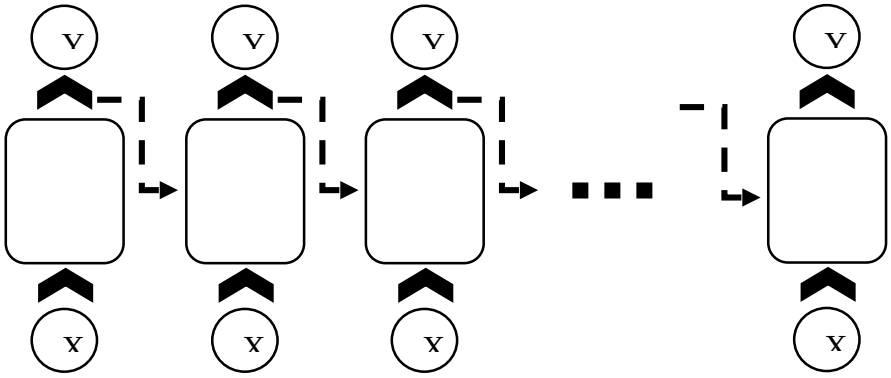


FIG.1. RNN WITH UNROLLED TIME

In this univariate case only two weights are involved (Eq. 1):

$$Y_t = \tanh(wY_{t-1} + ux_t) \quad (1)$$

The weight multiplying the current input $x_t$, which is u, and the weight multiplying the previous output $Y_{t-1}$, which is w. This formula is like the exponential weighted moving average by making its pass values of the output with the current values of the input.

Having this in mind, the deep RNN can be built by simply stacking units to one another. However, this kind of network will work well only for a short-term memory. Since the problem of FX rates extension has a longer time dependency, a modification of this network is necessary.

Long Short-Term Memory (LSTM) networks are an extension for recurrent neural networks, which basically extends their memory. Therefore, it is well suited to learn from important experiences that have very long time lags in between. The architecture of the basic cell/node of this model is given on the diagram presented in the Fig. 2.

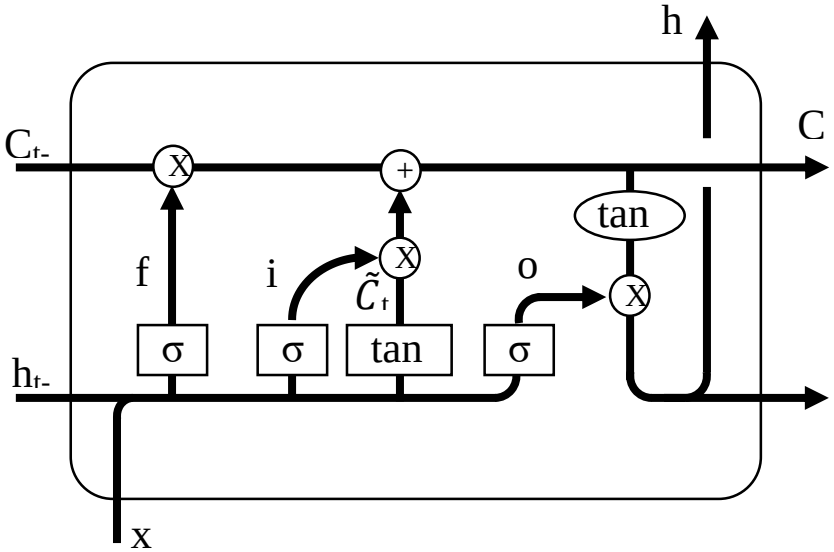


FIG.2. LSTM NETWORK NODE ARCHITECTURE

This model is organized in cells which include several operations. LSTM has an internal state variable, which is passed from one cell to another and modified by Operation Gates.

***Forget Gate***

Forget gate is defined with the Eq. 2.

$$f_t = \sigma(W_f \bullet [h_{t-1}, x_t] + b_f) \tag{2}$$

It is a sigmoid layer that takes the output at *t-1* and the current input at time t and concatenates them into a single tensor and applies a linear transformation followed by a sigmoid. Because of the sigmoid, the output of this gate is between 0 and 1. This number is multiplied with the internal state and that is why the gate is called a forget gate. If $f_t=0$ then the previous internal state is completely forgotten, while if $f_t=1$ it will be passed through unaltered.

***Input Gate***

The input gate takes the previous output and the new input and passes them through another sigmoid layer (Eq. 3).

$$i_t = \sigma(W_i \bullet [h_{t-1}, x_t] + b_i) \tag{3}$$

This gate returns a value between 0 and 1. The value of the input gate is multiplied with the output of the candidate layer (Eq. 4).

$$C_t = \tanh(W_C \bullet [h_{t-1}, x_t] + b_c) \quad (4)$$

This layer applies a hyperbolic tangent to the mix of input and previous output, returning a candidate vector to be added to the internal state.

The internal state is updated according the rule defined with Eq. 5.

$$C_t = f_t \bullet C_{t-1} + i_t \bullet \tilde{C}_t \quad (5)$$

The previous state is multiplied by the forget gate and then added to the fraction of the new candidate allowed by the output gate.

***Output Gate***

This gate controls how much of the internal state is passed to the output and it works in a similar way to the other gates. Its function is described with the Eq. 6 and Eq. 7.

$$O_t = \sigma(W_O \bullet [h_{t-1}, x_t] + b_O) \quad (6)$$

$$h_t = O_t \bullet \tanh C_t \quad (7)$$

These three gates described above have independent weights and biases, hence the network will learn how much of the past output to keep, how much of the current input to keep, and how much of the internal state to send out to the output.

## EVALUATION OF THE MODEL

***Dataset description***

We use daily Macedonian Denar and Euro exchange rates. All data were collected from the web site of National Bank of the Republic of Macedonia (NBRM web site, 2018). Data were collected for the period January 1st 1999 to March 31st 2018 (Fig. 3).

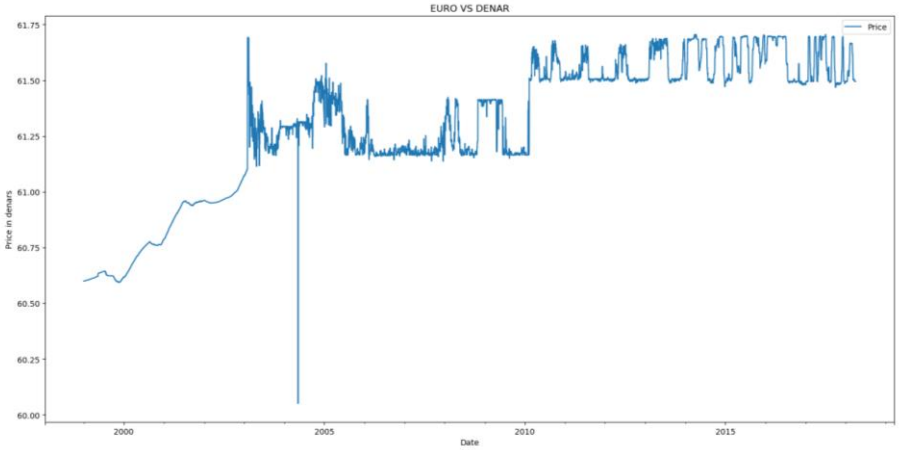


FIG.3. EXCHANGE RATES EURO VS DENAR

There were overall 7,030 observations; paper used data till December 31st 2013 (i.e. 5480 samples which is around 80% of the dataset - depicted in blue on Fig. 4) to build the model, while remaining data (presented in orange on Fig. 4) were hold for checking the accuracy of the forecasting performance of the model.

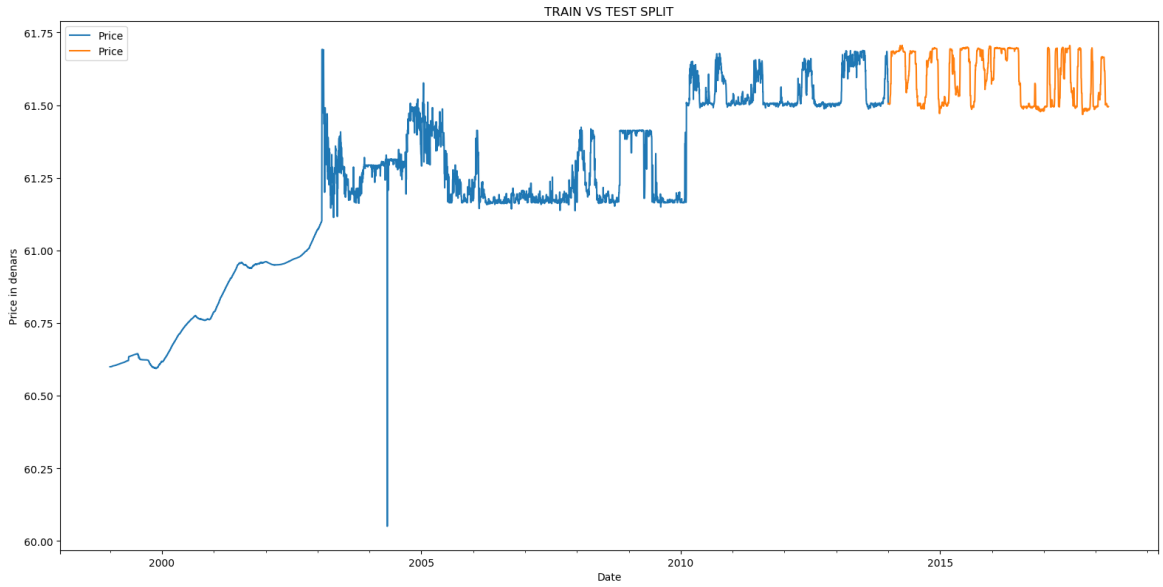


FIG.4. TRAIN VS TEST SPLIT

The recurrent model of network was built as a one-layer sequential model. 6 LSTM nodes in the layer were used and each of them was given an input of shape (1,1), which is one input given to the network with one value.

The last layer was a dense layer where the loss is mean squared error with stochastic gradient descent as an optimizer. The model was trained for 200 epochs with early stopping callback. The summary of the model is presented in Table 1.

After the training the developed model has learned to reproduce the yearly shape of the data well and the results of forecast are presented in Fig. 5.

TABLE 1. NETWORK MODEL

| Layer (type) | Output Shape | No. Params |
|---|---|---|
| LSTM | (None, 6) | 408 |
| Dense | (None, 1) | 7 |
| Total params: 415<br>Trainable params: 415<br>Non-trainable params: 0 | | |

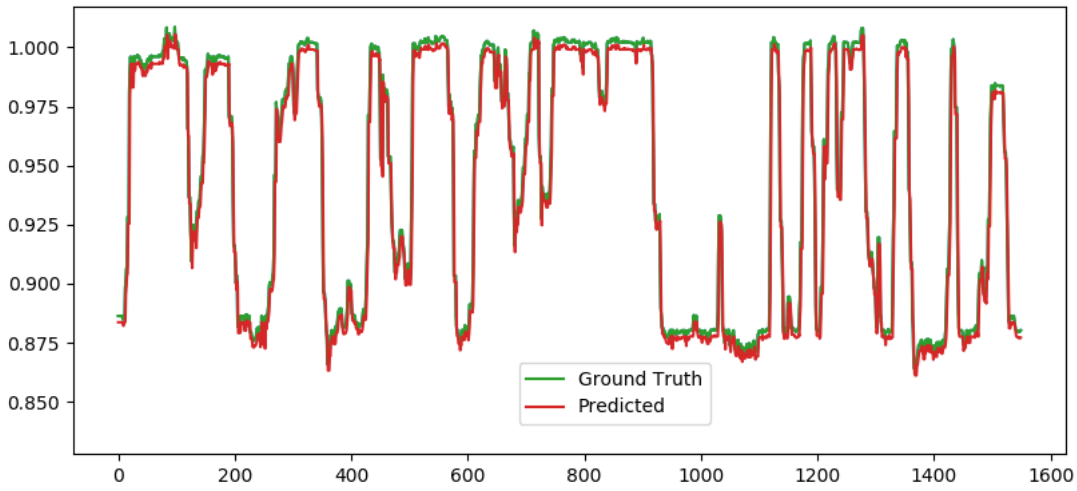


FIG. 5. PREDICTIONS GENERATED BY THE TRAINED NETWORK

## CONCLUSION

Deep learning LSTM neural network models are powerful enough to learn the most important past behaviors and understand whether or not those past behaviors are important features in making future predictions. LSTM works like a model which has its own memory and which can behave like an intelligent human in making decisions.

The model developed has been empirically validated over a publicly available dataset collected from the web site of the National Bank of the Republic of Macedonia. Obtained results show good correspondence between real and forecasted data. This implies that deep learning can be potentially useful method for forecasting the Euro vs Denar exchange rate fluctuations.

Future work foresees changes and improvements of the developed model. Various changes can be made in this model to improve it. The first intuitive idea is to modify the optimizer. Another important improvement is to implement the Sliding Time Window method, which comes from the field of stream data management.

This approach comes from the idea that only the most recent data are important. One can show the model data from a year and try to make a prediction for the first day of the next year. Sliding time window methods are very useful in terms of fetching important patterns in the dataset that are highly dependent on the past bulk of observations.

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