Testing Strong Form Market Efficiency of Jordanian Capital Market: Performance Appraisal of Mutual Funds a comparable study case with Saudi Arabia

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Summary

This paper analyses the strong-form efficiency of the capital market in Jordan by evaluating the performance of mutual funds over the period from 2011 to 2016, and compare it with the situation in Saudi Arabia using the Jensen modelling techniques. These tests were applied on monthly data. Results from the study show that there is no evidence of the strong-form of efficiency in either the Amman Stock Exchange or in the Saudi Arabia capital market. Therefore, investors in the Amman Stock Exchange and Saudi Arabia capital market cannot predict stocks prices or returns in the short term; with regard to firms, it suggests that the securities of firms cannot outperform the market and present market price is to a certain extent a true reflection of the present situation of their securities, in addition there is lack number availability of the mutual funds in Jordan.

Keywords: Efficient market hypothesis; Amman Stock Exchange; Jensen modelling technique; Strong-form efficiency; Abnormal Rate of Return.
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INTRODUCTION

In Jordan corporate insiders are required to disclose their trades to the Securities and Exchange Commission (JSC, 2019). The JSC Act requires the insiders to report their trades to the Commission within ten days following the end of the month in which the trade occurs. In this paper, the disclosure affects the trading strategies of competing insiders with imperfect information, and the implication of such trading strategies on market efficiency, market liquidity, and insiders' profit will be analyzed under the Jensen test modeling technique.

The stock markets play a crucial role in capital allocation and its transformation from savings to financing new investment initiatives, consequently creating more wealth**.** The efficient and effective operation of financial markets, particularly capital markets, constitutes the foundation of the development of the modern economy. Moreover, the financial investments on capital markets refer to the flow of all streams of funds managed by banks and financial institutions, mainly the stock exchange and institutions investing in the capital markets around the world and on different ways, i.e. investment funds, pension funds and insurance companies.

Many researchers want to illustrate the meaning of capital market efficiency and insist that the definition itself still remains without change as what Fama define it, although the new internet world means getting data is easier and more manageable, (Shapiro & Wilk 1965) (Fama, 1970) gave it a name that efficiency its possible in these days by talking about the right for all the investors to access information at the same time and

without any insider trading. There is no doubt that the market in general tries to manage the relationship between the borrowers and lenders and tries also to manage the saving percentage by offering new products or services. From another point of view, what customers need these days will become old fashioned in the future. Those who try to keep the past will face a lot of problems to modify in the future. The new version of computers is a good example: while the companies were competing to be the first to use computers in the 1990s, now the same computers are not enough efficient to do the same job. In other words, markets also change and there is a need for a new definition which borders new meanings. Efficiency is also important as we use new methods to sell and buy products and services, such as using new methods for delivering information to investors efficiently.

Efficiency is used to refer to the ability of the capital market to act in such a manner that security prices reflect the current information and new information flows from the market in an unbiased manner, so the prices should be determined on the basis of demand and supply(Fama & MackBeth 1973). In an efficient market the security prices are supposed to be reflected in an unbiased manner, the flow of the information should be in (smooth, and all public information is accessible to investors and same at the same time). So that means there is no advantage in using

private information to achieve excess returns (superior return) among others from investors

(means all visitors have same chance to achieve same return), in an efficient market, while

the prices of shares are absorbing the new changes of the information.

There are three forms of information efficiency of a market that may be verified. Testing weak form efficiency provides information on the reflection of the historical values of share prices. Most research on the subject proves the validity of the hypothesis that the technical analysis does not allow the achievement of abnormal rates of return (Fama 1991). In the case of the semi-strong form the empirical research does not provide explicit answers; however, most research weighs in favor of the hypothesis of the semi-strong form of market informational efficiency. According to the hypothesis, it is impossible to achieve above-average profits in the long run, based on technical and fundamental analysis (Fama 1991). The strong form efficiency represents another type of market informational efficiency, which is the most difficult to verify, as it requires the use of non-public information.

The main objective of stock markets is to provide capital inflow for entities issuing stocks, thereby allowing them to grow and to create wealth for investors, who invest their free capital in stocks, that they perceive as attractive investments. Moreover, the capital market is a place, where the current market value of a company is determined by the supply and demand of its shares. Reliability of the stock valuation process is substantially correlated with results obtained in the verification of the hypothesis of the stock market efficiency. The subject of market efficiency is very often brought into question by practitioners and theoreticians from the financial sector, who build and verify investment strategies.

One of the ways to test this level of efficiency is event study. This can be used to evaluate the behavior of share prices with publicly available information. It is used for typically different reasons. The first use of it is with the semi-strong form efficiency test, on the assumption that the postulates of the market efficiency hypothesis hold. The second use of the event study is as a tool for examining the impact of some event on the wealth of firms' shareholders (Barnes & Ma, 2002) (Khotari & Warner 2009). The third use is the same purpose as in this paper which is the strong form of efficiency test (Wong 2002). Investigating nominal price changes at the time of stock splits, where he tested the effect of unexpected dividend changes on the changes of stock prices, which is taken to be a breakthrough in testing market efficiency. Over the past half century, event studies have been employed in much research and their sophistication has been greatly improved by studies such as Fama et al. (1969).

But I will not use this technique, as it has been used already in testing the semi-strong form of efficiency in the capital market of Jordan. In strong form of efficiency it is possible to use the event study, as used previously in Bustanji (2019)

The objectives of the present study are as follows:

1. To study and analyze the equity and balanced schemes of mutual funds;
2. To compare the performance of mutual funds with the benchmark indicator;
3. To find out whether share funds in Jordan outperform mutual funds Saudi Arabia or not;
4. To discuss the market trends of mutual funds compared with those of the benchmark index;
5. To examine the mutual fund performance in the Jordanian capital market;
6. To test the existence of the strong form of Efficient Market Hypothesis in Jordanian Capital Market by evaluating the performance of mutual funds;
7. To find out whether it is possible to develop a long-term investment strategy, that will enable investors to achieve abnormal rates of return.

LITERATURE REVIEW

The full reflection of all relevant information has always been the main topic of the strong-form financial

market efficiency, with all historical and public, private or insider information. Prices immediately react to new information, so the chances of finding undervalued and overvalued securities are random. The above implies that the market is "unbeatable" and that active investment strategies are in vain.

The basic task of this type of test. also known as a privet information test, is to determine whether insider-based trading yields above-average returns Betzer & Theissen (2009) Seyhun (1986) (Finnerty, 1976) give an affirmative answer, for example proving that insider trading brings risk- and transaction-cost-weighted above-average return. With the help of privileged information, insiders buy stocks before the price rises and sell them before the price drops. The results of these studies provide evidence against the validity of strong-form EMH.

There is a difference in the behavior of investors. For example, insider information is forbidden in all of the capital markets around the world and a person who tries to do this runs the risk of being arrested, in. Alternative evidence relates to the performance of mutual funds. These institutional investors invest knowledge, time, and money to collect information about company performance. The collected information is not publicly available, as it is private, unlike insider information, it is legal because it is based on analysis.

The strong form of the efficient market hypothesis assumes all available public and private information is fully reflected in a security's market price. The strong-form, in terms of market participants, also assumes that no individual can have higher expected trading profits than others because of monopolistic access to information. One possible test of the strong-form is to determine whether insiders earn better than average profits from their market transactions. To ascertain if the market is truly efficient will involve determining how well insiders do relative to the market in general. To date, some work has already been done in evaluating rates of return earned by insiders trading for their accounts. Some researchers focusing on how calculated rates of return earned by insiders trading for their accounts and their work lends some support to the hypothesis that insiders do earn above-average profits, (e.g., Glass, 1966; Pratt & De Vere 1978; Rogoff 1964; Jaffe 1974a, 1974b). A major shortcoming of these studies centers on data availability, as no precise price per share or date of insider trades were reported to the Securities and Exchange Commission (S.E.C) before 1965. Further, except for Jaffe, the studies do not incorporate an explicit adjustment for risk. An additional problem with all the studies is the skimming of the cream of the crop in their sample selection. That is the selection of samples based on "intensive" insider trading criteria, i.e., the samples are biased in favor of whose performance would more than likely be superior to the average insider. This bias, while not affecting their results relative to the semi-strong-form, invalidates the findings for a test of the strong-form.

However, researchers wrote also about the strong form of efficiency using different models to get results. Some of this research is summarized it in a list 1.

From the table it is easy to notice that this topic was used in different markets and used different models to get reliable results. Some similarities and differences can be noticed, especially from the test used at the same level of efficiency and the same study style but with differences in the results. An example is Kyle (1985) and Cao & Ma (1999), both of whom used almost the same models but did not agree about the relationship of liquidity and the final paper results to conclude whether that market is efficient. I think that the current study looks at the problem research with more dimensions and objectivity.

Table 1
Summary of results on different markets and models used for strong form of capital markets

Authors	**Topic**	**Market name**	**Source of Data**	**Name of the test used**	**Period of study**	**Results**
Finnerty (1976)	Insiders and Market Efficiency	NYSE firms	S E C 's Official Summary of Stock Transaction s	Regression analysis and various tests for portfolio	from Jan. 1969 to Dec. 1972	Insiders can outperform the market. Insiders can and do identify profitable as well as unprofitable situations within their corporations inefficient market on the strong form
(Chau & Vayanos, 2008)	Strong-Form	infinite model	General competitive market	Kyles (1985) model	General theoretic al review	First, markets can be close to strong form efficiency even in the

	Efficiency with Monopolistic Insiders	with a monopolistic insider	(theoretical data)			presence of monopolistic insiders. Second, despite being close to efficiency, markets can offer significant returns to information acquisition
Kyle (1985)	Continuous Auctions and Insider Trading	General market	Mathematical	Dynamic Kyle model	General theoretic review	He used a model and tried to prove if its working to discover the insider trading, makes the simplified assumption that the market is organized as a series of batch auctions, which is not characteristic of capital markets.
(Cao & Ma, 1999)	Trade Disclosure and Imperfect Competition among Insiders	NYSE Market when there are multiple insiders	They analyzed the effects of trade disclosure throw a disclosure of the listed companies in NYSE	Dynamic Kyle model	They focused on disclosure when there are multiple insiders for different period series	Market is more liquid, and insiders make more profit with positively correlated signals. This contrasts with the BCW model in which insiders' signals become almost perfectly negatively correlated near the end. of trade which causes the market to be very illiquid and inefficient compared to the monopolistic case
(Khan & Sana, 2010)	Testing Strong Form Market Efficiency of Indian Capital Market: Performance Appraisal of Mutual Funds	Indian Capital Market	Mutual Funds using monthly returns, based on NAV's of 8 fund schemes.	Risk and Return Analysis, Sharpe's measure, Jensen's measure, Treynor's measure and Sharpe Differential returns	from 1st April 2000 to 30th April 2010	mutual funds earn higher return than the benchmark indicator
(Potocki & Świst, 2012)	Empirical test of the strong form efficiency of the Warsaw Stock Exchange: the analysis of WIG	Poland Warsaw	The research sample consists of 3,270 recommendations	1 January 2005 and 31 March 2010 by 63 financial entities	rate of return from the WIG index	supports the thesis of the existence of the strong form efficiency of the Warsaw Stock Exchange

	20 indexes shares					
Lekovic (2018)	Evidence for and against the validity of efficient market hypothesis	various financial market	Mathematic a l models (theoretical)	tests for private information	General theoretic al review	many market anomalies have not lived long after appearing in financial literature, efficient market hypothesis cannot be tested in isolation, but only together with the corresponding equilibrium model

Source: Compiled by author.

The idea of market efficiency was formalized based on the conditional expected value relative to relevant information. This theory assumes that conditions of market stability may be expressed by the value of the expected returns achieved on an effective market.

There is a lack of studies on the Jordanian capital market and research-informed recommendations for managers, investors, shareholders, and government authorities in making their decisions for motivating the capital market cycle and attracting more investments. From those points, this study gets its importance in pointing out specific details in the Jordanian capital market. Hopefully, this study will find its way for new recommendations for the capital market of Jordan.

IMPORTANCE OF THE STUDY

This study has to achieve some objectives:

Problem statement

This study seeks to measure the behavior of stock prices in the Amman Stock Exchange (ASE), and also compare it with a neighboring country, Saudi Arabia, taking into consideration the differences and trying to understand weather the capital market of Jordan is rehabilitating from the financial world crises in 2008. Strong form efficiency means that investors with access to general information, as well as those having access to non-public information, are not able to "beat the market" and achieve abnormal rates of return. The authors of this publication assume that the recommending institutions have access to nonpublic information. This article attempts to verify strong-form efficiency based on recommendations issued by 63 financial institutions in Jordan. The analysis was carried out based on the simplified assumption that financial institutions issuing recommendations could also use information not available to the average market participant (for instance non-public and confidential information). This assumption does not imply that having such information is a necessary condition for developing stock recommendations. Moreover, it is important to mention that Jordanian law prohibits exploiting non-public (inside information) or in conducting transactions on the capital market.

Scope

The present study tests the strong form market efficiency of the Jordanian Capital Market by evaluating the performance of mutual funds and comparing it with Saudi Arabia. Investment in mutual funds is the safest mode of investment by people despite having various avenues of investment, as it diversifies the risk. The study covers the period from 2011 to 2016. In the present study, the scope is limited to some prominent schemes of only four Jordanian mutual funds, depending upon their nature and their inception period. With limited numbers of mutual funds in Jordan, the authors will test the valid and liquid mutual funds.

The measurement of performance utilized in this paper is the widely used Jensen (1968, 1969) measure, which uses the security market line to evaluate fund performance. The Jensen measure may indicate poor performance when the manager possesses and utilizes superior timing information.

Importance of the study

This study came to achieve some objectives in practice:

1. To assess the growth and development of the Jordanian Capital Market;
2. To test the efficiency of the Jordanian Capital Market;
3. To develop an understanding of the concept and role of efficiency and easy to compare the Jordanian capital market with another market at the same level of efficiency;

4. To study the relationship between the movement of stock prices and disclosures, in other word the efficiency of management listed company shares and its price behavior;

5. To test the existence of the strong form of Efficient Market Hypothesis in Jordanian Capital Market in the context of (SCL), and (CAPM);

6. Study in detail the insider trading (if available) to help taking procedures for protecting the right for all investors getting the information at the same time;

7. To test the existence of the strong form of Efficient Market Hypothesis in the Jordanian capital market in the context of the Jensen test;

8. To study in detail the securities of firms, specifically weather it is possible to outperform the market and present market price or if there is a true reflection of the present situation of their securities.

DATA AND METHODS

The data is collected from several sources. The news archives of the Jordan Securities Commission (JSC, 2019) and Amman Stock Exchange (ASE, 2019) are primary source. Some information is available on the website of banks' in Jordan, especially in HBTF (2019) to official information for making the compassion between the Saudi Arabian and Jordanian capital market (Mubasher, 2019).

The data were collected from January 2011 to December 2016, because of insufficiency availability of data after 2016 for some mutual funds. Another limitation is the low number of the mutual funds in Jordan while it was only about two funds with a comparison with Saudi Arabia 267 mutual funds. The researcher understands that the number of mutual funds is not high but it is still worth doing a study on the available information for better recommendations to compare with the suitable country situation. According to the law in capital markets, companies listed on Financial Securities market are required to provide the market regulator with the important news, but the definition itself for "disclosing new information" from the Jordanian Securities Commission is still not obvious, when compared with the same level of disclosure with a comparison of other countries for example Lithuania, which stipulates, "Immediately but not later than the news is announced to the mass media" (LSC, 2018)

"The Stock Exchange shall immediately disclose information and data it receives which may have an impact on the prices of securities and trading." (ASE, 2019). The word "immediately" needs to be defined in the Amman stock exchange to enhance the effective tools in the capital market.

Methodology

Jensen test

The main points in this model test is that Jensen's measure is the difference in the returns of an individual vs. the overall market, this difference is commonly referred to as alpha. When a manager outperforms the market concurrent to risk, they have "delivered alpha" to their clients, and it is also used to measure accounts for the risk-free rate of return for the period. In any managed portfolio it must be assisted by performance during a specific period. Suppose we wish to evaluate performance with excess return.

This portfolio is chosen from N assets with excess returns $\mathbf{r}_{jt, j} = 1, ..., N$. Let $\mathbf{r}_{et}$ be the excess return on the portfolio that, from the point of view of the uninformed investor, is mean-variance efficient within the set of N tradable risky assets and whose orthogonal portfolio is used to compute excess returns.2 Next, assume that the uninformed investors' expected return on this mean-variance efficient portfolio is Ae and its variances σ_e^2. Let us say also it is possible to

imagine that there is expected return on assets **j** is μ_j and that the covariance

matrix of the returns $r = (r_1, r_2 \dots, r_j \dots, r_N, \dots, r_e)$ is constant given the

information available to the uninformed investor. Given these definitions, it follows from Roll (1977).

$$r_{jt} = \beta_j r_{et} + \varepsilon_{jt}, \qquad \beta_j = \frac{cov(r_{jt,}\, r_{et})}{\sigma_e^2} \tag{1}$$

Let us say from the point of view of the uniformed investor, $\boldsymbol{\beta_j}$ it is a constant and $\boldsymbol{E_{(\varepsilon jt)} = 0.}$ At the same time, the portfolio manager is assumed to possess different information modifying results in time-carrying expected returns. In the result, it is clear that the portfolio weights will vary over time, as will the uniformed investor's expected value of $\boldsymbol{r_{pt}}$, so, $\boldsymbol{\beta_{pt}}$ is likely to be time varying as well. We can write the returns on the managed portfolio as

$$\boldsymbol{r_{pt} = \beta_{pt} r_{et} + \varepsilon_{pt}} \tag{2}$$

The manager of the fund potentially possesses two types of superior information, which are: number one is

the information about r_{rt}. Letting **Φ** denote the time t information set of the manager, **if** $E(r_{et}/\phi_t) \neq$ E(r_{et}) = μ_e the manager is said to possess timing information. When E($\varepsilon_{jt}/\ \phi_t \varepsilon_{jt}) = 0 \neq$ E the manager is said to possess selectivity information.

A popular measure of the performance of a managed fund is the Jensen test (Jensen 1968, 1969) measure, which is the intercept,

α_p, of a least squares' regression of r_{pt} on r_{et} which are already equations before. While the Jensen measure provides an accurate indication of the performance of a fund when the manager has selectivity information but no timing information (Jensen 1972), Admati & Ross (1985) show that when a manager has superior timing information, the Jensen measure, α_p, can be negative.

Grinblatt & Titman (1989) examine a class of performance measures that includes the Jensen measure and show that certain members of the class do not suffer from the problems that arise with the Jensen measure. The class of measures, called period weighting measures, is defined for a sample of T observations by

$$\alpha = \sum_{t=1}^{T} w_t\, r_{pt}$$

$$\sum_{t=1}^{T} w_t = 1$$

$$\sum_{t=1}^{T} w_t\, r_{et}$$

(3)

where the weights, W_t, are functions of the return on the benchmark portfolio. Their main result is that if W_t > 0 for all t, the performance measure, denoted α* when w_t > 0, converges in probability to zero for an uninformed investor and to a positive number for an investor with selectivity information and no timing information or selectivity information and independently distributed timing information. Grinblatt & Titman (1989) show that the Jensen performance measure is obtained by setting

$$w_t = V_e - \frac{(r_{et} - \bar{r})\,\bar{r}_e}{T\,V_e}$$

(4)

where $\bar{r}_e$ and V_e are the sample mean and sample variance of the benchmark return. It could be concluded again

$$\alpha_p = \sum_{t=1}^{T} w_t\, r_{pt} = \bar{r}_p - b_p \bar{r}_e$$

(5)

where b_p is the estimated least squares slope coefficient from a regression of $\mathbf{r_{pt}}$ on $\mathbf{r_{et}}$. The problem that arises with the Jensen measure when the investor has timing information can be seen by examining the weights, $\mathbf{w_t}$. For large values of r_{et}, $\mathbf{w_t < 0}$. When the investor has timing ability, $\mathbf{r_{pt}}$ will, on average, be large when **E ($\mathbf{r_{et}}$| Φ)** is large and will therefore also be large, on average, when $\mathbf{r_{et}}$ is large. These large returns will then receive negative weights, making it possible that $\alpha_p < 0$ when the investor has timing information. Grinblatt and Titman propose restricting the class of performance measures to those with $\mathbf{w_t > 0}$ to overcome the problem of a negative Jensen measure arising when the manager has timing information. Following their suggestion, suppose the utility function of the uninformed investor in period **t** is given by

$$U(W_t) = \frac{1}{1-\theta} W_t^{1-\theta}$$

(6)

where

W_t: is wealth at the end of period t, If the uninformed investor can hold the N risky assets and a riskless asset with return R_{ft}, end-of-period wealth is given by $W_t(y) = 1 + yR_{et} + (1--y)\,R_{ft}$, where beginning-of-period wealth is normalized to one. Choosing -y to maximize expected utility yields, $E(W_t(\gamma*)^{-\theta} r_{et}) = 0$, where $\gamma*$ is the optimal choice of γ and ret is the excess return on the benchmark portfolio. An estimate of $\gamma*$ can be obtained by setting $W_t(\hat{\gamma}*)^{-\theta}\ r_{et} = 0$. Choosing the weights in $\alpha*$ to be $w_t = W_t(\widehat{\gamma*})^{-\theta}$ will then satisfy the last condition in (3) above. Normalizing the weights to sum to one implies that the positive period weighting measure has the same units as r_{et} does. When multiple portfolio benchmarks are employed, the same procedures are utilized to obtain a γ for each portfolio in the benchmark.

$$\alpha^* = \sum_{t=1}^{T} W_t\left(\beta_p r_{et} + \varepsilon_{pt}\right) = \beta_p \sum_{t=1}^{T} W_t\, r_{et} + \sum_{t=1}^{T} W_t\, \varepsilon_{pt} = \sum_{t=1}^{T} W_t\, \varepsilon_{pt}$$

(7)

The choice of the benchmark to carry out the tests of performance is relatively straightforward. Grinblatt & Titman (1989) show that under reasonable conditions both the Jensen measure and the positive period weighting measure require only that we consider a portfolio that is mean-variance efficient from the point of view of the uninformed investor within the set of risky assets available to the manager. We thus do not need to measure the returns on a "market" portfolio that includes nontraded assets. The researcher does need to verify, however, that the benchmark chosen is, in fact, mean-variance efficient within the set of securities available to the fund manager. The next section describes the procedures we use to test for the mean-variance efficiency of the benchmark.

Hypotheses

a) **Testing whether mutual funds are earning a higher return than the benchmark. Null hypothesis (H0):** Mutual funds are not earning a higher return than the benchmark indicator.
Alternate hypothesis (Hα): Mutual funds are earning a higher return than the benchmark indicator.

b) **Testing whether the Jordanian capital market is strong form market efficient.**
Null hypothesis (H0): The Jordanian capital market is not strong form efficient.

Alternate hypothesis (Hα): The Jordanian capital market is strong form efficient.

c) **Testing weather,the Jordanian Capital Market is outperforming the Saudi Arabian capital market.**
Null hypothesis (H0): The Jordanian capital market is not outperforming the Saudi Arabian market.

Alternative hypothesis (Hα): The Jordanian capital market is outperforming the Saudi Arabian market.

RESULTS

For testing the hypothesis**,** the calculation has been done for the Jensen Model. We use the following equation:

Jensen Model = $R_f + \beta*(R_m - R_f)$
Where
R_m = Return on market
R_f = Risk Free Rate
β = beta coefficient of portfolio = Cov_{xy} / Var_x
X = Market return
Y= Stock Return

Performance Appraisal of Funds: Risk and Return Analysis for Capital markets

Table 2 introduces some general statistics on the Jordan and Saudi Arabia markets. In this table, 72 months were taken into consideration (5 years) as the same base. Table shows the risk-specific period free rate and the average annual risk-free rate is higher for Jordan, while Saudi Arabia collected the higher average market return and average monthly market return.

Table 2
General statistics on the Jordanian and Saudi Arabian markets

Jensen index		
	Jordan	**Saudi Arabia**
Number of trading months	72	72
Average monthly market return	-0.11%	0.36%
Average annual risk-free rate	**62.00%**	**4.21%**
Average market return	**-8%**	**26%**
Specific period risk free rate	**12.40%**	**0.84%**

Source: Calculated from various monthly report of securities commissions of Jordan and Saudi Arabia.

Performance Appraisal of Funds: statistics Analysis for Mutual Funds

Table 3 includes only two mutual funds for Jordan as there are only three mutual funds in total, one of which is no longer tradable anymore. The total number of mutual funds in Saudi Arabia 26; the sample selected from the total mutual funds from Said Arabia are included in Table 3. In Saudi Arabia in 2015, public mutual fund assets accounted only for 4.25% of GDP, i.e., USD 464 billion. Further, the value of assets of the Saudi mutual fund industry reached SR 102.9 billion in 2015. However, the data also shows many other parameters, for example the maximum amount for Jordanian mutual funds is about 36% while for Saudi Arabia it is about 604% in return percentage.

Table 3
General statistics for Jordanian and Saudi Arabian mutual funds

Name of mutual fund		**Mean**	**Standard deviation**	**Standard error**	**Minimum**	**Maximum**
Jordan	**ALOfuq MF**	0.15%	0.44%	5.25%	-0.009	0.83%
	Stock exchange HB MF	0.10%	10.42%	7.43%	-75.00%	36.00%
KSA	**Ryadh MF for ryal trading**	-0.04%	0.47%	622.45%	-2.45%	0.23%
	Ryadh MF for dollar trading	-0.02%	0.18%	355.25%	-0.82%	0.11%
	Assundouq aldawli	-0.18%	4.64%	423.27%	-25.31%	8.13%
	Sanduq aleyadh alaqari aldawli	-0.26%	5.17%	6.25%	-14.83%	11.50%
	Sandouq Aletisalat	-0.38%	5.52%	5.31%	-23.08%	7.97%
	Sandouq alousahim alkhaligi	-0.14%	7.81%	6.54%	-37.86%	12.56%
	Ryadh for SMEs	0.30%	9.93%	182.49%	-37.74%	31.88%
	the British stock funds	0.41%	5.39%	84.61%	-27.41%	7.73%
	M F for future stocks	7.65%	72.29%	261.30%	-86.76%	604.77%

Source: Calculated from monthly reports of the securities commissions of Jordan (JSC, 2019a) and Saudi Arabia (Mubasher, 2019).

It has been taken only 2 Mutual funds in Jordan as there are only three Mutual Funds, one of them is not tradable anymore and the other 2 are still active. On the other hand, in Saudi Arabia in 2015, public mutual fund assets accounted only for 4.25% of GDP i.e., US$646 billion. 267 is the total number of the Mutual Funds in Saudi Arabia, against 2 in Jordan Further, the value of the assets of the Saudi mutual fund industry reached SR 102.9

billion in 2015. However, the data also shows many other parameters for example maximum amount for Jordanian Mutual Funds is about 36% while it is for Saudi Arabia is about 604% in return percentage.

Performance Appraisal of Funds: Jensen Modeling technique results.

Table 4
Jensen Test for the Jordanian and Saudi Arabia Mutual Funds

Mutual fund (M F) name		**β**	**Jensen Expected return**	**α**	**Average sample Jensen Expected return**
Jordan	**ALOfuq M F**	-1.03%	12.61%	-13.64%	12.73%
	Stock exchange HB MF	-2.18%	12.84%	-15.10%	
KSA	**Riyadh MF for royal Trading**	0.73%	1.024%	-0.29%	9.13%
	Riyadh MF for Dollar Trading	0.45%	0.96%	-0.50%	
	Assundouq Aldawli	33.88%	9.25%	24.63%	
	Sanduq Aleyadh Alaqari Aldawli	18.25%	5.37%	12.88%	
	Sandouq Aletisalat	17.69%	5.23%	12.46	
	Sandouq Alousahim Alkhaligi	94.81%	24.37%	70.44%	
	Riyadh for SMEs	94.81%	24.37%	70.44%	
	the British stock funds	8.22%	-1.20%	-7.02%	
	M F for future stocks	48.09%	12.77%	35.31%	

Source: Calculated from monthly reports of the securities commissions of Jordan (JSC, 2019b) and Saudi Arabia (Mubasher, 2019)

Given a beta of 24.63%, for example the mutual fund is expected to be riskier than the index, and thus earn more. A positive alpha in this analysis shows that the mutual fund manager earned more than enough return to

be compensated for the risk they took over the course of the year. If the mutual fund only returned 25.83%, the calculated alpha would be -1.2%. With a negative alpha, the mutual fund manager would not have earned enough return given the amount of risk they were taking.

Besides, average sample Jensen expected return for the Jordanian market 12.73 % - is higher than that for Saudi Arabia - 9.13 %. However, we must take into consideration that the large difference in the number of mutual funds means that this is not for a sure base to comparison.

TESTING THE HYPOTHESIS AND DISCUSSION

Statistical tests reject the first null hypothesis, where if the value of the test is positive, then the portfolio is earning excess returns. In other words, a positive value for Jensen's alpha means a fund manager has "beat the market" with their stock for achieving excess return, while the Jordan case with only two mutual funds (because of the limited mutual funds in Jordan) and based on Jensen test results, there is a possibility to achieve excess return with results around 12% positive. Saudi Arabia shows more variance in its results, with the maximum amount of 24% and minimum about -1% for only one negative result out of 9 mutual funds.

After analyzing the data, the researcher rejects the null hypothesis (**H0:** Mutual funds are not earning a higher return than the benchmark indicator), and accepts the alternative hypothesis Mutual funds earning a higher return than the benchmark indicator.

These results lead to another question. Is the capital market of Jordan a strong form of efficiency? The researcher rejects the alternate hypothesis **(Hα):** The Jordanian capital market is strong form efficient, and accepts the null hypothesis **(H0):** The Jordanian capital market is not strong form efficiency, because there is a possibility to achieve an excess return.

While the previous two hypotheses show that neither the Jordanian nor the Saudi Arabian capital market are the strong -form of efficiency it is also possible to compare the both capital markets by testing if weather the Jordanian capital market is outperforming the Saudi Arabian market or not. In this case, the null hypothesis is accepted the Jordanian capital market is not outperforming the Saudi Arabian market, and the alternative is rejected **(Hα:** Jordanian Capital Market is outperforming the Saudi Arabian market).

CONCLUSION

There is no doubts that the strategies which taken by the mutual fund's managers are a conservative investment way of investment. The Primary investment style followed is traced mainly by the market portfolio, in which the managers do not take the risk for achieving higher return, as the general rule in the finance world (more risk, more reward) to track risk aversion investors. Otherwise, they mostly try to adopt other stocks characteristics to diversify the fund's portfolio and realize an abnormal return; however, they are more attracted to the small, growth, and past winner stocks. This is because such stocks are less informationally efficient and are not dramatically followed by the investors; on the other side of the equation, this means that the stocks are less efficiently priced in the market, and this is a good opportunity for the managers to achieve an abnormal return in both environments of the study. This kind of stock is preferable to other stocks due to its growth, low liquidity, and long term stability.

Finally, the results from the study show that there is no evidence of a strong form of efficiency in either the Amman Stock Exchange or the Saudi Arabian capital market as well. Therefore, investors in the Amman Stock Exchange and the Saudi Arabian capital market cannot predict stocks prices or returns in the short term. Concerning the firms, it suggests that the securities of firms cannot outperform the market and the present market price is to a certain extent a true reflection of the present situation of their securities, although there is very limited availability of mutual funds in Jordan.

The study recommends that the Jordanian capital market establish a more suitable environment to attract more mutual funds in addition to adapting new strategy rather than trying to fix the current one, and recommends follow the good practice of neighboring country, at least in increasing the number of mutual funds. It should also open the international trading gate to these kinds of investments, if we still talking about the available liquidity in the capital market. In addition, it should create a coherent and comprehensive database for the mutual fund industry in both capital markets. Fund managers are also recommended to reassess their investment styles and maintain comfortable liquidity to adopt the rewarding investment styles at the right time to diversify the fund's portfolio and improve its returns.

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The Role of Knowledge Management in Creating Competitive Advantage in Small and Medium-size Enterprises in the Republic of Iraq

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SUMMARY

Knowledge management (KM) is a vital component of organizational strategies to increase competitiveness. This study identifies the impact of KM in creating a competitive advantage. The main purpose is to determine the level of appreciation of the concept among SME stakeholders in Iraq. Both qualitative and quantitative research methods were explored, 102 respondents were reached, and the results of the field survey were analyzed using SPSS for descriptive statistics analysis. The result shows that the application of KM is appreciated in Iraq, but its implementation is not yet at an optimal level. The research provides evidence from a developing country on the application of knowledge management in the management of small and medium-sized enterprises.

Keywords: Knowledge Management; competition; SMEs; Business; Efficiency; Iraq
Journal of Economic Literature (JEL) codes: M13, D83, M15
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INTRODUCTION

The application of business strategies in companies generates tested ideas that are proven to be productive. These ideas are produced from sequences of what happened within the organization coupled with organizational culture, as well as originating from external sources, which are ideas from external stakeholders like vendors, suppliers, and users on how products or services could be improved. These ideas are contained in a pool of knowledge within the organization. Knowledge management can be seen as a conscious effort to create this body of knowledge and to also improve its utilization. The purpose of the knowledge management process is to exchange views, ideas, experiences, and information; to ensure their availability in the right place and at the right time to make informed decisions, and to increase efficiency by reducing the need to rediscover knowledge. It also helps to improve decision making.

Knowledge management enables the stimulation of innovation necessary for organizations to break boundaries and to meet the demand of business in a constantly changing business environment. Macintosh et al. (1998) advanced the following reasons why knowledge management is crucial: It is essential to keep up with the highly competitive nature of the market which requires faster development of knowledge-based management system, it is customer-focused and enterprises must develop products that meet customers' expectations. The frequency of changes in the human resources of enterprises leads to loss of knowledge to meet the needs of globalization, which creates a knowledge gap in an effort of enterprises to meet up with the demand of its customers, thus knowledge management becomes an essential issue for the sustainable development of every organization(H. A. Mohajan, 2016) (Mohajan 2016).

The exploitation of knowledge management has increased the core competencies of companies (Macintosh et al. 1998).

- Knowledge management is responsible for the sustainable competitive advantage, which is important to support the demand of an increasing highly competitive market.

- Since enterprises are customer concentric, knowledge management provides the basis for enterprise to be customer focused.
- Knowledge management combats the knowledge gap that is frequently created due to employee mobility. With knowledge management, the organizational process asset provides a pool of knowledge base form for the historical records of all employees that have ever worked in an organization.
- Knowledge management prepares enterprises to compete globally.

From the foregoing, it can be seen that knowledge management is a conscious effort to create knowledge and to also improve its utilization. The purpose of the knowledge management process is the exchange of views, ideas, experiences, and information; to ensure their availability in the right place and at the right time to make informed decisions, and increase efficiency by reducing the need to rediscover knowledge. It also helps to improve decision making. An example of knowledge management in an organization is a system that has shared files that contain information that everyone on the team has access to, and were all team members have the opportunity to comment on the work performed by other members of the team. Knowledge management enables the stimulation of innovation necessary for organizations to break boundaries and to meet the demand of business in a constantly changing business environment.

The history of knowledge management dates to the 1990s. The main objective then was to use firms' practices and the accompanying technologies to leverage corporate knowledge. This is done by focusing attention on the capturing of knowledge in centralized systems which is made available to team members. The importance of knowledge management to companies can be summarized as facilitation of decision making, Common to all corporate bodies is the bombardment of managers with data. Media reports shows that each person is inundated with 174 newspapers' worth of information every day, comeing in the form of emails, television, and internet sources. Thus, there is a big problem in data management, and this underscores the importance of knowledge management.

While data remains a great asset in getting a great wealth of information, if large data are not properly processed, there is a tendency not to achieve a high quality of decisions. The GE Corporate Executive council (CEC) is an example of how one company introduced a knowledge management system to help executives overcome data challenges, share information, and improve decision-making. The CEC consists of the leaders of fourteen large GE enterprises, and it holds two-day sessions that are forums for sharing best practices, accelerating progress, and discussing successes, failures, and experiences (Harris & Gokcekus 2000). Although information overload or the need for knowledge from people from other parts of the company for decision-making can complicate the work of managers, the introduction of knowledge management systems can help them make more effective and more informed decisions. An effective knowledge management project should include four interacting dimensions: knowledge, technology, workflow, and conditions for stakeholders regarding service needs and usage preferences (Adekanmbi & Green 2014).

Deloitte, a corporate consulting firm, says that over 80% of knowledge users in the firm indicate that knowledge sharing leads to competitive advantage and adds real client value. The company sees the following as the advantages of knowledge management: Knowledge management does not allow employees to constantly reinvent the wheel, provides a basis for measuring progress, reduces the burden on experts, makes visual thinking tangible, and effectively manages large amounts of information to help employees better and faster serve their customers. The firm sees it as a fundamental factor in business development(CII, 2018).

Nowadays, with corporate mergers, employee turnover, and global expansion of businesses, people need to work differently: they need to work with foreign colleagues, exchange ideas, be aware of global issues and quickly answer their questions. The power of social media plays an important role in knowledge management, as it allows employees to collaborate, connect, and quickly access experts and information. Social networks also allow people to collaborate, be human, and express themselves in an electronic environment. Social networks have a solid foundation of trust and popularity among employees and are part of a knowledge-sharing culture.

Knowledge management helps solve the most common business problems and helps companies maximize their benefits by:

- protecting companies' intellectual capital;
- focusing on their most important assets, which are the human capital;
- reorienting their culture by choosing the best knowledge sharing strategy;
- linking people to each other by establishing methods of collaboration;
- opening the door to a new era of collaboration and sharing;
- improving business solutions with easier access to experience and best practices;
- improving efficiency, productivity, and smart work by reducing the incidence of "reinventing the wheel";
- mproving innovation through broader and limitless collaboration;
- reducing know-how losses through the collection of explicit and implicit knowledge;
- accelerating productivity with on-board training and timely access to knowledge;
- enhancing customer satisfaction by providing value;
- improving the quality and ability to collaborate by standardizing ways of working and conducting discussions with leading experts.

This study seeks to examine the level of implementation of knowledge management in Iraq and to investigate the impact it has on small and medium-scale enterprises, especially in the area of competitive advantage. The following questions will be answered by the study: To what degree is knowledge management applied by SMEs in Iraq? Who are the drivers of knowledge managements in Iraq? What impact does knowledge management have in Iraqi SMEs on driving competitive advantage?

LITERATURE REVIEW

Much scholarly literature on knowledge management shows the impact of knowledge management in the development of SMEs, especially its advantage in driving competitiveness. Consideration is given to the utilization of knowledge and knowledge management (KM) as an organizational capability and as a potential source of sustainable competitive advantage. The occurrence of changes either from external or internal sources in an organization usually requires new knowledge for workers to be able to do their work efficiently as past or current knowledge becomes obsolete; thus, an important task of knowledge management is to see that organizations are able to enhance and also expand the innovation process. From a strategic point of view, knowledge management helps organizations to identify the knowledge resources that need improvement in order to gain sustainable competitive and acceptable efforts on issues that are relatively underdeveloped. The quality knowledge applied by managers in enterprises goes a long way in shaping the success story of enterprises (Okunoye & Bertaux 2008; Karadsheh et al. 2009; Rahimli 2012). Competitive advantage related to finance is a situation where the firm has a superior financial return within its industry in the long run, such that it enables it to gain a competitive advantage over similar firms in the industry (Rivkin 2001).

As regards the application of knowledge management to gain competitive advantage, Peteraf & Barney (2003) see a competitive advantage to be when a firm can generate more economic value compared to the marginal competitors in its product market. This view is similar to J. B. Barney & Hesterly (2009) who see the competitive advantage as the ability to create more economic value than competitors. Competitive advantage can thus be defined as value creation, value capture, and value protection, as well as the implementation of value-creating strategies by an organization at a time when such strategy is not implemented by similar organizations within the same industry. This could be temporary, as the implementation of a unique strategy could lead to high profit which could attract competition and therefore make the competitive advantage short-lived (Barney 1991; Barney & Hesterly 2009; Wu 2010). The fierceness in global competition makes the idea of achieving sustainable competitive advantage of interest, but competition can be sustainable only if the competitors are unable to decode the strategy being implemented or unable to offer a better offering. This can be best achieved if the underlying principle of the competitive advantage is based on intellectual capital, as opposed to physical assets and capital (Halawi et al. 2005).

Two inter-related mechanisms that can be used for the integration of knowledge are direction and organizational routine. Complex activities should be correlated with more places that the activities should be re-created; more difficulties in executing activities should call for more reliance on knowledge integration. Integration of individual specialized knowledge is a way organization can achieve sustainable competitive advantage. The integration of knowledge is to be seen from the perspective of mixing the skills of employees in different forms in order to produce a great result. The strategy should also combine personal and practical professional skills to produce a dynamic result. The quality knowledge applied by managers in enterprises goes a long way in shaping the success story of enterprises (Grant 1996; Martin & Eisenhardt 2010).

Consideration is given to the utilization of knowledge and knowledge management as organizational capability and as a potential source of sustainable competitive advantage. The occurrence of changes either from external or internal sources in an organization usually requires new knowledge for workers to be able to do their work efficiently as past or current knowledge becomes obsolete. An important task of knowledge management is to see that organizations are able to enhance and also expand the innovation process. The essence of the strategic importance of knowledge management is for organizations to identify the knowledge resources that need improvement in order to gain sustainable competitive and agreeable efforts on issues that are relatively underdeveloped (Ruggles 1997; Okunoye & Bertaux 2008; Karadsheh et al. 2009).

HYPOTHESIS

A hypothesis of the expected result based on the background study was created. The hypotheses will be tested with statistical analysis of the empirical data collected for the study. The hypotheses connotations are explained below:

H1: Research hypothesis

The application of knowledge management can create competitive advantage among SMEs in Iraq.

H0: Null hypothesis

The application of knowledge management is not significant in the creation of competitive advantage among SMEs in Iraq.

METHODOLOGY

The research methodology employs both qualitative and quantitative research methods. The quantitative component of the research helps to quantify the objectives by way of generating numerical data or data that can be transformed into usable statistics. In this regard, managers and workers in SMEs in Iraq were given close-ended questionnaires to get their opinions on the application of knowledge management in driving competitive advantage. The total number of questionnaires given out was 150, of which 102 were returned completed. Though about 50% of the questionnaires were distributed in Baghdad, the capital city, efforts were made to ensure that respondents come from the major cities in Iraq such as Najaf and Basra. According to White (2012), firms that have a staff strength of 4 to 10 in Iraq can be considered small firms, while those that have 11 to 50 are considered to be medium-sized firms. Companies in this range of employment were approached that have been operating a minimum of 5 years in the IT sector, oil and gas sector, logistics companies, fast moving consuming goods, and fashion outfits. The questions have a preamble stating the purpose of the study, and we also received the consent of the respondents to participate in the survey before they were given the questionnaires. Respondents were reached directly, through email and phone calls. The survey was completed in November 2019. SPSS was used for descriptive data analysis.

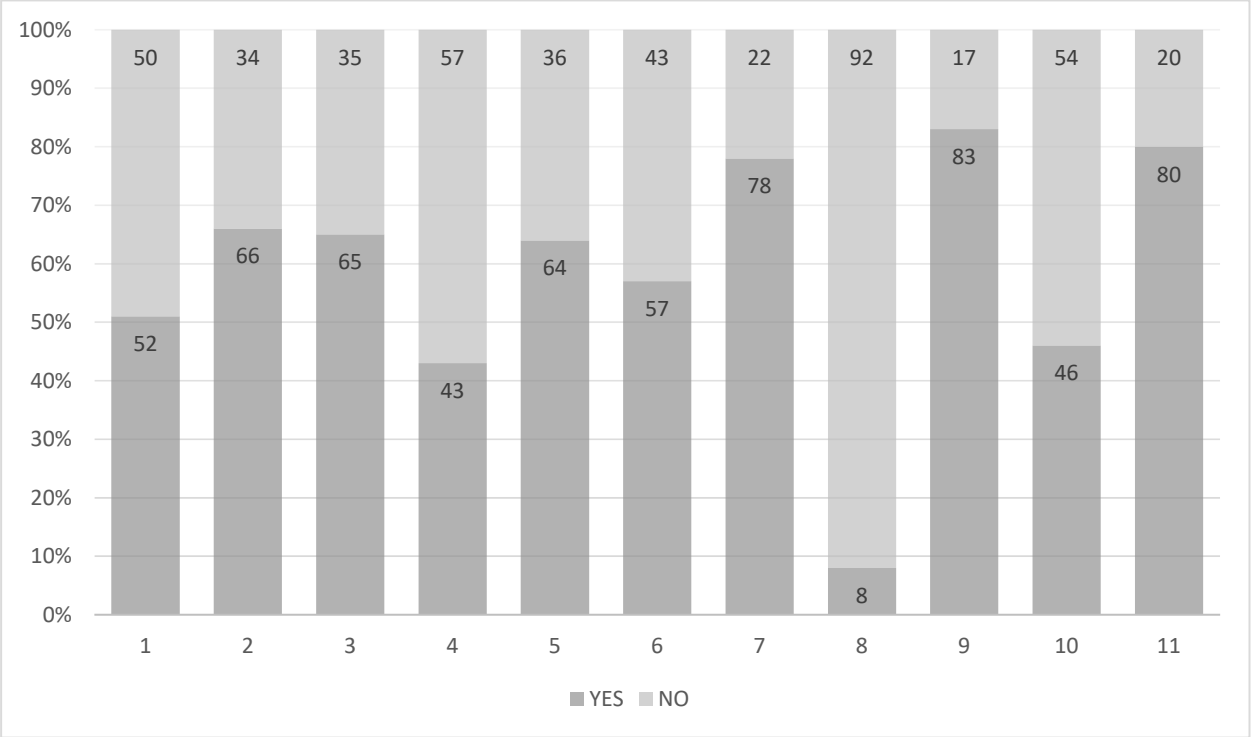
A qualitative research method that engages the technique of literature review, as well as deductions from interviews was used. Only the management staff were interviewed for the qualitative part of the research. They included Managing Directors, Executive Directors, Marketing Managers, and Operational Managers; the total number is 40. The interviews were conducted in person, the language of the interview was Arabic and a written transcript was used to note the answers after they had filled in the questionnaires; the first part of the questionnaire was used in the interview to get a more in-depth understanding. An English translation of the questionnaire used is attached in the Appendix.

Methods of content and narrative analysis were used for interviews analysis. With content analysis, we were able to classify data, identify patterns, establish relationships, interpret data, and explain the results. The narrative analysis allowed us to reformulate the answers to the interviews and coordinate them. These analysis methods helped us solve the problem of analyzing a large data set, especially in cases where some views are not seen to be fully correlated. The choice of a qualitative method depends on its ability to give an idea of the problems and draw conclusions on a large scale. This helps identify trends in thinking and opinions, and also provides depth and details that focus on how people make meaning from their experiences (Stuckey 2013).

FINDINGS AND DISCUSSION OF FINDINGS

The analysis of the field data shows for the demographic information section that most of the respondents were within the age group of 30 to 50. None of the managing directors or founders have less than 3 years of work experience. The educational background of respondents shows that about 68% have a minimum of a bachelor's degree, 21% have diplomas (two years of study after the high school) while the remaining mostly junior staff have high school certificates. The nature of businesses was also found to be about 52% sole proprietorship and 48% partnership (including family-owned businesses).

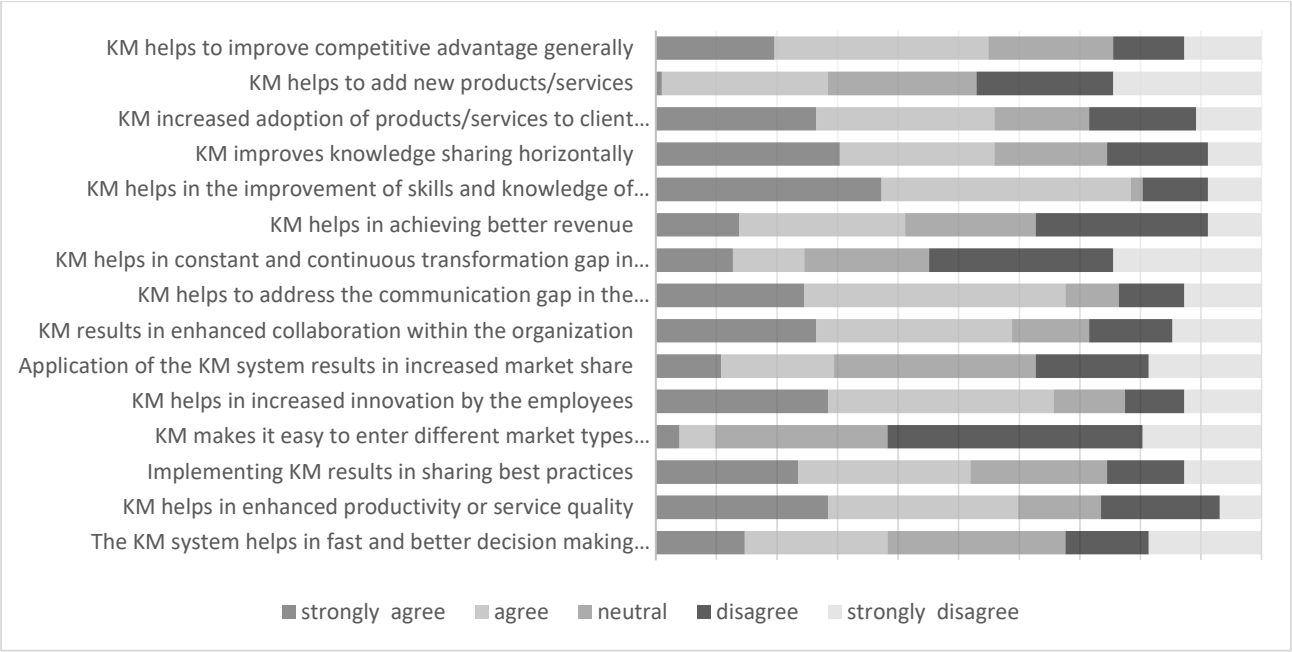
The Cronbach's Alpha coefficient value was 0.731 for all items after deleting item number 8 in part two from the measurement as it was before deleting this item 0.695 so the measurement shows that there is an accepted internal consistency and that the test is reliable since many sources say that Cronbach's Alpha coefficient above 0.70 is acceptable (Cortina 1993). The field data analysis reveals that the application of knowledge management in the running of small and medium-sized enterprises is acknowledged in the Republic of Iraq; however, its application is still not at an appreciable level. The results from the respondents show that the respondents have good knowledge of the concept of knowledge management and are open to its full implementation, in the area of the operation of knowledge management policy, a system that promotes knowledge sharing, partnership, or strategic alliance to acquire knowledge, installation of knowledge management software and track records in the implementation of knowledge management. However, many of them do not think that knowledge management has produced positive effects in their organizations. Similarly, many do not agree with acceptance of the fact that all employees are responsible for the acquisition and sharing of knowledge management in order to ensure the continuous development of the organization, as well as the acceptance that knowledge management has helped to improve their knowledge.



Source: Author

Figure 1. Understanding of the concept of knowledge management by SMEs in Iraq

In the second part of the work, the study indicated that enterprises in Iraq are open to full implementation of the concept of knowledge management and they believe they are important to position organizations for competitive advantage. Respondents are most optimistic that knowledge management helps to enhance collaboration within the organization (4.46), improves the skills and knowledge of workers (4.40), and improves competitive advantage generally (4.25). This is an indication that companies that can be regarded to have a competitive advantage in the Republic of Iraq are those that are well-grounded in the application of competitive advantage. The results also indicate that knowledge management can promote competitive advantage through sharing of best practices, developing skills among workers, motivating employees to be more innovative, addressing communication gaps among different departments, adopting products/service to client requirements, enhancing productivity, improving revenue, and fast-tracking better decision making. On a lesser scale, knowledge management can promote competitive advantage by increasing market share, and narrowing gaps in organization among different departments. The analysis of the results does not support the notion that knowledge management makes it easy to enter different market types internationally. Figure 2 shows how these factors compete with each other in ensuring the competitive advantage of companies.



Source: Author

Figure 2: Effects of knowledge management on competitive advantage, based on a 5-point Likert scale

An interesting point in the analysis is the result of the question of whether knowledge management helps in achieving better revenue. Though the result is positive at a mean score of 3.78, it is a surprise why respondents do not generally think that knowledge management is a big factor for companies to generate revenue.

To test the research hypothesis, the one-sample T-test was conducted for the data on the item related to the effect of knowledge management in an organization. The T value was 125.977 and significant, which proves the validity of the research hypothesis, which proposed that the application of knowledge management can create competitive advantage among SMEs in Iraq. Results are shown in Table 1.

Table 1
One-Sample Test

t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
				Lower	Upper
125.977	101	.000	58.70588	57.7815	59.6303

Source: Author

The distribution curve shows that it is skewed towards left, an indication that there are diverse opinions on the subject, and the mean is less than the median. Even though on the average the respondents think the implementation of knowledge management can increase the company's revenue, there are people who have a strong negative opinion. However, if we take all of the things that it is agreed that knowledge management can do – including enhanced collaboration within the organization (4.46) – these factors are highly likely to have a multiplying effect on the company's revenue, which is the main goal of management. There is, therefore, a need to bridge the gap between knowledge management and business performance. Innovations fully mediate the relationship between knowledge management and business performance of SMEs, and business owners of SMEs are therefore advised to adopt innovation as a conduit for knowledge management to boost their business performance(Kunyuan et al., 2017)

The analysis of the qualitative component of the field survey which involves the review of the interview questions written below shows that in modern business, the most important source of competitive ability is knowledge. Therefore, it is not surprising that employees are aware of the impact of knowledge on competitiveness and understand that having certain knowledge helps the company to remain in a dynamic business environment. It is also worth mentioning that the directors of the enterprises interviewed have similar views. The general conclusion is that the main sources of competitiveness of their enterprise are knowledge of market needs, high labor productivity for which collaborations among workers is key, low production costs, and a large volume of production, as well as quality. Strong market positions, new modernized

products, and the use of advanced technologies are also seen as important sources of competitiveness in which knowledge management is indispensable to get workers on the same front.

CONCLUSION

The reviewed literature shows that knowledge management is very important in enhancing competitive advantage, especially in this era of civilization where companies are opened to new ideas that could help them develop their goods and services. A fundamental observation is that the application of knowledge management among SMEs in the country is poor and there seem to be no coordinated strategies to generate and share knowledge, For this reason, many employees do not think knowledge management has a direct impact on them, either in the area of self-development or in enhancing their input in organizations. It appears many of the enterprises do not understand the strategic importance of knowledge in making companies competitive; there is a lack of well-developed strategic models that integrate knowledge management process into business strategies. Thus, there is a need to make the subject of knowledge management a matter of strategic importance, prompting companies in the country to develop knowledge that is significant to the competitive ability of the enterprises.

The study also shows that being innovative can bridge the gap between knowledge management and the desired effect on the company's revenue and staff's skills development, among other things. About the hypothesis created for the study, and in view of the conclusions from the empirical research, the research hypothesis which states that the application of knowledge management can create competitive advantage among SMEs in Iraq is accepted.

It is recommended that the strategies for the implementation of knowledge management to produce a competitive advantage in the Republic of Iraq should be such that the system allows staff to generate ideas, enhance technology, create platforms for sharing of knowledge, and act as a check and balance system that allows monitoring and evaluations so that the impacts of knowledge management on staff developments and company performance can be measured. There should also be a reward system that can identify innovative staff members that are outstanding in knowledge management and reward them accordingly.

Chief executive officers and directors of SMEs should also show great interest in turning their knowledge resources into the development of new products, processes, and markets to increase the level of efficiency of their business. This can be achieved by using highly qualified personnel, motivating, and empowering employees through short courses, and allowing them to attend seminars, conferences, and exhibitions to acquire new knowledge. Besides, it is necessary to strengthen the culture of knowledge sharing in the enterprise and use new knowledge to enhance innovation to improve business efficiency (Byukusenge & Munene 2017). Future research may want to consider the implementation of knowledge management systems in SMEs in Iraq.

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APPENDIX

Questionnaire

The Role of Knowledge Management in Creating Competitive Advantage in Iraq

This field survey aims to find out the Role of Knowledge Management in Creating Competitive Advantage. Collected information will only be used for research purposes and will be treated confidentially.

PART 1

This section seeks to know your enterprise knowledge/practice of **Knowledge Management (KM).**

1. Does your enterprise have a knowledge Management policy or Strategy for acquiring and sharing knowledge?
2. Does your enterprise have a Value System or Culture intended to promote Knowledge Sharing?
3. Does your enterprise follow Knowledge Management practices?
4. Does your enterprise use partnership or strategic alliances to acquire knowledge?
5. Is Knowledge Management software installed in your enterprise?
6. Are your staffs or colleagues acquainted with Knowledge Management practices used in your enterprise?
7. Has the application of Knowledge Management practices produced positive effects in your organization?
8. Do you think there are negative results of working with Knowledge Management strategies?
9. Do you agree that all employees are responsible for the acquisition and sharing of KM to ensure the continuous development of the Organization?
10. Does the enterprise have a good track record in implementing the KM initiatives smoothly?
11. Do you feel that KN initiatives have helped in improving your knowledge?

PART 2

The following are some opinions on the effect of Knowledge Management in an organization: 5 scale Likert questions (1 = strongly disagree, 5 = strongly agree)

1. The KM system helps in fast and better decision making related to doing your job.
2. KM helps in enhanced productivity or service quality
3. Implementing KM results in sharing best practices
4. KM makes it easy to enter different market types internationally
5. KM helps in increased innovation by the employees
6. Application of the KM system results in increased market share
7. KM results in enhanced collaboration within the organization
8. KM helps to address the communication gap in the organization among different departments
9. KM helps in constant and continuous transformation gap in the organization among different departments
10. KM helps in achieving better revenue
11. KM helps in the improvement of skills and knowledge of workers
12. KM improves knowledge sharing horizontally
13. KM increased adoption of products/services to client requirements
14. KM helps to add new products/services
15. KM helps to improve competitive advantage generally

Competitiveness and government spending in Cambodia: An autoregressive distributed lag approach

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SUMMARY

In the globalization age, global competitiveness is gaining attention from policymakers and scholars. This paper focuses on a measurement of trade competitiveness based upon the expansion of market size. Fiscal policy has become a subject of debate since the global crisis of 2008. This paper attempts to examine the influence of government spending (i.e., government investment and consumption) on trade competitiveness. The Autoregressive Distributed Lags (ARDL) approach is used to estimate the dynamic relationship. The result, based on Cambodia's annual data from 1970 to 2015, shows that Cambodia's trade competitiveness increases when there is a rise in public investment, government purchases, or aggregate private spending. This study shapes an alternative perception of the effectiveness of fiscal policy as domestic expenditure in enhancing international macroeconomic activities.

Keywords: Competitiveness; public investment; government consumption; ARDL approach; Cambodia
JEL classification: C50, C80, E62, F62, H50
DOI: http://dx.doi.org/10.18096/TMP.2020.02.03

INTRODUCTION

Competitiveness can be identified as the set of institutions (e.g., private and public institutions), policies (e.g., fiscal and monetary policy), and other economic factors (e.g., export and infrastructure) influencing the productivity in a country (Cann, 2016). A country's competitiveness is a basis for enhancing the level of well-being. The competitiveness of the economy is credited with its productivity. The elevation of productivity level reflects economic growth, which boosts the income level and therefore the level of well-being. Traditionally, one aspect of competitiveness is considered to be domestic producers' capacity relative to foreign producers in the term of substitution goods and services. The fluctuation in the nominal exchange rate of the home country and its trading partners leads to a change in trade competitiveness. The real exchange rate has been used as a measure for international competitiveness in a few studies (e.g., Makin and Ratnasiri (2015) and Nagayasu (2017)).

Many economic indicators affect the competitiveness of the economy. From a macroeconomic aspect, a wide range of factors (i.e., changes in the wage level, monetary and fiscal policy intervention made by the home country or by foreign countries) influences competitiveness. Fleming (1962) and Mundell (1963) analyze the efficiency of monetary and fiscal policy in an open economy to competitiveness. Under a flexible exchange rate system, an expansion of monetary policy improves not only competitiveness but also the trade balance. The stimulation of fiscal policy (government spending) financed by government borrowing appreciates the real exchange rate and negatively affects the trade balance due to an increase in interest rates, thereby hurting trade competitiveness. Mankiw (2012) discusses the notion of twin deficit. National savings decline just as government spending goes up, thus raising the real interest rates. Higher real interest rates generate more capital in the domestic capital market and therefore cause a fall in the net capital outflow. The appreciation of the real exchange rate (loss of international competitiveness) occurs in response to a decline in net capital outflow, which also has a negative effect on the trade account balance.

Historical research mostly investigated the reaction of the real exchange rate to interest parity, interest rates, monetary policy, price level, and purchasing power

rather than to fiscal variables. Paradigmatic studies conducted by Dornbusch (1975) and Monacelli and Perotti (2010) concern the influence of fiscal policy on international trade in the field of international macroeconomics and also suggest the existence of a linkage between government spending and the real exchange rate. The empirical literature, meanwhile, refers to effective fiscal policy and only explores the connection between fiscal balance and current accounts (a survey in Abbas et al. 2011). Some of the empirical research spotlight government expenditure-real exchange rate linkage. The revaluation of the real exchange rate responds to a rise in government purchases (Chen & Liu, 2018; Chinn, 1999; De Gregorio et al., 1994). Some scholars show a different result. The expansion of government purchases improves productivity and employment and also devalues the real exchange rate of a country (Corestti el al., 2012; Dellas et al., 2005; Kollmann, 2010; Makin & Ratnasiri, 2015; Ravn et al., 2007).

In the early 2010s, Cambodia's real effective exchange rate index continuously dropped (as seen in Figure 1). At the same time, government fixed capital formation (public investment) as a share of GDP declined from 8.20 percent in 2010 to 5.30 percent in 2015. Government final consumption expenditure as a share of GDP decreased from 6.34 percent in 2010 to 5.39 percent in 2015. The reduction of government spending during this period may have led to less incentive for investment and thus reduced private consumption in Cambodia. Household final consumption expenditure as a share of GDP went down from 81.29 percent in 2010 to 76.80 percent in 2015. This situation leads to lower relative money demand in Cambodia, thereby appreciating the real exchange rate or triggering a decline in the real effective exchange rate index. Thus, fiscal policy in Cambodia may contribute to the real effective exchange rate index. It is necessary to know how government spending influences the real exchange rate.

Nonetheless, this study deals only with one aspect of competitiveness derived from the expansion of the market size (i.e., a combination of the domestic and foreign markets) and focuses on the different types of government spending. For this kind of analysis, the best measurement for trade competitiveness is the real effective exchange rate (seen in the theoretical and empirical literature). This paper aims to investigate one aspect of competitiveness as trade competitiveness and the effect of government spending (i.e., public investment and government consumption) on trade competitiveness in Cambodia. The paper is structured as follows. Section 2 describes a measurement of trade competitiveness, the calculation of the real effective exchange rate index, and related research. Section 3 offers the competitiveness trend in the Cambodia context. Section 4 presents a hypothesis. The specific model, data collection, and method are presented in Section 5. Section 6 highlights results and discussion. Section 7 contains conclusions and policy implications.

LITERATURE REVIEW

A measurement of trade competitiveness

Most countries in the world are open economies. Globalization (i.e., the interdependence between countries or the openness of the economy to the world market) leads to the integration of national economies through culture, information technology, investment, and international trade. In a globalized economy, the extension of market size through international trade can be a potential indicator of trade competitiveness. The expansion of the market for produced goods and services encourages the trade competitiveness of a country. That is, lower prices on those goods and services and a higher level of aggregate productivity react to a larger market size due to higher elasticity of demand in the market. Remarkably, the market size is a critical pillar for determining global competitiveness, according to the global competitiveness report 2017-2018 (Schwab, 2017). With ceteris paribus, a change in foreign market size depends on a price level in foreign currency. If the foreign prices (prices in trading partners' currency) of goods and services produced in the home country are low relative to trading partners, the foreign market for these goods and services increases. The domestic price of products can represent the lowest cost of production at that place because producers can use economies of scale (i.e., a reduction in cost per unit as a response to an increase in the total output of production) to implement a low-price strategy in a competitive market (Samuelson, 1984). The domestic price measured in home currency can be expressed in a foreign currency with the help of the nominal exchange rate used to compute the real exchange rate in order to compare price levels between countries. An elastic real exchange rate creates elastic market size and thus trade competitiveness because a change in the real exchange rate can change the prices in foreign markets relative to those of the trading partners. The real exchange rate, therefore, can also be an alternative measurement of trade competitiveness. The clear connection between prices and cost competitiveness is measured with the help of the real exchange rate (Lipschitz & McDonald, 1992). An improvement in the cost competitiveness of international airlines is the result of the depreciation of the real exchange rate in the home country (Forsyth & Dwyer 2010). Makin and Ratnasiri (2015) and Nagayasu (2017) use the real exchange rate to measure the trade competitiveness of a country. An appreciation of the real exchange rate weakens the trade competitiveness of the economy while the devaluation of the real exchange boosts it. For example, the global competitiveness of companies from the USA improved in response to the devaluation of the US dollar between 2002 and 2008, thereby opening up education (skill development), employment, and investment opportunities (Baily & Slaughter, 2008).

The real effective exchange rate refers to the weighted average of the home currency against a basket of primary trading partners' foreign currencies. The Asian Development Bank (ADB) reports in own database that Cambodia regularly exports to ten trading partners (i.e., Belgium, Canada, Hong Kong, Germany, Japan, the People's Republic of China, Spain, Thailand, the United Kingdom, and the United States of America (USA)). The export value of these ten trading partners in 2010 was approximately 78 percent of Cambodia's total export. The bilateral real exchange rate can be computed by the formula below (Catão, 2007):

$$RER_{it} = \frac{E_{it} \times P_{it}^{*}}{P_t}, \tag{1}$$

where t =1970, 1971,…, 2015;

i=1, 2,…,10 stands for trading partners;

RER_{it} denotes the bilateral real exchange rate of the Riel (Cambodia's currency) against a foreign currency i at the time t;

E_{it} represents the nominal exchange rate measured by the AMA exchange rate (Riel/foreign currency i) at the time t;

P_{it}^{*} stands for the price level in a foreign country i at the time t;

P_t refers to the price level in Cambodia (home country) at the time t.

There are only data for the nominal exchange rate of the foreign currency of the country i against the US dollar; data of the nominal exchange rate of Cambodia currency against the foreign currency of the other countries is unavailable. The transformation can be made with this formula:

$$E_{it} = \frac{E_{USA,t}}{e_{it}} \tag{2}$$

where $E_{USA,t}$ denotes the nominal exchange rate of the Riel against the US dollar at the time t;

e_{it} stands for the nominal exchange rate of the foreign currency i against the US dollar at the time t.

The consumer price index (CPI) at 2010=100 is used as a proxy for the price level. In the case of states without available data of CPI (i.e., Cambodia, Hong Kong, and the People's Republic of China), a GDP deflator acts as a proxy for the price level.

To transform the real exchange rate into the index primarily relies on setting up the base year. Basing on the base year 2010, we get 100 as an index value of the bilateral real exchange rate in 2010. The bilateral real exchange rate index can be calculated as follows:

$$RER_{it}\ Index = \left(\frac{RER_{it}}{RER_{i,2010}} \right) \times 100 \tag{3}$$

where $RER_{i,2010}$ is the real exchange rate of the Riel against the foreign currency i in 2010.

These bilateral real exchange rate indices can be converted into a real effective (multilateral) exchange rate index as follows:

$$R_t = \prod_{i=1}^{10} \left(RER_{it}\ Index \right)^{w_i} = \left(RER_{it}\ Index \right)^{w_1} \times \left(RER_{it}\ Index \right)^{w_2} \times \ldots \times \left(RER_{it}\ Index \right)^{w_{10}} \tag{4}$$

where R_t stands for the real effective exchange rate index at the time t;

w_i denotes the export-weighted index for the country i.

These weights based on bilateral exports as a share of total exports in 2010 are calculated to estimate Cambodia's real effective exchange rate index. The export-weighted index can be computed as follows:

$$w_i = \frac{BE_i}{TE} \tag{5}$$

where BE_i represents bilateral exports between Cambodia and the country i in 2010;

TE denotes Cambodia's total exports in 2010.

Cambodia's exchange rate is written as a home currency against a foreign currency. A higher real effective exchange rate index can be interpreted as the depreciation of the real exchange rate, thereby improving trade competitiveness. The nominal exchange rate and GDP deflator at 2010=100 are taken from the National Accounts Main Aggregates Database, United Nations. CPI at 2010=100 and export data in 2010 are retrieved from the World Bank Indicators and the ADB database, respectively.

Related research

The Redux model (two-country model) developed by Obstfeld and Rogoff (1995) is based on macroeconomic dynamics of supply framework with some assumptions (e.g., monopolistic competition and price stickiness). Nominal producer prices in the short run are set in advance. Under rigid prices, output equals aggregate demand for the economy. Under monopolistic competition, producer prices are higher than the marginal cost, thus producing profits for producers. With the preset price in the home currency of the producers, the producers' output price in terms of the foreign currency fluctuates in response to a change in the exchange rate. The stimulation of home government

spending generates a decline in domestic consumption relative to foreign consumption since residents in the home country have to pay taxes used to finance government spending. The relative demand for money in the home country has higher fluctuation than the relative consumption, thus leading to the depreciation of the real exchange rate and thus improvement of trade competitiveness. Di Giorgio et al. (2018) also develop a two-country model with different assumptions from Obstfeld and Rogoff (1995). Their assumptions are non-Ricardian households and productive government purchases. Non-Ricardian households can be identified as households consuming based on current income and not taking out a loan to smooth their consumption (Céspedes et al., 2012; Coenen & Straub, 2005; Marto, 2014). In the case of productive government purchases, a rise in government spending causes a positive externality on the productivity of the private sector. The stimulation of government spending improves labor productivity in the private sector and influences marginal costs and inflation through demand-side and supply-side channels. In the demand-side channel, higher aggregate demand leads to inflationary pressure. In the supply-side channel, domestic inflation and marginal costs decline in response to higher productivity in the private sector. The non-Ricardian structure of this model leads to expansionary public policy with an unbalanced budget in each period. Households, therefore, arrange their savings to buy a government bond, thereby not disturbing their future consumption. With non-Ricardian households, the demand-side channel is relatively weak compared to the supply-side channel because the change in household consumption generates only a small change in aggregate demand. The final result, therefore, is a fall in domestic inflation. A decline in domestic inflation provokes a decrease in the local interest rates due to the monetary policy response, thereby depreciating the real exchange rate and enhancing trade competitiveness.

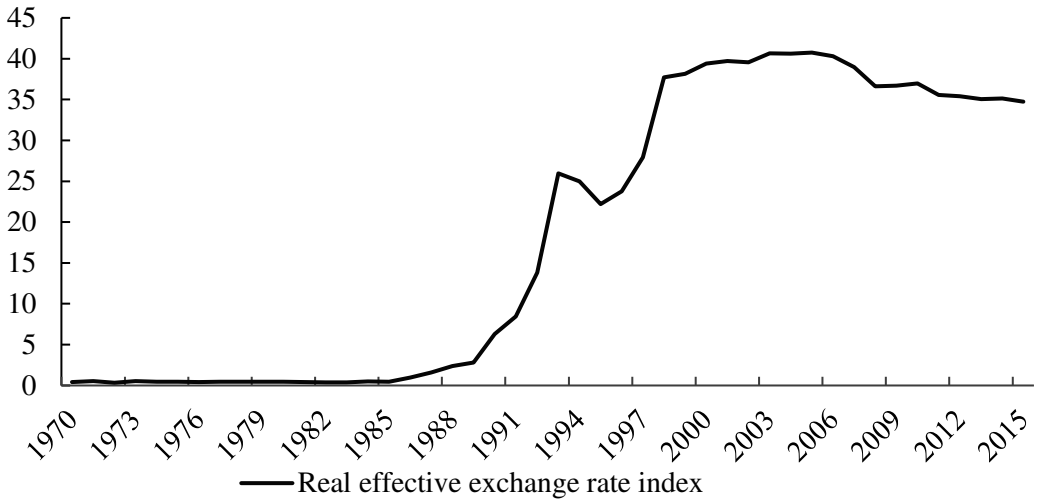
Makin and Ratnasiri (2015) studied the reaction of competitiveness to the extension of government spending in Australia. Two types of goods (tradable and non-tradable goods) are supposed in the Australian economy. The real exchange rate is the ratio of domestic currency price of non-traded to traded goods. Non-traded goods and services (e.g., electricity supply, water supply and so forth) refer to goods and services produced only for consumption in domestic economy and without making international trade (e.g., export and import) (Baxter et al., 1998; Sachs & Larrain, 1993; Jenkins et al., 2011). Australia's exchange rate is written as a foreign currency against the home currency, thereby losing international competitiveness in response to a higher real exchange rate index. The expansionary government expenditure (i.e., public investment or consumption) on non-tradable goods leads to lower productivity growth in the tradable than the non-tradable goods sector. A decrease in opportunity cost of production resources (e.g., labor and capital) in non-tradable goods sector generates a reduction in the relative price of tradable goods. Therefore, the expansion of government spending on non-tradable goods sector appreciates the real exchange rate and thus weakens international competitiveness.

Based on a panel SVARs (structural vector autoregressive) approach and quarterly data from four developed countries (i.e., Australia, Canada, Sweden, and the United Kingdom), Bouakez and Eyquem (2015) indicated that the real exchange rate reacts to expansionary government spending by depreciating, thus intensifying international competitiveness. Kim (2015) used a panel VAR (vector autoregressive) approach with quarterly data from 18 developed countries and also found that the stimulus to government spending leads to the depreciation of the real exchange rate, thereby boosting international competitiveness.

On the other hand, Chen and Liu (2018) employed a small open economy model and a time-series SVARs approach and revealed that a rise in public investment or consumption appreciates the real exchange rate, thereby deteriorating the international competitiveness and trade balance and leading to the government's twin deficit.

TRADE COMPETITIVENESS TREND IN THE CAMBODIAN CONTEXT

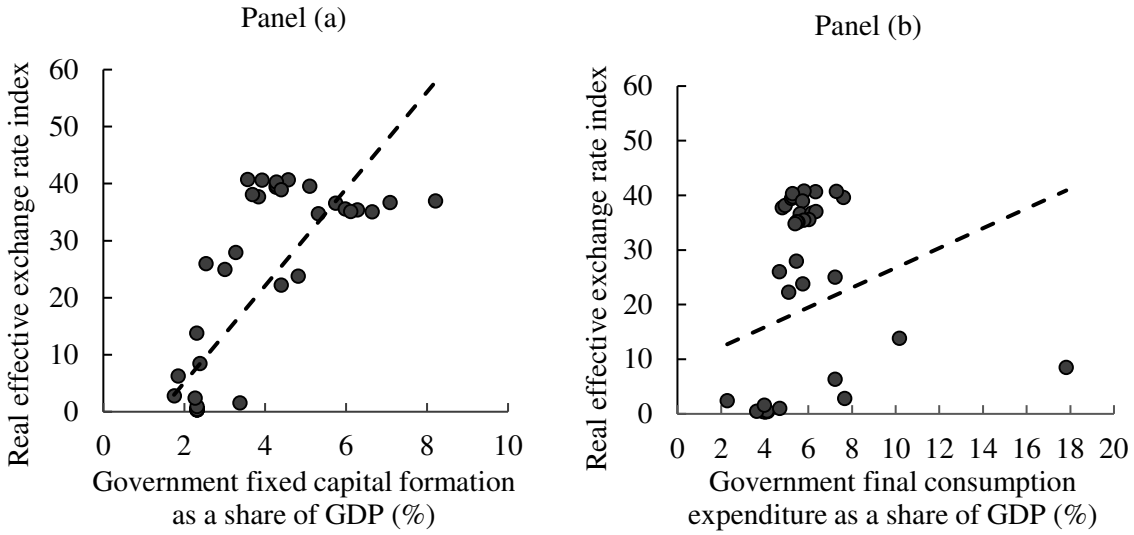
The data of the real effective exchange rate as a trade competitiveness measure are calculated to identify the trend. Figure 1 indicates the trend of the real effective exchange rate index over a period from 1970 to 2015. The first national election organized by the United Nations Transitional Authority in Cambodia (UNTAC) in 1993 took place after Cambodia faced civil war during the period from 1970 to 1993. Subsequently, the Cambodian government had to increase its expenditure to rebuild the infrastructure and economy destroyed by this war. The real exchange rate grows sharply from 1988 to 1993. During 1988-1991, Vietnamese were detached from Cambodia, and there was a period of political unsettlement. The National Bank of Cambodia (NBC) therefore injected an enormous amount of money to settle the issue of the budget deficit.



Source: Author's calculation

Figure 1. Cambodian real effective exchange rate index from 1970 to 2015

Cambodia adopted the managed floating exchange rate in 1993 (NBC, 2015). The real exchange rate also plays a principal role in Cambodia's export competitiveness (World Bank, 2015). Robust exports have also supported Cambodia's strong economic growth during the last decade (ADB, 2018).



Source: National Accounts Main Aggregates Database, IMF Database, and author's calculation
Note: Each dot depicts each year. Dashed line represents estimated line. Cambodian annual data are from 1970 to 2015.

Figure 2. Scatter (government spending, real effective exchange rate index) plot

As reported in panels (a) and (b) of Figure 2, two types of government expenditure (i.e., public investment and government consumption) seem to contribute to the real effective exchange rate index in Cambodia.

HYPOTHESIS

According to the Redux model of Obstfeld and Rogoff (1995) and the two-country model developed by Di Giorgio et al. (2018), expansionary fiscal policy depreciates the real exchange rate and thus boosts trade competitiveness. This paper investigates the two types of government spending, such as government investment and consumption. The hypothesis of this paper suggests:

H: Government spending (i.e., public investment and consumption) positively affects trade competitiveness in Cambodia.

METHODOLOGY

Specific model

Household consumption and private investment play a crucial role in the fluctuation of the real exchange rate, as explained in the two-country models of Obstfeld and Rogoff (1995) and Di Giorgio et al. (2018). The recent research conducted by Makin and Ratnasiri (2015) also takes into account both the aggregate private spending and government spending in their model. Therefore, the international competitiveness function in this study can be written as follows:

$$R_t = f\left(E_t, G_t\right) \tag{6}$$

where R_t stands for the real effective exchange rate index at the time t,

E_t refers to aggregate private spending (i.e., the sum of household consumption and private investment) at the time t,

G_t represents government spending at the time t.

Total government expenditure can be disaggregated into government consumption and public investment. Notably, public investment significantly affects the supply side (production) for international competitiveness. The regression for this study, therefore, can be rewritten as follows:

$$R_t = \beta_0 + \beta_1 E_t + \beta_2 GFCF_t + \beta_3 GFCE_t + \varepsilon_t \tag{7}$$

where t = 1970, 1972… 2015,

R_t represents the real effective exchange rate index of Cambodia at the time t,

E_t denotes aggregate private spending as a share of GDP of Cambodia at the time t,

$GFCF_t$ refers to government fixed capital formation as a share of GDP of Cambodia at the time t,

$GFCE_t$ stands for government final consumption expenditure as a share of GDP of Cambodia at the time t.

Data collection

Cambodia annual data obtained from1970 to 2015 create 46 observations. Variables used for this analysis are:

- Real effective exchange rate index: assessing cost competitiveness of the home country relative to the critical trading competitors;
- GDP at a constant price in 2011: the total value of goods and services produced per annum;
- Private investment at a constant price at 2011: the private sector's investment spending in infrastructure services according to Investment and Capital Stock Dataset of IMF;
- Household final consumption expenditure as a share of GDP: the consumption of goods and services made by households and enterprises in the nation;
- Government fixed capital formation at a constant price 2011: acquisitions (i.e., purchase of new or second-hand assets) plus specific expenditure on services providing extra value to non-produced assets and then minus disposal of produced fixed assets;
- Government final consumption expenditure as a share of GDP: goods and services consumed by and collective consumption services offered by the general government.

The data for these variables are derived from two primary sources: the Investment and Capital Stock Dataset of the IMF and the National Accounts Main Aggregate Database of the United Nations. The link to obtain the data of GDP, government fixed capital formation, and private investment at a constant price at 2011 is:
https://www.imf.org/external/np/fad/publicinvestment/

For the rest of the variables mentioned above, data are accessed through the link below:
https://unstats.un.org/unsd/snaama/dnlList.asp

The conversions to receive explanatory variables for the regression are:

- Private investment and government fixed capital formation at a constant price 2011 divided by GDP at a constant price 2011 is equal to private investment as a share of GDP and government fixed capital formation as a share of GDP, respectively.

- Aggregate private spending as a share of GDP is the sum of household final consumption expenditure as a share of GDP and private investment as a share of GDP.

The data analysis is conducted in STATA 15.1 software.

Autoregressive Distributed Lags approach

The Engle–Granger approach (Engle & Granger, 1987) or Johansen's multivariate maximum likelihood approach for co-integration (Johansen, 1988; Johansen & Juselius, 1990) requires all of the variables (i.e., dependent and independent variables) integrated to be order one I(1). The autoregressive distributed lags (ARDL) bound approach introduced by Pesaran and Shin (1998) and Pesaran et al. (2001) has several advantages over other traditional co-integration approaches. First, the ARDL model credibly deals with regressors with the existence of mutually integrated orders (zero I(0) and first I(1)) while the regressand is integrated of order one I(1) (Nkoro & Uko, 2016). Next, the ARDL model tests the existence of co-integration based on the standard F-test and estimates short-run and long-run relationships among explained and explanatory variables. Last, the ARDL approach also copes with the endogeneity problem by adding lags of explained and/or explanatory variables. Optimal lag lengths for ARDL bound test are selected under the minimum value of the Akaike Information Criterion (AIC) developed by Akaike (1977). The bound testing approach, based on the standard F-test with two sets of critical value (i.e., lower bound I(0) and upper bound I(1)), justifies the existence of long-run co-integration. If the F-statistic estimated from the ARDL bound model is higher than the upper bound I(1), the null hypothesis, no co-integration, is rejected. In the case of an F-statistic between the lower and upper bound, no conclusion can be confirmed. An F-statistic lower than lower bound leads to the conclusion that long-run co-integration does not exist. If there is a long-run co-integration relationship among dependent and independent variables, a causal relationship exists, at least in one direction. We assumed unrestricted intercept and no trend in the equation of the ARDL bound test. The ARDL bound model of this study can be written as follows:

$$\Delta R_t = \beta_0 + \beta_1 E_t + \beta_2 GFCF_t + \beta_3 GFCE_t + \lambda_R ECT_{t-1} + \sum_{j=1}^{p} \theta_j \Delta R_{t-j} + \sum_{j=1}^{k} \alpha_j \Delta E_{t-j} + \sum_{j=1}^{l} \varphi_j \Delta GFCF_{t-j} + \sum_{j=1}^{k} \rho_j \Delta GFCE_{t-j} + \varepsilon_t \quad (8)$$

where Δ represents the first difference, λ_R stands for the speed of adjustment, and ECT_{t-1} (error correction term) denotes disequilibrium. The coefficient of the error correction term indicates the speed to adjust disequilibrium due to short-run shocks to long-run equilibrium (Shahbaz et al. 2013). If this coefficient is statistically significant and negative, it depicts the existence of this adjustment. p, k, l, and m refer to lags of ΔR, ΔE, $\Delta GFCF$, and $\Delta GFCE$, respectively. The selected value of p, k, l, and m is based on AIC. ε_t represents the error term. This study deals only with the long-run relationship between explained and explanatory variables and the effects of E_t, $GFCF_t$, and $GFCE_t$ on R_t.

RESULTS AND DISCUSSION

Estimation

The analysis (e.g., OLS and ARDL approach) with the variables, non-stationarity after first differencing or without co-integration, generates a spurious result, thus demanding that a unit root test (stationary test) and co-integration test be conducted before running a regression (Granger & Newbold, 1973). The unit root test can be performed to reveal whether the time series has a deterministic trend (i.e., constant covariance, mean, and variance over time) or a stochastic trend (i.e., containing random walk) (Kirchgässner et al., 2013). If the unit-root exists, the variables have a stochastic trend. This study employs two well-known unit root tests (i.e., Augmented-Dicky–Fuller suggested by Dickey and Fuller (1979) and Philips–Perron developed by Philips and Perron (1988)). The null hypothesis of both tests is unit-root (non-stationarity). The Augmented-Dicky–Fuller (ADF) test relies heavily on the length of lags, therefore selecting the optimal lags based on the Bayesian Information Criterion (BIC) proposed by Schwarz (1978). The result of unit-root tests (ADF and Philips–Perron) seen in Table 1 reveals that the explained variable (R_t) is integrated of order one I(1). The explanatory variable *($GFCF_t$)* has integration of order one I(1), but the other explanatory variables *(E_t* and *$GFCE_t$)* are stationary at level I(0).

Table 1
Unit root tests

Test	Augmented-Dicky–Fuller (ADF) with intercept		Philips–Perron (PP) with intercept	
	X_i	ΔX_i	X_i	ΔX_i
R_t	-0.794	-3.161***	-0.699	-4.520***
E_t	-2.820***		-3.202**	
$GFCF_t$	-1.325*	-5.297***	-1.233	-6.604***
$GFCE_t$	-3.168***		-3.944***	

Note: Δ denotes the first difference. * , **, and *** represent the significance level at 10, 5, and 1 percent, respectively. If both tests express stationarity, the variable is concluded as stationarity.

The optimal lags chosen by AIC are 6 for the ARDL bound test. AIC also indicates 6, 5, 4, and 6 as the value of *p, k, l,* and *m,* respectively. The F-statistics shown in Table 2 are above the critical value of the upper bound at a significance level of 1 percent. The null hypothesis of no co-integration, therefore, is rejected at these levels. There is co-integration among these variables, so a causal relationship occurs in at least one direction.

Table 2
ARDL (6, 5, 4, 6) bound test for co-integration

	Dependent variable (R_t)	
F Statistics	30.1126	
Test critical value	I(0)	I(1)
1 percent level	4.29	5.61
5 percent level	3.23	4.35
10 percent level	2.72	3.77

Note: If F statistics is greater than the critical value of upper bound I(1), the null hypothesis is rejected.

The focus point of this study lies in the long-run relationship between government spending (i.e., public investment and consumption) and trade competitiveness. The long-run elasticity of the explained variable with respect to explanatory variables is reported in Table 3. E_t, $GFCF_t$ and $GFCE_t$ are positive and statistically significant at these levels. The extension of aggregate private spending, public investment, or government consumption depreciates the real effective exchange rate, thereby gaining more trade competitiveness. The coefficient of error correction term (ECT_{t-1}) is negative and significant at these levels. The error-correction coefficient ($\lambda_R = -0.334$) indicates that the speed of adjustment– the period needed to return to the long-run equilibrium after disequilibrium in the short run – is approximately 33.4 percent.

The estimated result of the short-run implication is also presented in Table 3. R_t also reacts to its lags at a 1 percent significance level. A negative response of R_t to an increase of aggregate private spending, public investment, or government consumption is found in the short run, and these three variables are highly significant at these levels.

Table 3
Regression results from ARDL approach

ΔR_t	ARDL (6, 5, 4, 6)	
	Coefficient	Standard Error
Long-run		
E_t	7.546***	0.450
$GFCF_t$	17.208***	0.682
$GFCE_t$	17.483***	0.860
Short-run		
ECT_{t-1}	-0.334***	0.031
ΔR_{t-1}	-0.726***	0.128
ΔR_{t-2}	-0.411***	0.090
ΔR_{t-3}	-0.182**	0.081
ΔR_{t-4}	-0.286***	0.065
ΔR_{t-5}	-0.267**	0.095
ΔE_t	-2.506***	0.275
ΔE_{t-1}	-2.751***	0.260
ΔE_{t-2}	-2.546***	0.283
ΔE_{t-3}	-1.630***	0.209
ΔE_{t-4}	-0.558***	0.126
$\Delta GFCF_t$	-4.988***	0.560
$\Delta GFCF_{t-1}$	-3.729***	0.436
$\Delta GFCF_{t-2}$	-2.515***	0.314
$\Delta GFCF_{t-3}$	-0.876**	0.301
$\Delta GFCE_t$	-5.755***	0.565
$\Delta GFCE_{t-1}$	-5.738***	0.540
$\Delta GFCE_{t-2}$	-4.342***	0.565
$\Delta GFCE_{t-3}$	-1.741***	0.367
$\Delta GFCE_{t-4}$	0.345	0.216
$\Delta GFCE_{t-5}$	0.540***	0.138
Constant	-285.156***	30.615

Note: Δ denotes the first differences. *, ** and *** indicate the significance level at 10, 5, and 1 percent, respectively.

Diagnostic tests

The key ARDL assumptions about the error term (residual) checked with diagnostic tests are no serial correlation, homoscedasticity, and normal distribution. A residual has a serial correlation (i.e., the residual at time t correlates to the residual at the previous time), thus impacting the volume of t-statistics, standard error, and confident interval. Heteroscedasticity (i.e., the residual's variance is not constant) implies that this built model does not explain the explained variable. If the residual is not a normal distribution, this model does not describe all trends of data. The Durbin–Watson test suggested by Durbin and Watson (1950) is carried out to check the residual. The null hypothesis is no serial correlation. The Breusch–Pagan test is used to confirm the residual with no heteroscedasticity as the test's null hypothesis (Breusch & Pagan, 1979). The Jarque–Bera test introduced by Jarque and Bera (1987) joins between Skewness and Kurtosis. This test relies on asymptotic standard error without correlation for sample size. The normal distribution is proposed as the null hypothesis of the Jarque–Bera test. The three tests presented in Table 4 indicate that the null hypothesis of each test cannot be

rejected at these levels. The residual of ARDL (6, 5, 4, 6) has no serial correlation, no heteroscedasticity, and normal distribution.

Table 4
Diagnostic tests of ARDL (6, 5, 4, 6)

ε_t	Chi squared
Durbin–Watson test	0.446
Breusch–Pagan test	2.21
Jarque–Bera test	4.45

Note: *, **, and *** denotes the significance level at 10, 5, and 1 percent, respectively.

Stability test

The robustness of models can be checked with the cumulative sum test to confirm the parameter stability for the regression model. The cumulative sum test propounded in Brown et al. (1975) and based on recursive residuals is potentially designed to detect instability of parameters (Ploberger & Krämer, 1992). The null hypothesis of the cumulative sum test is no structural breaks (no change of regression coefficients over time). The result shown in Table 5 reveals the null hypothesis is not rejected at these levels of significance. The estimated long-run parameters converge to the zero means, thereby leading to the existence of a stable and consistent model.

Table 5
Cumulative sum test

Model	ARDL (6, 5, 4, 6)
Test statistic	0.230
Critical value 1 percent	1.143
Critical value 5 percent	0.947
Critical value 10 percent	0.850

Causality test

The ARDL bound estimation does not disclose causality (i.e., cause and effect) among the considered variables. The Modified Wald test (MWALD) proposed by Toda and Yamamoto (1995) is carried out in this study to understand the directional causality relationship between government spending (i.e., public investment and consumption) and trade competitiveness. The MWALD, the so-called Toda–Yamamoto causality test, can manage problems (i.e., any possible non-stationarity or co-integration among variables) which the original Granger causality ignores (Wolde-Rufael, 2005). For the Toda and Yamamoto (1995) approach, a standard vector autoregressive (VAR) model is applied to the level of variables rather than the first differences in the traditional Granger causality test, thus lessening the risks of wrongly identifying the integrated order of series (Mavrotas & Kelly, 2001). The null hypothesis of the Toda–Yamamoto causality test is no effect of a variable on another variable. The kaleidoscopic result of Toda–Yamamoto causality test is presented in Table 6. The bi-directional causality relationship between three explanatory variables (i.e., aggregate private spending, public investment, and government consumption) and trade competitiveness is observed in this analysis.

Table 6
Toda–Yamamoto causality test result

Cause	→	Effect	Wald Statistics	P-value
E_t	→	R_t	5824.80***	0.000
R_t	→	E_t	163.58***	0.000
$GFCF_t$	→	R_t	2401***	0.000
R_t	→	$GFCF_t$	97.983***	0.000
$GFCE_t$	→	R_t	8502.6***	0.000
R_t	→	$GFCE_t$	131.89***	0.000

Note: * , ** and *** indicate the significance level at 10, 5 and 1 percent, respectively.

Discussion

The result of public investment and government consumption in this study coincides precisely with the explanations of Obstfeld and Rogoff (1995) and Di Giorgio et al. (2018) based on the two-country model, that is to say, an increase in government spending improves trade competitiveness through depreciation of the real exchange rate as a measurement of trade competitiveness. This finding also agrees with the result of Bouakez and Eyquem (2015), who indicated that the response to the extension of public spending is the depreciation of the real exchange rate, which intensified international competitiveness in four developed countries. The result of this study is consonant with the result of Kim (2015), who suggested that the extension of government consumption in 18 industrialized countries enhances trade competitiveness owing to the improvement of the market size in response to the depreciation of the real exchange rate. Thus, the extension of the market size in the ear of globalization can be an effective channel for the improvement of trade competitiveness for developed and developing countries (e.g., Cambodia). The extension of government spending can encourage a level of productivity that generates low production cost and high relative money demand in the home country, so it is a benefit for expanding the market size and therefore increasing trade competitiveness.

The result of this study is inconsistent with the outcome of Makin and Ratnasiri (2015) due to the different baseline to reflect the real exchange rate as the measurement of trade competitiveness. The real exchange rate is the proportion of the domestic currency price of non-traded to traded goods. The improvement of the real exchange rate index appreciates Australia's currency and thus reduces the international competitiveness owing to Australia's exchange rate written as a foreign currency against the home currency. In the case of expansionary public policy (i.e., public investment and government purchase) on non-traded goods, real exchange rate appreciation responds to the growth in the relative price of non-traded goods (i.e., an increase in opportunity cost of tapping production resources in tradable goods sector) due to faster productivity growth in non-traded than traded goods sector. As a result, the extension of government expenditure on non-tradable goods sector decreases Australian international competitiveness. The finding of this study also is not in line with Chen and Liu (2018), who pointed that the enhancement of public investment or government consumption worsens the trade competitiveness due to the existence of the government's twin deficit. While there are an increase in government expenditure and a decrease in national savings decrease, the real interest rates grow. More capital in the domestic capital market reacts to higher real interest rates, thus reducing the net capital outflow. A decline in net capital outflow decreases trade competitiveness via the appreciation of the real exchange rate and disrupts the trade account balance as well.

CONCLUSIONS AND POLICY IMPLICATIONS

Conclusions

Some scholars focus on the influence of public policy on trade competitiveness. This paper rigorously examines the reaction of trade competitiveness to the expansion of government spending (i.e., public investment and government consumption). The ARDL approach is employed to estimate dynamic relationships based on annual data from 1970 to 2015 from Cambodia. The result of this paper suggests that the extension of public investment or government purchases promotes trade competitiveness due to the devaluation of the real exchange rate. The result of aggregate private spending is the same as the result of public investment or government purchases. This study makes two contributes to international macroeconomic literature. Firstly, in the term of the extension of market size, it indicates how a change in domestic spending impacts opened economy's competitiveness through the real exchange rate. Lastly, international competitiveness based on the principle mentioned above is applied to Cambodian experience, thus revealing that a drop in Cambodia's trade competitiveness over the period from 2011 to 2015 responded to a reduction in government spending.

Limitation

This study faces the problem of limited data. Cambodia's historical data on public investment (GFCF) and government consumption (GFCE) from 1971 to 1986 seem to be unchanged. Cambodia was involved in a civil war at that period, so some of the data are the results of estimations by the United Nations and the IMF. This study only deals with one aspect of Cambodia's trade competitiveness and is not a complex aspect of competitiveness. Monetary policy also contributes to price level, the nominal exchange rate and thus the real exchange rate. However, our model does not take into account it because the data of Cambodia's money supply are limited.

Making use of quarterly (Makin & Ratnasiri, 2015) and semi-annual data can eliminate the effect of limited data. Alternatively, the panel data approach over ten countries in ASEAN is a solution for limited data.

Policy implications

The Cambodian government is making an effort to improve international competitiveness through the extension of market size, and thus Cambodia joined the World Trade Organization (WTO) in 2004. This outcome of this study depicts the efficacy of fiscal policy for Cambodia's international macroeconomic activities via the real effective exchange rate. The expansion of government spending creates more incentive to invest in Cambodia and also enhances productivity via the improvement of labor productivity in the private sector. It can bring down the marginal cost of production and encourage private consumption in Cambodia. As a result, there is a high relative demand for money in Cambodia, thus leading to a depreciation of the real exchange rate and improving trade competitiveness. According to the result of this study, the Cambodia government can improve trade competitiveness through an expansionary fiscal policy (i.e., public investment and government purchases). However, the efficacy of government spending may decrease if there are inefficient management of public investment and high corruption in the public sector. Dabla-Norris et al. (2012) find that Cambodia's PIMI (Public investment management index) is 1.57. PIMI can be defined as the multi-dimension index of the efficiency and quality of public investment management process. The value of PIMI ranges between zero and four, and public investment is fully efficient when PIMI equals to 4. The Cambodia value (1.57) of this index means that a US dollar of public investment translates approximately 0.4 US dollars of capital in Cambodia. The Cambodia corruption perception index is about 21 in the last six years (Quality of Government Institute, 2019) on a scale from 0 to 100 where 0 indicates the highest corruption and 100 means the perception is that there is no corruption in the public sector. Therefore, the government should take the initiative to improve the PIMI and the corruption perception indexes, thereby not offsetting the efficient and positive impact of government spending on trade competitiveness. The possibility for designing expansionary fiscal policy can be seen if there are high value of consolidated fiscal balance and low national debt. Cambodia's consolidated fiscal balance as a share of GDP based on the CEIC database declined from -7.65 percent in 2011 to -2.66 percent in 2015. As reported by IMF's database, Cambodia's national debt as a share of GDP in the same period slightly increased from 30.30 percent to 32.54 percent.

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The Positive Net Present Value of Loss-making Projects: Economic Content of the Two Internal Rates of Return

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SUMMARY

This paper examines the economic content of the positive net present value of a project type that is loss-making and has two internal rates of return. The most important finding is that the economic content of a positive net present value is false in such cases. The financial source of the missing amount to reach the level of business efficiency is a false interest income generated by the method. In such cases, the two internal rates of return are also derived from false interest income. The revealed and mathematically proved causality relationships usually prevail in some form in the case of other types of non-conventional cash flows as well.

Keywords: net present value; internal rate of return; non-conventional cash flow; investment project evaluation; loss-making project
Journal of Economic Literature (JEL) codes: D25, G31, G39, M21, O22
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INTRODUCTION

The literature does not address the economic content of the net present value (NPV). This content is clear only in the case of conventional (typical) investment projects. In this case, the NPV is the sum of the surplus profit generated above the required one, discounted for the present time (Illés 1990, 2012).The critical NPV value for business efficiency is zero. At this point, the payback requirement is met, because here all expenditures and the sum according to the required rate of return are returned. (There are many methods for exploring economic efficiency. In this field, the main question is the correct measuring of the return requirement fulfillment and the level of its over-fulfillment: Illés 2019a).

The economic content of the NPV is usually confused in the case of non-conventional investment projects. (If the sign of a given cash flow line changes more than once, then this is referred to as a non-conventional cash flow line. The label for this varies in the literature. The most commonly used variants of this are "non-normal", "non-regular", "non-typical", "non-conventional", "unconventional", and "unorthodox".) In the cases of non-conventional investment projects, even loss-making projects can have a positive NPV. This means that there are special projects that do not repay even the nominal value of the invested capital; nonetheless, according to the NPV rule, these are appropriate (Illés 2016).

According to the literature, all independent projects with positive NPV are considered to be appropriate. In this context, the possibility of loss does not arise. (As is well known, loss is usually disadvantageous for business.)

Literature review

The possibility of positive NPV of loss-making projects can only occur for non-conventional cash flows. Many variants of *non-conventional* cash flow can be found in the literature (by date: Mao 1969; Arnold & Hope 1990; Van Horne & Wachowicz 2008; Ben-Horin & Kroll 2012; and so on).This type of project can have multiple internal rates of return (IRRs). Samuelson (1937) was the first to indicate this connection (Bey 1998). Nowadays it is well-known that the maximum number of IRRs can be as many as the number of sign changes in the cash flow line.

In a significant part of the accessible publications, there are examples concerning non-conventional cash flows where the initial investment is relatively low and a high surplus income occurs at the end of the first year as compared to the initial investment, then the second year also finishes with a similarly high expenditure surplus. In these examples, the cash flow row has two IRRs.

A realistic example of this investment project type first appeared in the article of Loire and Savage (1955). This often-cited example deals with the possibility of a pump replacement, which allows the remaining two years of the original project to be reduced to one year. The cash flow line of the pump replacement project: -$1,600; +$10,000; -$10,000. The two IRRs are 25% and 400%. Although this type of example appears in several studies, not mentioned is the significant fact that these projects do not recover even the face value of the expenditures, that is, these are loss-making.

In this question, the difference between theoretical and applied economic science can be very large. This is reflected – for instance – in the paper of Ben-Horin and Kroll (2012: 114-115): "From a practical point of view an investment project should have a positive NPV at zero cost of capital... Such a requirement does not follow from any rational principle, but it reflects a basic prerequisite for most practitioners." Accordingly, by economic theory, there is not a problem if a project is loss-making. Namely, at the zero cost of capital, the negative NPV shows the nominal amount of the total loss. (Details are given later.) Unlike this, according to the applied economic sciences, the return of the expenditures is one of the basic requirements in business. Consequently, at the zero cost of capital, a non-negative NPV is a fundamental rational guiding principle in practice. Starting from the quoted statement, it can also be concluded that practitioners generally refrain from those theoretic conceptions which do not correspond to the business logic.

Table 1 shows some examples from the literature. (The publications do not mention the loss.) The list follows chronological order.

Table 1

Some published examples of non-conventional cash flow patterns with double internal rates of return

SOURCE	UNIT	YEAR			LOSS	IRRS
		0	1	2		(%)
Solomon (1956: 128)*	$	-1,600	+10,000	-10,000	-1,600	25 and 400
Renshaw (1957: 199)*	$	-1,600	+10,000	-10,000	-1,600	25 and 400
Southwick (1985: 532)	$	-125,000	+400,000	-300,000	-25,000	20 and 200
Brealey & Myers (1988: 80)	$	-4,000	+25,000	-25,000	-4000	25 and 400
Arnold & Hope (1990: 258)	£	-2,000	+5,100	-3,150	-50	5 and 50
Emery & Finnerty (1991: 295)	$	-10,000	+25,000	-15,600	-600	20 and 30
Shull (1993: 68)*	$	-1,600	+10,000	-10,000	-1,600	25 and 400
Plath & Kennedy (1994: 82)	-	-16	+100	-100	-16	25 and 400
Firer & Gilbert (2004: 43)	-	-1,600	+10,000	-10,000	-1,600	25 and 400
Van Horne & Wachowicz (2008: 341)*	$	-1,600	+10,000	-10,000	-1,600	25 and 400
Ross et al. (2010: 277)	$	-60	+155	-100	-5	25 and $33^1/_3$
Bierman & Smidt (2012: 93)	$	-100	+310	-220	-10	10 and 100
Balyeat et al. (2013: 45)	-	-60	+500	-500	-60	16.2 and 617.13
	-	-40	+500	-500	-40	9.61 and 1040.39

* Referring to the example from Loire and Savage (1955).

The NPV curve for these examples can be found in *Brealey* and *Myers* (1981: 80); *Campani (*2014: 4); *Firer* and *Gilbert* (2004: 43); *Ross* et al. (2010: 278); *Van Horne* and *Wachowicz* (2008: 342) and so on. The shape of these is the same. Each of these curves starts with a negative value range. The starting point is the sum of the loss in face value (the content of which is not mentioned). The curves cross the x-axis twice. In the zone of x-axis bounded by the two IRRs, each interest rate results in positive NPV. Outside these borders, each of the interest rates leads to the negative NPV. The general shape of NPV curves of the examples above is illustrated in Figure 1.

According to the general academic opinion, the NPV method is suitable for evaluation in the case of projects with non-conventional cash flows as well (e.g. *Southwick* 1985; *Brealey & Myers* 1988; *Arnold &Hope,* 1990; *Shull* 1993; Johnstone 2008; *Ross* et al.

2010; *Bierman & Smidt* 2012; *Banerjee* 2015). The argument – if there is one – is that also in this case only one NPV can occur, as opposed to the IRR.

Despite the dominant consensus, many efforts to solve multiple-IRR problems can be found in the literature. *Campani* (2014:3) says: "Although the problem of multiple IRRs is very well known by the literature, still its solution is not!" However, the real solving of this problem starts with the question as to how a positive NPV can be generated when even the face value of the expenditures is not returned by the project.

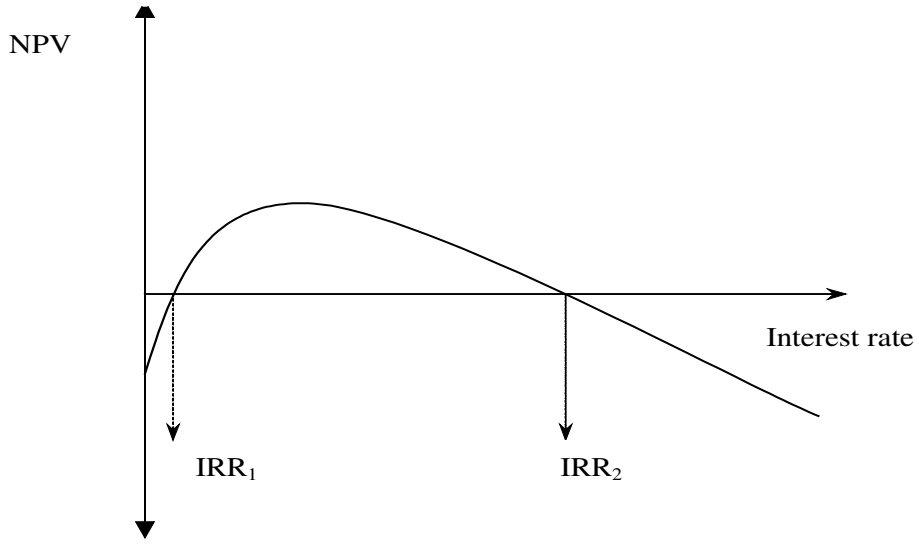

Figure 1.The general shape of NPV curves for the examples in Table 1

Purpose and method

The main objective of this paper is to explain and to prove that the positive NPV of loss-making projects can be misleading. For the sake of relative simplicity, the paper uses a special variant of the non-conventional investment projects, which have a two-year lifetime, are loss-making, and have two IRRs. As seen in Table 1, this project type is often mentioned and used in the literature.

In implementing the main objective, the paper is based on the following main content elements:

- Revealing the fundamental methodological relationships that can lead to a positive NPV for the case of the loss-making projects;
- Proving that the mechanism of the NPV method can create a false interest income;
- Proving that the two IRRs are also derived from false interest;
- Analyzing the content structure of the false interest income;
- Exploring the possibilities of business efficiency examination for such cases;
- Numerical demonstrations of the revealed relationships;
- Indications that the false interest incomes can prevail also in other types of non-conventional cash flows.

The purpose of the paper is also to demonstrate that the revealed relationships to be interpretable without having to follow the process of proof in detail. The verbal explanations and the numerical demonstrations serve this purpose.

The main research methods are content analysis, methodological analysis, and model editing and model analysis. Logical and mathematical methods are used to confirm the findings.

This paper uses a new analytical method for examining the special NPV content. The new method became necessary because the primary discounting process makes the content examination of the payback process impossible. The follow-up of the payback process is the only way to explore the emergence and realization of return requirements and the process of surplus profit formation. (The planning activity and thought process of corporate executives also move in a forward direction in time.) The year-after-year calculation allows also the net future value (NFV) to be calculated, the discounted value of which is the NPV. Thus after the systematic exploration of content relations, the analysis can return to the well-known NPV.

The most important conditions and categories are as follows:

- The research uses an interdisciplinary approach during the exploration of the literary background. It analyzes sources in economics, finance, and management accounting (and also refers to some textbooks). The explanation and analysis use a business approach according to the real conditions and practical wording.

- In the general case, capital is a scarce resource for the company.
- The literature of investment projects evaluation frequently names the amount of the negative NPV "loss". This can be misleading. In the case of a conventional cash flow line, the negative NPV has two grades. The first is when the IRR is positive but NPV is negative. In this case, the examined project is profitable from a practical point of view, but the profit is not sufficient to fulfill the profit requirement on the required rate of return. Here the negative NPV signals the amount of missing profit at present value. In the second grade, the IRR is also negative. This means that the face value of the expenditures cannot be recovered (Illés 1990). In practice, only the unrecovered expenditures or unrecovered practical costs are called loss. (In practice, the cost is a part of the expenditure, related to a specific period or a specific matter.) The paper uses the practical variant of the expression of loss.

THE BASIC CONTENT RELATIONSHIPS

The relevance of the nominal profit value calculated for the whole lifetime

In the case of conventional cash flows, the NPV calculated with zero interest rate shows the nominal profit sum for the whole lifetime. This profit amount is the source that can serve as a cover for the profit requirement of capital tied up at all times. Moving from the zero interest rate a positive NPV is given, as long as the cumulative profit requirement according to the interest rate is less than the nominal amount of profit. The interest rate at which the two sums are equal is the IRR itself. By further raising the interest rate, NPV will be negative, indicating that the sum of the whole profit sum no longer covers the profit requirement.

The NPV rule shows not only loss-making projects are to be rejected but also those profitable ones where the IRR is smaller than the required rate of return. The positive NPV is the same as the discounted sum of yearly surplus profits generated over the required rate of return.

In the case of non-conventional cash flows, the NPV calculated with zero interest rate also quantifies the nominal profit sum generated during the whole life of the project. (This can be easily seen if the NPV formula is written with the zero interest rate.) In the case of the analyzed project type, there is a loss at the zero interest rate. Consequently, there is no generated source to cover all of the expenditures during the lifetime of the project. In addition to this, a positive sign of NPV can emerge. As a starting point, there is a need to explore how this positive NPV is created.

The methodological handling of surplus profit is the key to the problem

The yield is a positive difference in annual sales revenue and annual expenditure. This amount is a surplus compared to the next year's financial needs of the project. Therefore, the amount of the yield leaves the project in that year when it is generated. Usually, the circumstances of the use of the amounts leaving the project will not affect the evaluation of the examined project. Unlike the actual financial processes, the automatism of the NPV method handles the content ingredients of the yield differently. This method focuses on the present value of the resulting surplus profit, so the surplus profit remains within the calculation. In the calculations, this amount will continue to be included as a part of project indicators, although in reality this yield part also goes out from the project. The consequences of this are radically different in the case of conventional and non-conventional investment projects.

Formula (1) describes the net future value (*NFV*) of a conventional project where the yearly yields are in chronological order. (In the case of the multi-year investment process, the cash flow line starts with more than one negative amount.)

$$NFV = -E_0\,(1+i)^n + H_1\,(1+i)^{n-1} + \\ + H_2\,(1+i)^{n-2} + \ldots + H_{n-1}\,(1+i) + H_n \qquad (1)$$

where:

E_0 = initial investment;

H_t = yield, which is the difference in revenues and expenditures at the end of the year number *t*. In the case of a project with conventional cash flows, the magnitude relation is always $H_t > 0$;

t = the serial number of the years;

n = lifetime of the project;

i = required rate of return.

Calculated year by year, at first the yields reimburse the initial investment and the profit requirement continuously. After the return requirement has been met, the generated yields are the surplus profits with a positive sign. The surplus profits are no longer need to cover any requirement. They remain within the calculation, as in the NPV case. The method omits from the calculation only those amounts that are needed to cover the return requirement (Illés 2016).

According to this NFV method, the surplus profits are increased by the required rate of return up to the end of the period. The resulting interest incomes are not real, as the surplus profits have left the project. These false interest sums are technical items. They are needed only for the summation of the surplus profits generated at different times. The false interest amounts automatically disappear when the NFV is discounted to the present value. The discounting takes effect from the year of surplus profit creation. So, in this case, the different

handling of content ingredients of the yield does not lead to an error. For the project with conventional cash flows, the IRR method does not create surplus profit. The rate of return includes all the generated profits.

The above context is not valid for the analyzed non-conventional investment projects. For these special projects, in the first year, all of the initial capital and its profit requirement are returned; furthermore, also a very high temporary surplus profit is generated. The high expenditure surplus in the second year will sweep away the temporary surplus profit. The difference between the expenditure surplus and temporary surplus profit will be the loss. The temporary surplus profit goes out of the calculation. Therefore, discounting can no longer eliminate false interest income.

It follows from the above that according to the calculation of the NFV, the temporary surplus profit generated at the end of the first year will be increased by the interest for one year. The method does not charge interest on the full first year's yield, but only on the temporary surplus profit. This interest income is false, as the temporary surplus profit also leaves the project as a part of the yield at the end of the first year. The temporary surplus profit can yield real interest only after being invested in another project. The false interest income, if it is large enough, will cover the loss, the profit requirement and the remainder will be the false NFV. The discounted amount of the latter is a false NPV.

For the analyzed project type, the calculation mechanism of IRR also applies the utilization of non-existing interest income. Here, the amount of the false interest income exactly equals the sum of the loss and the profit according to the IRR.

MATHEMATICAL PROOF

Proving the false outcome by a mathematical model

According to the above, the model of the analyzed investment project type is loss-making, with two IRRs, and the lifetime is two years. The amount of the initial investment is relatively low, a high revenue surplus (yield) is generated at the end of the first year as compared to the initial investment, and then the second year also finishes with a similarly high expenditure surplus. Formula (2) describes this model mathematically.

$$-E_0 + H_1 - U_2 = M_s < 0 \quad |E_0| < H_1; \quad |E_0| < |U_2|; \; r_1 \neq r_2 \quad (2)$$

where

M_s = the loss generated during the lifetime of the project;

H_1= yield, which is the difference in revenues and expenditures at the end of the first year;

U_2 = expenditure surplus, which is the difference in revenues and expenditures at the end of the second year;

r_1 and r_2 = the two IRRs.

(Further magnitude order conditions are necessary between E_0 and H_1 and U_2 for the existence of the two IRRs. From the aspect of the purpose of the paper, the presentation of these is unnecessary.)

Based on formula (2):

$$H_1 < E_0 + U_2 \quad (3)$$

That is, the first year's yield does not cover even at face value the sum of the initial investment and the second year's expenditure surplus. According to (3):

$$H_1 - E_0 < U_2 \quad (4)$$

As stated above, the first year's yield completely leaves the project. However, a part of the yield, namely the temporary surplus profit, remains within the calculation mechanism. The temporary surplus profit (ΔH_s), appearing at the end of the first year, is the difference of the first year's yield and the sum of the initial investment and its one-year profit requirement. Mathematically:

$$\Delta H_s = H_1 - E_0 - E_0 i \quad (5)$$

According to (5), the structure of the first year's yield is as follows:

$$H_1 = \Delta H_s + E_0 + E_0 i \quad (6)$$

The substitution of the detailed inscription of H_1 [according to (6)] into Formula (4):

$$\Delta H_s + E_0 + E_0 i - E_0 < U_2$$

That is:

$$\Delta H_s + E_0 i < U_2 \quad (7)$$

Consequently, (8) also is true:

$$\Delta H_s < U_2 \quad (8)$$

The NFV at the end of the second year:

$$NFV = -E_0 (1+i)^2 + H_1 (1+i) - U_2 \quad (9)$$

The discounted NFV is equal to the NPV:

$$NFV \frac{1}{(1+i)^2} = NPV = -E_0 + H_1 \frac{1}{1+i} - U_2 \frac{1}{(1+i)^2} \quad (10)$$

The substitution of the detailed inscription of H_1 [according to (6)] into Formula (9):

$$NFV = -E_0 (1+i)^2 + (\Delta H_s + E_0 + E_0 i)(1+i) - U_2 \quad (11)$$

Performance of the assigned operations at (11):

$$NFV = -E_0 - E_0 i^2 - 2E_0 i + \Delta H_s + E_0 + \\ + E_0 i + \Delta H_s i + E_0 i + E_0 i^2 - U_2 \quad (12)$$

By rearranging (12), step by step, a simple formula of the NFV is available.

$$NFV = \Delta H_s + \Delta H_s i - U_2 \quad (13)$$

The false interest income is in (13) as $\Delta H_s i$. In the case of $NPV > 0$, NFV also > 0, and Formula (13) can be rearranged to Formula (l4).

$$\Delta H_s + \Delta H_s i > U_2 \quad (14)$$

However, according to (8) the temporary surplus profit is lower than the second year's surplus expenditure. The simultaneous fulfillment of (8) and (14) can only be true if the false interest income is used in the financing of the project. Accordingly, it is unequivocal that a positive NPV of the loss-making projects can only happen if the false interest income is used in financing. In this way, the NFV and the NPV calculated from this is also false.

The content structure of the false interest income

A clear exploration of the content structure of the false interest income can be solved using the IRR method. For IRR, NPV is equal to 0. The zero value of NPV can only occur if NFV is also equals to 0.

In the case of false IRR, the false interest income is equal to the product arithmetical of the temporary surplus profit and IRR. According to the logical approach, the generated false interest income is equal to the sum of the loss and the profit according to the interest rate. Mathematically:

$$\Delta H_s i = E_0 i + M_s \quad | \; i = r; NFV = 0 \quad (15)$$

The way to prove the correctness of Formula (15) is to describe its elements in detail and then rearrange them into the well-known IRR formula. A detailed description of (15) is as follows:

$$(H_1 - E_0 - E_0 i) i = E_0 i + E_0 - H_1 + \\ + U_2 \quad | \; i = r; \; NFV = 0 \quad (16)$$

Rearranged:

$$H_1 i - E_0 i - E_0 i^2 = E_0 i + E_0 - H_1 + U_2; \\ H_1 i + H_1 - U_2 = E_0 + 2E_0 i + E_0 i^2; \\ H_1 i + H_1 - U_2 = E_0 (1+i)^2, \\ -E_0 (1+i)^2 + H_1 (1+i) - U_2 = 0 \quad | \; i = r; \; NFV = 0 \quad (17)$$

If *NFV= 0*, then (17) equals (9). After discounting (17):

$$-E_0 + H_1 \frac{1}{1+i} - U_2 \frac{1}{(1+i)^2} = 0 \quad | \; i = r; \; NFV = 0 \quad (18)$$

(18) is the well known IRR formula. This proves that the false interest income structure according to (15) is correct. In this case, the components of false interest amount indeed are the profit by IRR and the loss.

Based on the evidence of (15), it is clear that the positive NPV of the examined model can only occur if the sum of the false interest income is greater than the sum of the profit requirement and the loss. So when evaluating such projects, it must be the starting point that the loss is a loss.

The model analyzed is relatively simple, so the argumentation is relatively straightforward and the relationships are transparent. Even a relatively small modification in the model leads to more complicated possibilities of analysis.

Based on the above, it is obvious (but mathematically is not proven) that the NPV is always false when the NPV curve has a section where the increase in the interest rate increases the NPV. It has been known for more than half a century that the IRR is not suitable for assessing investment projects with non-conventional cash flow. Now it has been proven that the NPV is not appropriate, either. Project-specific methods need to be developed to assess the potential benefits of such projects.

EVALUATION OPTIONS

In the case of conventional cash flow lines, the loss-making project cannot have a positive NPV. Therefore, realization of this is automatically not recommended by the NPV rule. Examined in itself, the business efficiency of a loss-making project is inadequate in the case of non-conventional cash flows neither. However, in some cases, further examinations may be recommended. For the analyzed project type, it can be examined whether the relatively high yield in the first year could be a considerable advantage for the company, despite the later loss. Although the methodology for the general solution is not known, there are several possibilities for examinations based on management logic. Below are two variants of the combined method for this.

The critical value of the reinvestment rate

According to the above, the total amount of the first year's yield will leave the project. One of the main questions is as follows: what reinvestment rate is needed for this yield to ensure the return requirement for the original project at the end of the second year? In this

case, a critical profitability rate can be determined that would ensure that the reinvestment project compensates for the loss and fulfills the originally required rate of return.

In this case, the following two projects are analyzed together. One is the original project, and the other one is the one-year investment of the first year's yield.

The cash flow rows are as follows.

- Original project:

$$-E_0; +H_1; -U_2$$

- Reinvestment project:

$$0; -H_1; +H_1(1+r)$$

- The two projects together:

$$-E_0; \quad 0; \quad -U_2 + H_1(1+r)$$

where r = the profitability rate (that is the IRR) of the reinvested first year's yield.

The NFV of the two projects (the return requirement of the original project contains the original required rate of return):

$$NFV = -E_0(1+i)^2 - U_2 + H_1(1+r) \tag{19}$$

The critical profitability rate is where NFV = 0. After rearranging Formula (19):

$$E_0(1+i)^2 + U_2 = H_1(1+r_k) \quad \Big| \; NFV = 0 \tag{20}$$

where r_k = critical profitability rate of the first year's yield (the return requirement of the original project cannot be met if the realizable profit rate is lower than this).

According to (20), the one-year investment and its yield must reimburse the nominal value of the initial investment and its profit requirement for two years and the surplus expenditure at the end of the second year.

The first question for the evaluation: how realistic is the feasibility of critical profitability rate? The second question is whether it is appropriate to use a substantial part of the new investment's profit for loss financing. The answer can be given only by knowing the specific circumstances, numbers and options. (The calculation may also be made according to the after-tax variant of the temporary surplus profit.)

Merging with an independent project

If a company has a project with conventional cash flow, and it can be combined with the examined non-conventional project so that the two projects together as a project combination also will be conventional, then this possibility might be appropriate to examine. It is a very important rule that in this case only the IRR method can be used for analysis. NPV and its traditionally derived indicators are not suitable for comparing the new project and the project combination. (Transforming the NPV to a comparable index number leads to the surplus profitability rate, that is, to the difference between IRR and the required rate of return; seeIllés 2012). In addition, information on aggregate capital needs is also required.

The aggregate capital need is a capital sum that quantifies the sum of capital needed throughout the whole lifetime of the project. For this, the capital tied-up must be determined for each year and then added up. This shows such content as if this whole amount would be invested for one year. The measurement unit is one unit of tied-up capital for one year. (This is a new conception and a new business economics category. For modelling and an example of its calculation see Illés 2019b.)

The course of the calculation: It is necessary to quantify the IRR and aggregate capital needs of the project with originally conventional cash flow, and then the IRR and aggregate capital needs of the merged project.

As decision-making information, the IRR and the aggregate capital needs of the new independent project and the merged project should be compared. The economic impact of the original non-conventional project is favorable if the indicators of the merged project are more favorable than the indicators of the new independent project. That is, the merged project is advantageous if the larger amount of capital results in the higher IRR. Because of the opposite effects (aggregate capital need decreases, the IRR increases), further analysis may be necessary.

NUMERICAL DEMONSTRA-TIONS OF THE REVEALED RELATIONSHIPS

The analyzed non-conventional project example is Project A. That has the following main features.

- Cash flow line: $-20; +125; -125$
- Loss: -20
- The two IRRs are 25% and 400%.

The false interest income as a financial source

The data in Table 2 show how the temporary surplus profits are generated and how the NPV and IRR methods use false interest incomes for financing.

Table 2
Generating the temporary surplus profits and false interest incomes for Project A, at variable interest rates
Measurement unit: unit

PER-CENT	STRUCTURE OF 125 UNITS YIELD AT END OF 1ST YEAR			RESOURCE CALCULATED AT END OF 2ND YEAR		*NFV*	*NPV*
	For capital returns	For interest	Temporary surplus profit	Carried over	False interest income		
	$-E_0$	$-E_0 i$	$\Delta H_s = H_1 - E_0 - E_0 i$	ΔH_s	$\Delta H_s i$	$\Delta H_s + \Delta H_s i - U_2$	$NFV \frac{1}{(1+i)^2}$
15%	20	3	102	102	15.3	117.3-125= -7.7	-5.8
30%	20	6	99	99	29.7	128.7-125= 3.7	2.2
25%	20	5	100	100	25.0	125-125 = 0	0
400%	20	80	25	25	100.0	125-125 = 0	0

In the row of 15%, the 15.3 units of false interest income are not enough to cover the 20-unit loss and the 3-unit profit requirements. The lack is 7.7 units. The present value is a lack of 5.8 units. The conventional method results in the same NPV:

$$NPV_{15\%} = -20 + 125 \times 0.86957 - 125 \times$$
$$\times 0.75614 = -20 + 108.7 - 94.5 = -5.8$$

In the row of 30%, the 29.7 units of false interest income cover the 20-unit loss and the 6-unit profit requirements, and 3.7 units of surplus are also generated. In this case, the NPV is 2.2 units. According to the conventional method, the NPV calculation is as follows:

$$NPV_{30\%} = -20 + 125 \times 0.76923 - 125 \times$$
$$\times 0.59172 = -20 + 96.2 - 74.0 = 2.2$$

At the next two rates of IRRs (25% and 400%), the false interest incomes cover the 20-unit loss and the 5 units and 80 units, respectively, for interest.

Finding the critical reinvestment rate

Following from section 4.1, this method also uses a complementary project. This project is the reinvestment of the yield that exits from Project A at the end of the first year. The cash flow rows and the profit requirements are as follows:

- Original project (Project A): $-20; +125; -125$;
- Reinvestment project: $0; -125; +125(1+r_k)$;
- The two projects together: $-20; -125; +125(1+r_k)$;
- The required rate of return for Project A is 15%.

The critical return rate calculation for the re-invested amount:

$$20 \times 1.3225 + 125 = 125 \times (1 + r_k);$$
$$\frac{151.5}{125} = 1 + r_k = 1.212; \qquad r_k = 0.212$$

The result of the calculation shows that if an investment opportunity of at least 21.2% profitability for a year can be found, the two projects together will meet the entire return requirement. However, for the sake of clarity, it is advisable to review the forming of the profits of each project separately.

- The loss of Project A:
  $$-20 + 125 - 125 = -20.0 \text{ units}$$
- Profit of the reinvestment project if the criterion is met: $0 - 125 + 151.5 = +26.5$ units
- Total nominal profits of the two projects together: +6.5 units.

The results of the additional calculation clarify the very essence of the problem. On the one hand, it is unlikely that an investment opportunity with 21.2% profitability for one year can be found, while the required rate of return of Project A is 15%. On the other hand, if such an option were available, probably it would not be appropriate for a large part of the profit to be absorbed with the loss, meaning that instead of a profit of 26.5 units a profit of 6.5 units would be realized. Probably without Project A, even in the case of borrowing the 125 units, more profits would remain in the company than from the two projects together.

Analysis of a merged project

The merged project method also uses an independent conventional project. This is Project B. The cash flow rows are as follows.

- Project A: -20; +125; -125;
- Project B: -100; +40; -125;
- Merged Project: -120; +165; 0

The main calculated data of Project B and Merged Project are in Table 3.

Table 3
The IRR and the aggregate capital needs

Measurement unit: unit

PROJECT	TOTAL PROFIT (FACE VALUE)	AGGREGATE CAPITAL NEEDS	IRR %
Project B	65	100 + (100 – 6.4) = 193,6	33.6
Merged Project	45	120	37.5

(The calculation of the second year tied-up capital for Project B is as follows: At the end of the first year, there is a yield of 40 units. The content distribution of this: 33.6 units are the profit requirement [100 × 0.336] and the difference [40-33.6 = 6.4 units] is the returned part of the capital. Thus, the tied-up capital for the second year is 100-6.4 = 93.6 units.)

According to the data in Table 3, the profitability of Merged Project is 3.9 percentage points higher than the profitability of Project B. This is a favorable effect. However, the total profit is lowered by the loss of Project A, and the higher profitability applies to a considerably lower principal amount. The first-year yield of Project A is very high, so this results in a significant reduction in capital needs in Merged Project.

In this case, decision-makers have to decide which is more favorable for the company: 33.6% profitability for the capital of 193.6 units or 37.5% profitability for the capital of 120 units. The 33.6 % profitability of project B is excellent. However, the question is whether the critical profitability of the difference in the aggregate capital needs of 73.6 units can be reached. The critical profitability rate calculation:

$$120 \times 0.375 + 73.6\, r_k = 65;$$

$$\text{From this :} \quad r_k = 0.272$$

The critical profitability rate of the difference between the two aggregate capital needs is 27.2 %. If this can be achieved, then the average profitability of the capital sum corresponding to 193.6 units of aggregate capital needs originally required for Project B will not fall below 33.6%. If the profitability for the difference in aggregate capital needs is predictably higher than 27.2%, then the project combination may be advantageous.

In general, the critical profitability of the aggregate capital needs difference depends on the differences in the parameters of the original projects in the merged project.

CONCLUSIONS

In the case of non-conventional cash flows the NPV of loss-making projects may be positive. This is a false indication of business efficiency. Obviously, a loss-making project cannot be profitable. The economic content of the positive NPV calculated for such cases is false. The two IRRs are false as well. The paper has proven that in the case of a special variant of non-conventional projects a false interest income covers the loss, the required profit, and furthermore may show some surplus profit. The discounted amount of surplus of the false interest income gives positive NPV. This alone demonstrates that in the case of non-conventional cash flows, the NPV is not suitable for evaluating projects. This finding differs from today's general academic opinion.

Even the NPV of profitable (not at a loss) variants of non-conventional cash flow may contain false interest income. In the literature special NPV curves can often be seen, which have a section where the increase in the interest rate increases the NPV. When the surplus profit is temporary, then its false interest incomes cannot disappear during discounting. So these are incorporated as the yields of the project, and the shown returns are not real. In these cases, the NPV will also be false. The mathematical proof of the general context of that problem is not resolved yet.

An additional research objective may be to explore whether there is a project type that is profitable and non-conventional where the NPV components cannot include false yield elements.

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Green Economy Sustainability in the UAE and Agrarian Leadership

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SUMMARY

Recently, green economy sustainability has become one of the major studies for science. In particular, developing countries need more infrastructure and technologies in order to improve their green economy. This article attempts to demonstrate a way of the implementing the green economy sustainability concept in the United Arab Emirates through improvement of the green economy based on new technologies, innovations and agrarian leadership.

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Journal of Economic Literature (JEL) codes: O13; Q01; Q56; Q58.
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INTRODUCTION

The most common definition of the green economy is described as being "low carbon, resource-efficient and socially inclusive" and an economy that "results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities" (Luomi 2015; Willis & Kirby 2015). Furthermore, the green economy has become a main concept in international sustainable development programs. One main objective of the green economy is to reduce risks of environmental and ecological shortages, aiming to eventually lead to sustainable development without destroying the environment (Fogarassy 2017).

The concept of the green economy in the Gulf countries is beginning to take shape, and finally can be "underpinned by a complex web of multifaceted, state-led international interactions" (Luomi, 2015). As countries become richer, a heightened interest in the environment comes from two sources: from citizens and from governments (Markandya & Tamborra 2005). For instance, building and construction sector in the Gulf Cooperation Council (GCC) region has already experienced rapid development in some factors such as the economic growth, increasing population and modernization of the country. Furthermore, the world's highest per capita values of energy consumption and environmental emissions belong to the GCC. Therefore, the rapid growth and developing of the building sector which has already taken place in the GCC have negative implications on the region's energy and environmental scenarios.

The main subject of this research is to review the concept of the building sector in the GCC region, focusing on one of the most important countries in this area: the United Arab Emirates (UAE). We compare the green economy indicators of the UAE with Hungary and OECD-EU. This research reveals a relationship among the role of the leadership and the green economy in the UAE why the terms of ongoing investment in the building sector, population and the size of the economy in the UAE has been reached to 79% in the GCC region.

LITERATURE REVIEW

The term "green economy" was first mentioned in a pioneering report for the government of the United Kingdom by a group of leading environmental economists in 1989, entitled "Blueprint for a Green Economy" (Pearce & Barbier 2000). According to sustainable development reports, the economy cannot be separated from the environment. The method and techniques with we are managing the economy may directly and indirectly affect the environment, and the environmental quality has a direct effect on the performance of the economy as well (Pitelis 2011). On the other hand, nowadays the issue of global warming is becoming one of the most significant challenges for scientists. Global warming has already provided some threats to human life such as sea-level rise, food insecurity and increased natural catastrophes like flooding, droughts and wildfires in the global ecosystem.

In this situation, the building and construction sector plays an important role in global warming since it accounts for more than 40% of materials consumption and more than one-third of the total greenhouse gas emissions in the world (Klufallah et al. 2016). The contribution of constructions to global warming is not only usage of resources such as energy and raw materials but also producing waste and harmful atmospheric emissions as well. Moreover, the availability of natural resources, unpolluted air, clean water, adequate food and shelter must be balanced between protection and provision of resources for the growing population. For instance, the electricity demand in the UAE has grown from 38,600 GWh in 2000 to 79,500 GWh in 2009 and then to 90,600 GWh in 2010, with an average annual increase rate of about 8.8% during the last decade (Mokri et al. 2013). Between 2006 and 2011, the annual increase in electricity demand (10.8%) closely followed the trend in annual population growth of 11% during the same period (Mokri et al. 2013). In addition, the population of the UAE reached 1 million in 1980, to 8.4 million in 2010 and 9.77 million in 2019.

The UAE has decided to face the issue of the global warming and provide a specific goal for 2021. The vision for National Agenda 2021 focuses on improving the quality of air, preserving water resources, increasing the contribution of clean energy and implementing green growth plans (National Agenda 2019). The UAE government seeks and implements collaborative and innovative instruments to meet immediate basic needs while ensuring that the long-term needs of the country are also met. Likewise, the National Agenda highlights the importance of the infrastructure and aims for the UAE to be among the best in the world in the quality of airports, ports, road infrastructure, and electricity. A leading telecommunications infrastructure would allow the UAE to become a forerunner in the provision of smart services. For providing and improving this purpose, the UAE has set standards and the state is clearly monitoring its national key performance indicators. Some of the sources such as the data and information are related to the measurement are taken from the Ministry of Climate Change and Environment in coordination with the National Center for Meteorology & Seismology, the Ministry of Climate Change and Environment in coordination with the Federal Competitiveness and Statistics Authority, the Ministry of Energy, the World Economic Forum - Global IT Report, the World Bank, the United Nations, and the Sheikh Zayed Housing Program. The Government of the UAE, both at the federal and Emirate level, is the key driver of sustainability in the UAE. The UAE has aligned itself strategically with the green economy goals, as demonstrated by a speech by Dubai's Ruler and the UAE's Vice President and Prime Minister, Sheikh Mohammed bin Rashid Al Maktoum in January 2012:

> 'Our goal [...] is to build [an] economy that maintains the environment, as well as an environment that supports the growth of the UAE economy. In line with the vision 2021, the UAE seeks to diversify an economy that is based on knowledge and innovation and through which we can provide employment opportunities for our citizens, maintain our natural and environmental resources, and strengthen our competitive position in global markets, especially in the areas of renewable energy, and green economy-related products and technologies.'- (Luomi 2015, p. 15).

International Cooperations of the UAE for Green Economy Sustainability

The UAE cooperates with different institutes and initiatives in order to reach its green growth goals. Here are the most relevant ones, according to Luomi (2015):

Specialized International Institutions IRENA (International Renewable Energy Agency): UAE has already decided to participate in the international relations of the green economy. IRENA is an international agency which is promoted the adoption and sustainable use of renewable energy.

UNEP, World Bank, and UNIDO: The UAE signed technical assistance and cooperation agreements with the international agencies with expertise in green economy-relevant tools and strategies. In March 2014, UNEP and the UAE's Minister of Environment and Water signed an agreement under which UNEP is to assist the UAE in implementing its Green Growth Strategy and the broader Vision 2021 agenda**.**

Global Green Growth Institute: The UAE and Qatar are founding members of the Seoul-based Global Green Growth Institute (GGGI), which aims to support green growth in developing countries as well.

Clean Energy Ministerial: The UAE is an active member of the US-led Clean Energy Ministerial (CEM) initiative, which was launched in 2010.

International Partnership on Mitigation and MRV: The UAE is represented by the Ministry of Finance. In addition, the UAE is the only GCC state that participates, along with three non-oil exporting Arab states (Lebanon, Morocco, and Tunisia) in the International Partnership on Mitigation and MRV (measurement, reporting, and verification), an initiative established at the 2010 Petersberg Climate Dialogue by South Africa, South Korea, and Germany.

Renewables Club: The UAE is also a founding member of an intergovernmental 'Renewables Club', proposed by Germany's Environment Minister in 2013 and by a committee of ministers from 10 countries that represent over 40 per cent of global renewable energy investments.

PAGE: The UAE has also been an active participant in the UNEP-led, multi-agency Partnership for Action on Green Economy (PAGE) initiative, established in 2013. PAGE supports green economy transitions in 30 countries through capacity-building, research and information services aimed at shifting investment patterns and policies. The first PAGE conference was held in Dubai in March 2014.

UN Secretary-General's Initiatives: In addition, the UAE participates via its Ministry of Foreign Affairs Directorate for Energy and Climate Change (DECC), in two sustainable development initiatives launched by former UN Secretary-General Ban Ki-moon: The Sustainable Development Solutions Network (SDSN), and the Sustainable Energy for All initiative (SE4ALL) in 2015.

Dubai Green Economy Partnership: At least one green economy international cooperative initiative has been established by a GCC state. Launched in 2012, Dubai Green Economy Partnership has a multi-stakeholder with a cross-sector partnership in order to promote green growth in the Middle East and supports the growth of green trade, investment, uptake of green technologies, products, and services globally.

ADFD-L'Agence Francaise de Developpement Partnership: In January 2015, during the World Future Energy Summit in Abu Dhabi, the UAE and France announced a funding partnership for promoting renewable energy deployment in developing countries.

Strategic Tracks for Green Growth in the UAE

The UAE has applied some strategies for providing better green economy and meeting green growth goals. The UAE Green Growth Strategy is divided into six main paths covering various aspects of economic, social and political life (National Agenda 2019).

Green Energy: Effectiveness programs and policies for promoting the production and use of renewable energy which is related to technologies as well.

Green Investment: Development of policies for encouraging investments in the green economy and facilitating the production, import, export and re-export of green products and technologies.

Green Cities: Policies and program for urban planning, which includes the special design for improving the environmental efficiency usage of houses and buildings.

Tackling Climate Change Impact: Policies to reduce carbon emissions from industrial and commercial enterprises and also to encourage the industrial sector to use organic agriculture for their activities.

Green Life: Providing special policies and programs for rational usage of water, electricity, natural resources, and for waste recycling projects.

Green Technology: Determining the carbon capture, storage techniques and waste-to-energy technologies that contribute to the economical disposal of waste to meet certain energy needs.

The roadmap of this vision can be divided into three parts: short-term (until 2017), medium-term (until 2021) and long-term (until 2030 and from 2030 onwards). The UAE has already solved the most important challenges to be completed by the end of 2021, such as the introduction of a functional data system and key policies. By 2030, major structural changes in the UAE economy will be achieved, and prospects for 2050 will be expanded to stay on track in pursuit of achieving the green growth strategy vision. Table 1 shows some sectoral indicators in the United Arab Emirates' economy and the growth rate values of the UAE for 2030, when the estimated population in the UAE will be 12.33 million. For comparison, the UAE's total GHG emissions were 128,300 Gg of CO2 equivalent in 2000, a 64% increase in total GHG emissions since 1994 (Jayaraman et al. 2015).

Table 1
Projected Values for the Identified Goals for the Year 2030

Goal by the Year 2030	Value	Growth Rate
GDP growth (G1)	2,725 billion USD	7%
Electricity Consumption (G2)	286,980 GWh	8%
GHG Emissions (G3)	284,739 Gg	2%
Number of Employees (G4)	9452000	3.75%

Source: Jayaraman et al. 2015

In addition, the Gross Domestic Product (GDP) in the United Arab Emirates was 414.18 billion US dollars in 2018. The GDP value of the United Arab Emirates represents 0.67 per cent of the world economy. GDP in the United Arab Emirates averaged is 137.54 USD billion from 1973 until 2018, reaching its peak of 414.18 USD billion in 2018 compared with 2.85 USD billion in 1973. Therefore, Figure 1 presents the GDP of the UAE in billion US dollars.

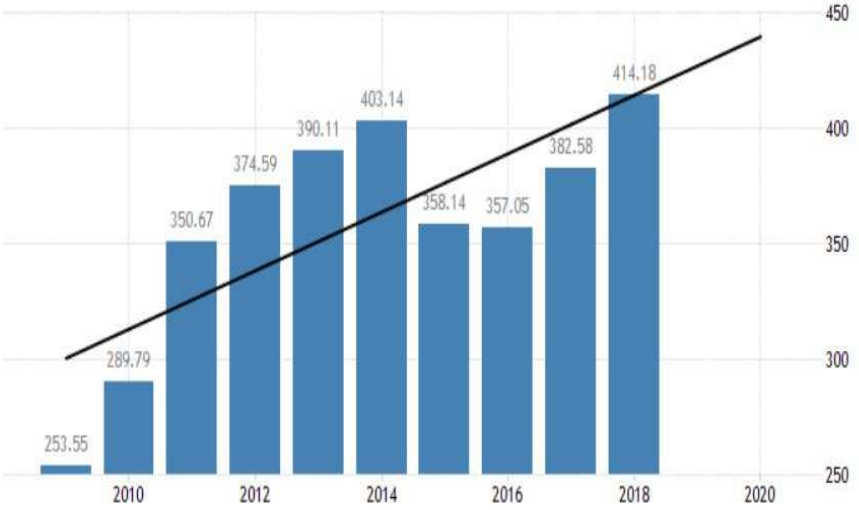


Figure 1.GDP of the UAE, 2009-2018 (in Billion US dollars)

Figure 1 shows that the GDP of the UAE has a positive trend. Abu Dhabi government's strategic development programme and the Mubadala quasi-sovereign wealth fund signed a number of framework agreements with other governments and state-owned entities from South Korea, Jordan, Morocco, France, and Japan.

In 2009, Masdar (also known as Abu Dhabi Future Energy Company) and the Ministry of Knowledge Economy of South Korea signed an MoU (Memorandum of Understanding) on enhanced collaboration in renewable energy and sustainable technologies. In 2013, the Jordanian government and Masdar signed a framework agreement, constituting a public-private partnership, which reportedly allows Jordan to consult on Masdar project viability and delivery-related aspects. In 2013, Masdar also signed a framework agreement with the Moroccan Ministry of Energy, Mines, Water and Environment on cooperation in the area of renewable energy (Luomi 2015). Similarly, in 2013 the UAE, Masdar and France signed a conjoint declaration outlining areas for collaboration between the UAE, Masdar and French companies and institutions, which includes of the technology co-development, exchange of human capital and experiences, and joint research in renewable energy projects and sustainability technologies. In addition, cooperation between Mubadala and the Japan Bank for International Cooperation (JBIC) began with an MoU signed in 2007, and has since continued with JBIC's participation in one of Masdar's technology funds in 2010, and a bilateral meeting between Japan and the UAE in 2013, where the two countries announced their intention to improve collaboration in the area of clean and renewable energy. Masdar has also signed a framework agreement with the European Investment Bank (EIB), dubbed as the financial arm of the EU, to identify opportunities for joint investment in the development and financing of renewable energy projects in the MENA region. The agreement includes a

human capital development element in the form of an internship programme (Luomi 2015). In addition, Masdar has partnered with a number of leading global companies (for example, Siemens) in the sustainable energy industry. According to the company's website, the company has ongoing projects in 17 countries all over the world. In the next section the case of Masdar city will be presented briefly.

The Case of Masdar City

Masdar City is located in a desert area near Abu Dhabi airport within 17 kilometres in the southern-east part of Abu Dhabi (Manghnani & Bajaj 2014). It has been under construction since 2007. Masdar City is intended to be one of the world's first completely sustainable communities, combining renewable energy sources and efficient resource usage with traditional Arabian design and spectacular architectural elements (Manghnani & Bajaj 2014). In addition, this city is raised on a 23-foot-high concrete base to maximize its exposure to cooling winds and decrease the need for air conditioning (Manghnani & Bajaj 2014).. Petrol-powered vehicles will not be allowed on the narrow streets of the city, about 2, 59 square km in area, but a fleet of computer-driven electric cars will navigate a complex of tunnels under the concrete base (Manghnani & Bajaj 2014). Masdar City worth $22 billion for its construction for government and independent investors (Manghnani & Bajaj 2014). Simon Joss from the University of Westminster includes Masdar among a collection of global projects, appropriately named "eco-cities", that represents the culmination of several decades of theoretical research into sustainable development (Manghnani & Bajaj 2014). All the buildings in Masdar city are designed in order tothe usage of natural light, low-energy lighting usage, and energy-efficient appliances. Through these measures, Masdar City is projected to need only a quarter of the energy supply required by an ordinary city with the same population. Water consumption will be reduced by installing high-efficiency fixtures and appliances and incorporating an advanced network of meters that not only notifies consumers of their usage levels but also determines the location of water supply throughout the city (Madichie 2011). In addition, the city's landscape needs low water requirements and will be irrigated with wastewater; Masdar's total water demand is planned to be less than half the amount that a regular community demands. The infographic in Figure 2 gives a better understanding of the prospective characteristics of Masdar city respectively.

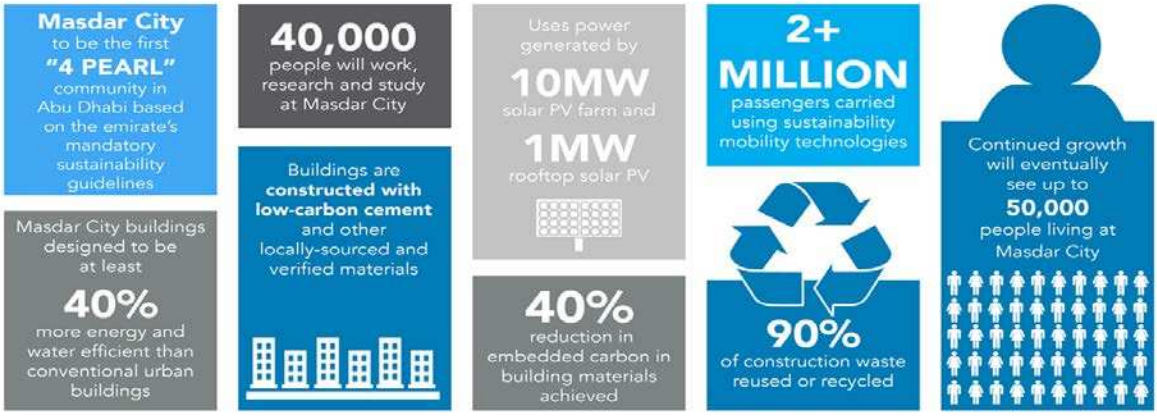


Figure 2. Prospective characteristics of Masdar City (Source: Masdar homepage)

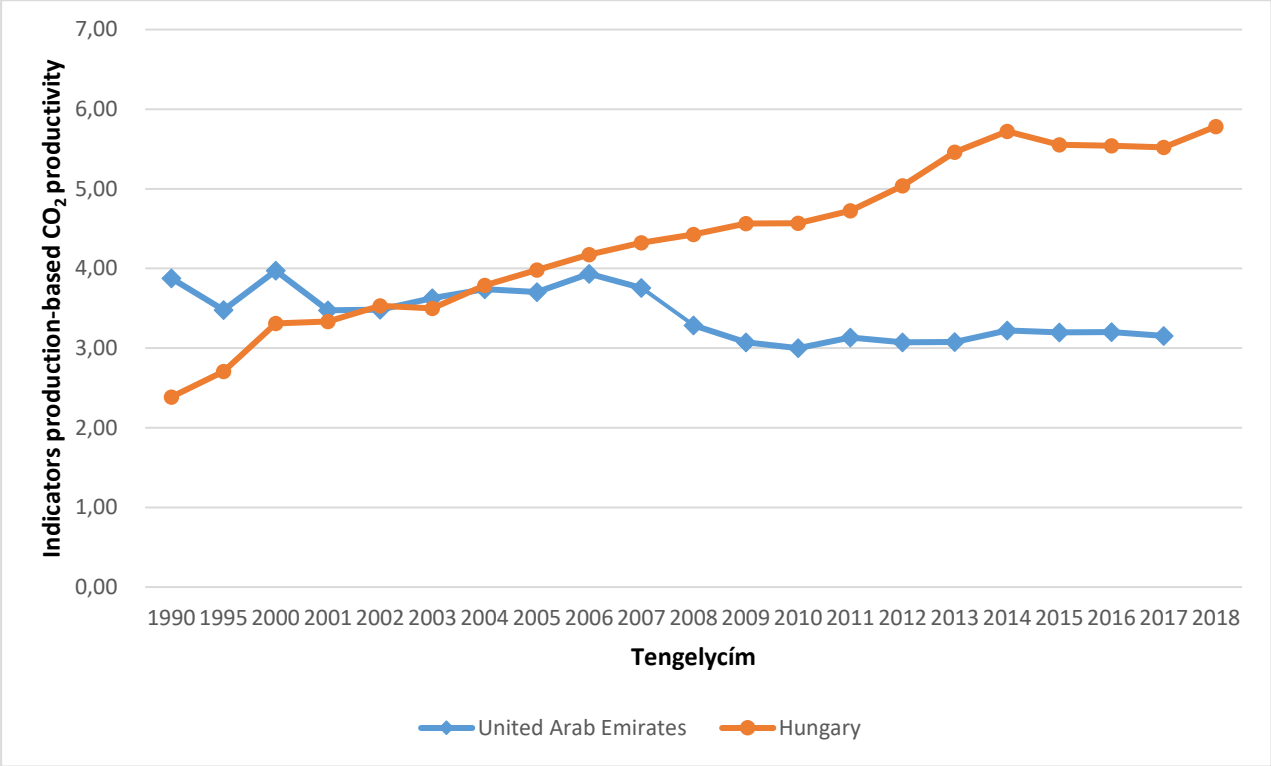
Masdar City's power infrastructure features a range of renewable energy technologies, such as usage of the photovoltaic plants (PV), a concentrating solar thermal power plant (CSP), evacuated thermal tube collectors, and a waste-to-energy plant (Nader 2009).

METHODOLOGY

In this research data are collected from both primary and secondary sources. In addition, to achieve research objective qualitative and quantitative research methods were used. We would like to use the special formula (Szita Tóthné 2014) for our calculation of the green growth indicators based on the OECD report on sustainability (retrieved from https://stats.oecd.org) in order to reach concrete results in this study.

UAE Green Growth Indicators

Green Growth indicates that economic growth is shaped by usage of the natural resources in a sustainable manner. In addition, the Green Growth concept consists of environmental and resource productivity; natural asset base; environmental dimension of quality of life; economic opportunity and policy responses; socio-economic context indicators. Among the above-mentioned Green Growth features, the environmental and resource productivity indicators of the UAE, Hungary and OECD Europe were selected for use in calculations. Figure 3 shows a comparison of production-based CO_2 productivity (GDP per unit of energy-related CO_2 emissions) in the UAE and in Hungary.



Source: Own edition

Figure 3. Changes in production-based CO_2 productivity of the UAE, Hungary (OECD 2019)

As shown in Figure 3, the lowest amount of the UAE in production based CO_2 was 3 (USD/kg) in 2010. Meanwhile, the lowest amount for Hungary was 2.39 in 1990. In 2017 this amount reached 3.15 in the UAE and 5.52 in Hungary. According to the OECD database and line chart, the UAE has a fluctuating trendline from 1990 to 2008, afterwards, it shows a steady trendline in comparison with Hungary which shows a positive trend.

Based on formula below we calculated the environmental and resources productivity of the green growth indicators concerning the UAE, Hungary and OECD Europe (Szita Tóthné 2014).This formula includes two main steps:

1. The first step is the calculation of the various countries' indicator indices with the help of the minimum-maximum statistics model, based on the use of the OECD green growth indicators: Ii = (Xi – Xmin)/(Xmax – Xmin), where Ii is the index of the various indicators (1–n);

- Xi: the indicator under review;
- Xmin: the minimum value of the indicator under review in the OECD countries in the given year;
- Xmax: the maximum value of the indicator under review in the OECD countries in the given year.

This step also removes dimensions at the same time and produces a ranking order of the OECD countries in terms of the indicator concerned, on a scale of zero to one.

2. After that, taking the average of the various indicator indices, we attain to the green index of each country:

$$ZI = \sum_{i=1}^{n} li/n$$

According to our calculations, results show that the green index on the environmental and resources productivity indicators in OECD-EU (ZI=0.53) is higher than the UAE (ZI=0.51) and Hungary (ZI=0.22) in 2017 but the UAE is higher than Hungary.

Table 2
OECD-EU, Hungary and the UAE countries ranking in terms of the Green Index, 2017

Year			**2017**		
Country			**OECD-EU**	**UAE**	**HUNGARY**
Variable	Min	Max	**Ii**		
Production-based CO_2 productivity, GDP per unit of energy-related CO_2 emissions	3.15	5.88	1.00	0.00	0.87
Production-based CO_2 intensity, energy-related CO_2 per capita	4.71	20.71	0.09	1.00	0.00
Production-based CO_2emissions, index 2000=100	85.93	246.10	0.03	1.00	0.00
Production-based CO_2 emissions	64.40	1,152.60	1.00	0.04	0.00
		ZI	0.53	0.51	0.22

Source: own calculations based on OECD Green Growth Indicators (2019)

According to Szita Tothne et al. (2019), accepting a new idea such as the green economy among diverse cultures is not easy when each person has their own values, attitudes and behaviour in the society. On the other hand, the main role of management is planning, controlling and monitoring the environment of the society. Furthermore, the implementation of the new idea does not belong to the management in any society. Because of this, we cannot skip the role of the leadership for changing the mindset of mankind in the global scene. Consequently, in the next section of our research, we explain the role of the leadership in the UAE and which type of leadership could be suitable for providing green economy sustainability in the UAE.

Religion of UAE and its benefits to leadership

Culture, although not entirely ignored in economics, has never been given a rigorous attention (DiMaggio1990; Guiso et al. 2006; Fernandez 2008; Kwanjai & den Hertog 2009).There are several studies which are related to the improvement of the personal and organizational success of leaders in order to guide their followers in a green economy have already published. For example in the Islamic culture, the perception of preserving natural resources is rooted in the Holy Book of Muslims (the Quran). The significant principles of environmental conservation are included in the Holy Quran and it condemns environmental damage and mismanagement of natural resources. According to the Holy Quran: "Eat and drink: but be not excessive. Indeed, God does not like those who commit excess" (Surah Al-A'raf 7:31; Al-An'am 6:141). In the Holy Quran, it is also stressed that "the wasteful people are brothers of the devils, and ever has Satan been to his Lord ungrateful" (Surah Al-Isra' 17:27). According to these statements, the conservation of all-natural resources from misusage is the obligatory duty of everyone. In fact, the Holy Quran and Islamic law can be a significant factor and play an important role in encouraging sustainable development in Islamic countries (Vaghefi et al. 2016). In addition, there is a critical need and requirement for Islamic countries to be "greener" in management and business due to the equitable law in Islam, whereby the correlation between greenness and the equitable law is very close. Islam & Islam (2011) emphasized the need for leadership in Islamic countries to successfully implement green management. Without appropriate management, great ideas cannot be implemented for the purpose of achieving a green economy. They believe that Muslim countries would be more developed if their people led their lives based on the principles of Islam. For clarification and better understanding about leadership in the next part we present the common leadership skill.

Common Leadership Skills

Asif (2016) believes that any organization needs a direction from its leaders. People want the ability to trust their leaders because trust is the social glue that brings commitment. They also want leaders who are optimistic and have a clear vision of the future. In addition, they want action and results from their leaders. According to

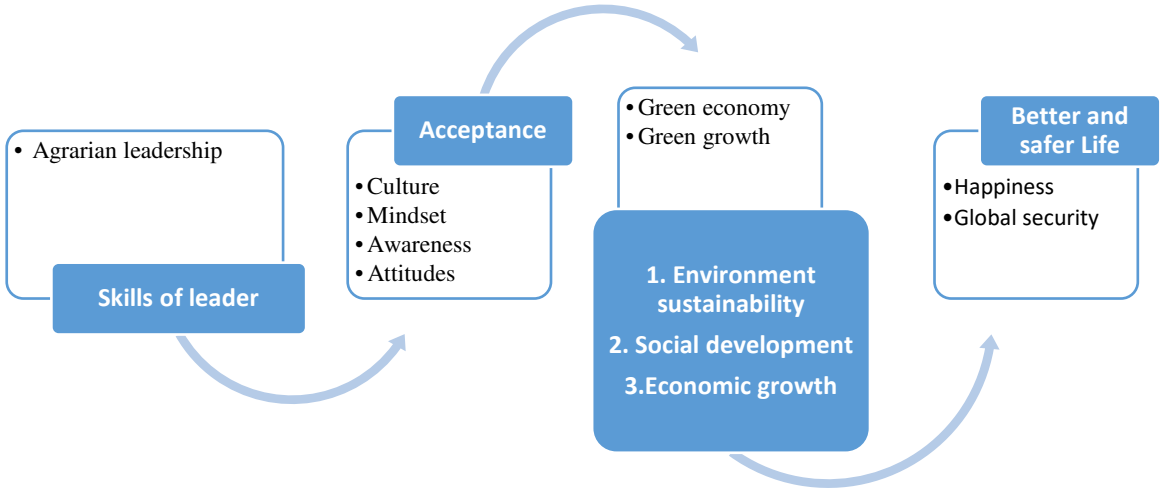
Asif (2016), the basic ingredients of leadership are the following:

- Guiding vision professionally and personally. The leader has a clear idea of what he/she wants.
- The second ingredient is passion. The leaders love what they are doing and are enthusiastic about it.
- The next ingredient is integrity. The essential parts being: self-knowledge, sincerity, and maturity.

Leadership in the Green Economy

Green & McCann (2011) argue that agrarian leadership represents a new contextual model in dealing with leadership in a green economy. Agrarian leadership is defined as a contextual influence that has an impact on subordinates' attitudes and performance by leaders who are both value and results-driven (Green 2010). In agrarian leadership managers consider their followers as crucial part of the socio-technical system and the technology does not have any part in driving the value system for society. Before the Industrial Revolution, society evolved on the land and through labour, and it was simpler than nowadays, especially for the leader who was tended to lead the society as an agrarian leader. Therefore, establishing good benchmarking processes of leadership is become important. Green & McCann (2011) argue the merits of benchmarking as a continuous process of identifying, learning, and implementing best practices to optimize opportunities to gain competitive advantage.

In our opinion, based on the ARENA report concerning the green growth indicators, all of the factors have integrity with each other, afterwards, we need the role of the leadership in order to improve our attitudes about green growth indicators (Arena annual report 2019). Figure 4 illustrates the framework of the integration among the indicators.



Source: Own edition

Figure 4. Effectiveness Role of the Leadership to Improve Cultural Awareness Concerning the Benefit of a Green Economy

CONCLUSION

The population in the United Arab Emirates has been already increasing rapidly due to immigration. Therefore, the UAE started implementing programmes in order to create sustainable cities to provide its citizens with a better future with a higher quality of life while preserving its environment. On the other hand, without technological changes and innovations, a full implementation of the green economy is not feasible. In fact, some countries do not have all the technologies, finance and resources which are required for the transition to the green economy. It is important that the UAE's green strategy has the highest level of political support, has been approved by the Cabinet and is designed by the requirements of the federation-level development vision for 2021. This new economic revolution will be started with a new, positive outlook applying agrarian leadership. There are various types of leadership in any situation (Mitchell 2008). In the green economy, the best type of leadership would be the agrarian leadership due to how it shapes the conservation of the ecosystem and environment. Agrarian leadership has the ability to apply green economy sustainability in the society too. At the same time without implementation the green economy transition is not feasible. The revitalized global partnership will facilitate an intensive global engagement in support of the implementation of all goals and targets while bringing governments, civil,

society, the private sector, the United Nations Organizations and other actors in mobilizing all available resources together (Hong 2017). Finally, the limitations of our research are that to our results are based on findings of other researchers and can be applied only in the local area, which limits the generalization of the results. Furthermore, we suggest that further research can be applied in other geographical areas.

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Rethinking Classical Precondition Formulas of Changes

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SUMMARY

Some authors have expressed the most important preconditions of change success in different formulas. All formulas but one comprise a threshold value below which change cannot happen. The one without a threshold presumes proportionality between some factors and change success. These two approaches seemingly contradict each other. This paper resolves the contradiction by proposing a new model that comprises both a threshold value and a modified proportional relation that becomes valid beyond the threshold value. The conventional dimension of the 'result' is modified from 'change' to 'attitude towards change' because attitude in itself cannot guarantee that the planned change actually happens.

Keywords: change management; change success; change equation; change formula; attitude towards change
Journal of Economic Literature (JEL) code: M10
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INTRODUCTION

The purpose of the complex and multidisciplinary field of managing organisational changes cannot be anything else than wanting to make changes (more) successful. "Yet, according to optimistic estimates, only 30% to 40% of the change efforts organisations initiate attain their intended objectives." (Kim et al. 2011) Most such estimates put the probable success rate of change efforts around 30–35% (Beer & Nohria 2000; Ewenstein et al. 2015; Rogiest et al. 2015; Sirkin et al. 2005; Worley & Mohrman, 2014), while others (Al-Haddad & Kotnour 2015) claim it is even less than 30%.

Success or failure of change efforts can be examined from two different points of view: "(1) *criteria* of success and failure of change projects (evaluation criteria); and (2) *factors* of success and failure of change projects (reasons, causes)." et al. 2006) This paper focuses on the second type: on the preconditions of successful changes.

These preconditions, which have to come into existence before and during the change projects for their eventual success, are obviously essential parts of the change management body of knowledge. They have been formulated in several different forms by different authors (e.g., Beckhard, 1969, 1975; Beckhard & Harris, 1977, 1987; Buchanan & Boddy, 1992; Carnall, 2007; Dannemiller & Jacobs, 1992; Koller, 2014a, 2014b; Latham, 2015) following diverging ways of thinking. The first version was invented by a management consultant, David Gleicher of Arthur D. Little, the first-ever management consulting firm (Arthur D. Little, 2020), as an effective tool for focusing the attention of the client company's management on the most important change success factors. His formula made it easier for his counselling clients to structure and understand what had been a "fuzzy mess" before. Inspired by Gleicher, some other change management experts invented different versions of this change equation. These formulas proved to be useful in practice and became popular: some of them can be found in several change management course materials, and are used in consultancy, as well. But there are contradictions between the different versions, and even inconsistencies within the particular formulas themselves. The vital importance of knowing change success preconditions, the popularity of these formulas, their embarrassing inconsistencies, and the divergence between the different versions make the topic important and motivated us to examine these formulas more closely.

The aim of this conceptual paper is to suggest some new, critical thoughts for consideration, challenging the current dialogue regarding the necessary (pre)conditions of change success through a critical review of already existing precondition formulas and the synthesis of a new model that can resolve currently existing contradictions and thus help better management of

organisational change efforts. This paper presents comparisons, evaluations, and proposed improvements of the existing precondition formulas with the aim of contributing to the ever-present, multidisciplinary dialogue. In order to solve the contradiction between the two basic types of the different formulas (those with or without a threshold value), we propose a synthesised model with two different modified formulas, which are valid in two different domains of the impact of change efforts (one above and one below the threshold value).

The article is structured as follows: First, the already existing precondition formulas are reviewed and then discussed with special attention to the discoverable inconsistencies and potential contradictions. Then the suggested precondition formula is introduced through a physical analogy. The conclusions of this conceptual article highlight the real-life benefits of the suggested new approach.

LITERATURE REVIEW

There are several formulated preconditions that must be provided for selling change proposals and implementing those changes successfully. Neither of the formulas is dimensionally consistent (e.g. one of them compares energy to cost), but it is not their purpose to be so. *These are not real mathematical formulas, they do not show any relationships between measurable (e.g., economic) quantities, they express only qualitative concepts.* These formulas are not invented for measurements and calculations; they just help focus attention on the most important factors of change success in practice. They are qualitative, not quantitative formulas, simple but effective practical change management tools.

Different authors have proposed different formulas, and sometimes the same author's formula is cited slightly differently by others. The history of most of these formulas is clarified and documented by Koller (2014a, 2014b) and Latham (2015), but there are some other formulas that are not mentioned in the sources cited above. Continuing their formula history is out of the scope of this paper; the aim is to review, comment on, and compare the different versions found in the literature, and after that to propose a new advanced formula with an explanation of its advantages.

The first change formula originated from management consultancy as a useful practical tool for making the most important success factors of major changes clear for clients. Preconditions of successful changes were expressed for the very first time in the form of a symbolic inequality by David Gleicher in the 1960s. He did not publish it himself, but others did, either citing him (Beckhard, 1975; Beckhard & Harris, 1977; Buchanan & Boddy, 1992) or without citation (Beckhard & Harris, 1987). Gleicher's formula is the following:

$$C = A \times B \times D > X \qquad (1)$$

where C: change,
A: level of dissatisfaction with the status quo,
B: clear or understood desired state,
D: practical first steps toward a desired state,
X: 'cost' of changing.

The 'cost' can mean much more than money: it can comprise any kind of sacrifice the implementers must make for the success of the change effort. (For the validation of this formula in practice see Čudanov et al., 2019.)

Beer (1980) proposed the same formula with a practical modification: he used the first letters of the words in the formula, reminding us of the whole words behind the letters.

$$Ch = D \times M \times P > C \qquad (2)$$

where *Ch:* Change,
D: Dissatisfaction with the status quo,
M: a new Model for managing or organising,
P: a planned Process for managing change,
C: Cost of change to individuals and groups.

Beer attributed this formula to Alan Burnes of Corning Glass Works, but remarked that he had found a similar one in Beckhard and Harris' (1977) work, who attributed it to David Gleicher.

Buchanan and Boddy (1992) cited Gleicher's formula with some modifications. They also changed the characters to the first letters of the words in the formula but in a different way than Beer (1980) did: not only the names but also the order of the 'multiplicands' is different from Gleicher's version and Beer's version. The most important difference is that they omitted the equation on the left side and used only the inequality on the right side:

$$K \times D \times V > C \qquad (3)$$

where *K:* Knowledge of first practical steps,
D: Dissatisfaction with the status quo,
V: the desirable Vision of the future,
C: the Cost (material and psychological) of movement.

Dannemiller and Jacobs (1992) also used the first letters of the words in the formula, though in a slightly different way than Buchanan and Boddy. They modified the content of the formula as well: there is resistance on the right side of the inequality instead of cost:

$$D \times V \times F > R \qquad (4)$$

where *D:* Dissatisfaction with how things are now,
V: Vision of what is possible,
F: First, concrete steps that can be taken towards the vision,
R: Resistance.

Purser and Griffin (2008) combined Dannemiller's and Jacobs's version (4) with Gleicher's original formula (1): there is resistance on the right side of the

inequality as in formula (4) and an equation with change on the left side as in formula (1):

$$Change = (Dissatisfaction)(Vision)(First\ Steps) > Resistance \quad (5)$$

where the multiplicands are:

Dissatisfaction: dissatisfaction with the present situation,

Vision: a compelling vision of how the change will create a better future,

First Steps: the first steps for reaching the vision.

Carnall (2007) wrote a similar formula to Gleicher's original one (without referring to any source). The novelty of this version is that instead of change, it has 'energy for change' on its left side:

$$EC = A \times B \times D \quad (6)$$

$$EC > Z \quad (7)$$

where *EC:* energy for change,
A: felt dissatisfaction with the present situation,
B: level of knowledge of the practical steps forward,
D: shared vision,
Z: perceived cost of making change.

Pettigrew also created a formula of this kind (cited by Buchanan & Boddy, 1992, referring to Pettigrew's name but no particular publication):

$$C \times V \times L > I \quad (8)$$

where *C:* significant pressures and arguments for, change in the inner and outer Context of the organisation
V: the presence of Visionary leadership,
L: perceived Legitimacy of change proposals,
I: the organisational Inertia sustained by the current dominant ideology.

The letter *C* used by Pettigrew essentially expresses the same as 'dissatisfaction with the present state' does in the other formulas above. The first practical steps are missing from this version, but it has a new component instead: legitimacy. On the right side of the inequality, there is inertia instead of cost or resistance.

In a new version of the precondition formulas, Latham (2015) proposed four components instead of the traditional three:

$$D \times V \times FS \times B > R \quad (9)$$

where *D:* Dissatisfaction with status quo,
V: compelling Vision,
FS: First Steps,
B: Believability,
R: Resistance to change.

Here the new component is *B*, believability, which has three key elements: alignment and integration, sustainability, and logic. Alignment and integration is the degree to which the other three components are consistent and working together. Sustainability is the degree to which the change can be institutionalised and remain effective in the long run. Logic is the degree to which the first action steps make sense, given the gap between the status quo and the vision.

Bancroft (1992) cited a formula attributed to Beckhard (1969), which differs from all of the others from an important point of view:

$$C = (A \times B \times D)/X \quad (10)$$

where *C:* change,
A: dissatisfaction with the status quo,
B: vision of the future,
D: clear action steps,
X: cost.

While all the previously cited formulas have a threshold value, i.e., they are all inequalities, this one does not comprise any such threshold. This is a substantial conceptual difference: the threshold models suggest that there is no hope of accomplishing any change below a certain threshold value, while according to Beckhard's version, partial changes can still be possible if the whole change concept is not accepted in its entirety.

There are other preconditions of change success as well, not only the formulated ones. Formulas of this type comprise factors eminently influencing the attitudes of the stakeholders of the change, which are necessary but not sufficient preconditions of change success. There are three groups of enablers of successful changes: knowledge and skills, resources, and commitment (Al-Haddad & Kotnour, 2015). The attitudinal preconditions expressed by the formulas presented above refer to this commitment enabler, but the other two types of enablers are also needed for a successful change effort.

DISCUSSION OF THE FORMULAS KNOWN FROM THE LITERATURE

These change success formulas are not real mathematical ones. Their components are not quantifiable, and the dimensions of the two sides of the inequalities are either different (e.g., energy vs cost in Carnall's formula (7)) or cannot be determined at all. Actually, they express qualitative relationships, not quantitative ones. Even so, their important attribute is that they all comprise a kind of multiplication: if any multiplicand is zero, then the result of the multiplication will be zero, irrespective of the magnitude of the other multiplicands, that is, the change effort has a poor chance of success.

There is an important difference between Formula (10) attributed to Beckhard by Bancroft (1992) and all the other versions: each of the other ones comprises some kind of threshold value below which the change cannot begin. In Beckhard's formula (10) there is not any kind of threshold value: according to that version, a change, bigger or smaller, always takes place in proportion to the magnitude of the ratio on the right side of the equation. These two kinds of thought seemingly contradict each other, but we propose a solution to resolve this contradiction in an improved model.

In Gleicher's original formula (1) and in Purser and Griffin's (2008) version (5), the idea of combining an equation and an inequality into one formula, namely

putting 'change' onto the left side of an equation when there is an inequality on the right side of it with a threshold value, is questionable. If the magnitude of the product is higher than zero but lower than the cost as a threshold value, then the two sides of the formula contradict each other: the equation promises the possibility of change, while the inequality shows the impossibility of it. Two out of the six authors of the different versions with threshold values (Bancroft (1992) and Beer (1980)) left this equation unaltered with change on the left side of formulas (2) and (10). Carnall (2007) replaced 'change' with 'energy of the change' in formulas (6) and (7), while the other four authors simply omitted the equation. Carnall's 'energy of the change' resolves the contradiction because it does not promise that change will happen below the threshold value. Therefore, we prefer either Carnall's modified left side or the omission of the left side to Gleicher's original version.

Latham's (2015) additions in Formula (9), the three components of believability (namely alignment and integration, sustainability, and logic), are all debatable. The first one, alignment and integration, means the consistency and co-working of the three classical multiplicands. But such classical multiplicands' attributives such as 'clear', 'understood', 'desirable', or 'shared' mean that people think that the planned new state would be better than the present state, in other words, the plan is consistent with the assessment of the situation. And such attributes as 'possible', or 'can be taken' mean that the planned action steps are consistent with both the present and the planned new state. The authors of the other formulas obviously considered the multiplication as a whole, with consistent components. Any multiplicand that is inconsistent with the others could not be called 'desirable' or 'possible'. The second addition, sustainability, is an evidently implicated attribute of the (desired, desirable, possible, shared, compelling) vision, not a separate factor. And the last one, logic, means whether the first steps make sense or not. But the classic multiplicand, called 'first steps toward a desired state', or 'a planned process for managing change' etc. obviously means the existence of proper plans and first steps, not improper ones. Therefore, these additions are unnecessary because they are obviously inherent in the other multiplicands.

Dannemiller and Jacobs (1992), Purser and Griffin (2008), and Latham (2015) put resistance to the right side of the inequality in Formulas (4), (5) and (9), respectively. We disagree with presuming that there is resistance to every change initiative; reactions to changes can be neutral or supportive as well. Change sponsors and agents have to sell the change proposal to those who are affected by the change; they have to win the stakeholders to their cause. Surpassing resistance can be a part of this process, but it is not the same thing. People affected by the change do not necessarily automatically resist any kind of change – their reactions can be neutral, or they may welcome and enthusiastically support the change initiative. On the full spectrum of reactions to change, see, for example, Choi (2011); Conner (1993); Giangreco and Peccei (2005); Oreg et al. (2011); Rafferty et al. (2012); or Wittig (2012).

We agree with both of Pettigrew's modifications in Formula (8): 1) inserting legitimacy into the factors of the production, and 2) writing inertia on the right-hand side of the inequality. Legitimacy refers to the opinions of the target persons or groups of the change about the appropriateness of the way the change is managed, i.e., do they accept the way sponsors and agents initiate and implement the change or not.

As for inertia, every organisation has a certain amount of inertia that has to be overcome when the organisation wants to change its direction. Inertia plays a similar role in organisations as the keel in boats: without a keel, the boat would be nimbler but would also become unstable; a massive wave could overturn it easily. The keel makes changes in the direction more difficult, but it stabilises the boat at the same time, which is vitally important. An organisation's inertia does the same. Either too low or too high inertia can cause trouble. Too low inertia means something like this: "Every few months, our senior managers find a new religion. One time it was quality, another it was customer service, another it was flattening the organisation. We just hold our breath until they get over it and things get back to normal" (Hammer, 1990). Too high inertia can be characterised by the famous saying of Jack Welch: "If the rate of change on the outside exceeds the rate of change on the inside, the end is near." A normal amount of inertia of a healthy organisation has to be and can be overcome if necessary.

On the right side of the inequality, we prefer inertia not only to resistance (see the reasoning above), but to cost as well. Cost always means something negative, a kind of loss or sacrifice, which has to be minimised, in an ideal case nullified. But inertia has a very important benefit for the organisation: stability, so it must not be reduced beyond measure.

In addition, inertia's meaning is broader than just the cost of a particular change. Inertia manifests itself in particular changes but does not depend only on the actual change, but also on the organisation's capability to change in general. This capability evolves during the organisation's life also as a result of the impacts of past events, not only due to the actual change. The organisation's history always has to be taken into account when a change strategy is planned (e.g., Endsley, 1994; Nadler, 1988; Nadler & Tushman, 1979, 1980, 1997; Tushman & Nadler, 1986). There are several theories of (different aspects of) the organisations' capability to change, given different labels, for example, change capacity (Buono & Kerber, 2010), ever-changing organisation (Pieters & Young, 1999), nimbleness (Conner, 1998) or resilience (Conner, 1993; Välikangas, 2010). Taking account only the cost of the actual change but not the organisation's capability to change in general would be a narrow-minded

approach; therefore, using inertia as the threshold value is a more effective concept than using cost.

THE PROPOSED PRECONDITION FORMULA

The contradiction between the approaches with and without threshold values can be resolved. Since we found a physical analogy by Lind and Sulek (1994) useful in understanding the nature of organisational changes, we decided to use a similar one: the analogy of the current-voltage characteristic, or I–V graph of semiconductor diodes (for an accessible introduction see, e.g., Kuphaldt, 2016)—confined to its forward bias behaviour for the sake of simplicity. Incidentally, this analogy could be referred to as the backward bias behaviour as well, which has a different physical explanation, but this difference would be unimportant from our viewpoint. The forward bias region was chosen in order to avoid using the technical term 'breakdown' (when the diode begins to conduct current in the backward bias region) because it could cause negative associations like 'resistance is harmful and have to be repressed'. We do not want to support such falsely preconceived ideas with an infelicitous term unintentionally. The technical terms of 'threshold voltage', 'cut-in voltage', or 'knee voltage' used for describing the diode's behaviour in the forward bias region cannot cause such negative associations.

In the forward direction only a very little (practically no amount of) current flows until a threshold (or cut-in, or knee) voltage is reached. If the voltage placed across the diode becomes greater than the threshold voltage, then the diode 'turns on', i.e. current will flow through it, limited only by the (very small) resistance of the diode's material.

We perceive an analogy between reactions to change and the behaviour of semiconductor diodes. Change formulas comprising threshold values describe a phenomenon similar to the threshold voltage of the diode. In the initial stage of change efforts, called 'unfreezing' by Lewin (1947), below the threshold value, just as 'current will not flow', change cannot be set into motion. Above the threshold value 'current will flow', Lewin's 'moving' stage of the change can begin, and Beckhard's formula without any threshold value becomes valid. Thus, the two approaches, the one with a threshold value and the other without it, do not necessarily contradict but can complement each other. The proposed formula integrates the two approaches.

Three questions have to be answered in order to assemble a new formula using the diode analogy:

- What multiplicands should comprise the multiplication?
- What should be the 'result' of this multiplication?
- What should be the threshold value?

The first question is: what components should comprise the improved formula's multiplication? Gleicher's three classical factors in Formula (1), dissatisfaction with the status quo, compelling vision, and (first) steps, are included in almost all known formulas, except for Pettigrew's version in Formula (8). Only the wordings differ slightly, but they all mean the same. We consider these three factors vitally important, so we applied all of them in our suggested formula. As was shown above, Pettigrew (cited by Buchanan & Boddy, 1992) added 'legitimacy' to the three classical factors, which we also consider very important. Therefore, it is also used in the suggested new formula, but not as a separate multiplicand because it is an attribute of the steps forward only, it does not refer to the whole multiplication. Legitimacy was inserted into the wording of the practical steps instead. This way, the phrasings of the three multiplicands can comprise every important attribute taken from the different versions cited above.

The second question is: what kind of 'result' should be chosen for the product of this multiplication? Some of the known formulas equate it with change or with the 'energy for change', while some versions do not give a name to this product. We chose the 'energy for change' because – as said earlier – the magnitude of change depends not only on the effect of the change agent's efforts on the attitudes of the change targets but also on several other factors, while these formulas apply only to the attitudinal aspect. Therefore, the proposed multiplication and its product are the following:

$$E = D \times V \times S \qquad (11)$$

where
- E: Energy for change,
- D: clear and shared Dissatisfaction with the status quo,
- V: clear and shared Vision of the desired state,
- S: clear, shared, and legitimate practical Steps forward.

As was mentioned above, the phrasings of the multiplicands in the new version express factors that were additional multiplicands in some other versions.

The third question is: what should be considered the threshold value, i.e., what is the analogy of the diode's knee voltage? We have already reasoned why we prefer Pettigrew's 'inertia' to the terms 'resistance' or 'cost' for being the threshold value. We find inertia a very expressive and useful concept, so we accept and use it as the threshold value. True, if energy is compared with inertia, then the formula becomes dimensionally inconsistent—as are each of tthose taken from the literature. However, we do not consider it a significant shortcoming because, as we have already clarified, these formulas are not real mathematical ones; they express qualitative relationships regardless of the dimensions. (Incidentally, this dimensional inconsistency could be easily remediated by using 'energy needed to overcome inertia' instead of just 'inertia', but it is needless to try being dimensionally consistent when the multiplicands have no measurable physical dimensions at all. As

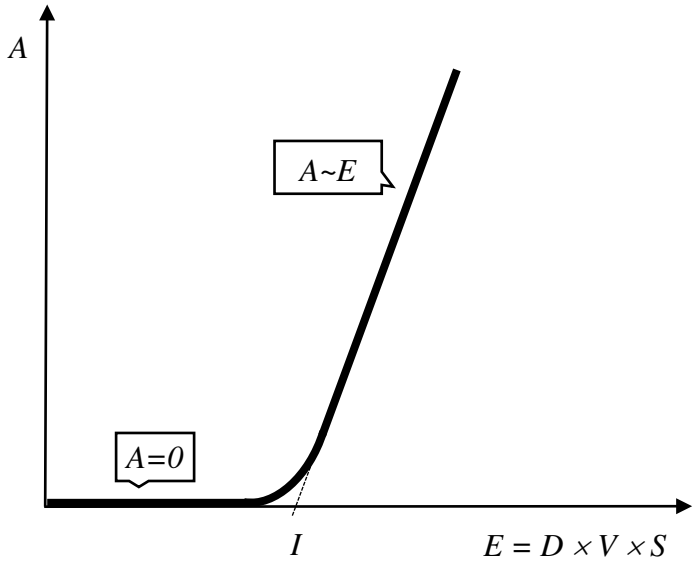

Figure 1. Graphic representation of the proposed formula

Aristotle said: 'It is the mark of an instructed mind to rest content with that degree of precision which the nature of the subject permits and not to seek exactness where only approximation of the truth is possible.') Therefore, the following inequalities can be used:

$$\text{if } E < I \text{ then } A = 0 \qquad (12)$$

$$\text{if } E \geq I \text{ then } A \sim E \qquad (13)$$

where E: Energy for change,
I: organisational Inertia,
A: favourable Attitude towards change,
~: proportionality.

Figure 1 shows a graphic representation of the formula that was explained above using the analogy of the I–V graph of semiconductor diodes in the forward bias region.

It is important that the vertical axis of Figure 1 represents *attitude towards the change,* not change. The concept of attitude is based on the theory described in social psychology by Katz and Scotland (1959). Attitude has three components: affective (or emotional), cognitive, and conative (or behavioural) ones. The affective dimension contains the emotions, feelings of the individuals. The cognitive dimension refers to what individuals think about something, how they assess it. The conative dimension tells about what kind of intentions drive their actions. "Behavioural responses are outcomes of the cognitive and emotional reactions" (Smollan, 2006: 143). But actual actions are influenced not only by intention: some external non-volitional factors can also modify the actors' intended behaviour, that is, some circumstances can force them to act in a different way than they would have intended to act without those constraints. There can be several practical obstacles in the way of carrying out a change initiative. Each multiplicand in every formula influences the intentions (via the affective and cognitive components); none of them refers to other circumstances that determine the feasibility of the intended actions. It would be just a naive illusion to think that a positive attitude and a strong intention to change guarantees that the desired change is really going to happen. That is why we use 'attitude' instead of 'change' in our model.

Proportionality between energy and attitude does not mean linear or any other kind of proportionality that could be expressed with exact mathematical functions. As already stated, these change success formulas are not real mathematical ones, and this applies to this exactly undefinable proportionality type as well.

Unlike the formulas cited earlier, the suggested new version does not state anything about the partial or complete implementation of the change, about its speed, its degree of success, or the duration of the emergent new state. As mentioned before, these attributes of the change depend on several other factors than the attitudes of the change targets; therefore, we do not regard any postulation about the change itself justifiable. We just propose to state that:

- if the energy for change is lower than a certain threshold value, then it cannot overcome the organisation's inertia, but
- if it exceeds the threshold value, then it favourably influences the attitude towards the change—the bigger, the better.

More than that cannot be stated reliably and responsibly without comprehensive knowledge about the conditions and circumstances of the actual change effort.

CONCLUSION

In this study, we analysed the different change success precondition formulas, finding that there are both common and differing elements of the different change success precondition formulas, and there are contradictions within some of the formulas themselves, not only between different formulas. Any formula (or model) without such contradictions could help organisational change theorists and also practitioners get a step closer to what is needed for successful change implementation.

This article, therefore, proposed a suggestion for the improvement of the classical precondition formulas of changes that is free of contradictions, utilising the elements of some previous models with modifications. The new version synthesises the two approaches that were already found in the literature (the ones with a threshold value and the one without threshold value) into one unified model.

The additional added value of the new version lies in the proposed formula's capability to describe what happens below the threshold value, as well as what happens above it, without being self-contradicting like many of the previously existing formulas. We believe that the analogy of diodes and the visual presentation of the newly synthesised model is graphic enough to make people understand that even after exceeding the threshold value, there is still more to be done to ensure the fulfilment of success criteria.

Acknowledgement

We would like to thank Professor Gyula Bakacsi for calling our attention to Beer's version of the formula.

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I have seen the future, and it rings – What we know about mobile banking research

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SUMMARY

In the history of banking services, mobile banking has been thought of as a key interactive channel between financial institutions and customers. The last decade there has been an increasing interest in studying mobile banking topic. Most literature in the field of mobile banking has only focused on an individual approach and lacked the macro approach and industry approach. Therefore, this research aims to show a comprehensive review of mobile banking research in past decade and analyses the significant results from previous research. This paper makes a contribution to a deeper understanding of mobile banking from a macro approach and industry approach.

Keywords: mobile banking; financial services; banking services; descriptive literature review, banking industry
Journal of Economic Literature (JEL) codes: G21
DOI: http://dx.doi.org/10.18096/TMP.2020.02.07

INTRODUCTION

Technology development offers many industries a great opportunity to provide new digital services. In banking industry, adopting these remarkable achievements has become a central issue for financial services. Recently, providing services on the mobile platform has been a major area of interest within the field of financial and banking services. Furthermore, mobile banking is considered a business model and competitive strategy in each bank. This means that banks release mobile banking services as a response to intense competition in the banking industry when mobile banking is expected to become a major channel for bank transactions (Lee et al. 2015). Mobile banking (MB) brings both opportunities and challenges for banks, since the financial service market is expanding and involved with more participants and stakeholders. Newcomers offen encounter higher competition and risks. Meanwhile, the legal environment greatly affects the responsibilities of members in the market. That context requires financial institutions in every country to have a broader view of mobile banking services that are not limited to the customers' aspect.

The concept of mobile banking has received considerable critical attention by many researchers. While the current studies mainly focus on mobile banking adoption, the research related to the macro approach, service quality, and the competitive landscape in mobile banking topic is quite scattered. There have been studies on individual adoption and individual performance with mobile banking. While these studies in the mobile banking literature have only focused on customer or individual adoption (Ha et al. 2012; Shaikh & Karjaluoto 2014; Tam & Oliveira 2017), no previous studies have investigated a literature review in other aspects such as a macro approach, industry approach or legislation topic (Onay & Öztaş 2018). This prospective study was designed to provide a comprehensive analysis of mobile banking studies beyond individual adoption. By interpreting and analysing the results obtained from previous studies, this study may provide new insights into the topic of mobile banking for researchers, managers, and stakeholders. Furthermore, the study helps future researchers shorten the time for literature review for future mobile banking topics.

The literature review was conducted through several steps, followed by the selection of studies between 2011 and January 2020. The author synthesized and analysed the results obtained from earlier studies to answer the following research questions:

First question: what do we see from recent mobile banking studies?

Second question: besides mobile banking adoption studies, which themes have been investigated?

The contribution of this research includes: Firstly, the research presents a comprehensive review of mobile banking studies: over time, research themes, scientific journals and investigated regions. Secondly, the study provides a deep descriptive literature review with two important themes in mobile banking which have been

neglected by previous literature reviews. Lastly, the research points out the important findings from the previous studies and the shortcomings in the topic of mobile banking, which can be used to promote further research. These contributions make this study unique and valuable.

This review paper has been organized in the following way: Section 2 is concerned with the methodology used for this study. Section 3 highlights overall insight of mobile banking research and provides in-depth understanding into themes and subtopics. Section 4 presents the conclusion and academic and practical contributions. Lastly, Section 5 contains limitations and further research directions.

METHODOLOGY

The descriptive literature review approach was used in this study covering the period from 2011 to January 2020. The past decade has seen the rapid development of internet broadband and the new generations of 3G and 4G mobile networks, as well as the continuous innovation of smartphones, all of which have greatly supported the development of MB. Furthermore, there is no doubt that MB services have developed beyond sending codes by SMS. Therefore, the 10-year period from 2011 to 2020 allows us to reflect the up-to-date research trends about MB. This study uses a descriptive literature review in order to gain insights into the state of mobile banking research (King & He 2005). In this research, mobile banking refers to a product or service provided by a bank or a microfinance institute (bank led model) or MNO (non-bank-led model) through using mobile devices (Shaikh & Karjaluoto 2014).

Firstly, the search process was conducted based on searching in databases: Scopus and the Web of Science (WOS). Searching for terms such as "mobile banking" "m banking" "m-banking" in the title, the study found 620 articles in Scopus and 219 articles from the Web of Science. Next, criteria for selecting articles were as follows: published between 2011 and January 2020, in English language, where the document type is article. The primary inclusion criterium for selecting published articles was ensuring the best quality of data because most of them have passed the peer-review requirement for publication. As a result, the author obtained 528 articles. Then, the author chose articles in the subject area of business, management, and accounting. As a result, 270 articles went on to the next round of screening. After that, 79 papers were excluded due to duplication, leaving 191 articles. Then only accessible articles were selected in the next stage; therefore, 34 research papers were rejected (leaving 157 articles). Finally, based on a review of the abstracts, we rejected 2 articles on the topic of technical matters in mobile banking. The remaining 155 articles were used for the descriptive literature review.

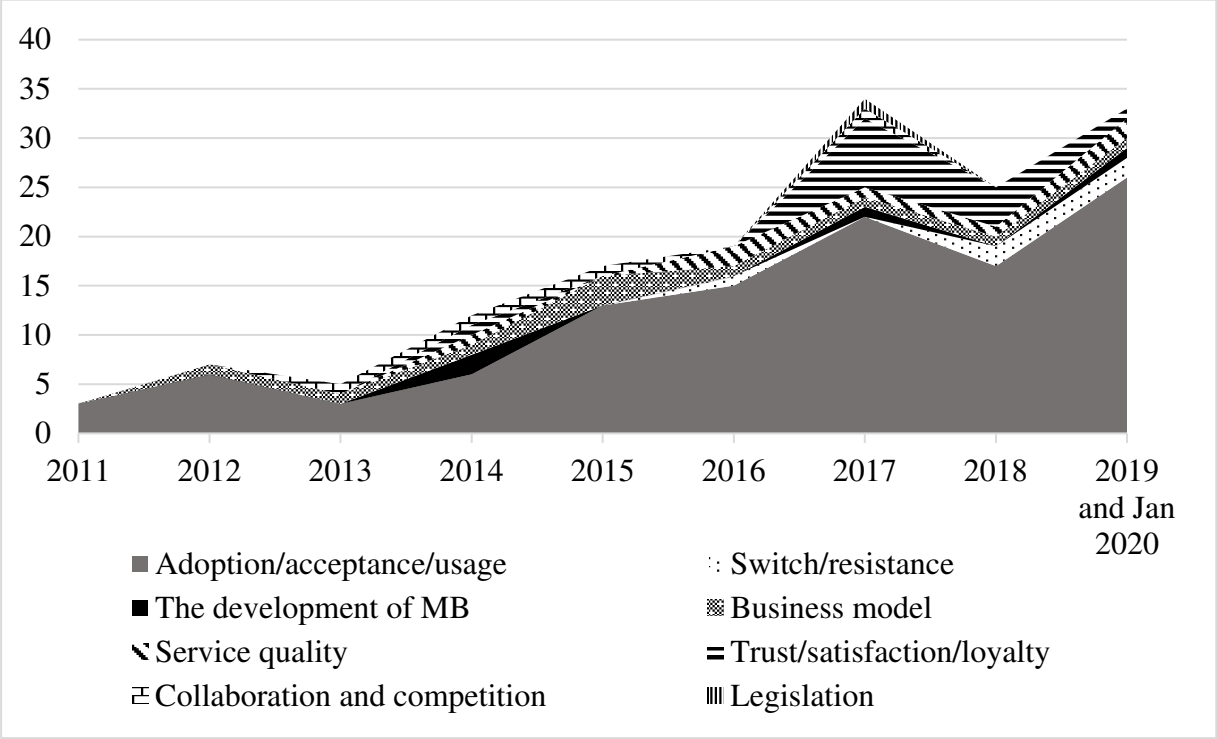
Table 1
Steps for selecting articles

Step 1: Search with Title	TITLE (“mobile banking” OR “m banking” OR “m-banking”		No. of rejected articles
Result	SCOPUS: 620 documents	WOS: 219 documents	
Step 2: Filter with “year/ language/ document type”	Year publication = 2011-2020 Language = English Document type = articles		331
Result	SCOPUS: 324 articles	WOS: 184 articles	
Step 3: Filter with “subject area”	Subject area= “business, management, accounting”		238
Result	SCOPUS: 175 articles	WOS: 95 articles	
Step 4: Filter with “Duplicate”	SCOPUS + WOS = 191 articles		79
Step 5: Select accessible papers	SCOPUS + WOS= 157 articles		34
Step 6: Abstract reading for relevance	SCOPUS + WOS= 155 articles		2

DISCUSSION

The descriptive literature review method combining the statistic summaries provide the comprehensive synthesis of mobile banking research.

Current state of mobile banking research



Source: Own calculation

Figure 1. The number of publications on mobile banking topic

From the data in Figure 1, it is apparent that the number of publications on mobile banking research has increased dramatically during last 10 years. The increasing trend of mobile banking articles has demonstrated the higher interest in this topic. The single most striking observation to emerge from the data comparison was that the number of publications from 2017 to January 2020 made up of 60% of total publications (with 92 articles). Surprisingly, the majority of articles concentrated on individual adoption and customer behaviours such as adoption/acceptance/usage (72%). Recently, some studies have emerged that pay attention to switching or resistance behaviour intention of customers in using mobile banking services. This research trend reaffirmed that mobile banking services are considered a customized service, as a result, the perception of customers will play a pivotal role in the success of this mobile service. However, only a minority of papers have approached mobile banking from the macro level (the development of MB and its legal aspects) and industry level (business model, collaboration & competition, service quality).

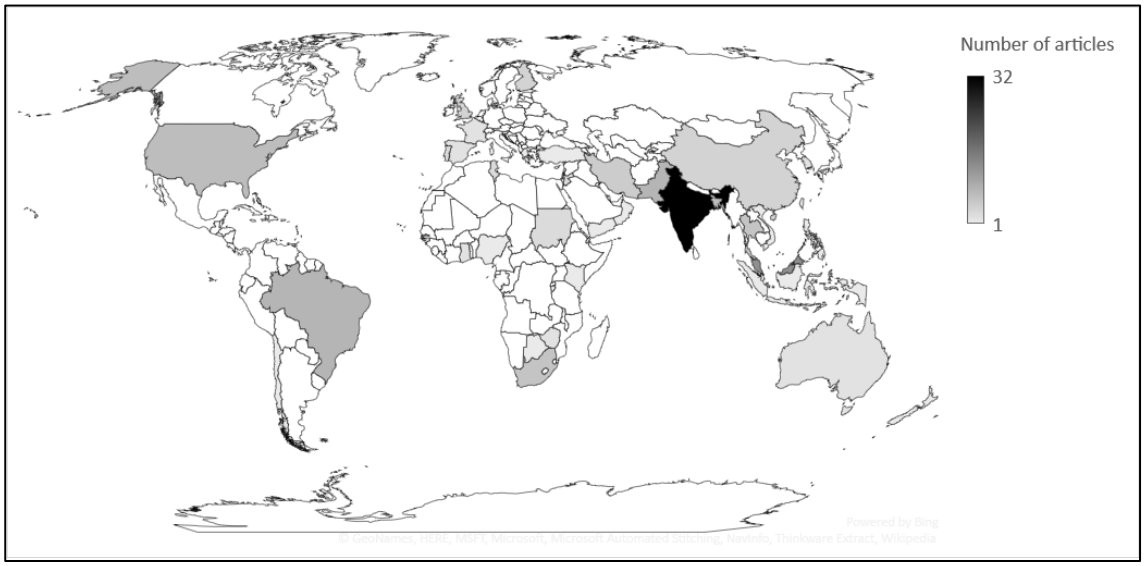
Table 2: Journals publishing mobile banking research (2011- January 2020)

Journal	Number	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Percentage
International Journal of Bank Marketing	**24**				1	3	5	9	2	4		**15.5**
Journal of Internet Banking and Commerce	**11**	1	3	1	2	1	3					**7**
International Journal of Business Information Systems	**6**						1	3		2		**3.87**
Journal of Islamic Marketing	**5**				1				1	3		**3.22**
Journal of Retailing and Consumer Services	**5**							1	1	2	1	**3.22**
International Journal of Electronic Finance	**4**					3			1			**2.58**
Global Business Review	**3**							1	1	1		**1.93**
International Journal of Business Innovation and Research	**3**				1	1				1		**1.93**
International Journal of e-Business Research	**3**	1						1	1			**1.93**
Internet research	**3**	1						2				**1.93**
Journal of Business Research	**3**						2		1			**1.93**
Journal of Enterprise Information Management	**3**						1			2		**1.93**
Journal of Financial Services Marketing	**3**					1		1	1			**1.93**
Journal of Global Information Management	**3**								2	1		**1.93**
Marketing Intelligence and Planning	**3**		1		1	1						**1.93**

Note: Journals with at least 3 articles in Mobile banking (own calculations)

A total of 155 articles about mobile banking have been published in 83 scientific journals. However, they are mainly concentrated in 20 journals with 92 articles (around 60%). The two journals with the most

articles on mobile banking are the *International Journal of Bank Marketing* (24 articles) and the *Journal of Internet Banking and Commerce* (11 articles).



Source: Own calculation

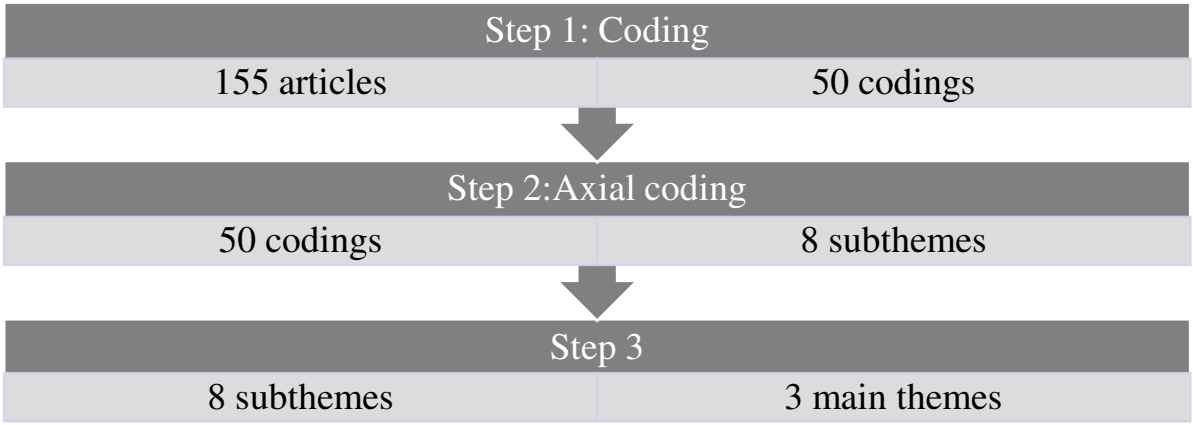
Figure 2. Mobile banking research by country

Only 31 studies were conducted in developed countries[1]. Most of the research on mobile banking has been concentrated in developing countries. Some regions have attracted particular attention from researchers, such as South Asia and Southeast Asia. Especially such countries as India, Malaysia, Brazil and Pakistan have the highest number of publications on the topic of mobile banking (61 out of 155 studies).

Themes in MB

The classification in the MB study was prepared using the 155 studies retrieved above. Firstly, the author carefully read through each study and coded it. This approach was adopted to allow deeper insight into the main theme of each article, even though this process takes a long time. , for analysis, 50 codings from 155 articles were extracted. Following this process, 8 subthemes in mobile banking research were identified using axial coding. Finally, the classification of mobile banking research studies was categorised by three main themes: macro approach, industry approach, and individual approach.

The advantages of this classification method are that it allows us to identify and characterize the purpose of each research study, even it takes time.



[1] Members of OECD are lassified as developed countryies. https://www.oecd.org/about/members-and-partners/

Figure 3. The steps in classifying the mobile banking topic

This study brings a comprehensive view to the knowledge of mobile banking research by identifying two more important themes in mobile banking – macro approach and industry approach. Consequently, after presenting an overview of mobile banking research in Part 1 this study focuses on descriptive qualitative analysis with the macro approach theme and the industry theme.

Table 3
Themes in mobile banking research

Macro approach	Industry approach	Individual approach
Development of MB	Business model	Adoption/usage/acceptance
Legislation	Collaboration & competition	Satisfaction/trust/loyalty
	Service quality	Rejection/resistance

Macro approach

Development of mobile banking

Mobile banking from the macro aspect has not received enough attention from researchers. Only three studies were conducted in the theme of the macro approach out of 155 studies. This is a modest number. These studies concentrated mainly on the development of mobile banking in developing countries (Gómez-Barroso & Marbán-Flores 2014; Nguena 2019; Van Der Boor et al. 2014). It is important to affirm that the trend of mobile banking development in recent years is obvious (Moser 2015). Approximately 85% of innovation services such as mobile banking, mobile payment, mobile money, or telecom services have risen in developing countries. Firstly, fulfilling the growing demand in developing countries is a contributing factor in the emergence of mobile banking (Van Der Boor et al. 2014). The existing needs of the poor in developing countries stems from limited access to finance, low level of education, and underdeveloped technology infrastructure (Van Der Boor et al. 2014). After that, these mobile banking services continue to expand to developed countries.

M Pesa a banking service on mobile phones in Kenya is a clear example of success in developing mobile banking services. Recent research has shown that there are two circumstances for explaining this success in Kenya: internal factors and external factors. According to Gómez-Barroso & Marbán-Flores (2014), firstly these services themselves offer a method that is simple and understandable to most people for managing their financial transactions. Secondly, the context of a largely rural population with a low level of education living far from urban areas presents a great demand for access to finance. More importantly, a factor that cannot be excluded is the support from the central bank of Kenya (Gómez-Barroso & Marbán-Flores, 2014). Macro factors have been found to influence the development of mobile banking services: domestic credit, human capital, remittances, trade openness, credible monetary policy, and infrastructure (Nguena, 2019). Among these, human capital has the greatest impact. These findings suggest that the development of mobile banking not only comes from fulfilling the needs of customer aspects but also from policy factors. As a result, countries need to have a consistent and transparent monetary policy, improve their infrastructure, develop financial literacy, and provide education to promote digital financial services.

Legislation

Mobile banking brings many opportunities for both banks and customers. However, it has some challenges. For mobile banking providers, the major challenge is related to security risks and privacy risks when deploying mobile banking (Ashta 2017). For users, risks related to the theft of personal financial information are the biggest concern (Wonglimpiyarat 2014). When addressing these risks, the legislation aspect cannot be neglected. Ashta (2017) argued that despite obvious benefits from mobile banking, some inherent risks in mobile banking should be taken into consideration such as risks arising from banking operations, telecommunication companies, and mobile banking applications. One obvious characteristic of risk in mobile banking is that these kinds of risks are related to both mobile banking providers and telecommunication providers. For example, the billing risk and identification risk occur when customers use mobile banking to pay for telecom or type the wrong phone number of recipients. Therefore, this study suggested that regulations should be involved with all market players to reduce these risks. In particular, there should be regulations related to the establishment of strategic alliances and acquisitions between telecom operators and banks (Reeves & Sabharwal 2013). In the future, when mobile banking is part of the mobile ecosystem of the economy, there should be more standard regulations in banking transactions for participants as a consequence of more risks involved and existing interoperability (Wonglimpiyarat 2014).

This study found that firstly there are very few studies showing the factors affecting the development of mobile banking at the macro level. There is no comparative study among countries on the development of mobile banking. Secondly, there are few studies evaluating the effect of regulation on the development of mobile banking. Because of this, there is a need for more evidence on whether a legislation orientation from governmental authorities affects the development of

mobile banking. Moreover, there are no studies to assess the impact of mobile banking on social development. Whether mobile banking contributes to poverty reduction as well as improvements in making financial services more inclusive is unclear. Unfortunately, although Ashta's study (2017) mentioned some related risks of mobile banking, previous studies in the macro approach have not dealt with this topic in mobile banking research.

Industry approach

a) Business model

Only 10 studies out of the 155 have investigated mobile banking from the business model aspect. These studies have attempted to evaluate the benefits from MB services to providers (Amran et al. 2019; Onay & Öztaş 2018; Parvin 2013), MB implementation (Ketkar et al. 2012; Mullan et al. 2017), the competitive strategy (He 2015), business model innovation and ecosystem of MB (Osmani et al 2017; Moser 2015; Mustafa 2015; Tingary & Mahmoud 2014).

Benefits from MB services to providers

Parvin (2013) drew an overview of mobile banking services in Bangladesh and observed that mobile banking services were quite new to both banks and customers in Bangladesh. Initially, some banks implementing MB did not actively develop mobile banking services even though the benefits and prospects of mobile banking services are recognized by users. A possible explanation for this might be that mobile banking service is a new type of service, so it takes time to prove its superiority over other services. After that, banks realized providing mobile services was irreversible. The major advantage of MB deployment is cutting operational costs and meeting the growing customer demand (Parvin 2013). Moreover, providing MB services allows banks to improve their financial situation by managing tracking assets and liabilities, helping to add revenue from providing added-value services to existing customers, and attract more customers (Onay & Öztaş 2018). Mobile banking not only benefits banks but also microfinance institutions. Through using mobile banking, lending and collecting repayment activities are more transparent while risks of debt collection are reduced, thereby enabling loans to the poor (Amran et al. 2019).

MB implementation

MB is considered as a banking service offered on mobile devices, so the success of this service depends on how the market responds and the way a bank effectively coordinates its resources in service delivery. To find the stakeholders' perspective, Mullan et al. (2017) surveyed stakeholders and listed two main reasons why a bank had decided to implement a mobile banking service. The first is external factors: global mobile phone penetration, customer demand, and stakeholder partnership. The second is internal factors: customer convenience, the competitive advantage for banks, the strategy of banks, and low perceived risk concerns. The findings of Mullan et al. (2017) seem to be consistent with those of Ketkar et al. (2012), who concluded that mobile banking providers need to pay attention to technological factors and infrastructure to ensure that the transaction on MB is fast with low cost. Moreover, telecommunication network coverage should be good enough to demonstrate the advantages of MB by being able to conduct financial transactions anywhere at any time. A comparison of the findings with those of Osmani et al. (2017) confirms that security infrastructure was the most important feature to explain why a bank implements mobile banking services. Other aspects such as legal and socio-economic issues and flexibility in technique should be considered as the top concern of banks. These conclusions bring a clearer view of the application of mobile banking. These findings indicate that banks should have effective and comprehensive strategies of providing mobile banking services by analysing all related stakeholders such as customers, telecom, partnerships and utility companies as well as the banks' strategic orientation.

Competitive strategy

In the aspect of competitive strategy, He (2015) found that the more competitive the market is, the more banks applied MB to compete through price. In contrast, in a centralized market, banks tended to apply MB to enhance technology and improve customer experiences.

Business innovation model and ecosystem of mobile banking

Broadly, banks' managers should think of mobile banking in the context of a business innovation model (Mustafa 2015). Moser (2015) revealed that the trend of implementing mobile banking channel is increasing among banks, and in the near future social networks and mobile banking could be integrated. Through the analysis of mobile banking services in Pakistan, it is suggested that mobile banking should be studied in a broader scope than traditional service. The discussion of mobile banking should be mentioned in the scope of the ecosystem of the business model (Mustafa, 2015). Banks need to discuss with relevant stakeholders such as mobile operators, end-users, technology vendors, call centres, retailers and utility companies. As a result, these associated members allow banks to establish a connecting network which is called the ecosystem of mobile financial services (Mustafa 2015).

b) Collaboration and competition

The trend in cooperation and competition among MB providers has been investigated by a number of

researchers (Lee et al. 2015; Reeves & Sabharwal 2013; Shaikh et al., 2017; Wonglimpiyarat 2014).

To address financial exclusivity among the poor, Reeves & Sabharwal (2013) suggested the establishment of tcooperation between mobile network operators and microfinance institutions. These mobile network operators help financial service providers deliver their services at a lower operating cost, meanwhile, customers could save from using mobile banking. Consequently, mobile companies provide more value-added services, while microfinance services can expand their customer base. In the development of mobile banking, competition and cooperation exist almost parallel to each other (Lee et al. 2015).

To better understand the collaboration and competition in mobile banking services, Wonglimpiyarat (2014) analysed a case study in the Thailand market and discovered that strong competition forces mobile banking providers to seek strategic alliances (network collaboration) to offer innovative solutions. Furthermore, this study suggested that building up strategic alliances could benefit mobile banking providers when these collaborations not only help banks provide more value-added services to their customers, but also upgrade the core banking system and expand the e-banking channels.

In Korea, using actor-network theory (ANT), Lee et al. (2015) attempted to analyse the development stage of mobile banking in Korea. This study found that the interaction between members in the market changes over time, and technology plays a leading role in the stages of mobile banking development, acting as a key player in the actor-network analysis. At an early stage, "the technology was under the control of mobile carriers because the services could be offered without involving mobile phone manufacturers" (Lee et al. 2015, p. 158). In the next stage, when IC chip technology-enabled enhancing mobile banking services, banks began to participate and later created competing actor-networks in mobile banking through competing to control customer information. In the next phase, smartphones allow mobile banking providers to develop their applications, regardless of the technology from mobile operators. Thereby, this study revealed that to be the winner of the mobile banking race, banks need to identify and understand the current and future technology development trends. Secondly, banks should choose the right partner to develop together. Thirdly, the market will become more expanded with many new players, including new competitors or partners from the same industry or other industries.

One of the limitations with mobile banking is that users are required to register an account at a bank; as a result, it is very costly to conduct a payment between a mobile banking account with another non-banking account (such as an electronic wallet). To meet the needs of both banking and commercial transactions, Shaikh et al. (2017) proposed a conceptual model in which banks, telecom, startups, and fintech are combined to create a system called an MBPS (mobile banking payment system) as a combination of mobile banking and mobile payment. However, to have effective cooperation, this study emphasized that not only strengthening financial literacy but also strict legal provisions for cooperation should be taken into consideration. This proposal further supports the idea of Tingary & Mahmoud (2014), who also suggested that to facilitate the collaboration among all concerned parties legislation should be clearly and sufficiently orientated.

c) Service quality

Only 7 out of the 155 studies concentrated on MB service quality. These studies mainly investigated the determinant of MB service quality and the relationship among MB service quality, satisfaction & loyalty, and trust (Jun & Palacious 2016; Kapoor & Vij 2020; Nisha 2016; Puriwat & Tripopsakul 2017; Sagib & Zapan 2014; Shankar et al. 2019; Zoghlami et al. 2018). Among the theories used for investigating service quality, servqual was found to be the best theory to explain variance in mobile banking service quality (Shankar et al., 2019).

The findings from researchers on the service quality topic suggested that factors of service quality have positive impacts on customer satisfaction. By adopting the theory from service quality such as e-squal; servqual; servperf mobile service quality, most studies affirmed that such factors as reliability, responsiveness, efficiency, security/privacy and empathy have great influence on customer satisfaction (Nisha 2016; Puriwat & Tripopsakul 2017; Sagib & Zapan 2014; Shankar et al. 2019; Zoghlami et al. 2018). Of the factors, reliability is the most common factor found in these studies. Due to the characteristics of service delivered through mobile applications, factors affecting the quality of apps also affect the quality of MB services such as content, accuracy, ease of use, speed, aesthetics, security and unique mobile application service features (Jun & Palacious 2016). Additionally, users highly appreciate mobile banking applications when they perceive that these applications are well designed in terms of content, informative, have a fast response time and low latency (Kapoor & Vij 2020).

From an industry perspective, the application of new technologies to the provision of banking services such as mobile banking has surpassed the limit of a mere service. Studies have shown that the benefits of mobile banking are enormous and related to many concerned parties such as suppliers, customers, technology providers and mobile phone companies. These participants form an interconnected ecosystem in which the competition and cooperation among participants change quite dynamically according to the evolution of technology development and the participation of fintech companies. In summary, no studies in the industry theme evaluated the impact of mobile banking on the financial performance of banks or their market share. The assessment of service quality with mobile banking

has identified several factors found to affect the quality of MB services.

CONCLUSION AND CONTRIBUTIONS

Conclusion

Firstly, this study briefly presents the research trends of mobile banking over the recent decade. The last decade has witnessed an increase in the number of MB studies, which mainly focus on the individual level. Most of the studies are on customer adoption/usage/acceptance. The number of studies on the macro approach and industry approach in mobile banking is modest. MB studies are spread across many countries and regions but focus mainly on developing countries, especially South Asia and Southeast Asia. Quantitative research is the dominant method in mobile banking research.

Secondly, some evidence released from previous studies shows that the development of mobile banking was contributed to by both the advantages of MB and demand from developing countries.

Lastly, future development trends in mobile banking are obvious and reaffirmed by many studies. There will be more mergers and acquisition (M&A) activities and cooperation or alliances between banks and fintech, and between banks and telecommunication providers in providing mobile banking services. In the future, the MB market will witness participation from new startups and non-bank financial institutions, which may come from the financial industry or other industries. This research literature review has not been able to identify a single study that evaluates the impact of big tech companies such as Facebook, Amazon, or Alibaba on mobile banking services. These big tech companies are expanding payment activities (even creating cryptocurrencies) that will surely have a great impact on the traditional banks' mobile banking service. The expansion of players in this market will be accompanied by related risks and challenges. The boundary of mobile banking will depend greatly on the approach of the legal framework in each country.

Academic contribution and practical implications

This study has summarized all research on mobile banking in the last 10 years, as well as provided researchers with a comprehensive picture of mobile banking topics. Therefore, the study has aimed to increase academic knowledge of mobile banking research. Firstly, the study has synthesized a large number of studies on mobile banking published in journals indexed in Scopus and Web of Science on mobile banking to produce a clear research trend, research topics, number of articles, and research area for the last 10 years. Secondly, the findings from this study contribute to the literature review stage for future studies to shorten the time for synthesis and analysis. Thirdly, despite much attention to individual approaches, there is still room for future research with the macro approach and industry approach.

In practical implications, it suggests that the developing trend of mobile banking has been affirmed by many studies. Most of them predict in the future there will be more collaboration and acquisition among banks, fintech, and startup companies because of increasing competition and technological advantages. The conclusions from this research may help bank managers have a clearer view of the service development model for the future scope of mobile banking.

LIMITATIONS AND FURTHER RESEARCH DIRECTION

Firstly, the research has collected published articles from two large databases, Scopus and the Web of Science. However, other mobile banking studies may be ignored. Therefore, future research may further expand the scope of the search to draw a more general and complete picture of mobile banking research.

Secondly, this study provides a literature review on mobile banking, but this research only evaluates studies on the fields of economics and business. Technical articles related to mobile banking are not considered in this study, which is one of its limitations.

Thirdly, mobile banking is growing, and as a result, more players are arriving from banking industries or other industries. Unfortunately, no study has attempted to examine the participation of big tech companies in the mobile banking market. Future studies with banking services can be conducted on a larger scale, not only with mobile banking but also with digital financial services.

Lastly, there are few studies on mobile banking in terms of the macro approach, industry approach, and legislation approach. There is a gap in research on the firm-level and macro approach with mobile banking. Assessing the impact of the mobile platform on the performance of banks requires new research. Each country has its own cultural factors and population structure; therefore, it is necessary to have a better assessment of the factors that influence the decision to adopt a mobile platform from the firm level of each country.

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Human Capital Investment and Employment Growth in Nigeria

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SUMMARY

This paper mainly examines the link between human capital investment and employment growth in Nigeria for the period spanning 1980–2019 using timeseries data. The theoretical model is rooted in the simple theory of investment in human capital based on Ashton and Green (1996) relating to maximization of lifetime earnings and wealth. Diagnostic tests show that the ordinary least square (OLS) estimation technique is plausible. Results show that employment rate can positively induce government expenditure on education and health and secondary school enrollment.Creation of investment opportunities through basic infrastructural facilities – electricity, roads,etc. – is key to employment growth and human capital investment.

Keywords: Human capital investment; employment; Correlation LM Test; Heteroscedasticity Test, OLS
Journal of Economic Literature (JEL) codes: E24, 011, 015
DOI: http://dx.doi.org/10.18096/TMP.2020.02.08

INTRODUCTION

It has been argued that production depends not only on labour; labour is together with other factors and thus production cannot be identified only on the basis of number of heads or hours of work, since it depends on the quality of labour as determined by knowledge and skills subject to further development. The emergence of the economic transformation of many Western nations recognises knowledge and skills as key in enhancing greater output level, be it at the microeconomic ormacroeconomic level. Hence, human civilization mainly focuseson education alongside with other factors and this has motivated nations toincrease spending on education.

Human capital (HC) consists of general skills, specific skills and technical and scientifiknowledge used in determining productivity at the individual and aggregate level at large.Accordingly, regions characterised by a high concentration of human capital often generally farebetter economically in terms of employment growth and hence increases in productivity and income compared to other regions. Hence, human capital is directly related to the rates of employment, productivity and wage levels. Employment remains vital not only for the wellbeing of an individual but also for the society at large. Even though economic conditions differ from one region to the other, a general economic policy goal is the delivery of employment opportunities accompanied by highly qualified skilled labour. It therefore follows that education and acquisition of skills remain crucial for facilitating sustainable growth and employment. While it is possible for acquisition of skills to lead to high employment rates, it is equally possible for educated individuals to move to areas in which higher employment rates exist. Thus, causality runs from both ends.

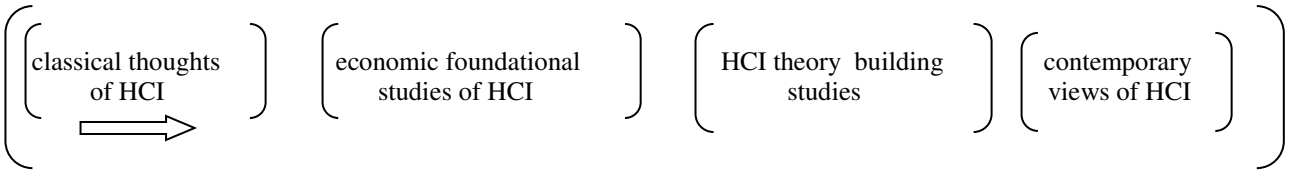
In Nigeria, attempts to effect stabilisation and structural adjustment policies over the last three decades to enhance economic growth and development have not successfully overcome the problem of unemployment. Just as many African nations, efforts towards increasing human capital development have not reduced the high rate of unemployment, just as investment in education has not resulted in expected output. The issue of employment and human capitadevelopment is fundamental, as this provides some of the explanations forthe poverty growth thresholds of the economy. In spite of the low acquisition of skills in Nigeria compared to some other nations, on a yearly basis, the number of educated individuals on the aggregate level is comparatively higher than the rate of employment. The experience has been that unemployment has been on the increase and has continued to exist amidst a relatively high rate of educated individuals. Undoutedly, this has cut across most of the notable sectors of the economyincluding industry, banking, education and

most importantly the private sectors as frequently observed and thesehave succeeded in adding to the present unemployment problems. Again, socio-economic problems including poor infrastructure such as roads, electricity supply etc, have also contributed in no small way to the current unemployment crisis.Recessionssuch as thatof 2016further aggrevated the problem, as many sectors are unwilling to employ more workers, irrespective of the levels education and skill acquired.

Many studies have either focused on human capital investment or employment related issues but attempts at linking the two have beengrossly inadequate. For example, Kenny (2019)examined the effect of human capital on unemployment volatility in Nigeria, and Imide &Dania (2019) studied thehuman capital and economic growth relationship. These two studies mentioned do not connect human capital with employment issues and so making studies in this area scanty. Linking the two informs policy makers in striking a balance in such a way that the number of educated individuals does not outweigh available employment opportunities. This isnecessary to curb the increasing level of poverty and move closer to attaining sustainable growth in Nigeria. In the search of the literature, emphasis has mostly been laid on impacts of human capital on employment/unemployment growth but the reverse is without adequate attention. This is indeed a good motivation and thus, subsequently, the objective of this paper is basically to examine the role employment opportunities play in human capital investment, with an emphasis on the primary and secondary levels of formal education. Following the introduction, Section 2 provides relevant literature, Section 3 provides the theoretical model, estimation and discussion are provided in Section 4, while Section 5 concludes.

LITERATURE REVIEW

Studies in the literature have identified and recognised investment in human capital (HC) and the theory in line with it. Schultz (1963) as cited in Devadas (2015) was first to identify education as a formof capital with uncertainty that skills and knowledge are a form of capital (Schultz, 1961).In the studies of Becker (1960, 1961), he establishes a theoretical relationship between education and economic development or high income earnings with the use of an external rate of return on education (Becker, 1960) and internal rate of return (Becker, 1964). The evolution of HC theory has passed through some eras: classical economic thought, economic foundation studies of HC theory and contemporary views, as shown in Figure 1 below:



Source: Adapted from Devadas (2015)

Figure 1. Evolution of human capital investment (HCI) theory

Sweetland (1996) in anearlier review considers economic viewpoints, economic foundation studies, and HC theory. Therefore, consideration is given here to developments that took place after Sweetland's work.

To the classical economists, particularly Adam Smith, human efforts have been considered as the root of all wealth, as emphasised by Sweetland (1996). Other economists equally contribute in this area of HC. As noted by Sweetland (1996), Marshall considers human abilities as personal wealth, interpreting this as capitaland as an agent of production. The commencement of HC formalised classical thought of HC. In this regard, Sweetland (1996) highlights some studies by Mincer (1958), Fabricant (1959), Becker (1960) and Schultz (1961) as cited in Devadas (2015), were significant contributors prior to the official establishment of the HC theory in the early 1960s. Mincer (1958) notes that training and skills to a large extent affected personal income dispersions. Fabricant (1959) in his studiesemphasises the importance of intangible capital –improvement in basic science, technology, business administration and education and training. Schultz (1961) identifies five major challenges of human activities (investments) in the areas of health facilities and services, on job training, formally organised education at various levels and migration of individuals and families in response to new job opportunities. According to HC theory, employee productivity is increased through development in their knowledge, skills and attitude that can facilitate better performance (Ofobruku&Nwakoby, 2015; Ofobruku&Yusuf, 2016;Anike et al., 2017).

In their contribution to HC,economic fundational studies highlight the role of education (training and skill) indisparities in personal income (Mincer, 1958), the importance of intangible capital (Fabricant, 1959), appropriate methologiesforstudying HC(Becker, 1960) and how education relates to HC, including the types of HC (Schultz, 1961). Similarly, Sweetland (1990) provides an insight into the various contributions of Denison (1962), Schultz (1963), Becker (1964) to the HC theory of development studies.

Based on the views of HCearlier in existence, Becker (1993) put forward adefinition of HC and notedthat expenditures on education, training and medical care are essentially investment in HC.Following this, using education as a yard stick has been criticized due to its limitations, including other proxies of education in subsequent studies. While other studies on HC have been extended to explain its link to other macroeconomic variables in diversity apart from growth/output/national income, particularly important factors are its expansion by quality of education (Wößmann, 2003;Gundlach, 1997), learning on the job impact (experience) and the role nutrition and health play (Gundlach, 1997). Criticisms have however followed various discussions on quality of education, life-long job, higher related earning, and unemployment, among other formal procedures (Livingstone, 1997) which explain HC theory. In recent times, complexity in the dimensions of HC is becoming noticeable. With reference to Natoli (2008), it is highlighted that HC is non-tradable (except in slavery conditions), possesses both quantitative and qualitative aspects, can be either general or specific, and equally possesses external effect with social environment and the institutional context where it exists.

The intensity of HC in a locality might influence the local employment rate through production related or consumption related mechanisms, or even both. Focusing on the consumption related mechanism in the first instance, some high-income educated individuals increase spending patterns in absolute terms and the share of their income on services that are not necessities, such as leisure activities and personal services,areconsidered to be income and education elastic, However, not all fall into this category; most of these services are characterised by being nontraded, nonsubstitutable (human labour) by technology in their availability, possession of low skills. Jobs belonging to this category are cleaning and security services together with services requiring personal contact like sales assistants and care workers.

The prediction of the above view is premised on the idea that continuity of high income and aneducated population in a local area tends to boost the demand for low-skilled consumer service jobs. Hence,an upward sloping surply curve emanating from this implies rising wages and employment in these service jobs. Spatially differentiated growth of high skilled individuals in different areas of the economy could be explained by theattraction of cities tohighly-skilled workers (those valuing them) due to the urban amenities and productivity gains being offered. From another perspective, operation of agglomeration economies in the local labour market of cities could enhance the productivity of highly skilled workers compared to those in diffusion areas. This essentially increases demand in agglomeration economies. Consequently, there would be an increasing inflow of highly-skilled individuals into these areas based on increasing returns to HC and rising employment opportunities which they offer. Apart from this, spatial differentiation can result from local youth cohorts characterised by a higher educational level and moving into highly-skilled, highly paid occupations. For instance, as individual returns to HC in a certain area increases, local youth might be encouraged to receive higher training and skills. Even though skill requirements are low for highly-skilled jobs they have not become obsolete yeteven in the presence of great advances in technology in recent times. For more than a decade now technology itself has not totally managed to replace labour for some services requiring personal contact.

There have been submissions from various contributors to urban literature. Glaeser et al. (2001) provides an important theorisation of the rise of the city as centre of consumption. They argue that cities as consumption centres amidst areas of rising incomes have remained crucial for the cities and urban resurgence. This is because urban centres provide a large variety of services and consumer goods that are non-traded, hence attracting increasingly rich workers. The attraction of richer and highly educated workers gives rise to high productive capacity and hence contributes positively to employment growth. Glaeser and Gottlieb (2006) and Shapiro (2006) offer some empirical evidence in support of this.

On empirical grounds, Morreti(2004) makes a distinction between spillovers in productivity and complementarities in production with the findings that the wage premium in cities characterized by large shares of college graduates declines as new knowledge is acquired. By implication, low-skilled individuals benefit most fromthe existence of a larger number of graduates. Mete and Schultz (2002), using the OLS method, examine labour force participation rate based on change in the quality of health. The study finds that labourforce participation rate increases health quality and vice-versa.

THEORETICAL MODEL

Theoretically, an individual's investment in human capital is increased when the gains from this exceeds the losses, orput differently, when the revenues from such investment exceed the cost, and this applies to any other investment. In this context, investment in human capital is explained in terms of investment in education. A simple model based on Ashton and Green (1996) is therefore developed and is applicable to any form of investment. This model is concerned with maximization of life time earnings and wealth. In its simple form, while investment in compulsory education is fixed, the model leaves out all non-monetary revenues thatare indirect revenues.

Consider the lifetime wealth accumulated by an individual defined by

$$W_i = \sum_{i=ca}^{Rt} \left(y_i(h_i) m S_i \right) \left(1-r\right)^{a-i} \left(1-t\right),$$

(1)

where W_i is future lifetime wealth accumulated in period i being the current period, ca is current age, Rt represents the retirement age(age at which economic activities diminish), $y_i\ (h_i)$ is the income in period i and h_i is human capital level, m is unit cost of education, S_i equals the amountof education obtained in the same period, r is the rate of discount and t represents tax.

Funds can be a major constraint, as the possibility of investment taking place is a function of cumulated amount of funds that can sustain an individual. The constraint in mathematical term then becomes

$$\left(y_i - mS_i \right)\left(1-t\right) \geq c,$$

(2)

where c is minimum expenditure required for survival in eachperiod.

However, human capital in eachperiod is a function of its previous and present level of investments, such that

$$h_i = \sum_{j=1}^{i-Ac} S_{i-j} \left(1+\delta\right)^{1-j} + hc\left(1+\delta\right)^{Ac-i},$$

(3)

where Ac is age attained after compulsory education, hc is total human capital attained during compulsory education and δ represents the rate of depreciation of skills.

Given that an individual maximized his total lifetime earnings investment in human capital in every period, this can therefore be determined by a number of factors expressed in the following form:

$S_i = f_i\left(ca, c, \delta, r, h_A, m, Rt, t, \mu\right)$ with a proriexpectations

$$\frac{\partial S_i}{\partial ca} < 0, \frac{\partial S_i}{\partial c} < 0, \frac{\partial S_i}{\partial \delta} < 0, \frac{\partial S_i}{\partial r} < 0, \frac{\partial S_i}{\partial h_A} < 0, \frac{\partial S_i}{\partial m} < 0, \frac{\partial S_i}{\partial Rt} > 0, \frac{\partial S_i}{\partial t} < 0, \frac{\partial S_i}{\partial \mu} < 0 \cdot$$

(4)

The simplicity of this model leads to certain imperfections such as the inability to predict consequences of changes in any of the variables, the assumption of constancy in most parameters throughout the life span, and neglecting varying costs involved in human capital investment,among others. On this basis, the model is extended to a general approach to investment in human capital. Therefore the extended model is:

$$S_i = \beta_0 + \beta_1 S_{i\_1} + \beta_2 ca + \beta_3 c + \beta_4 \delta + \beta_5 r + \beta_6 h_A + \beta_7 m + \beta_8 Rt + \beta_9 t + \beta_{10} \Delta S_i + \beta_{11} lf + \beta_{11} lf$$

(5)

The foregoing provides a guide to the baseline models as follows:

$$Ged = \alpha_0 + \alpha_1 Ged(-1) + \alpha_2 Agd + \alpha_3 Emr + \alpha_4 Gcf + \alpha_5 Geff + \alpha_6 Le + \varepsilon_1$$

(6)

$$Gehlt = \beta_0 + \beta_1 Gedhlt(-1) + \beta_2 Agd + \beta_3 Emr + \beta_4 Gcf + \beta_5 Geff + \beta_6 Le + \varepsilon_2$$

(7)

$$Pse = \sigma_0 + \sigma_1 Pse(-1) + \sigma_2 Agd + \sigma_3 Emr + \sigma_4 Gcf + \sigma_5 Geff + \sigma_6 Le + \varepsilon_3$$

(8)

$$Sse = \rho_0 + \rho_1 Sse(-1) + \rho_2 Agd + \rho_3 Emr + \rho_4 Gcf + \rho_5 Geff + \rho_6 Le + \varepsilon_4$$

(9)

where Ged is government expenditure on education, $Ged(-1)$ its lag by 1 year, $Gehlt$ is government expenditure on health, $Ghlt(-1)$ its one year lag, Pse is primary school enrollment as a percentage of gross enrollment, $Pse(-1)$, its one year lagand Sse is secondary school enrollment as a percentage of gross enrollment, with $Sse(-1)$ its one year lag. Each of these represents measures of human capital investment, Agd represents age dependency ratio as apercentage of the working age population, Emr is employment rate, Gcf denotes gross capitalformation, $Geff$ is government effectiveness and Le is defined as life expectancy. $\varepsilon_1 = \varepsilon_2 = \varepsilon_3 = \varepsilon_4 = \varepsilon$ is the stochastic term. The ratios and percentages appear large in values and so the logarithmic transformation is taken in each case except for government effectiveness. $\alpha_0, \ldots . \rho_0$ represent the

intercept for each model in (6), (7), (8) and (9) while $\alpha_1,.....,\alpha_9$, $\beta_1,.....,\beta_9$, $\sigma_1,.....,\sigma_6$ and $\rho_1,.....,\rho_6$ are slope coefficients.

Data employed is mainly from the World Development Indicators and the Central Bank of Nigerian Statistical Bulletin and IndexMundi for the period 1980–2019. Data for *Ged* and *Gehlt* began from 1981 and ended in 2016. *Emr* data only started from 1981 and ended in 2017. Estimation technique is the ordinary least squares (OLS) method because it follows basic classical linear assumptions. The OLS is known to be the best linear unbiased estimator (BLUE) among the class of estimators and is a special property recognised in econometric study.

ESTIMATION

First, the unit root test is conducted to understand the stationarity condition of the process. With a non-stationary process, law of large numbers and central limit theorem are violated, therefore familiar test statistics become inapplicable. Any attempt to apply this renders results to be spurious. The Augmented Unit root test is employed here because it is usually valid in large samples. Therefore, the sample observations employed in this paper fit into the ADF unit root test method.

Table 1
Stationarity test

Variable	Test statistics	Test Type	Prob.	Decision	Order of Integration
Agd	Intercept	ADF	0.000	Stationary	I(1)
Emr	Intercept	ADF	0.084	Stationary	I(0)
Gcf	Intercept	ADF	0.000	Stationary	I(1)
Ged	Intercept, Trend	ADF	0.034	Stationary	I(0)
Geff	Intercept	ADF	0.011	Stationary	I(0)
Le	Intercept	ADF	0.000	Stationary	I(0)
Pse	Intercept	ADF	0.003	Stationary	I(1)
Sse	Intercept	ADF	0.021	Stationary	I(0)

Source: Author's computation.

The test for stationarity inTable 1shows that only government expenditure on education, government effectiveness, life expectancy and secondary school enrollment and employment rate variables are stationary in their levels, although the latter fulfills this at the 10% level. Gross capital formation and primary school enrolment variables are stationary in their first differences.

Table 2
OLS regression

Variable	Ged Model	Gehlt Model	Pse Model	Sse Model
C	-23.309	8.215	2.279	-40.439
Ged (-1)	0.659**	-------	-------	-------
Gelht(-1)	-------	-0.617**	-------	-------
Pse (-1)	--------	-------	0.567	--------

Sse (-1)	---------	-------	--------	0.324
Agd	4.183	-13.313	5.730	3.716
Emr	1.229	0.910	-0.564	7.963**
Gcf	-1.540*	-0.670	0.194	0.113
Geff	-0.260	-0.466	-0.147	0.113
Le	5.089	-3.077**	-0.051	2.967*
AR(1)	-------	-------	-------	-------
AR(2)	-------	-0.451	-------	-------
R-Squared	0.944	0.424	0.343	0.937
R-Squared Adj	0.916	0.115	-0.149	0.890
S.e	0.304	0.339	0.057	0.077
Prob. F stat	0.000	0.296	0.661	0.000
DW	2.293	2.418	1.463	2.123
Residual JB-Prob	0.569	0.679	0.552	0.765
Correlation LM Test	0.048, 0.013	0.232, 0.087	0.045, 0.008	0.045, 0.008
Heterosceadasticity test: ARCH	0.056, 0.076, 0.705	0.348, 0.298, 0.850	0.918, 0.836, 1.000	0.467, 0.363, 0.982

Source: Author's computation

The analysis is based on four basic baseline models: Government expenditure on education (Ged) model, Government expenditure on health (Gehlt) model, Primary school enrollment (Pse)modeland secondary school enrollment (Sse) model. For each model, applicability of the OLS is tested (Table 2) with reference to the normality, correlation LM toHeteroscadasticity tests. For the Ged model, the normality test statistics indicates that residuals are normally distributed while the correlation LM test statistics, at least in part, show that residuals are not serially correlated and for the Breusch-Pagan-Godfrey heteroscedasticity test the assumption of equal variance is maintained, hence, OLS is applicable here. The normality test correlation test and heteroscedasticity test results show that residuals are normally distributed and that null hypotheses of serial correlation and heteroscadasticity are rejected for the Government expenditure on health model with second order autoregressive scheme.

The same goes for primary and secondary school enrollment models. The test results show normal distribution of residuals, no serial correlation and absence of heteroscadasticity (Table 2).

Starting the discussion of results with the government expenditure on education, initial government spending on education is positive (0.659) with significant effect on the current spending. This demonstrates that past efforts on human capital development trend into the present. In contrary, the lag value of government expenditure on health is significantly negatively (-0.617) related to current spending on health. Hence past health expenditure patterns seem not to favour the present. Age dependency ratio (8.895), employment rate (1.229) and life expectancy (5.953) largely impact positively on government expenditure on education. Most importantly, increasing population within the age range of compulsory education can stimulate government preparedness to spend more on attaining quality education.

Similarly, for the government expenditure on health,an increasing employment rate encourages knowledge attainment through education and subsequently more spending on education. Longevity

sustains more expertise and thus encourages more spending on education, as a longer life expectancy complemented by a long period of wealth accumulation gives rise to more investment in human capital.The employment rate (0.910) facilitates government expenditure on health and has a lower impact compared to its impact on expenditure on education.

Government effectiveness and gross capital formation impact negatively on both education and health expenditures. The negative coefficient of government effectivess is a measure of low quality of governance in the system. In the same way, concentration on accumulating unproductive investments retards spending on both education and health.

For the other category of human capital measure, initial primary school enrolment relates positively (0.567) with current levels of enrollment. Hence, past education tend to encourage more education, particularly as more people are willing to accept new training.The same is true forthe initial level of secondary enrollment (0.324) but with lower impact on the current level. Age dependency ratio influences both primary and secondary school enrollment positively. An increasing dependency ratio increases the desire for both levels of education, but more so for primary education. Interestingly, employment rate is positive (7.936) and significantly related to secondary enrollment but negatively related to primaryschoolenrollment (-0.564). Thus, a greater level of employment encourages secondary education compared to primary school education. Quality of governance lowers primary school enrolment, as indicated by the negative value(-0.147), but improves secondary education (0.113). Life expectancy is significantly and positively related to secondary education while its effect on primary enrollment is on the reverse.

The models appear adequate as confirmed by the probability F-statistics (0.000),especially for government expenditure on education, primary and secondary school enrollment models.

CONCLUSION AND POLICY IMPLICATIONS

The paper examined the relationship between human capital investment and employment growth during the period 1980-2019. A weak structural adjustment programme together with ineffective stabilisation policies have not changed the trend in unemployment rate in Nigeria. Undoutedly, the government is making aneffort toensure alow level of unemployment but this has not yet been achieved as expecte. In most cases, the low level of output resulting from a low level of industrialization and human capital investment has been a fundamental issue. Due to frustration from the unemployment crisis, the few cases of human capital development are accompanied by brain drains as opportunities arise abroad. This is indeed a major withdrawal from the domestic economy and injection to foreign ones; moreso that individuals are trained again to acquire further skills. There are many ways out of this persistent problem.The major one is focusing on massive investment creation in education infrastructure, particularly technology that can ensure a better quality education. This will encourage the skilled, semi-skilled and unskilled workers in Nigeria through demonstrating hidden positive talents.Nigerians are creative if they can be encouraged. Health infrastructure should be available and well equipped to keep productive labour in good health conditions.Resarch and development should be stronglyencouraged, as this will usually inceasethe extent of collaboration of ideas, particularly on the need to improve human capital. Electricity and road infrastructures for national and international routes should be put in good shape to further stimulate more trade integration and investment opportunities. In the long runthese measureshould improve employment opportunities and subsequently investment in human capital.

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The Value Innovation of Symphony Orchestras and the Triggering Effect of Coronavirus

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SUMMARY

The current coronavirus situation both gives an opportunity to the organizations and forces them to change and rethink fundamentally their business models. The pandemic causes an extremely difficult situation for symphony orchestras, as they have to cancel their performances and redefine how to reach their audience. Either they follow a Red Ocean Strategy and lose significant revenue or develop a Blue Ocean Strategy and prosper. The Blue Ocean Strategy involves a value innovation that can be achieved by four actions (eliminate, reduce, raise, create) and taking advantage of the opportunities offered by digitalization. After briefly reviewing the concept of business model innovation, the article gives an overview of some novel aspirations, attempts and projects selected from international and Hungarian symphonic orchestral life to provide excellent examples of how the value proposition can be redefined and how the expectations of the 21st-century audience can be met.

Keywords: culture management, business model innovation, symphony orchestra, digitalization, Blue Ocean
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INTRODUCTION

The economic effects of the coronavirus are immeasurable for the time being, although it is clear that the world is facing a major challenge. It is considered as a "neglected risk", as companies and organizations have considered the challenges caused by an infectious disease quite unlikely (Ramelli & Wagner 2020). Naturally, the medical impacts of the virus are the most urgent however, the economic effects are likely to be as crucial as the medical ones due to the fact that the virus has also affected the economically most important nations (Baldwin & Tomiura 2020). Many companies are temporarily pausing operation worldwide, universities and schools had to change to distance education, organizers had to postpone all kinds of events. Moreover, in many countries it is prohibited to walk on the streets without a good reason. The emergency actions can cause a significant loss of income for the actors involved in the economy. Organizations which can react quickly – or can react at all – to these new circumstances will be able to survive this period and may gain competitive advantage. In the case of those which cannot tailor their operation to the present situation, survival is questionable. The current situation poses especially great difficulties for organizations of the cultural sector which deal with performing arts, as concerts and performances – providing the basis of their operation – have become impossible. In order to gain "immunity" to the virus, business model innovation and digitization are essential.

PROPER MANAGEMENT THINKING: VALUE INNOVATION INSTEAD OF REDUCING COSTS

A manager could easily come up with the following innovative, cost-saving suggestions for symphony orchestras:

1. the presence of the conductor at the concerts is unnecessary, as he has already taught the piece and given instructions to the orchestra during the rehearsals;
2. in some parts of the piece, the four oboists do nothing: it would be advisable to reduce their number and distribute the task evenly, in order to avoid suddenly

getting so much work that one person is not enough for it;

3. all violinists play the same thing, which is unnecessary duplication, as one person could play the given parts (and when big band sound is needed, the desired effect could be achieved by electronic sound amplification);

4. there is no point in the horn repeating the part that the strings have already played, and omitting the redundant parts could significantly shorten the piece, which could result in less salaries being paid (Pemberton 2014).

It is obvious that all of the suggestions above would greatly reduce costs, although it is also clear that these are not real alternatives: orchestras have to follow artistic aspects to create quality productions. However, this does not mean that business thinking is incompatible with focusing on cultural values and artistic activity. The question, in fact, is how to simultaneously control or even significantly reduce costs and greatly increase the value provided to the customers. This article highlights the importance of management thinking by presenting some innovative symphonic orchestral solutions, business model innovations that fundamentally change the way orchestras operate: reshape the revenue structure, allow new audiences to be addressed, or redefine value provided to consumers.

BUSINESS MODELING FOR CONTINUOUS VALUE INNOVATION

The business model represents the operational logic of the organization – in other words, the system of "business" ("how the organization creates, delivers and captures value," Osterwalder & Pigneur 2010, p. 14) – and focuses on the way that value is created. Business modeling tools are not only suitable for reviewing the operation of for-profit companies. They can also be used in the case of non-profit organizations, as every organization must have a business model: in order to survive, revenues must cover the costs of creating and delivering value.

In a rapidly changing world, however, no business model is forever; it needs to be continuously improved in order to survive and operate successfully. Thus, in the case of symphony orchestras, it is not enough to rely on the existing repertoire and follow traditional models. Without innovatively rethinking their operation and "services", orchestras will find it difficult to win against other segments of the entertainment industry (e.g., pop music concerts, cinemas) in the competition for people's leisure time (Radbourne & Arthurs 2007). Business model innovation is therefore needed to ensure the prosperity of orchestras in the 21st century. Business model innovation means that there is a significant change in one or more elements of the organization's business model (Horváth et al. 2018).

Red Ocean means the known "market place" where industry boundaries and the rules of competition are known and organizations want to benefit more from current demand by defeating each other. The more organizations appear on the market, the lower the potential for growth is. In contrast, Blue Ocean is an untouched marketplace that provides opportunities for profitable growth and creating new demand. The way out of the "bloody" struggle and the way to maintain a competitive advantage is to formulate new value propositions and to map new ways of value creation and delivery (Kim and Marbougne 2005; Matthyssens et al. 2006). An essential element of the Blue Ocean strategy is value innovation, which can be defined by answering the following questions:

1. Which elements can be **eliminated** that were taken for granted before?
2. Which elements can be **reduced** below the industry average?
3. Which elements can be **increased** compared to the industry standard?
4. Which elements can be **created** that the industry has so far not offered to consumers?

By reshaping the value provided for consumers, the organization can achieve a more customer-oriented approach and address potential future customers as well (Lauer 2019). Value innovation can be reached by redefining the business model and the standards of an industry (Berghman et al. 2012). Compared to the traditional orchestral operating model, such innovative solutions can be recognized both on the international scene and in Hungary; examples of these are given below.

RETHINKING THE REVENUE STRUCTURE

In the frame of their corporate social responsibility (CSR) activities, companies often happily sponsor classical music organizations, including symphony orchestras, which can be beneficial for them from both a social and a business point of view: it helps to achieve business goals and contributes to the preservation of classical values (Ásványi 2014). Sponsorship is an important part of the revenue structure of symphony orchestras; however, in the current situation affected by the coronavirus, orchestras cannot rely on the support of companies that are also facing difficulties. In order to survive, orchestras have to look for new ways by rethinking either the revenue structure or the value proposition.

Recently, many orchestras have created a "friends of the orchestra" – a group for supporters –in order to build a core audience and have a more personal connection with the concert-visiting audience. By charging membership fees, this also provides a new source of funding. Events and community building programs for members strengthen audience engagement. For young people, several orchestras create a separate group (see,

for example, the Young Friends of the Festival Orchestra Budapest or the Junge Freunde der Berliner Philharmoniker) with programs and events that address younger people. This also helps to solve the problem of audience renewal by creating and nurturing the next generation of concert-goers. Keeping in touch with the friends and supporters of the orchestra helps the organization to better understand the opinions and needs of customers and can even be used to channel innovation ideas from outside. As many researchers emphasize, customer orientation and the integration of the "voice of the customer" into business model innovation is essential (Wirtz & Daiser 2018, Pynnönen et al. 2012).

An excellent example of crowdfunding, which is very popular today, is the "sound investment" typically used by English orchestras. It means that the coverage of the costs of the composition and performance of a given contemporary piece is created by breaking down the required amount into smaller units (sound tickets), which are sold among those who are interested. In return, the "investors" are invited to rehearsals, have the opportunity to meet the composer, receive a dedicated score and are kept up to date with the progress of the piece. (ABO, 2010). Similarly to the above mentioned "friends of the orchestra" groups, it also provides an opportunity to get to know the opinion of the audience better, involve them, and nurture public relations.

INNOVATIVE REPERTOIRE – ADDRESSING AND INVOLVING NEW AUDIENCES

We can often hear about the problem of the aging audience of classical music. The average age of visitors to classical music concerts is between 50 and 60 years; classical music is not part of the lives of most young people (Váradi 2010; Figaro 2013). In order to have a music-lover core audience in the future as well, great attention must be paid to reaching out to new segments, especially younger people, and expanding the target market. In this process, it is essential to get to know the target audience of the performances and the special needs, expectations and interests of each customer segment, as this makes it possible to expand the aging audience (Šimic & Pap, 2019). Today's consumers, especially the younger ones, typically appreciate creative, innovative productions, demand active involvement and multi-sensory experiences, and evaluate performances mainly along the functional (quality, price, location) and emotional (production-related emotions) dimensions (Ercsey 2014). Having recognized this, many orchestras have come up with innovative repertoires and productions: they integrate different genres and branches of art into their programs, come up with a novel concept, or look for unusual concert venues.

An excellent example for mixing genres is the Cincinnati Symphonic Orchestra (Ohio, USA). The members of the orchestra founded the Cincinnati Pops Orchestra, which draws from a wide range of musical styles and genres and gives highly successful, popular concerts in a symphonic orchestral lineup. They have collaborated with famous artists such as Ella Fitzgerald (jazz), Henry Mancini (film music), Dave Brubeck (jazz) or John Williams (film music). Besides the pieces of Mozart or Beethoven, their repertoire also includes movie soundtracks (such as Star Wars, Harry Potter, Shrek, Madagascar), pieces by famous, deservedly popular pop music singers (such as Whitney Houston), musicals, background music of stunning natural (such as the Wonders of America) or scientific films (One Giant Leap - exploration of outer space) and live concert shows with movie screenings (Cincinnati Symphony 2020).

The repertoire of the Charlotte Symphony (North Carolina, USA) also features novel productions in addition to the classical ones. The "Pops" series offers entertainment from the disco music of the '70s to soul, swing, jazz classics to Broadway hits. The "Movie" concert series features popular movies (such as Star Wars, Jurassic Park, Polar Express) in a unique way: the soundtracks are played by the orchestra while the film can be viewed on a giant projector (Charlotte Symphony 2020).

The Brooklyn Philharmonic has integrated hip-hop into their production: it has given a free concert in one of Brooklyn's neighborhoods with one of the genre's most popular rappers. The basic goal of the orchestra is to tailor the performance to the needs of the current audience. In this case, the integration of hip-hop was the way to the local community (Woolfe 2011).

Such crossover productions can be recognized in the case of Hungarian orchestras as well: many of them have applied the concept in the domestic market. For example, the Dohnányi Orchestra of Budafok has created its Cinemusic series, which focuses on performing movie soundtracks in the same way as the above-mentioned Charlotte Symphony. The orchestra also gives concert shows which integrate other music genres and branches of art as well (BDZ 2020). The Philharmonic Orchestra of Győr is about to premiere – besides other movie concerts – its production called Amadeus Live which features the movie "Amadeus" with live orchestral accompaniment (GYFZ 2020). The Danubia Orchestra of Óbuda also regularly performs movie soundtracks, has created its Danubia Pops series with the classics of pop music, and has a musical stand-up comedy show as well (ÓDZ 2020).

Reaching a new audience is not only possible with an innovative repertoire. Many orchestras try to engage a wider range of consumers with unconventional concerts that adapt to the rhythm of young people's lives. The Midnight Music concert series of the Budapest Festival Orchestra offers an alternative entertainment opportunity for those who prefer late-night programs: the audience can enjoy a concert colored with interesting reviews of the pieces performed while sitting on beanbags or lounging among the

musicians – by breaking the conventions and leaving the formalities (BFZ 2019). The "Spicy Classics" series of the South Netherlands Philharmonic reflects a similar concept: classical pieces are performed in a modern way, while the members of the audience can even have a beer if they want (Bijsterveld 2019). The "Night/Light" concerts of the above-mentioned Cincinnati Symphony Orchestra also focus on an unusual concert experience and try to create an informal atmosphere: at the concerts start at 11:30 p.m., the audience can enjoy the music with a glass of wine in hand, by candlelight (Cincinnati Symphony 2020).

EXPLOITING THE OPPORTUNITIES OFFERED BY DIGITIZATION AND ROBOTIZATION

Digitization opens up new ways for the orchestras to rethink their value proposition and also to reach and address audiences in an unusual way. Nowadays, "digital thinking" is essential in the field of cultural management as well (Hunt, 2019). Live concert streaming is no longer a novelty; however, the Berlin Philharmonic's *Digital Concert Hall* project was the first initiative which used social media to broaden the audience globally by making the orchestra's excellent concert recordings available to consumers around the world via the Internet (Digital Concert Hall 2019). Thus, the audience can access the orchestra's recordings or even live concerts anytime, anywhere. This also provides an opportunity to reach a new audience: the concept can be attractive to those who, while open to classical music, cannot appear in person for any reason (e.g., remote location, schedule, other tasks/programs). Furthermore, it is a great way to reach out to young people who prefer listening to music at home and often consider the traditional concert form uncomfortable (Figaro 2013). Since the concert experience is not the same through the screen as live, no orchestra has to worry about losing current audiences. The application of the concept is more likely to result in the involvement of new audience members, while the existing core audience may "consume" more. Today's online viewers can be tomorrow's ticket buyers. Nowadays, almost all orchestras – both international and Hungarian – make available previous concert recordings and live performances by online streaming, which is currently gaining even more importance in the pandemic situation.

Another interesting example of the exploitation of opportunities offered by digitalization is the San Francisco Symphony's "SoundBox" program, which aims to redefine the concert experience. The venue for the program is one of the orchestra's rehearsal rooms, and the concert hall resembles a cozy bar where guests can enjoy the concert with a cocktail or beer in their hands. Thanks to the modern technological, audiovisual solutions and effects, viewers can feel as if they were in a cathedral or – just a moment later – in an underground club, while the volume and complexity of the music is constantly changing. The musical experience is enriched by video installations projected on the walls, which dynamically adapts to the current environment (SF SoundBox 2020). During the program, the artists also put emphasis on interactions with and involvement of the audience. The innovative performances of SoundBox have great audience success; tickets are usually sold out within a few days.

One of the most innovative projects of the digital age can be linked to the name of the Detroit Symphony Orchestra: in 2008, the orchestra was conducted by a Honda Asimo robot (Ovshinsky 2008). The initiative is not unique: the Tokyo Symphony Orchestra performed Beethoven's 5th Symphony conducted by a robot (Rojas 2004), while the Japanese-developed "Alter" robot debuted in 2018 as conductor (RobotReporters 2020). Of course, it is questionable whether a robot can really replace the conductor, since every movement and facial expression can be significant. However, these novel experiments undoubtedly point out that digital transformation is present in all areas of life and is constantly shaping our everyday lives.

DIGITALLY MATURE ORCHESTRAS ARE "IMMUNE" TO THE CORONAVIRUS

The importance of digitization has become even more obvious nowadays: due to the worldwide coronavirus epidemic, orchestras and theaters have had to cancel all of their performances. The only way they can share concerts, performances and reach the audience has become the Internet. Many orchestras make their previous recordings available and give online performances – quarantine concerts - without an audience, in most cases for free. The orchestras are also trying to put emphasis on maintaining personal connection with their audience: they are creating behind-the scene-videos which provide an insight into the lives and practice habits of their musicians. The previously reviewed orchestras are taking their part in online education as well by creating listening guides to famous musical pieces, musical coloring books or docu-series about renowned composers (Swed 2020; Voynovskaya 2020).

Some unique and brilliant ideas can be recognized in the case of Hungarian orchestras as well. For example, in the frame of the "Open a window for music" campaign, the MÁV Symphony Orchestra provided access to music to everyone from two cars cruising in Budapest and playing previous recordings of the orchestra (Walker, 2020). Just to give another example, the Danubia Orchestra of Óbuda – after creating its successful video called "Symphony orchestra at home office" featuring a famous Hungarian folk song – has started its project "Musicians working from home –

Seriously" ((O)tthonról (D)olgozó (Z)enészek – Komolyra fordítva). In the mini-videos of the project, some musicians perform a pop song in the style of a famous classical composer in chamber music format (ÓDZ 2020).

It is clear that coronavirus is not a few-day-long challenge for which a temporary solution must be sought. Current forecasts suggest that the epidemic will last for several months, and consumer habits are expected to undergo irreversible changes, too as people are becoming financially more vulnerable (Mogaji 2020). Furthermore, similar cases can occur at any time for which orchestras have to be prepared. As a result, orchestras (and in a broader sense all kinds of organizations) need to fundamentally rethink their business models. In the current situation, more "digitally mature" organizations have a significant advantage over those that are just beginning to explore the possibilities; however, it is not too late for those either to innovate their business models. Business model innovation can be implemented efficiently and effectively through the collaboration of artists and economic professionals who are experts of the methodology. As Köves et al. (2020, p. 219) highlight, "art and science can be natural allies of each other" - it is therefore worth exploiting the synergistic opportunities offered by the cooperation.

CONCLUSIONS

To sum up, we have compared the innovative solutions and experimental productions (Blue Ocean Strategy) described in detail above with the "traditional" (Red Ocean Strategy) symphony orchestral performances in terms of the experience and value provided to consumers (Figure 1).

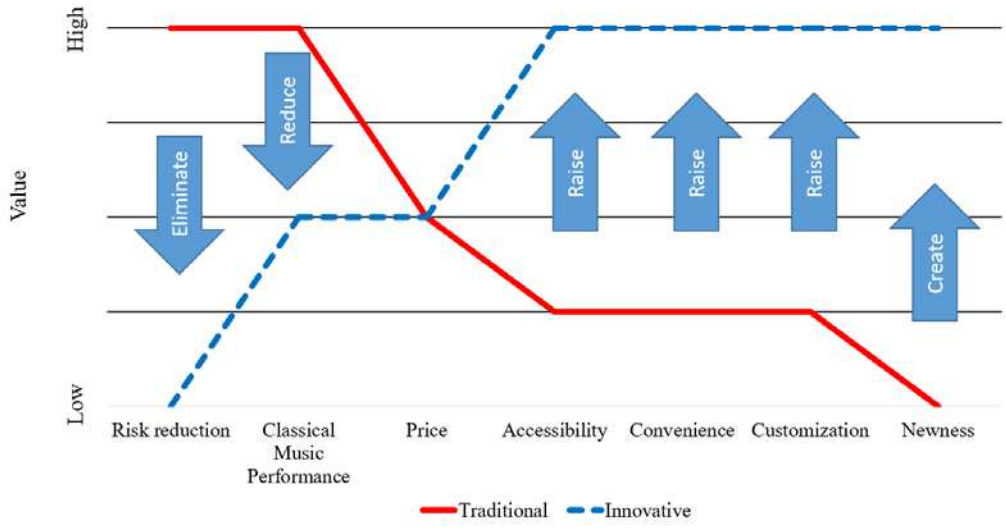

Figure 1. The value innovation of symphony orchestras

Traditional symphony orchestras are repeatedly offering a high quality classical music performance which means low risk (high value) to the customers. Innovative solutions are eliminating the risk reduction value proposition by surprising their customers with something new. The innovative repertoire helps orchestras reach new audiences, including younger people, while leveraging digital opportunities helps to reach audiences in a novel and perfectly convenient way and to redefine the concert experience.

The number of classical music performances is reduced, but innovative performances are more accessible, convenient and customized to the customers. Location is not restricted to concert halls – clubs or other unusual concert venues can be selected, and moreover, digital broadcasts can be listened to anywhere. The pricing of an innovative production is on average at the same level as a traditional production, but the range is different; innovative productions can be more expensive, on the other hand, many are available for free. Newness has many sources, such as integrating classical music with other musical genres and branches of art, or offering a multisensory experience. Of course, innovative approaches and experiments do not guarantee immediate success, but the fact that an initiative is not well received at first does not mean that it cannot become successful in the future.

This article highlights the importance of orchestras being able to respond to the changing needs of consumers and adapt to changes in the world. Such a change is, for example, the current coronavirus epidemic, which affects all sectors and creates challenges for all organizations – including symphony orchestras.

It is important to note that all innovations become standard after a while and are no longer considered as "extras" by consumers. As Lauer (2019) emphasizes, if there is a newcomer on a market with a different operating model and value proposition, the traditional players also start reshaping their strategies towards the new direction, thus a convergence can be observed. This has happened with many of the previously described innovative ideas that are widespread nowadays. If other organizations start applying the same concept, the competitive advantage resulting from it disappears. Thus, new solutions and ideas are always needed: long-term success is not possible without continuous innovation, experimentation and rethinking of the operation. All organizations have to create a value proposition and a business model that is appropriate to their market segment and have to handle the changes of our world. Uncertainty is, of course, a natural feature of innovation - let us recall that most of the composers who are very popular today were pioneers in their age!

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Digitalization, Quality of Life and Purchasing Power

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SUMMARY

The World Economic Forum stated that while digitalization caused a rapid productivity growth, it has also had its disadvantages. Can digitalization be the catalyst of economic development? Our hypothesis contributes to the debate that the higher the level of digital development in a given country, the greater the quality of life and purchasing power it can achieve due to the benefits of various digital technologies. In our research, we investigated the relationship between the Digital Economy and Society Index (DESI), the Quality of Life Index (QLI) and the Purchasing Power Index (PPI) among the EU countries from 2014 to 2019. We acquired datasets from Eurostat and Numbeo and examined correlations between indices. We found a strong positive relationship between the level of digitalization, the quality of life, and the purchasing power.

Keywords: digitalization, ICT, transformation, European Union, middle income trap
Journal of Economic Literature (JEL) codes: E00, E01, E20, E21, I30, I31
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INTRODUCTION

Digitalization is the driver of the Fourth Industrial Revolution. Bojár (2018), on the other hand, considers the name of the Fourth Industrial Revolution to be misleading. In his view, the essence of the processes taking place today and in previous decades can be grasped more accurately by the paths of IT development, moreover he rather writes about the Third IT Revolution. Besides, there are three degrees of the concept "digitalization" used in everyday life (of which only one is actually digitalization itself): (1) digital processing, (2) digitization/digitalization, and finally (3) digital transformation (Leonhard 2016). Digital processing means the conversion from analog to digital form. Digitization/digitalization is more than digital processing in that digital technologies are integrated into (business) processes. During digital transformation, organizations (e.g. companies) completely transition their operations into digital ones. In this study we examine the digital transformation of the economy and society and its relation to the quality of life and the purchasing power.

Digitalization and the various solutions associated with it significantly rearrange the production efficiency of each country (Kovács, 2017a). This has a positive effect on the country's global competitive market position, so it also serves further long-term development. However Kovács (2017b), Bajmócy et al. (2019) and Lukovics et al. (2018) raise the question of whether digitalization has only positive effects. Bajmócy et al. (2019) suggest that digitalization only regenerates social inequalities as it helps developing each economy, meanwhile Lukovics et al. (2018) raise concerns in connection with autonomous driving and its further regulations.

The effects of digitalization on quality of life and purchasing power

Digitalization itself does not directly affect quality of life and purchasing power, but digital technologies stimulate innovation (Falk & Biagi 2015); moreover, the integration of digital technologies into the operation of companies improves productivity. Entrepreneurial managers (Hortoványi 2012) are making a number of new digital products and services available to a wide range of consumers that improve their quality of life and purchasing power. Quality of life and purchasing power can also be improved by creating new jobs, but it is important that if this is the case ('growth model'), it only can be sustainable if it is employment-intensive (Georgescu & Herman 2019). On one hand, digitalization brings about a higher standard of living, but on the other hand, a higher standard of living enables to achieve a higher digitalization level by meeting rich customer's higher expectations (Hecht 2018). This could lead to a vicious spiral, where the rich become even richer.

At the same time, the quality of life and purchasing power of the poorest working groups could be significantly improved. An important challenge for policy makers is to reconcile pro-growth and pro-poor policies. As stated in the World Economic Forum's 2017-2018 report (Schwab 2018), a new growth model is needed that prioritizes the citizens of each country and the goal of improving their living standards. These types of measures would induce "real" growth instead of later "intention". Schwab (2016), in an earlier study, emphasizes great concern over the challenges what Industry 4.0 could induce concerning rising inequalities and welfare.

One such potential growth path is reindustrialization. The study of Nagy et al. (2019) examined how re-industrialization takes place in the ten new EU member states, if it has started, and what similarities can be discovered compared to the processes taking place in the EU15. As the intention to re-industrialize has already arisen not only in the official documents of EU, but also in the economic policies of some EU Member States, the urgency of the issue is clear. The study also examined what new division of labor could result from the Fourth Industrial Revolution among individual EU member states. With the help of a decomposition study, they came to the conclusion that, with the exception of a few countries (including Hungary), the growth of the manufacturing sector compensates for the negative labor intensity effect, therefore not only the sectoral GDP, but also the number of employees could increase.

In their study, Nevado-Peña et al. (2019) discovered a clear link between the assessment of the quality of life of the inhabitants of a given country and the technological characteristics of the affected (geographical) area. Niebel (2018) also suggests that economic development strongly correlated with digitalisation (ICT usage). Accordingly, the life satisfaction rate increases in parallel with the achievement of different technologies and higher levels of ICT readiness. Citizens living in cities with higher ICT capacity or a high uptake of digital solutions are more in need of sustainable and inclusive economic growth. Finally, the use of ICT by technology users leads to a better assessment of the efficiency and governance of public administration, emphasizing the importance of understanding between users and public services in the virtual sphere. However, Pozdnyakova et al. (2019) see a further restructuring in employment. From their perspective Industry 4.0 ends up in further (specialist) job losses due to the machine-induced reduction in human participation in production.

At the same time, the outbreak of the COVID-19 pandemic is creating a new economic environment in which companies face new challenges. The impact of the virus-induced situation affects each company differently. Fletcher and Griffiths (2020) highlight that the situation caused by the epidemic should lead to a different kind of behavior to encourage firms. According to them, different companies should implement higher-level digital solutions, the future of less digitally developed companies is questionable, and companies that are more digitally advanced can offer more flexibility.

Based on the aforementioned debate, we have formulated the hypothesis that the higher the level of digital development in a given country, the greater the quality of life and purchasing power the country can achieve due to the benefits of various digital technologies.

MEASUREMENTS AND DATASETS

The Digital Economy and Society Index: DESI

DESI is the official index of the European Union for measuring the level of digitalization in the EU-28 countries. DESI is a composite index consisting of five main and several sub-indicators which shows the digital performance of European countries and the development of the digital competitiveness of the EU Member States. The main components of the DESI index are: (1) Connectivity, (2) Human Capital/Digital Skills, (3) Use of Internet Services by Citizens, (4) Digital Integration of Digital Technology by Businesses, (5) Digital Public Services.

In 2019, Finland ranked first among EU countries with a DESI of 69.9, while Bulgaria came in last with a DESI of 36.2. Hungary ranked 23rd out of 28 countries with a DESI value of 45.4.

Quality of Life Index: QLI

Measuring quality of life and, more broadly, well-being is relative. The standard GDP/capita indicator, which has been in use for many years, is becoming increasingly questionable. Researchers and world organizations are suggesting the introduction of additional soft indicators, including the Well-Being Index (Global Wellness Institute 2019), the Human Development Index (United Nations 2019), and the Happiness Index (Helliwell et al. 2020). Indicators that address such issues try to measure social well-being and its essence at the macro level rather than at the micro level.

At the same time, the development of a country's well-being is closely linked to its labor market performance. In the study of Fülöp (2018), the researchers' opinions examined by him differed on the expected effects of digitalization on the labor market. Nábelek et al. (2016) suggested approximately 500,000 jobs would be lost in Hungary, while Frey and Osborne (2017) predicted the loss of 47% of American jobs. Although there are pessimistic views about the labor market (and thus indirectly welfare) effects of digitalization, the level of digital development can also open up new opportunities for a country, thereby promoting the development of social welfare and the quality of life. Concerning digitalization, Frey and

Osborne (2017) as well as Cavaglia and Etheridge (2020) found that income distribution was different for routine and non-routine jobs. Frey and Osborne (2017) showed the risks of technological unemployment, while Cavaglia and Etheridge (2020) pointed out that digitalisation solutions induced higher labour demand.

However, the measurement of social well-being is questionable as some authors have a different point-of-view. Maasoumi and Racine (2016) suggest further research and indicator constructs to measure social well-being more effectively, which truly reflects the wellness of each country. Seth and Yalonetzky (2020) criticised later deprivation measurements. The authors highlight the need for differentiation concerning deprivation between 'the poor and the poorest' for better policymaking.

A popular way for measuring quality of life is QLI, which consists of 6 main components: (1) Cost of living and purchasing power, (2) Affordability of housing, (3) Pollution indicators (including air, water, etc.), (4) Crime rates, (5) Health system quality, and (6) Commute times. The indicator can only be a positive number higher than 0, and its highest value was below 200 in the examined period. The indicator (in 2019) reported the values of 71 countries, of which Hungary ranks 41st (134.47). The highest value was achieved by Denmark (198.57) and the lowest by Egypt (83.98 (Numbeo, 2019a). It should be noted that for the periods examined, the QLI indicator was not available for all EU Member States in each year (e. g. Cyprus, Luxembourg and Malta 2019 data were missing).

Purchasing Power Index: PPI

Local Purchasing Power Index (Numbeo, 2019b) shows relative purchasing power in buying goods and services in a given city/country for the average net salary in that city/country. If domestic purchasing power is 40, this means that the inhabitants of that city/country with an average salary can afford to buy on an average 60% less goods and services than New York City residents with an average salary.

The indicator's value can only be above 0. In 2019 Qatar had the highest value with 138.3, which was followed by Switzerland (129.7), Germany (116.2), and Denmark (114.39). The countries with the worst values were Albania (33.81), Ukraine (32.72), and Moldova (30.75). Hungary took the 29th place (54.66) among the 40 continental European countries (Numbeo 2019b).

RESULTS

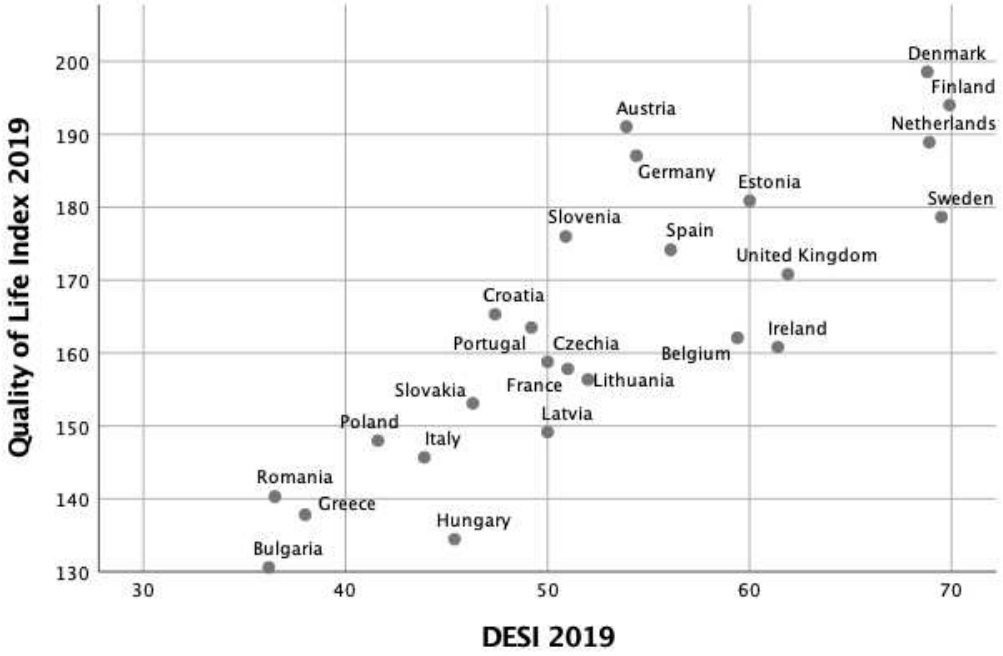
The relationship between digital development (DESI) and quality of life (QLI)

Our examination can be divided into three main findings (Table 1). On the one hand, the digital development and quality of life indicators (for the same period) show a strong positive relationship (Table1, Figure 1). Thus, digitally developed countries have a higher quality of life. On the other hand, the relationship is also strongly positive regarding the change of these indicators from 2014 to 2019. Therefore, the increase in digital development has been accompanied by an increase in quality of life. Thirdly, there is a strong negative relationship between periodic indicators and periodic change indicators. This means that in more digitally developed countries, the development of digitization and quality of life grew more slowly than in less developed ones (convergence can be observed). This is understandable, since the higher the level of digital development or quality of life in a country, the more difficult it is to achieve progress in both digital development and quality of life.

Table 1.
The relationship between Digital Economy and Society Index (DESI) and Quality of Life Index (QLI)

			1.	2.	3.	4.
1.	DESI 2019	Pearson Correlation	1			
		Sig. (2-tailed)				
		N	28			
2.	QLI 2019	Pearson Correlation	.835**	1		
		Sig. (2-tailed)	.000			
		N	25	25		
3.	DESI change from 2014 to 2019	Pearson Correlation	-.759**	-.778**	1	
		Sig. (2-tailed)	.000	.000		
		N	28	25	28	
4.	QLI change from 2014 to 2019	Pearson Correlation	-.839**	-.790**	.675**	1
		Sig. (2-tailed)	.000	.000	.000	
		N	23	23	23	23

**. Correlation is significant at the 0.01 level (2-tailed).
Data source: Eurostat (2019) and Numbeo (2019a)



Data source: Eurostat and Numbeo

Figure 1. Simple Scatter of Digital Economy and Society Index (DESI) by Quality of Life Index,

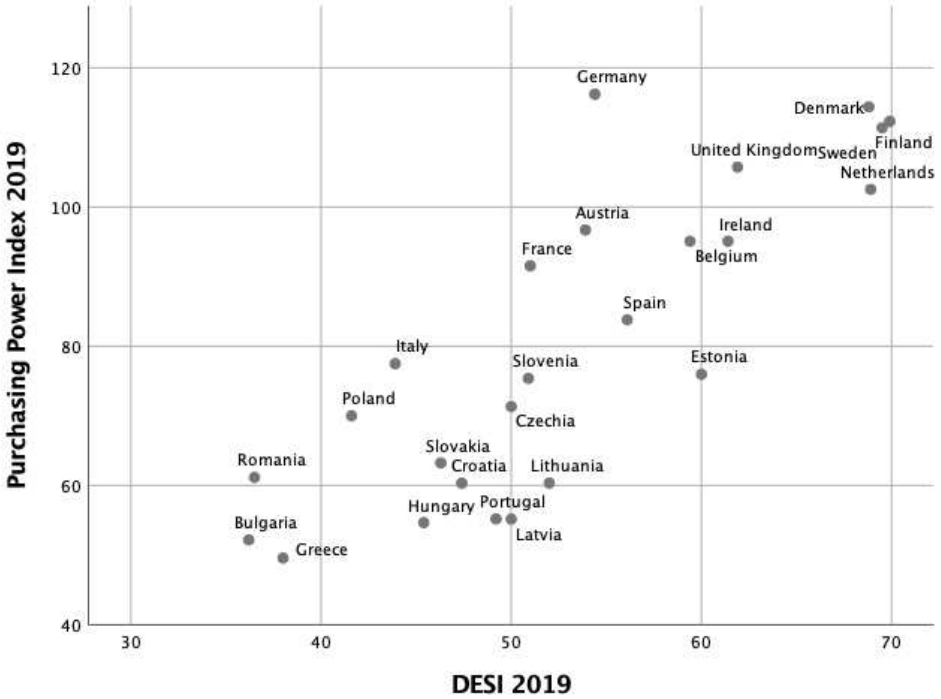
The relationship between digital development (DESI) and Purchasing Power Index (PPI)

Each country's purchasing power and quality of life have a strong relationship with each other. That is why we have examined the relationship between Purchasing Power Index and DESI (Table 2, Figure 2). In this case, two conclusions can be drawn. Firstly, the digital development and purchasing power indicators (for the same period) show a strong positive relationship. This means that the more digitally developed a country is, the higher the purchasing power level it achieves. Secondly, there is a moderate negative relationship between periodic digital development and periodic purchasing power indicators; however, digital development have a significant negative effect on the increase of purchasing power.

Table 2.
The relationship between Digital Economy and Society Index (DESI) and Purchasing Power Index (PPI)

			1.	2.	3.	4.
1.	DESI 2019	Pearson Correlation	1			
		Sig. (2-tailed)				
		N	28			
2.	PPI 2019	Pearson Correlation	.824**	1		
		Sig. (2-tailed)	.000			
		N	25	25		
3.	DESI change from 2014 to 2019	Pearson Correlation	-.759**	-.741**	1	
		Sig. (2-tailed)	.000	.000		
		N	28	25	28	
4.	PPI change from 2014 to 2019	Pearson Correlation	-.376	-.485*	.295	1
		Sig. (2-tailed)	.085	.022	.182	
		N	22	22	22	22

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
Data source: Eurostat (2019) and Numbeo (2019b)



Data source: Eurostat and Numbeo

Figure 2. Simple Scatter of Digital Economy and Society Index (DESI) by Purchasing Power Index.

CONCLUSIONS AND FINAL REMARKS

Our study contributes to the international debate on whether digitalization is a positive or a negative phenomenon. We examined relationships between the digital development, the quality of life and the purchasing power in European Union countries and found strong correlations. There is no significant changes regarding the order of the countries whether we are examining digitalization, quality of life, or purchasing power (Figures 1 and 2). Based on our results, digitalization contributes to improving the quality of life and the purchasing power, and these indexes can co-evolve even in developed countries. Hungary's digital development, quality of life and purchasing power is lower than the European Union average; however, based on the results, there is a possibility for convergence.

The results show that digitalization has a positive impact on broad layers of the economy and society. Therefore, the Fourth Industrial Revolution is not limited to IT or just industry, but affects all organizations and industries. Digitalization creates many opportunities to offer new products and services and thereby create new jobs. It can also help in increasing employment and in the inclusion of marginalized, poor sections of society.

Thus, while we can talk about a positive phenomenon overall, it is important not to forget about the potential losers and challenges. The losers of digitization will be countries, companies and individuals who are unable to rapidly disseminate, integrate or use digital technologies in their activities, or cannot cope with the challenges raised by digital technologies. Therefore, an efficient digital transformation is especially important for Hungary and for the prosperity of the people living here.

Acknowledgement

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How Did Reciprocity Evolve in Online Communication? Turnout of Reciprocal Altruism

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SUMMARY

Why do we help strangers on the Internet? Sharing our experience, knowledge, or information does not involve a large investment of energy, yet users often expect to be rewarded for sharing their personal resources. Economics and other disciplines call this type of exchange reciprocal altruism. The present research introduces different types of altruism and then deals with reciprocal altruism. It describes how this form of selflessness can appear in social media. The aim of the research is to create an overview of Hungarian and international research, which is the first step of a long-term, comprehensive research project.

Keywords: Altruism; Reciprocity; Knowledge Sharing; Social Community
Journal of Economic Literature (JEL) codes: D64, O35
DOI: http://dx.doi.org/10.18096/TMP.2020.02.11

INTRODUCTION

Online social networks are communication channels that allow information and knowledge to be shared and exchanged between people around the world. They have remodelled the traditional "face-to-face" form of social contact and contributed to cross-border networking. Although users have access to vast amounts of information and knowledge with the spread of online social networks, it is doubtful that they will expect reciprocity for sharing their own knowledge (Chang & Chuang 2011). This form of mutuality is the so-called reciprocal altruism, which is not a familiar concept in various disciplines. Most people have limited time, energy, or other resources, so they often expect a reward in return. Reciprocity is a very effective incentive for knowledge sharing and self-image building, especially in online communities (Davenport & Prusak 1998).

In our study, we use the academic literature to explore the concept of reciprocal altruism and illustrate its presence on online social media through various cases. We are examining, how reciprocity, as a type of altruistic behaviour can affect online knowledge and resource sharing, and how altruism can evolve on online social media sites.

THE CONCEPT OF RECIPROCAL ALTRUISM

Altruism is a dominant form of behaviour. Many researchers, sociologists and economists – (Piliavin & Charng 1990; Samuelson, 1993, Michalski 2003), etc. – have studied altruism; however there is no unified definition on it. The creation of the concept is attributed to the 19th century French philosopher Auguste Comte. In his view, altruism is an instinct that is the opposite of egoism and is related to selflessness. From time to time, researchers have raised several questions. Does any pure, selfless help actually exist? Are there different types of altruism? Sociologists seek social behaviour, so they base their thoughts on Comte's conception. Psychologists, however, regard altruism as a hidden egoism, because according to their view selfless behaviour is connected with additional reward. Proponents of the theory of evolution link altruism to behavioural genetics. According to Richard Dawkins: "An apparently altruistic act is one that looks, superficially, as if it must tend to make the altruist more likely (however slightly) to die and the recipient more likely to survive. It often turns out on closer inspection that acts of apparent altruism are really selfishness in

disguise" (Dawkins 1989, pp. 80-81). In his work *The Selfish Gene* (1989) Dawkins submitted many ideas and cases of a gene-centred view of evolution. To explain altruism, he also presents some cases from the world of animals. 'An entity, such as a baboon, is said to be altruistic if it behaves in such a way as to increase another such entity's welfare at the expense of its own. Selfish behaviour has exactly the opposite effect. 'Welfare' defined as 'chances of survival', even if the effect on actual life and death prospects is so small as to seem negligible. One of the surprising consequences of the modem version of the Darwinian Theory is that apparently trivial tiny influences on survival probability can have a major impact on evolution. This is because of the enormous time available for such influences to make themselves felt" (Dawkins 1989, p. 13). In the economic approach, according to Hámori, altruism can be defined as the application of others' prosperity into the individual's welfare function (Hámori 2003, p. 59).

In another study, Hámori points out that

> "[…] according to the development of economics over the last two to three decades, it examines the motivations of beyond self-interest and cases of propitiousness and viciousness. Onto the characters of the economy particularly the underdeveloped one, the envy and wicked joy changes individual utility functions and creates a connection between individual utilities. In the same way, altruistic and compassionate economic actors, whose survival has been questioned for a long time, not only exist, but with their manner »magnetize« the behaviour of selfish actors who contact them. As a result of this cooperation, they act »as if« they are selfless." (Hámori 1994, p. 510)

These concepts do not fully cover altruism, as definitions may differ even within disciplines, depending on which type of altruism is appearing. Here and now, we assume that in pure altruism the individual does not expect any reward in return for his selfless act. In selfish altruism, the individual is driven by his or her own interests and is only seemingly selfless.

In kin altruism, the closer is kinship; the more common is altruistic behaviour (Karajz 2018). In 1964, the American evolutionary biologist William D. Hamilton found a connection between altruistic behaviour and evolutionary selection, also referred to as Hamilton's rule. Hamilton relied on relative selection, according to which a person's genes are present not only in direct posterity but also in relatives. If altruists help their relatives to survive or reproduce, these relatives also develop a gene which is disposed to selflessness, that they can pass on to descendants. The more common genes are shared by relatives, the more certain they are to pass altruistic genes on (Hamilton 1963). In his work *The Evolution of Altruistic Behavior* (1963), Hamilton revealed the terms of theory: "It follows that altruistic behaviour which benefits neighbours irrespective of relationship (such as the warning cries of birds) will only arise when (a) the risk or disadvantage involved is very slight, and (b) the average neighbour is not too distantly related" (Hamilton 1963, p. 355).

According to Hamilton, the reason for the evolutionary spread of altruistic behaviour is the mechanism of kin selection. According to one of the basic tenets of the theory, the evolutional suitability of an individual depends on the extent of genes that the individual is able to pass on to the next generation. Each descendant inherits 50% of each parent's genes, which means that half of both paternal and maternal genes passed on to the next generation. Thus, in the case of four descendants, both parents double their genetic representation. However, copies of an individual's genes are not only carried by descendants, but also by other relatives, depending on the extent of kinship. The measure of common genes between relatives is shown by the so-called Coefficient of Relationship (r), first defined by American geneticist Sewall Wright in 1922. According to this coefficient, siblings share 50% of their common genes (r = 0.5), while first cousins share 25% (r = 0.25) (Hamilton 1964) .

There are examples of Hamilton's rule seen not only among humans but also among animals. One of the most frequently mentioned examples is observed for squirrels. In case of danger, ground squirrels signal each other with whistles, but in same time, they also draw the attention of the predators. However, the study showed that the purpose of the signalling is to warn those living in nearby hollows, although endangering their own safety. The study also showed that females in the nearby hollows usually mate with related individuals. Males wander at a young age, while females settle in a nearby hollow (Bereczkei 2009). Hamilton provided a scheme of four social behaviours with their effect on actor and recipient (Table 1). If a behaviour is beneficial for both actor and recipient it is a mutual benefit, if a behaviour is beneficial for only one party is selfishness or altruism, if a behaviour is disadvantageous for both it is labelled spite (West et al. 2006).

Table 1.
A Hamiltonian classification scheme for social behaviours

		Effect on recipient	
Effect on actor		**+**	**-**
	+	*Mutual Benefit*	*Selfishness*
	-	*Altruism*	*Spite*

Source: (West et al. 2006)

A non-related type of altruism is reciprocal altruism, a type of "exchange of gifts" where the individual expects a return in exchange for selflessness in the future. This differs from selfish altruism in that the altruist does not expect reciprocity from the recipient and in a specific situation, but trusts that another individual will later act in an altruistic manner. Henceforth, reciprocal altruism will be the focus of the study.

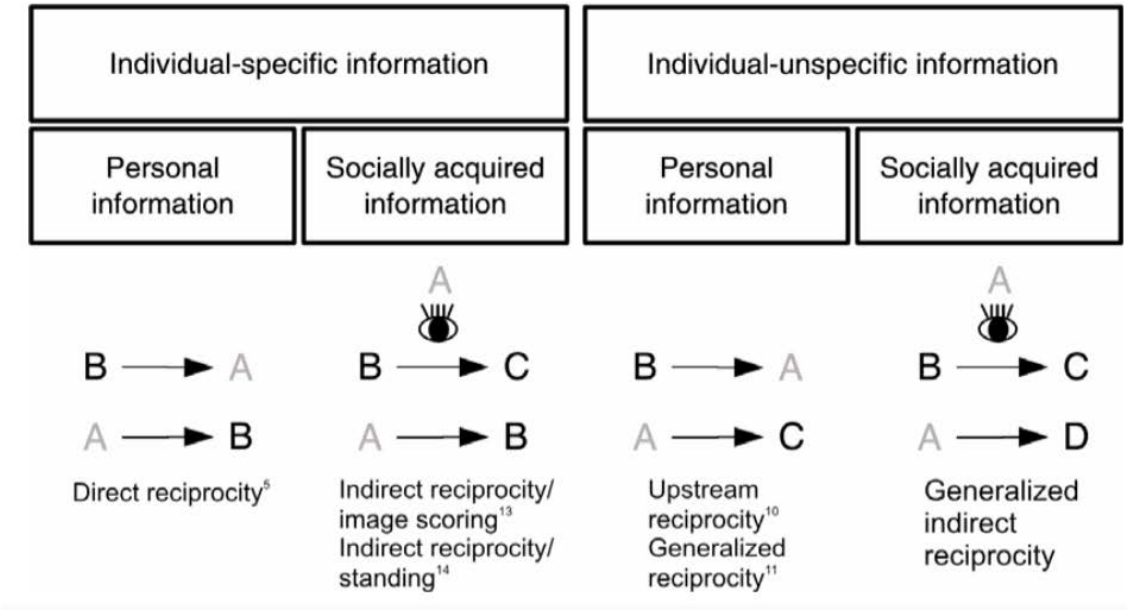
Reciprocal altruism is one of the most common turnout of altruism. Robert Trivers (1971) was the first to deal with this topic in detail, arguing that it is worthwhile to behave altruistically in long run, since selfless acts pay off later, and if the favour is reciprocated, kinship is not a premise. Imagine that two participants, strangers to each other, get into a distressed situation. Selfless action from one of them can be an advantage for the other, who can repay this act later to help us solve a serious problem. There are four conditions for reciprocity. One is the positive profit-loss balance, i.e., the amount of benefit caused by selflessness is greater than the cost to the assisting party. The second condition is the return of selflessness, that is, the existence of a circumstance which may justify cooperation. The third condition is to maintain a constant relationship, while the fourth is the existence of social intelligence by which fraudsters can be filtered out. In certain social situations, altruistic behaviour is explained by various emotional influences such as gratitude, guilt, anger or joy. Different emotions develop during the practice of reciprocal altruism in order to meet the above conditions. Trust, sympathy, and friendship are qualities that strengthen relationships with individuals who have reciprocated selflessness. Aggression, egoism and greed appear in individuals who have not reciprocated altruistic behaviour, thus cooperation is not worth maintaining (Trivers 1971; Bereczkei 2003).

According to the economic view, reciprocal altruism connects two actors: the victim and the beneficent. In this view, Christopher Stephens (1996) argues that further conditions can also be met with reciprocal altruism. In addition to the four conditions listed by Robert Trivers (1971), Stephens points out that the number of mutual assistance situations does not needed to be known. If the participants know in advance the number of collaborations, the last cooperation would no longer make sense, as it will no longer be reciprocated (Stephens 1996). In the case of altruism, however, there is always uncertainty. If someone does a favour to a certain person, that person – even if through no fault of his or her own – may not be able to return the favour later. Therefore, one of the most important components of reciprocal altruism is trust. Reciprocal altruism can be described as a kind of exchange relationship, more precisely as a clearing system for charities, but it is also a community of risk. Reciprocal altruism can also interpreted as risk sharing.

In order to guaranteed the benefits of mutual favours, in most cases we need to belong to a well-defined network. The bigger and tighter the net, the safer it is (Hámori 2003). Such networks can be formed not only among the players presented in the market, but can also be a circle of friends or a university group. Trust can also reduce the costs for actors, as cooperation in the other party awakens respect and propitiousness, and those who are respected can acquire financial benefits (Pinker 2009; Golovics 2015). Trust also leads to opportunistic behaviour. Advance of trust results in a long-lasting relationship, and the parties do not assume that either of them could abuse the situation. Breaking up a long-term relationship of trust is far more unfavourable than fraud for instantaneous gain, because if either party notices the fraud, trust-based cooperation leads to failure. It is beneficial for both participants to ignore situations that bring momentary benefits but undermine cooperation in the long run.

Researchers Rutte & Pfeiffer (2009) demonstrated a model (Figure 1) of the mechanism of reciprocal altruism with help of computer simulation. The authors found that "mechanisms for the evolution of reciprocal altruism may rely on personal or socially acquired information about the behaviour of other individuals. This information may be individual-specific or unspecific" (Rutte & Pfeiffer 2009, p. 1573). Figure 1 shows that individual-specific information can be gained through both personal information (by direct action with the environment) and socially acquired information (by observing the behaviour of others). Socially acquired information is used when personal information is not available or is costly. In these cases, direct reciprocity happens when individual A helps individual B, because they helped each other before. In indirect reciprocity, measures of reputation (image scoring and standing) apply. Individual A took notice that B helps C. Because of B's reputation (either it is image scoring or standing), A helps B. Individual-unspecific information is not ascribed to a specific individual, it can be anonymous. In generalized reciprocity, A receives help from B and then B helpsC. In generalized indirect reciprocity, A took notice that B and C had been cooperating; therefore, A helps D. Generalized indirect reciprocity is

[...]a mechanism for the evolution of cooperation based on marks that are (inadvertently) left in the environments from cooperative or non-cooperative actions. In an untidy place, for example, people may tend to care less to deposit waste in the waste bin than they do in a clean place. Such behaviour might be adaptive because it is not advantageous to invest in cooperative actions where it is unlikely that the investment will be reciprocated. Marks are pieces of socially acquired information that cannot be associated with a specific individual. (Rutte & Pfeiffer 2009, p. 1577).



Source: (Rutte & Pfeiffer 2009, p. 1574)

Figure 1. Mechanism of reciprocal altruism relied on individual-specific and individual-unspecific information.

Rutte and Pfeiffer showed that various strategies expand based on behaviour and interaction in the evolution of reciprocal altruism. In reciprocal altruism, many other aspects can appear, like the so-called "goods of trust", such as knowledge. One of the greatest values of the information society is knowledge and the capability of sharing. Through Internet connections and on social media, it is even truer that the sharing of trust and knowledge increasingly contributes to the building of lasting cooperation (Hámori 2003).

RECIPROCITY IN SOCIAL MEDIA

The community of Internet users is constantly growing: the share of households with Internet in Hungary in 2018 was 83%. This proportion increased by an average of 4.5% per year since 2010, and the proportion of frequent Internet users is 76%. The Hungarian population is also active in the use of social media, as 86% of them participated in some kind of social network in 2018. This figure is even higher than the EU average (65%) and The Visegrad Group (cooperation between the Czech Republic, Hungary, Poland and Slovakia, what focus on the construction of democratic systems) average (66%) (KSH 2018). The National Media and Infocommunications Authority in their latest report discriminated six different type of Internet users in Hungary (N=4000): net-aholic youth (5%), multi-communicatives (10%), versatile and skilled (17%), social media avoiders (16%), almost average (28%) and basic level browsers (23%). Among *net-aholic youth*, the time spent actively using the Internet is far above average (11,6 hours/day), they are typically young people (43% under 30). *Multi-communicatives* are the "champions" of online communication and social life. They have the widest range of used browsers to surf the Internet, also this group representing the highest proportion of graduated members (37%).The usage of social media sites is significant among *versatile and skilled,* who represent the second lowest average age group (age 37.4), and this group has the highest proportion of active workers (79%). This group have high rates of Internet use, visiting social networking and online entertainment sites are also great above average, however average activity in terms of online communication. The main feature of the group of *social media avoiders* – as can be judged by their title –is the conscious avoidance of social media, and this group has the highest proportion of men (60%). The most populous group is represented by the *almost average*. They slightly have outstandingly strong or weak characteristics; however, in the use of social media, especially the use of, they are significantly above average (100%). It is also worth to mention that this group contains the highest proportion of women (62%). *Basic level browsers'* Internet usage skills are lag behind other groups. They use the Internet mostly on one device (laptop or phone) usually at home exclusively for browsing and e-mailing. Taking the whole sample as a basis, the most frequently used social media site is still Facebook, which is followed by YouTube. The most common activity for social media users is "liking". In addition, women are more active then men in liking, posting or sharing (NMHH 2020).

The use of social media is significant, not only in Hungary, but in most parts of the world. Social media is

a tool that creates connection easily with different communities. Social networks are forums of a personal nature where users often reveal information about themselves that is often sensitive or intimate. Shared content can be seen as self-unfolding and self-presentation by users (Hubert 2016). Before we dive into a deeper overview of social media, it is important to mention Web 2.0., a platform built on community, whose contents are no longer created by service providers, but instead by users. According to Kaplan & Haenlein (2010) Web 2.0 is a platform for the ideological and technological evolution of social media. The authors mentioned that Web 2.0 has created a new cultural knowledge that requires only minimal competence and technical proficiency from the user, and a mass of people participate in the production of media content. O'Reilly links the success of blogs, wikis, tagging, and ultimately Web 2.0 to new representations of the wisdom of crowds. For example, by liking, the user connects new information to a specific text, image, or video, creating new content. By clicking on the link, other users confirm their opinion, creating a route that search engines, such as Google itself, register and take into account when ranking results. In this way, the wisdom of crowds creates a new kind of knowledge (O'Reilly 2007). Social media are Internet-based applications that are based on Web 2.0 and allow online interaction in order to obtain content or opinions and to create and share attitudes, insights, media and relationships with each other.

By strategic aspects, there are many categories of online social media, like blogs (both personal and corporate), micro-blogs (Twitter), collaborative projects (Wikipedia), content-sharing pages (Flickr, YouTube etc.), virtual worlds (Second Life), social news sites (Reddit), social media sites (Facebook, LinkedIn), or trading community (eBay) (Markos-Kujbus & Gáti 2012). According to Kietzmann et al. (2011) there are seven functional building blocks of social media, which can provide an instrument for understanding their mechanism for operation. The first one is *presence*, which characterizes the availability of users on each social media platforms. Then *identity*, which represents the extent of users revealing themselves. *Dialogues* represent the path of communication of users, where motivation, content and frequency are also key factors. *Sharing* is the exchange of several exchange of contents between users. *Relation* describes the affection and love for somebody. There is a strong connection between relation and identity: the higher the identity within social media, the higher the relationship is rated. *Reputation* describes how users esteem themselves. The main indicators are strength, availability, emotion and passion. Last, *groups* refer to communities or sub-communities, which are the basis of social media. There are two main types of groups: one is the type that is open for everyone, the second the type that is clarifying their connections and organizing them in different groups. Qi et al. (2018) compared four theoretical perspectives – Goffman's self-presentation, Bourdieu's social capital, Sartre's existential project, and Heidegger's shared-world – in relation to social media to get better understanding of human's social media usage behaviour. Erving Goffman's theory of self-presentation (Goffman 1959) provides a comprehensive picture of the strategies we use when we want to be recognized or liked. When we enter a social situation, we show a "facade" of ourselves. It is a constant set of traits, "an impression to others that lies in accordance with one's own interest" (Qi et al. 2018, p. 96). In the life of social media, people use this platform to present themselves as better than they actually are. For example micro-blogging sites like Twitter provide short messages that can be viewed publically and spread through shares and likes. Users can use this platform as a theatre, where they can play a role, showing only the "front stage" of themselves to others and controlling their impressions. Pierre Bourdieu's theory of social capital (Bourdieu 1986) is a complex set of resources that are based on belonging to a group. This social capital held by a group member serves as warrant and strengthen credibility in front of other members of the group. This social network is a product of investment strategies that are consciously or unconsciously aimed at establishing and maintaining social relations, which eventually promise direct benefits. For producing social capital, regular contact is essential. In the case of social media, the importance of strategy decisions in posting or sharing is crucial. The wide range of people that can be reached on social media can spread online social capital, and build an image of oneself. Jean-Paul Sartre's existential project (Sartre 2007) – in short form – states that existentialism is an endeavour that proclaims the primacy of existence over essence. "According to Sartre, behind each human, we need to discover a unity of his or her life. This unity is related to responsibility, and this responsibility should be personal. This unity is also the unity of the person, and the person should be free to perform this unity" (Qi et al. 2018, p. 98). Users can use online social media for "experimenting or finding justifications related to diverse aspects of their identity, including sexual, cultural, or ethnic characteristics" (Qi et al. 2018, p. 99). In the last theory, Martin Heidegger's shared-world (Heidegger 2010) is about a connection of our act in the past, present and future, which is characterized by concern and taking care for others. An individual's acts or thoughts are a reference to their loved ones. This mutual care is also expressed in the future by the way the individual will care about someone, whom they does not know yet. Social media sites allow people to consolidate identities: "when using Facebook, the behavior of users can be related to both their past and their future projects. The past appears in Facebook status updates; the present is seen in terms of what is going on; and the future appears through the intentions of the user or through a user's continuous use of Facebook" (Qi et al. 2018, p. 99). A relation between some typical characteristics of social media use and each theoretical finding is suggested in Table 2.

Table 2.
Theories appearing in social media

	SOCIAL MEDIA
Goffman's self-presentation	• Social media is like a theatre play, where I conduct a performance; I play a role • On social media, I present myself in order to influence my audience • On social media, I want to control the impressions that others form of me
Bourdieu's social capital	• The main purpose of social media is to build social capital, which may lead to economic capital in the long run • For each possible post, I should evaluate my hopes and the objective chances of success • My strategies on social media come partially from dispositions and are influenced with external conditions
Sartre's existential project	• My contacts on my Facebook or WeChat hold a secret – the secret of who I am • On social network sites, I identify myself in the way my contacts look at me • The world should be revealed to my contacts through me
Heidegger's shared-world	• The meaning of my posts on social network sites to those who matter to me is that I care for them • I want to tell them on social network sites that my concern for them is constitutive of my identity • On social network sites, I want to tell those I care for that the existence of others defines me

Source: (Qi et al. 2018)

There are different influences for using social media, such as collective social consciousness, certain personality traits, specific social situations, but also altruism. Virginia Anne Killian (Killian 2013) examined the incentives of using social media and pointed to three needs: respect, security, and the need for recognition (so-called "ego maintenance"). In her descriptive model, she classified altruism in the category of self-promotion, including self-affirmation, as in all cases the idea of charity and selflessness increased the self-esteem and social capital of the participants. The literature has already dealt with the psychology of social media in studies – (Újhelyi 2014; Wilson et al. 2010; Evans et al. 2012) – as it also contributes greatly to the development of corporate social media sites.

Eddleston and Kellermanns (2007) examined the presence of altruism in family firms. According to their results, it can be said that altruism reduces the extent of conflicts and increases the willingness of cooperation. Smooth communication is essential for knowledge sharing. Altruism is conducive to this and creates a space for knowledge sharing (Eddleston & Kellermanns 2007; Chang & Chuang 2011). This is especially true for social media, as it allows unlimited communication. However, it is important to note that social networking sites allow users to be free and behave on their own schedules, which makes it harder to stay in touch. Knowledge sharing is more common among users that are more active. Frequent presence results in reciprocity, as users are more likely to share information with those with whom they are in constant contact, as feedback is presumed.

Altruistic behaviour greatly increases user satisfaction and is related to building trust. Sharing information and experiences on social media increases user satisfaction as they take pleasure in helping others. This is especially true for groups with similar interests. Group members share information with each other to improve their self-image, and gain respect and recognition, thus increasing members' trust in each other. This is not only typical for relatives or groups of friends, but also on the social pages of online shops and businesses, where customers can provide feedback on the quality of products/services. Online marketers use the tools of psychology to monitor the impact of altruism on user behaviour. Reciprocity can also be observed in these cases, as users expect some reward (respect, recognition, reputation) in exchange for sharing the knowledge (Shiau & Chau 2015).

Ma & Chan (2014) discussed the motivation for online knowledge sharing using four measures: perceived online attachment motivation (POAM), perceived online relationship commitment (PORC), online knowledge sharing behaviour (OKSB) and altruism (ALT). Their key findings were that perceived online attachment motivation has both a significant and direct effect on perceived online relationship commitment and online knowledge sharing behaviour,

and altruism has a significant and strong effect on online knowledge sharing behaviour. According to their explanation: "Altruism is important to families, communities, and organizations as it promotes bonding by fostering loyalty, interdependence, and commitment to long term prosperity. We propose that altruism is especially important in social media environments in which communities are formed based on common interest" (Ma & Chan 2014, p. 56).

Other online platforms like blogs have become a significant way for knowledge and information distribution. A blog is also a form of social media community, as it gathers individuals with similar interests. Hsu & Lin submit, "In the past, knowledge sharing was viewed as a transaction process of knowledge markets, where the knowledge buyers and sellers needed to have reciprocal benefits from the exchange. Thus, expected reciprocal benefits, reputation, altruism and trust were considered as the incentives for knowledge sharing. Nevertheless, factors contributing to the sharing intention were likely to vary in the blog community due to its characteristics" (Hsu & Lin 2008, p. 66). Their results showed that individuals participating in blogs were motivated by the joy of helping each other with knowledge sharing. Enjoyment and easy utility were important factors, and "gain(ing) a sense of belonging" also motivated participants (Hsu & Lin 2008).

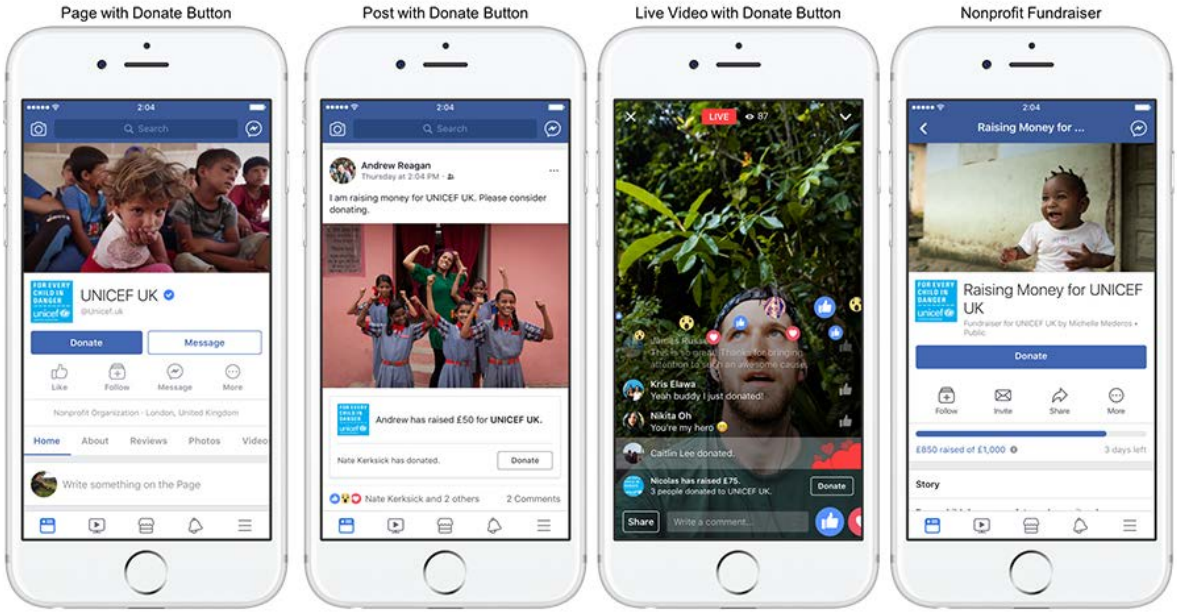
Another study found out further interesting results about online knowledge sharing. Pee (2017) examined whether the need for knowledge and knowledge sharing in Wikipedia was connected with altruistic behaviour. With a survey (N=323) he found that "[…] Wikipedia users who perceive a greater knowledge need in the community tend to perceive less forgone benefit of free riding and have a stronger knowledge sharing intention. In sum, others' need influences one's knowledge sharing due to utility interdependence. […] A potential explanation for the insignificance of level of knowledge is that the objective indicator of education level does not fully reflect one's level of knowledge and the capacity to provide knowledge in Wikipedia" (Pee 2017, p. 845).

New forms of expressing altruism are turning up in digital forms and forums. Cambridge professor and social psychologist Sander van der Linden (2017) identified a trend, so-called "viral altruism", which he described as a situation when "the altruistic act of one individual directly inspires another, spreading rapidly like a contagion across a network of interconnected individuals" (van der Linden 2017, p. 1). Social cause campaigns use viral altruism as a tool for raising donations. Linden labelled these campaigns as SMART acts, which is the acronym of social influence (S), moral imperative (M), affective reactions (AR), and translational impact (T). These kind of campaigns go viral very rapidly and influence the public to be a part of a social cause, triggering off a very strong emotional reaction. Although the course of viral altruism is fast, "viral social campaigns can effectively capture the attention and support of mass audiences, but in order to make viral altruism stick, more gradual and deeper engagement with a social cause is required over a sustained period of time" (van der Linden 2017, p. 3).

However, altruism does not only appear in thematic online community groups. Volunteerism is also related to altruism, as it defined as "a helping action of an individual that is valued by him or her, and yet is not aimed directly at material gain or mandated or coerced by others" (Til 1988, p. 6). The four main components of volunteerism are free will behaviour with no reward; aiming to help strangers on a long-term basis. Volunteerism is an organized and formal method of altruism (Haski-Leventhal 2009). Mejova et al. (2014) summarized with her co-authors (Mejova et al. 2014) summarized the factors that affect individuals in online volunteering in four points: individual capacities and willingness, the individual's range of interest, social influences, and external influencing factors, such as non-profit advertising. Their results show that positive returns also influence volunteerism, like benefit to self (for instance non-profit foundations share their results with volunteers), and benefit to others (a non-profit organization does a major act such as buying vital medical equipment for a hospital).

Social networking sites like Facebook, Instagram or Twitter have a so-called "click-to-donate" interface where practicing altruism is just a click away. Non-profit businesses are increasingly taking advantage of the opportunities offered by social media. Altruism has a significant impact on the social environment. The simplicity of click-to-donate has allowed users to do good with one click, and this altruistic behaviour encourages corporate social responsibility (Klisanin 2011).

Social media sites, like Facebook provide several possibilities for click-to-donate activity (Figure 2). Not only non-profit organizations can use these tools but also personal fundraisers can collect donations for personal causes (small businesses, collecting money for friends, etc.).



Source: Cooney (2017)

Figure 2. Variations of click-to-donate and fundraising via Facebook.

Facebook started fundraising action in 2015, and according to its own statements, the donations for non-profits and personal causes were more than US$2 billion over the world since then (Facebook 2020). Unfortunately, Facebook and other platforms do not provide available and detailed statistics about their fundraising activity; however, the most popular fundraisers are approachable. Since the breakout of COVID-19, the need for donations has became urgent; according to recent data (May of 2020) from the WHO, more than $214 million has been raised since the epidemic outbreak (United Nations Foundation 2020). On Facebook, the top two most popular fundraisers are CDC Foundation, in the name of Combating the Coronavirus, and United Nations Foundations, in the name of COVID-19 Fundraiser for WHO. Both fundraisers had collected more than $6 million from the end of March 2020 until May.

In the use of social media fundraising tools, Conolly (2012) found other interesting results. Her research has shown that altruistic behaviour and charity is related to the frequency of social media use. Users who visit social media sites more frequently are more willing to donate than less active users. Users' online social capital (number of acquaintances, amount of participation in groups, etc.) also influences the extent of charity. Connolly's research has also shown that commitment to a profession is related to altruistic behaviour. Careerists are more active in seeking new relationships and more committed to their own self-image, so they see charity as a means of building their careers. Social pressure also increases the prevalence of digital altruism. The active participation of a valued person in charity has an influence on the behaviour of acquaintances. Social pressure also plays a role in self-image. The more charity you make, the more positive your charity's recognition will be, thus it is increasing your self-esteem. In this case, reciprocity is valid, following the principle of "expect good in place of good". Users expect a higher degree of recognition and self-esteem in return for their altruistic behaviour (Connolly 2012).

CONCLUSION

Altruism can be rather diverse in both physical and digital environments. Through many studies and cases, we provide an overview about the classic presence of altruism from different disciplinary perspectives. It is hard to choose only one aspect, or a single definition that can fully cover the essence of altruism. Altruism is a form of selfless act that depends on several aspects (cost of the act, size of the reward, stage of kinship etc.). Although reciprocal altruism does not depend on relation, it also has many forms (direct or indirect reciprocity, etc.). Studies about reciprocal altruism in online communities provided an outline of how digital altruism can influence knowledge sharing, promote self-esteem or boost donations.

As a summary, we created an overview about the main findings of altruism in social media (Table 3). With help of content analysis, we collected the main factors of altruism in general appearing in social media to get a better understanding of users' behaviour. We created two groups: one is the premises of altruism; other is the effects of altruism. These premises are the most common factors prompting altruistic acts, which lead to several effects. Reciprocity plays a leading role, as it is crucial toward a long-term altruistic act.

Table 3.
Factors of altruism that affect users' behaviour on social media

ALTRUISM IN SOCIAL MEDIA	
PREMISE	• frequent presence
	• possibility of feedback/reward
	• smooth communication
	• similar interests
	• enjoyment
	• utility interdependence
	• commitment
	• social influence
	• simplicity
	↳ RECIPROCITY
EFFECT	• reduces the extent of conflicts
	• increases the willingness of cooperation
	• increases user satisfaction
	• builds trust
	• improves self-image
	• fosters loyalty
	• creates positive recognition
	• influences others' altruistic behaviour
	• increasing the number of acquaintances

Source: own editing

The research that we presented in this study provide an insight into the emergence of online altruism, but mainly deals with international viewpoints. The Hungarian literature focuses more on the traditional appearance of altruism, so in our following studies we will focus on Hungarian cases as well. Henceforth, it is worth examining two topics; the relationship between online knowledge sharing and reciprocal altruism, and between online volunteerism and reciprocal altruism.

The constant technological renewal of social media presents new opportunities for researchers. Users' online behaviour and attitudes are constantly changing, so their attitudes towards selflessness and altruistic behaviour are always evolving.

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