REVIEW OF ECONOMIC AND BUSINESS STUDIES

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RELIABLE SIGNALS AND LIMIT CONDITIONS FOR AUTOMATED TRADING SYSTEMS

CRISTIAN PĂUNA[*]

Abstract: *Automated trading software is a significant part of the business intelligence system in a modern investment company today. The buy and sell orders are built and sent almost instantly by computers using special trading and computational strategies. The trading decisions are made by automated algorithms. In this paper it will be presented one of these mathematical models which generate trading signals based only on the time price series. The algorithm combines several known computing techniques to build a trading indicator to automate the trades. With this method, buy decisions on oversold intervals and sell decisions on overbought price values can be built. Limit conditions in order to close the long and short trades can be also automatically generated. More trading signal types based on this model will be revealed. Trading results obtained with all these signals will be presented in order to qualify this methodology developed especially for algorithmic trading.*

Keywords: *financial markets (FM), trading signals (TS), limit conditions (LC), algorithmic trading (AT), automated trading software (ATS)*

JEL Classification: *M15, O16, G23, M21*

1. INTRODUCTION

In the business intelligence system of any modern financial investment company, the ATS have a central place nowadays. "The purposed objective of the ATS is to generate profit" (Păuna, 2018). The trading decisions are computed through mathematical algorithms. The buy and sell orders are built and sent almost instantly by specialized servers using advanced computational techniques. Similarly, the closing trade decisions are made also automatically by special procedures. This paper will present a mathematical model which can be used with good results to build automated trading orders to entry on the financial markets and also to implement the automated exit decisions in algorithmic trading.

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"Buy the market after it's dropped; not after it's risen" (Connors, 2009). The questions are when a market is dropped enough in order to take a buy decision with a reasonable risk and when the price has increased enough in order to exit the buy trade or to sell? How to take these decisions? And how to automate them? The model presented in this paper will permit to answer all these questions. Being exclusively a mathematical model based on the price time evolution, the algorithm can be easily implemented in any ATS in order to automate the trade process.

The trading methodology presented here uses several well known computation techniques as exponential and weighted moving averages (Cox, 1961), relative strength index (Wilder, 1986) and inverse function of the Fisher transform (Ehlers, 2004), knowledge that will not be presented in this paper. A first objective of this article is to reveal how all of these techniques can be combined together in order to build a reliable trading indicator. The developed method is practically the inverse Fisher transform of the relative strength index of the smoother exponential moving average of the time price series. We will call this indicator Inverse Fischer Smoothed RSI, on short IFR.

Another purpose of this paper is to describe how the buy and sell decisions can be automated using the IFR function. The last target is to build limit conditions based on the IFR indicator in order to stay away the market on the overbought and oversold price periods, to reduce the exposed risk. These limit conditions can be combined with any other trading methodology in order to increase the trading profitability. Some real trading results will be also presented in the last chapter in order to have a measure for the efficiency level of the presented trading method.

2. THE MODEL

The development of the method starts considering a price time series given by open, high, low and close values for each time unit in a considered time interval. The time unit is not important; the method can be applied for any timeframe. As we can see in the figure 1.A., the price series gives us no clear indication about the next movement. In addition, due to the price volatility differences, the price makes ample moves in some intervals and small amplitude movements in others. Using only the price graph we cannot take an automated decision to know when is good to buy or to sell.

One of the objectives of the IFR method is to find the intervals when the price is overbought or oversold. With other words, we want to find those intervals

when the price is close to change its direction. If those intervals will be found, trading and limit conditions can be set in order to manage the trading decisions.

First step is to reduce the time price series to a smoothed price line, a line that can represent the movement of the main price trend. There are several known methods to convert the price time series to a smoothed price line. Simple moving averages with a short periods (Cox, 1961), polynomial, trigonometric or least square regressions (Berbente, 1997) or simple Spline lines interpolation functions (Reinsch, 1967) can be used in order to figure the price evolution in time.

In the presented model, for simplicity, the smoothed price line (SPL) is given by a 4 period weighted moving average. The SPL can be shown in figure 1.A. overlapped with the price graph. The SPL function is still in the price space and has values in accordance with the current price evolution. We will note (SPL$_i$) the SPL value for each (i) time unit. The next step is to reduce this function to another one in a much limited interval space.
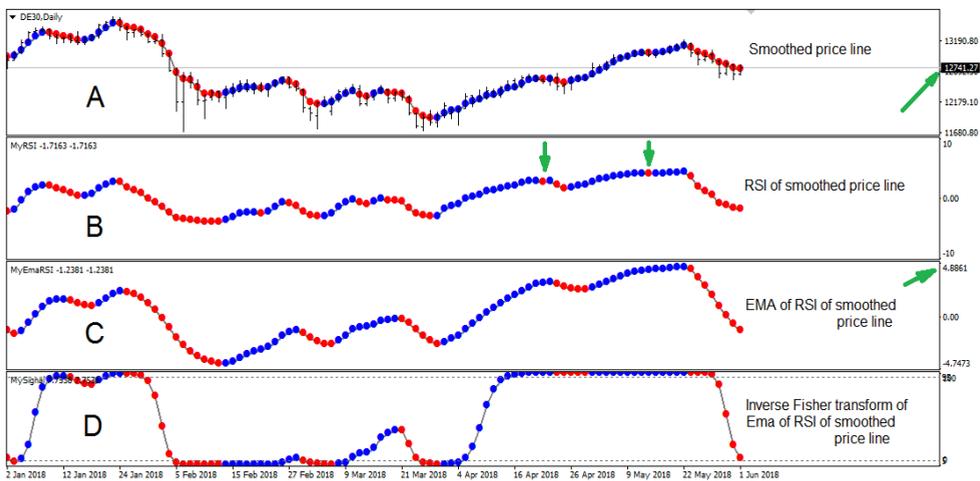
Figure 1. IFT of EMA of RSI of SPL (IFR) for DAX30 index

Applying the relative strength index (RSI) methodology to the SPL function we will obtain the graph represented in the figure 1.B. We will note the values of this function for each time unit with (RSI$_i$). The variation of this function is limited into a smaller interval as we purposed.

As we can see in the figure above, due to the price volatility, the RSI function presents some false direction points. There are moments when the function is not decided about the next direction. After a small down movement the value is going up and down again after a little while. This is happening often when

the price is close to change the direction. We wish a better function with no such of undecided movements. An attenuation method can solve these false points. The next step is to apply the exponential moving average (EMA) technique to the RSI function in order to attenuate the values.

The EMA permits to obtain a more stable function practically with no time delay for this case. The results can be seen in the figure 1.C. With a 10 period EMA, the values noted with (EMA_i) are more stable and the unstable cases of the (RSI_i) values were filtered. To determine the intervals where the price is overbought or oversold a new transformation must be used. For the known advantages we will use the Fischer transform function, in this case in the inversed form.

We will apply the inverse Fisher transform function to the (EMA_i) values with:

$$IFR_i = \left(1 + \frac{e^{2*EMA_i} - 1}{e^{2*EMA_1} + 1}\right) * \xi \qquad (1)$$

The new function is drawn in the figure 1.D. The ξ parameter will permit to change the scale of the IFR function. With $\xi=50$ the function will take values the interval [0; 100], as it is presented in the figure above.

The IFR function is the final function of our model, their values noted (IFR_i) have a similarity in variation with the price function and gives us more information about the price evolution as we will see. This function has some particular characteristics which help us to build the trading and limit conditions presented in the next chapters.

Even to obtain the values of the IFR function implies to use some advanced mathematical techniques, to implement this function in AT as part of an ATS is a simple task. The code sample for IFR indicator in meta quotes language (MQL) is presented in figure 2.

```
28 int start()
29    {int CountedBars=IndicatorCounted(); if(CountedBars<0) return(-1);
30     int CountedLimit=Bars-CountedBars; if(CountedBars==0) CountedLimit-=1;
31     for(i=CountedLimit;i>=0;i--) SPL[i]=iMA(NULL,0,4,0,MODE_LWMA,PRICE_CLOSE,i);
32     for(i=CountedLimit;i>=0;i--) RSI[i]=0.1*(iRSIOnArray(SPL,0,RsiPeriod,i)-50);
33     for(i=CountedLimit;i>=0;i--) EMA[i]=iMAOnArray(RSI,0,EmaPeriod,0,MODE_EMA,i);
34     for(i=CountedLimit;i>=0;i--) IFT[i]=((MathExp(2*EMA[i])-1)/(MathExp(2*EMA[i])+1)+1)*50;
35     for(i=CountedLimit;i>=0;i--) {if(IFT[i]>IFT[i+1]){UpBuffer[i]=IFT[i]; DnBuffer[i]=EMPTY_VALUE;}
36                                    else{DnBuffer[i]=IFT[i]; UpBuffer[i]=EMPTY_VALUE;}} return(0);}
```

Figure 2. IFT indicator multi query language code

Different versions of this algorithm can be imagined in order to improve the results. The values of SPL function can be built in different ways as we presented. Before to apply the inverse Fisher transform, in the (EMA_i) values can also be inserted more information about the historical price using values (EMA_k) for k

historical intervals, with k<i. Polynomial functions can be used in order to insert historical values:

$$\overline{EMA_i} = \sum_{k=1}^{n} \alpha_k EMA_k \qquad (2)$$

where n is the number of the time unit intervals and α_k is a weighting coefficient for each time unit included. The values for α_k are functional parameters that are the subjects of an optimization process of the indicator for each financial market and timeframe used in order to optimize the risk and exposed capital for the traded strategy. These coefficients are computed by repetitive procedures considering the historical time price series for each market. A machine-learning procedure can be organized in order to improve the functional parameter set time to time. In practice the n number of time intervals included in the method are usual n=2 or n=3. For higher values of the n parameter, the computational effort is increasing without a significant change in the model precision.

3. LIMIT CONDITIONS

The main characteristic of the IFR function is the asymptotic behavior on those intervals when the price is preparing to turn the direction. This behavior is due to the usage of the inverse Fisher function. Using this property we can set some conditions in order to define if a price is overbought or oversold. These Boolean conditions will be set by:

$$\begin{cases} OverboughtPrice_i = (IFR_i > \varpi) \\ OversoldPrice_i = (IFR_i < \rho) \end{cases} \qquad (3)$$

where ω and ρ are two optimization parameters. Using the overbought conditions is simple: buy on market or keep the buy trades opened until the (IFR_i) is less than ω. Similarly, sell or keep the sell trades opened until the (IFR_i) values are higher than ρ. With other words we will stay away the market risk if the IFR function has a value close to the 100 or 0 values, considering ω and ρ as to be the safe limit for the trading model. From this reason we will call these conditions as limit conditions. The values for ω and ρ will be optimized for each market minimizing the risk and maximizing the profit.

The limit conditions presented in (3) can be used in order to filter the trades made by any other trading strategy. With a good parameter set, this data mining method will considerably filter the trades in order to improve the trading efficiency. To see the power of this simple limit conditions we will present the example below.

Using TheDaxTrader (Păuna, 2010), an automated trading software for Frankfurt Stock Exchange Deutscher Aktienindex DAX30 (Börse, 2018), a long trading signal was traded with and without the IFR overbought limit conditions included in (3). How the trading signal is built is not important for this example. The trading signal played did not have something in common with the IFR function. This example wants to reveal here only the power of the IFR limit conditions.

IFR limit conditions (3)	Number of trades	Profit	Drawdown	Risk to reward ratio
Without IFR	258	1,003	28,824	1:0.03
With IFR	147	38,011	9,194	1:4.13

Table. 1. Trading results obtained with and without IFR limit conditions

The numbers presented in Table 1. Were obtained executing only buy trades. The risk and capital management were made using the "Global Slop Loss" method (Păuna, 2018). As we can see in the example presented above, without the overbought limit conditions more trades were executed, with 75,75% more trades than the case when IFR conditions were used. A part of these additional trades were in profit but another small part made a heavy loss. This is because buy trades were opened on overbought price intervals, on intervals where the price was near a local or global maximum point, according to the Fischer function methodology. With a proper optimization of the ω parameter, the automated trading software can avoid all those losing trades. In the case presented ω=99.5. When the overbought condition is used, even the number of trades is less, the profit obtained is significant higher, much higher than the profit without the overbought conditions. The test above was made in the period 01.06.2015 – 31.05.2018. As we can see in the figure 4, no losing trade was obtained using the IFR conditions.
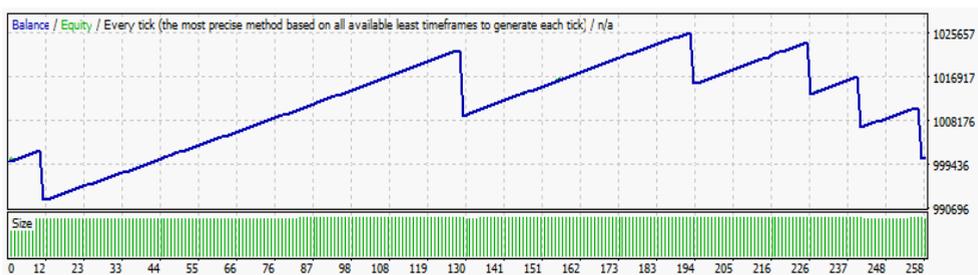
Figure 3. Capital evolution without IFR overbought limit condition
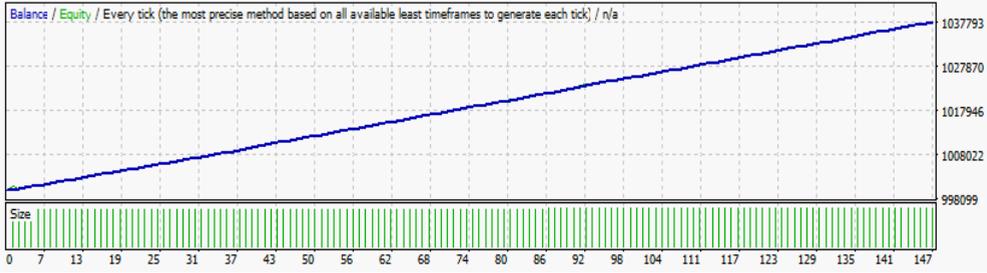
Figure 4. Capital evolution with IFR overbought limit conditions

A main characteristic of the IFR function are the monotony intervals. There are clear increasing or decreasing intervals indicating the tendency of the price. The Paerson's correlation coefficient for the IFR function can be calculated for each market. Or the example presented in this paper, the correlation coefficient calculated on intervals between 20 and 100 time units on a ten years time interval for several timeframes (M5, M15, M30, H1, H4 and D1) has values between 0.486 and 0.981 for the DAX30 Index market. These values indicate a strong and positive correlation between the IFR function and the price evolution. Based on this strong correlation, another type of limit conditions can be imposed using the IFR function. Considering the assumption that in a long trend when the price goes up, IFR function has an increasing interval. Similarly, on a short trend, the decreasing values of the price correspond with a decreasing interval of the IFR.

The increasing or decreasing tendency of the price movement can be tested or filtered with the IFR monotony conditions:

$$\begin{cases} UP_i = (IFR_i > IFR_{i-1}) \\ DOWN_i = (IFR_i < IFR_{i-1}) \end{cases} \quad (4)$$

The gradient of the IFR function can be a good filter for any trading signal. After the price changed the direction, due to the specificity of the Fisher transformation, behavior transmitted to the inversed Fischer function used, the gradient of the IFR function is significantly changing. The IFR monotony conditions (4) will filter those trades with high gradient, meaning the trades made after the local price trend change. This reason will reduce the risk, in the overbought and oversold price intervals the gradient of the IFR function being reduced. To avoid trading in the overbought and oversold intervals, the relations (4) are improved to define the IFR gradient conditions by:

$$\begin{cases} UP_i = (IFR_i > IFR_{i-1} + \lambda) \\ DOWN_i = (IFR_i < IFR_{i-1} + \mu) \end{cases} \quad (5)$$

These values (λ and μ) are functional parameters that can be optimized for each market in order to minimize the exposed capital. In order to show the impact of these kinds of limit conditions in the trading results, the next example is presented. A buy trading signal was traded with and without the (5) IFR gradient conditions. The signal opens a long trade when a new long trend is met, considering another methodology which is not a subject of this paper. In order to confirm the new long trend, the (5) up limit condition was used with $\lambda=0.5$. The next results were obtained in the period 01.06.2015 – 31.05.2018 with the same risk considerations as presented in the previous example.

IFR limit conditions (5)	Number of trades	Profit	Drawdown	Risk to reward ratio
Without IFR	144	5,561	16,141	1:0.34
With IFR	48	12,426	3,380	1:3.67

Table 2. Trading results with and without IFR gradient conditions

As we can see analyzing the results from the table 2, the contribution of the IFR gradient conditions is a significant one. Without these conditions the profit obtained is less even more trades were executed. Much important is the value of the drawdown which is significantly higher in the case without the IFR gradient conditions.
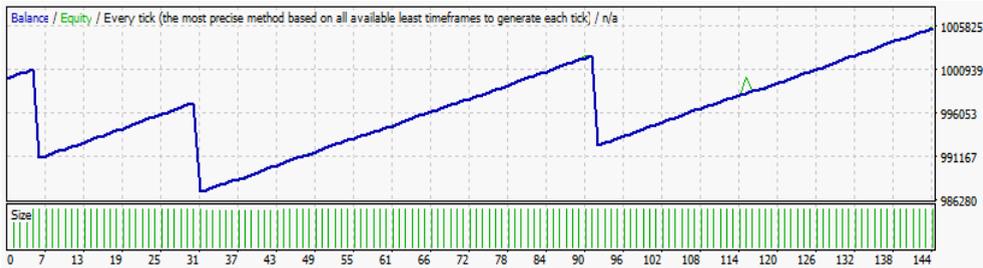
Figure 5. Capital evolution without IFR gradient conditions
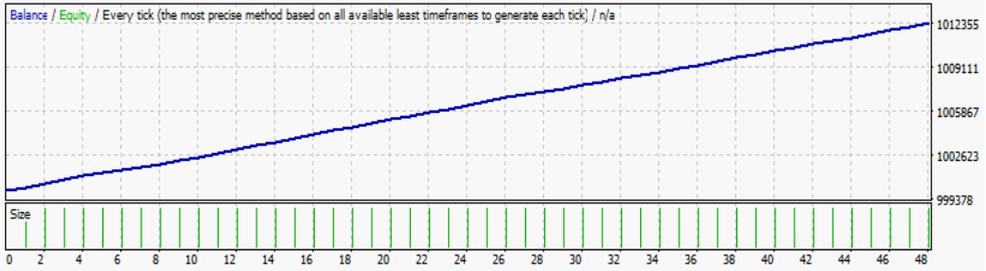
Figure 6. Capital evolution with IFR gradient conditions

Comparing the cases with and without IFR presented in the two examples above, we can conclude that the IFR limit conditions are reliable trading conditions in order to filter the trades to reduce the risk and to maximize the profitability of any other trading algorithm.

4. TRADING SIGNALS

The IFR function gives us also the possibility to build independent trading signals. Having the chance to know when a price is oversold, buy trading signals can be built using IFR function on these intervals. Usual an oversold price stays oversold for a period of time. After that period the price will reverse the direction and it will increase for higher values. The specificity of the inversed Fischer function used in the IFR model, tells us that after the IFR function has a local minimum, the price will turn up in order to record a new local maximum value. This is a buy opportunity which can be automated using the IFR function. The IFR oversold trading condition is given by the formula:

$$BuySignal_i = \left(\sum_{k=i-n}^{i-1} IFR_k < \xi\right) \wedge (IFR_i > \rho) \qquad (6)$$

where n is the number of back time interval taken into account; ξ and ρ are functional parameters that can be optimized depending on the traded market. Another type of trading signals which can be assembled with the IFR function use the assumption that if the IFR function gradient has an important variation, the price just passed a minimum point, according the Fischer function methodology, and that can be a good buy signal. To avoid the oversold and overbought zones, the next relation can be used in order to build the IFR gradient trading signal:

$$BuySignal_i = (IFR_i > IFR_{i-1}) \wedge (IFR_i > \varphi) \wedge (IFR_i < \psi) \qquad (7)$$

where this time the parameters φ and ψ define a specified interval for the (IFR_i) where the price is low enough to make a buy trade and not enough higher

to increase the risk. These parameters will be optimized for each financial market in order to minimize the risk. The sell signals can be similarly built as the signals in (6) and (7) are presented, for those markets where short trading signals can be considered.

Trading results obtained with both IFR oversold and gradient trading signals are presented below. For (6) n=4, ξ=0.25 and ρ=1.5 and for (7) φ=0.01 and ψ=10. Both signals were traded for DAX30 market between 01.06.2015 and 31.05.2018 with the same risk considerations as for the examples presented in the chapter 3.

Trading signals IFR	Number of trades	Profit	Drawdown	Risk to reward ratio
IFR oversold (6)	22	5,698	3,772	1:1.15
IFR gradient (7)	78	20,209	6,197	1:3.26
(6) and (7) together	100	25,907	6,197	1:4.18

Table. 1. Trading results obtained with IFR trading signals

5. CONCLUSIONS

The IFR function presented uses only known computational methods. Using the inverse Fisher transform, the IFR function transform the price into a limited asymptotical function which permit an automated analyze for the overbought and oversold intervals. When the IFR function has an asymptotic evolution near 100, the price is approaching to make a new high and to reverse the evolution to a local minimum point. In other time intervals, when the IFR function has an asymptotic evolution to the 0, the price is on an oversold period, a new local minimum point will be met and the price returns in order to make a new local maximal point.

The IFR function gives us the possibility to establish limit conditions in order to automate the trading decisions regarding the overbought and oversold price values. With these limit conditions, any trading signals can be filtered in order to avoid to buy near a local maximum point or to sell near a local minimum point. In addition, these conditions can be used in order to close earlier the buy trades when the price touch a local maximum point.

The high gradient of the IFR function can be assimilated with the period after a minimum or maximum local price value. The difference between two values of the IFR function can be a good filter for a trend oriented trading signal. Adding more consecutive IFR values on an oversold interval and comparing the results with an optimized parameter can be a good buy signal for an oversold trade. In addition, on the increasing periods of the IFR function, until a specified limit found by optimization, buy trades opportunities can be made using the IFR signals presented. Having a good risk to reward ratio values, the trades built with IFR functions are reliable trades. Based only on mathematical functions, all these signals and can be easily implemented in algorithmic trading.

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THE PROCESS OF OWNERSHIP SEPARATION IN CO-OWNED COMPANIES OF THE TEL AVIV MUNICIPALITY AND THE STATE OF ISRAEL. A CASE STUDY

AVI KETKO [*], MARIA VIORICA BEDRULE-GRIGORUȚĂ [**]

Abstract: *Professional literature deals extensively with commitment (management and personal commitment), trust between partners and transparency as critical success factors in collaboration in general and in collaboration among public entities in particular.*
The State of Israel and the Municipality of Tel Aviv owned seven joint subsidiaries with different holdings in each of the companies.
The Israeli government made a decision to sell the State's shares in these companies to the Tel Aviv Municipality.
In 2016, a long process, of over eight years of negotiations, between the parties on a commercial basis, came to an end.
The purpose of this article is to demonstrate how the implementation of principles of commitment, trust and transparency in practice led to the successful conclusion of the process.
The research method was qualitative research, using semi-structured interviews, in the process where involved 12 people.

Keywords: *Collaboration, Trust, Management Commitment, Co-owned companies, Separation of Ownership, Municipality Institutions e.*

JEL Classification: *790, 830*

1. INTRODUCTION

The Case Study of ownership separating described in this article is unique because of the vision underlying the decisions to implement it and its implementation after many years of experience and partial acceptance of bureaucratic processes that prevented its promotion.

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This process is unique because it is made for the first time with this magnitude, among public entities thanks to the boldness and vision of the heads of the two organizations involved (the Government Companies Authority and the Tel Aviv-Yafo Municipality), their mutual trust and commitment to implement it.

The process described in the article, and as expressed in all the interviews with the stakeholders in this study, substantively demonstrated all that is stated in the literature about cooperation – enablers, obstacles and ways to overcome them, as some of them will be described in practice in the article itself.

In cooperation in general and in cooperation described below in particular, the elements of cooperation such as a common vision, agreed goals, defined objectives, trust, management commitment, accountability, communication, assessment and control – as facilitators and enablers if they exist or obstacles in their absence.

The purpose of all the stakeholders involved in the process was to ensure that these components have the right measure, to take most of the necessary actions to prevent them from being used as obstacles, to find ways to overcome the crises that have arisen on the way and ultimately, achieve successful implementation.

2. LITERATURE REVIEW/ THEORETICAL BACKGROUND

The professional literature on collaboration includes many terms such as: partnership, collaboration, alliance, cooperation, joint venture, coordination and so on. In some of the literature the differences between the terms is the extent of the intensity and manner of the relationships of the partners involved in the process.

Regardless of how the collaboration is carried out, its shape, scope, number of participants, the importance and duration of the collaboration, there must be a number of essential components to enable its implementation. These components include: defining a shared vision, goals and objectives, partner identification, partnership structure, trust, management commitment, accountability, processes, crisis resolution, communication, agreements and contracts, key factors for success, assessment and control.

Trust is one of the most important components of success. Trust appears as the element of "magic" required for success. One of the definitions of trust speaks of the partners' ability to rely on each other, and each side is interested in the well-being and success of the other. Another definition of trust speaks about the likelihood that the other partner will act not only on the basis of independent interests in an opportunistic manner, but in favor of the overall partnership.

Reciprocity is a key factor in promoting a common vision while taking into consideration the organizational interests of the parties (Olson, 2004:33).

Walker, Smith, and Adam (2009:53) Define trust as the expectation that one can rely on the fulfillment of commitment and fair behavior when there is a possibility of opportunism. Trust in cooperation has greater significance, since in a joint system the organizations consciously remove control of their actions, remove defensive walls and expose themselves (policies, processes, knowledge, resources, ideas, development plans, etc.) to other organizations in general and to those capable of influencing them in particular. Collaboration changes the attitude and management of the potential damage, risks and level of uncertainty of the partners.

Prescott and Stibbe (2017) refer to three core principles of co-existence. Building trust and mutual respect – the recognition that each partner has a vital contribution to bring to the "table" and for what he is valued, together with the right to make his voice heard, in a manner that respects him in the decision-making process. Transparency and trust – is the basis of a working relationship that is the heart of an operative partnership. Such a system is essential for building and maintaining trust. Trust is like oil in the engine of the partnership that enables the parties involved to commit themselves out of faith and recognition that the other partner will comply and also uphold its commitment. Mutual benefits – partnership based on sharing risk and benefits. A strong partnership recognizes that each side needs to achieve a specific value beyond common benefits and all partners should help ensure that each partner achieves its goals.

Fasel (2000: 94-96) refers to trust in a number of aspects. Building mutual trust leads to productivity-enhancing partnerships by focusing attention on work, encouraging innovation, reducing monitoring and control costs, and increasing the energy and enthusiasm of both individuals and groups for the joint project. Trust cannot develop when there is inappropriate personal behavior, hidden agenda, unreliable information, faulty systems and processes, and lack of integrity. In order to build trust and respect between partners, the partners needs to be skilled and capable of carrying out the work assigned to them, and there is a common and agreed purpose of the participants. The information is reliable and accurate, the metrics, reward and recognition are compatible and are adapted to outcomes and all participants operate with full integrity.

Harpaz (2015) notes that trust relates to two areas: trust in man and his pure and good intentions, and trust in his ability to "deliver the goods" he has undertaken in the framework of matching and coordinating expectations. Trust in a partner is central and meaningful, and the intention is not only that the other side is

telling the truth, but also that it can be relied on for the rest of the period of cooperation. Trust begins to be built when the parties know each other genuinely whether in an informal and/or formal framework. It is necessary to make sure that the words and statements correspond to the intentions, which can be proved only through doing. The fulfillment of promises strengthens the trust of the parties and proves internal integrity. Both sides should feel and know that one can rely on the word of each other and that they do not act in a way that contradicts the understandings and their common interests.

Walker, Smith, and Adam (2009) mention three mechanisms for increasing coordination: the use of authority (an option is possible mainly in bureaucratic systems, the creation of interests for coordinated actions and the establishment of trust based on solidarity); Common characteristics (ethnicity, culture, organizational function, professional and personal background); Reciprocity (based on shared interests, a history of positive experience and expectations from the shared interaction).

The real challenge in managing a strategic alliance is to move the sharing agreements into a productive and effective relationship. The way in which the sharing begins and the interaction – in the first stages, affects the development of the entire collaboration later on and its success. Lack of attention to issues such as trust, organizational culture, management commitment, communication, and transparency are the factors that can cause the lack of cooperation on the one hand and are the key factors for success on the other. Managers and work teams involved in cooperative processes for common goals may sometimes have different assumptions and expectations about the sharing itself and how it is to be achieved. This situation becomes more complex in light of cultural differences, barriers of communication, and suspicion about the hidden interests of partner organizations. If the lack of certainty or conflict between stakeholders is not properly managed and handled from the earliest stages, there may be a lack of trust and could reinforce the potential partners' perception of "we are against them". One way to prevent such situations in advance is to create effective (formal and informal) communication of high quality that provides a basis for commitment and trust. Open communication and information sharing among partners is critical to building a common understanding of shared goals and objectives (Kelly, Schaan and Joncas, 2002; Beyerlein and Harris, 2004; Smith, 2005; Southern, 2005; Bachmann and Inkpen, 2011; Swärd, 2016).

Management commitment is another vital and important factor to the very creation, motivation and successful completion of the partnership. The managements of the partner organizations play a key role in execution and implementing of the partnership. The role of the senior management is to draft

policies, to create a shared vision, goals, and objectives, to deliver them clearly and easily to the middle managers and staff, to allocate resources, and to resolve conflicts during the collaboration processes. Without senior management's commitment to statements, and especially behavior and actions on an ongoing basis, the chances of success are almost nonexistent. Leadership is required from both sides involved that can rise above the current crises, see the overall picture and the ultimate common goal, and steer all involved to achieve the goals originally defined for sharing (Gray, 1989; Perri, Leat, Seltzer and Stoker 2002).

3. THE CASE STUDY

The State of Israel and the Municipality of Tel Aviv-Yafo jointly owned five subsidiaries with different holdings in each of the companies (four jointly owned companies of 50% each and one company with a majority hold by the State).

As a result of the understanding at the State level (by the Ministry of Finance – Government Companies Authority), the Israeli government made the decisions to sell the State's shares in these companies to the Tel Aviv-Yafo Municipality (Government Resolution on 12 May 2009 and 1 June 2014). The outline and the scope of the project were as follows:

- The Government of Israel wouldsell its holdings (stocks) in the "Atarim" company to Tel Aviv Municipality and the company would become a company 100% owned by the Municipality. ("Atarim" company is in charge of development, management and maintenance of the Tel Aviv coast line –tourist and recreation sites, art and cultural compounds, leisure areas, and other projects which serve and promote tourism in Tel Aviv – Yafo).
- The Government of Israel would sell its holdings (stocks) in the "Tel Aviv Port" company to theTel Aviv- Yafo Municipality and the companywould become a company 100% owned by the Municipality.("Tel Aviv port" company runs leisure and entertainment complexes – the water front of Tel Aviv which is a unique meeting place between the city, the people and the sea.
- The Government of Israel would sell its holdings (stocks) in the "Old Jaffa Development" company to Tel Aviv- Yafo Municipality and the company would become a company wholly owned by the Municipality. (The aim of the Old Jaffa Development Company is to develop Old Jaffa as a center for art, tourism and entertainment).
- The Tel Aviv-Yafo Municipality would sell its holdings (stocks) in the "Ayalon Highway" company to the Government of Israel and the

company would become a company entirely owned by the Government. (The company specializes in management projects, in the field of infrastructure and land transportation).

- The co-owned company "Halamish" (public housing, rehabilitation and renewal neighborhoods in Tel Aviv-Yafo), would be dismantled. The public housing assets would be handed over to a similar government company and remaining assets would be divided by agreement between the two owners.

As part of the preliminary understanding between the Municipality and the Government it was agreed that the above outline is a "one piece" and should not be dismantled into parts.

After the publication of the government resolution of Jun 2014 a "kick off" meeting was held with the participation of the Municipality'sDirector General and the Government Companies Authority's Director General. Both would represent their superiors (the Finance Minister and the Tel Aviv-Yafo mayor), which authorized the process. Immediately there after, two teams of experts were established representing the Government and the Municipality.

The Government team included members from several units and sub-units in the Ministry of Finance: Government Companies Authority, General Accountant, Israel Land Authority and legal Counselor. The municipal team included representatives from the flowing department in the TelAviv-Yafo Municipality: the Bureau of Municipality Corporations, the Budgets wing, theAssets wing and lawyers from the legal department. Each team was assisted by external professional consultants, according to the different fields of knowledge – accountants, appraisers, external lawyers and land assessors. These two teams that became a target group, met together for dozens of meetings and sessions throughout the two years between June 2014 and June 2016 – the successful end of the process.

The first step taken by the teams was to agree upon the existing and future economic value of assets in the companies. For this purpose, an expert company, which provided the parties withaevaluation of the existing assets in the joint companies, was jointly selected. On the basis of this assessment, each side added its estimate of future trends that could affect the value of the assets (such as future construction plans, changes in the trading trends in the relevant areas and the future change in the commercial contracts).

Of course, after this process, the value of the assets in the "coast line companies" ("Atarim", "Tel Aviv port" and "Old Jaffa development company") decreased according to the Municipal account (the purchasing side), whereas the

value by the State increased (the selling side). The same process, only in the opposite direction, happened also within the "Ayalon Highway" company – the value by the Municipality increased (the selling side), while in the opinion of the State (the purchasing side) the value decreased.The gap between the overall assessments of the parties amounted to 50,000,000 €. After approximately three months of deliberations relating to the assumptions that were the basis of the economic and trade estimations, the parties succeeded to reduce the gap to 10,000,000 €.

At this point, since the parties had completed the dialogue between them, the escalation mechanism went into effect and some meetingswere held between the Municipality Director General and the Government Companies Authority Director General. In those meetings the disputed points were discussed and at the end an agreed value was fixed. This value actually determined the price pf sale of the various companies and the cost of the entire transaction.

Once this issue was over, the parties began drafting legal contracts with the help of both internal and external lawyers.This activity is particularly complex and complicated, since a detailed legal formulation of agreed principles reveals many points that are not expressed in the framework of the agreement, on a general formulation of the principle in the framework of the overall outline. Again, during this process, the escalation mechanism has been activated several times. The Municipality Director General and the Government Companies Authority Director General met every two or three months to over come disputes and disagreements that came up between the parties in drafting the legal contracts. After another ten to twelve months, the legal agreements were finally ready for signature by the authorized signatories of the parties.

After two years of intensive work, that included ups and downs in relations between the parties, the work was finally completed and the agreements were signed in June 2016.

4. RESEARCH DESIGN

The method of the research is based on a constructive approach (Bryman and Bell, 2015) and we used both grounded theory and case study design techniques, since one of the authors was part of the process described in this paper (Charmaz, 2014; Hancock and Algozzine, 2011, Creswell, 2014). The purpose of this study is to explore the contribution and the influence of the commitment of management at all levels, trust and personal relationships between the teams and their managers, as well as transparency in ongoing work.

The participantsin the study were members of the teams and semi-structured interviews were conducted with the following questions: background questions, how the process works, the relationships between the teams' members (formal and informal), the extent of trust between them, the flow of information and the senior management commitment to the process (Appendix A).. Data were collected through those individual semi-structured interviews and first analyzed using open coding. The researchers then used axial coding to reconstruct the data in new ways by making connections between the categories. The categories emerging from open and axial coding were the basis for the findings as revealed through the analysis of the data collected.

5. FINDINGS

At the beginning of the process the municipal team was convinced that the expert company for asset evaluation was biased in favor of the government side. Therefore the Municipality team hired another expert company which prepared a parallel evaluation of the assets on which the continuation of the negotiations was based. This event planted seeds of distrust between some members of the Municipal team – a lack of trust that caused the prolongation of the process brought disagreement from time to time regarding data and basic assumptions. The decomposition of the evaluations into their basic components enabled the teams to extract the agreed-upon issues from the overall picture and to discuss the issues in dispute one by one. This method of highlight and emphasis on the many agreed and approval issues, compared with the few remaining issues in dispute – enabled the parties to take a positive attitude and to strive for formulation of agreements on all the issues that were on the agenda. At the end of this process, all the principles were agreed upon and the outline of the transaction was ready for the stage of legal drafting of the agreements.

The external lawyers of the parties accepted the principles and began formulating the legal agreements. The lawyerstried to provide solutions to any problem that could arise in the future between the parties, big or small without any distinction. This situation has reawakened the debates on those issues that have already been agreed and even on new issues. At that point some of the professional team members over ruled the legal positions (after hearing all the arguments) and overcame non-substantial legal disputes (which were true formany of them). As indicated by the participants, this intervention prevented unnecessary negotiations and brought increased trust among the team members. The increase in trust was the

result of the fact that the parties saw that each side did not hold on to legal arguments that might delay the process and even brought it back to the beginning.

During the negotiations between the teams in the presence of all the members, at internal consultations or in separate one-on-one discussions, dozens of formal and informal drafts and copies of documents were formulated. Those documents contained and expressed everything that was discussed and agreed, including special aspects that were disputed. Because of the large number of drafts, documents, and updates, there were cases where mistakes were made in wording or formulating, without one of the parties paying attention to it, even though it was in favor of the other side. On a few occasions this happened, the side which ostensibly gained immediately brought it to the attention of the other side and agreed to a suitable correction. Such behavior indicates a high level of fairness, honesty and rectitude that developed among the teams, mainly because the trust between the professional members and their commitment to the process led to the desired results and outcomes.

During the two years of meetings and discussions (principle, economic and legal negotiations) there were a few occasions that the parties were forced to use the conflict resolution and dispute settlement mechanism. This mechanism included escalation to the higher level – the Municipality Director General and the Government Company's Authority Director General. At every such meeting the two Director Generals were presented with all the data and points of dispute, and theyevaluated the situation they reached a satisfied solution for all. In such a way they proved unequivocally their unbounded commitment to the process and its outcomes. Moreover, the commitment that they showed to the members of the teams, strengthened the significance, worth and importance of completion of the mission.

6. CONCLUSIONS

In accordance with the findings presented above, the processes and the techniques used are in fact common and accepted procedures in the world of conflict resolution and negotiation. Those processes made it possible to depersonalize the problems encountered, focus on interests rather than on positions, and to comprehend the difficulties and obstacles of the other side – were actually expression and execution of the open communication and the trust that have been formed between the members of the teams (Fisher and Ury, 2011; Lax and Sebenius, 1986; Kuttner, 2011; Tomas and Kilmann, 2017).

   As seen in the literature regarding collaboration, cooperation and partnership – the components of trust, management commitment and open communication were actually expressed in our case study. Without trust between the team members, the senior management commitment and transparency – the process would not have come to a successful end.

   The function and the part that the two C.E.O's took were most significant, their combined and integrated leadership and ability to resolve disputes and conflicts as they functioned as Conflict Specialists (Kuttner, 2011: 104). This leadership influenced and motivated the team members to develop mutual relationships in the day to day work. This work layout arrangement enabled the parties to make commitments and obligations to each other under the assumption and belief that the other side would fulfill its own obligations (Prescott and Stibbe, 2017). While working together and based on successes and achievements over time, a healthy partnership was created. The parties at all levels recognized that each side needs to achieve specific values beyond common benefits and all partners helped in practice to ensure that each partner achieved its goals.

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APPENDIX A – QUESTIONS FOR THE SEMI-STRUCTURED INTERVIEWS

1. What is your role in your organization?
2. What was your role in the negotiation team?
3. What were your authorities in the negotiation process?
4. In which phase did you join the negotiation?
5. In your opinion, how were the meetings carried out?
6. Who were the factors that supported the process?
7. Who were the factors that delayed the process?
8. Was there informal interaction among the members of the team? Between teams?
9. Was there an atmosphere and a sense of trust among the team members?
10. If so, how was this reflected?
11. If not, how should it have been expressed?

12. Were there any organized trust-building activities between the teams?
13. Did you felt that the other side was being dishonest?
14. Did you felt that the other side was hiding data, information?
15. Was all the information available to the teams?
16. The other side shared problems that made it difficult to advance at certain points?
17. Was the duration of the process appropriate?
18. What was the involvement of the senior management (government and municipality) in the process?
19. Was the senior management available when their assistance was needed?
20. What was the level of commitment of the senior managements?
21. How does this level of commitment express itself?
22. Were the necessary resources allocated? On time?
23. What were the strengths of the process?
24. What lessons should be learned from this process for similar cases in the future?
25. Would you do something differently?
26. What do you have to add beyond what has been said so far?

Leveraging Social Media Metrics in Improving Social Media Performances through Organic Reach: A Data Mining Approach

Jen-peng Huang [*], Genesis Sembiring Depari [**], Sri Vandayuli Riorini [***], Pai-Chou Wang [****]

Abstract: *This paper identified the relevance of several publication's characteristics of each publication in reaching more people through organic strategy using Support Vector Machines. Before finding the relevance of several inputs, 10 potential models were examined. Based on the results of 10 models examination, we found that Comments, Likes and Shares have smallest error. However, those variables represent the customer engagements, instead of reaching more people. In the other side, Lifetime total organic reach is the best model compares to other models, therefore lifetime total organic reach was selected as a model. Furthermore, page total likes were found as the most relevance input in reaching more people through organic reach. The next most relevance inputs were followed by Type, month, day and hour of publication. Eventually, we come up with a managerial implication on how to publish a post in order to reach more people through organic reach.*

Keywords: *social media, data mining, organic reach, Facebook pages, Rapidminer*

JEL Classification: *M1, M3*

1. Introduction

The importance of social media is becoming more popular today and many company's decision makers put more efforts in searching best strategies to leverage their presents in social media such, YouTube, Facebook, and Twitter (Kaplan and

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Haenlein, 2010). Through leveraging social media, companies can build possibility in communicating with thousand or millions of consumers in promoting products and services (Kietzmann et al., 2011). On the other hand, a research in UK shows that more than a quarter of B2B SMEs currently adopt social media in achieve brand objective, especially in reaching new potential customer (Michaelidou et al.,2011). Many companies soon noticed the opportunities of internet-based social networks in affecting customer's decision and combining social media strategies to benefit their company (Moro et al.,2016). However, the challenges that many enterprises face is even they understand the urgent of evolving in social media they don't really understand how to make it effectively and measureable (Hanna et al.,2011).

Since introducing products and services through social media is cheaper and it is known as an acceptable way to market products and services at particular target market (Kirtiş and Karahan, 2011), more and more companies put more efforts in understanding the performance of their company's social media especially on finding the most efficient way in promoting their products and services. In other words, effective leveraging social media could help SMEs in financial way. In fact, several studies put more focus on analyzing interaction, prediction and the efficiency of using social media advertisement (e.g. Handayani and Lisdianingrum,2011) rather than identifying factors that affect the succeed of promoting social media in organic strategies that offer almost zero cost.

In the beginning 2018, Indonesia has 132.7 Million internet users and around 130 Million of the users is active in using social media Facebook (Wearesocial, 2018). This phenomenon offers huge opportunities in reaching new customer through online advertising, especially in targeting Indonesian market. Advertisements strategy through Facebook page generally divided into paid advertisement and organic advertisement.

Data mining offers overwhelming methods for generating predictive insight through leveraging raw data (Turban et al., 2011). Data mining is proved as a helpful tool in using to analyze huge, flexible, and complex social media data (Barbier and Liu, 2011). Nevertheless, recent studies only focus in investigating the reactive interaction based on different source of social group data. In this research we focus on identifying factors related in building SMEs brand through fans Page Company in using organic strategies. The factors relevance are identified by using Support Vector Machine weighting and in order to determine the best prediction model, we also provide 14 potential testing model. The selected model then used to analyze the importance of inputs in determining the best strategies publishing each post in Company Facebook pages.

Table 1. Features from arranged data set

No	Features	Type of data set
1	Comments	Numeric
2	Likes	Numeric
3	Shares	Numeric
4	Type	Text (Video, Photo, Status, Link)
5	Post Message	Text
6	Posted date	Text
7	Permanent Link	Link
8	Post ID	Unique Code
9	Page Total Likes	Numeric
10	Total Engagements	Numeric
11	Post Day	Text (Sunday……, Saturday)
12	Post Hour	Text (01,02,….,24)
13	Post Month	Text (January,…., December)
14	Lifetime Post Total Reach	Numeric
15	Lifetime Post organic reach	Numeric
16	Lifetime Post Total Impressions	Numeric
17	Lifetime Post Organic Impressions	Numeric
18	Lifetime Engaged Users	Numeric
19	Lifetime Post Consumers	Numeric
20	Lifetime Post Consumptions	Numeric
21	Lifetime Post Impressions by people who have liked your Page	Numeric
22	Lifetime Post reach by people who like your Page	Numeric
23	Lifetime People who have liked your Page and engaged with your post	Numeric

Extracted from https://www.facebook.com/#/insights/?referrer=page_insights_tab_button

In this research we use a small educational company data (table 1) which focus on promoting study to Taiwan. The data was generated by company's Facebook pages that consist in 215 post published from June 2016 to April 2018. Thus, this published data set was feed in to data mining software (Rapidminer) as an input.

The purposes of this research as follows:

- To find the best model (label) that predicts the impact using factors related or characteristics by comparing the differences between predicted value and real metrics value
- To analyze the insight generated by the best model and weighting the input including how the input affects each published post in helping manager selects the best decision
- To identify the factors that affect company pages based on lifetime post total organic reach by assessing weighting input and others factors that may be related.
- To create a managerial implication map in helping manager make a decision.

2. LITERATURE REVIEW

In order to keep closer with their users, several universities in Malaysia use Facebook pages as their online platform (Ayu and Abrizah, 2011). In addition, Facebook also offers open source data for admin of a Facebook pages. This metrics provide a valuable insights in measuring Facebook pages performance (Bonsón and Ratkai, 2013). In facts, many companies are not really understand on how to use and measure the metrics (Hanna et al.,2011). Therefore, in this research, data mining technique was used in identifying Facebook pages factors that could help stake holder in determining best decision.

Data mining offers powerful technique in dealing with big, complex, and rapidly changing information (Barbier and Liu, 2011).Data Mining has a good ability for finding precious patterns and hidden knowledge in social networks (Gupta et al.,2014).

Support Vector Machines (SVM) was first developed by Cortes & Vapnik (1995). The idea is to find optimal separating hyper plane in two distances by optimizing difference among distances' closest values. The concept described in fig. 1. The dots put in the dash line are called support vectors, then the line between dash lines is called separating hyper plane. SVM is able to control capacity and changeable in setting up decision implementation makes it very useful and wide-functional on machine learning (Cortes and Vapnik, 1995). Therefore, SVM has showed very important role in many issues of data mining field (Mangasarian, 2001).
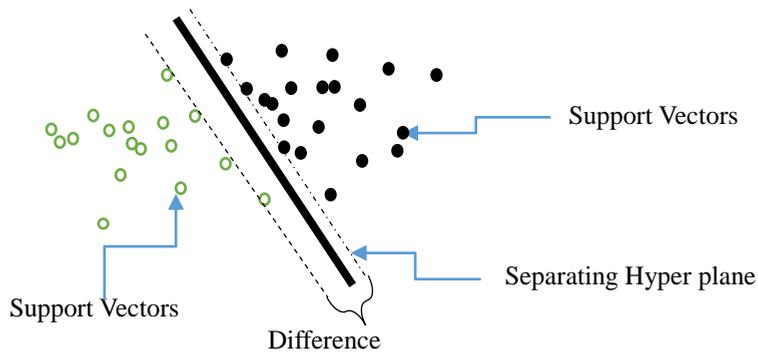
Fig.1 Support Vector Machine

3. METHODOLOGY AND DATA

The data set was taken from Facebook pages metrics provided by Facebook through admin page. The data consist of two years posts published of Educational Company from Indonesia. The Company mainly works for promoting study to Taiwan. All the posts were published from June 2016 to April 2017. As a result, the data accumulated consist of 215 posts published. Table 1 shows all of the features arranged in the data set. All of the data was generated from the company's Facebook page from June 2016 to April 2018. The company's Facebook pages generated 23 features related with page performance metrics, however only some features will be taken. Then the selected features are divided in to two parts. The first part is treated as input features and the second part is used to be modeled.

Since hour consist of 24 hours, it was grouped into 5 major groups. The first hour group is ranged from 00.01-05.00 am; second hour group is ranged from 05.01-10.00 am; third hour group is ranged from 10.01-15.00 pm; fourth hour group is ranged from 15.01-20.00, and 20.01-24.00 is the last group.

Table2. List of input Features

Feature	Description
Page Total Likes	Total People who have liked the company's Facebook page
Post Day	the day when The post was published
Post Month	the month when The post was published
Post Hour	the hour when The post was published
Type	Type of the posts

Adapted from Moro et al (2016)

As Posted, Permanent link, Post ID, Post Message are text unique data, then these features are considered as possible future research. To understand those text data, text mining probably possible to be applied. Type, Post Day, Post Hour, Post Month, Page Total likes are treated as input features (Moro et al.,2016). Detail of these input features is described at table 2. Post day consist of from Sunday to Saturday, Post month consist of from January to December, Post hour consist of from 00.01-24.00, type consist of photo, status, link and video.

The second part of data is grouped as several potential model. These potential model will be analyzed in order to determine the best predictive model using Support Vector Machine. These potential model are described in table 3. These models was divided into 2 major group such engagement variables and visualizations variable. Comments, Likes, and Shares were engagement variables and the rest was treated as visualization variables.

Table 3. List of outputs features to be modeled

No	Output features	Descriptions
1	Lifetime Post Total Reach	The number of people who had Company Page post enter their screen (Unique Users)
2	Lifetime Post organic reach	The number of people who had company Page post enter their screen through unpaid distribution. (Unique Users)
3	Lifetime Post Total Impressions	The number of times company Page post entered a person's screen (Total Count)
4	Lifetime Post Organic Impressions	The number of times company Page posts entered a person's screen through unpaid distribution. (Total Count)
5	Lifetime Engaged Users	The number of unique people who engaged in certain ways with company Page post (Unique Users)
6	Lifetime Post Consumers	The number of people who clicked anywhere in company page post. (Unique Users)
7	Lifetime Post Consumptions	The number of clicks anywhere in company page post. (Total Count)
8	Lifetime Post Impressions by people who have liked your Page	The number of impressions of company Page post to people who have liked Page. (Total Count)
9	Lifetime Post reach by people who like your Page	The number of people who saw company Page post because they've liked the Page (Unique Users)
10	Lifetime People who have liked your Page and engaged with your post	The number of people who have liked company Page and clicked anywhere in the posts. (Unique Users)
11	Comments	Total Comments in the post
12	Likes	Total likes in the post

No	Output features	Descriptions
13	Shares	Total shares in the post

Extracted from https://www.facebook.com/#/insights/?referrer=page_insights_tab_button

Data Mining is a sequence of extracting information from various perspective into useful insight or knowledge (KS and Kamath, 2017). In doing Data Mining process, Rapidminer data Analytic was used. In order to select the best model among 13 models in table 3, Support Vector Machine was run and 5 input features was feed into the system as input variables to. Detail flow is described in Fig. 1. In preparing the 215 rows of raw data from Company Facebook pages, 15 outliers were removed and Z-transformation was used to normalize all of the features. Furthermore, one feature with less Mean Absolute Deviation (MAD) is selected to be a model in order to analyze factors that affected Facebook page performance. After finished selecting best model, then Support Vector Machine Weight was run in determining the most influential factors among 5 inputs. After obtaining the weight of the inputs with respect to model, the weights were analyzed in order to identify others possibility strategies that may be useful in supporting company' Facebook page reach more people through organic way. The others likelihood might be related with particular factors, such Indonesian cultural, recent phenomenon etc.
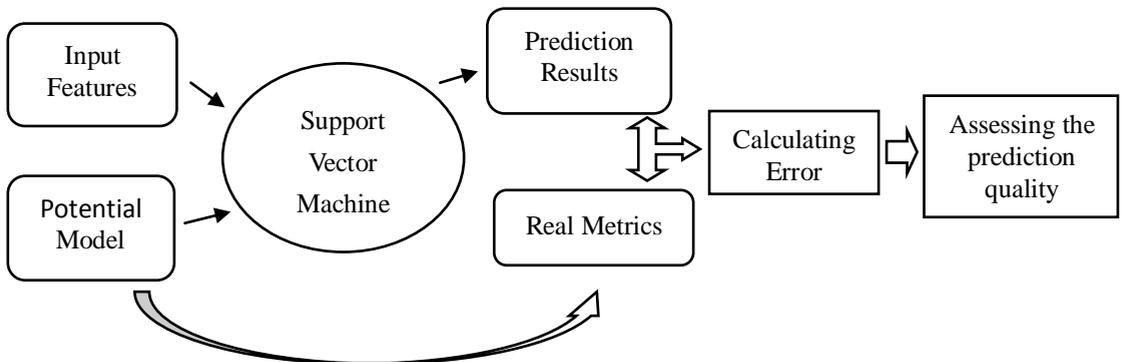
Fig. 1. Data Mining Procedure

4. RESULTS AND DISCUSSIONS

As explained in section 3, five inputs were used to predict the performance of 13 potential model describe at table 3. Z-transform was used to guarantee the 5

inputs are normal distributed. In order to get better prediction results, 15 outliers were deleted and the rest were treated as building model. Using SVM, the data was split in 2 parts, 80% as a train data and rest 20% as a test data. To guarantee the test data can represent the whole data characteristics, stratified sampling was performed. After processing the 13 models using 5 inputs, we measured the assessment results by calculating the error using Mean Absolute Deviation (MAD), which is widely method used to evaluate the regression prediction performance (Sharpe, 1971). The results are shown in Table 4.

Results on Table 4 shows that engagements metrics have a better accuracy than visualizations. This results are contradict with previous research that conducted by Moro et al (2016). The difference results generally caused by different target customer. In this research, the data is from a SMEs educational company from Indonesia whose target customers are mainly students. In this case, customer engagements are important because the company is promoting the way to study in Taiwan. Customers always have many questions related how and when the registration is opened.

Although Comments, Likes, and Shares have smallest MAD value (table 4), these interactions metrics only show engagements or interactive communications between customer and company. The number of comments, Likes and Shares don't show the number of new target customer reach by each post published. On the other hand, comments may contains positive or negative feedback and still be a potential area to research more (e.g., Gerolimos, 2011). Life time total organic reach is the best visualization model proved by its small error difference compared to others visualization models. This result is aligned with the research goal to identify and build organic posting strategy to reach more customer through organic strategy. Thus, we use Life Time Post Organic Reach as a model to identify factors that can affect the successful of organic promoting using company Facebook Pages.

Table 4. Results of Prediction Model Performance

Model (Y)	MAD	Source
Comment	0.077625	Engagements
LIKE	0.323548	Engagements
SHARE	0.32521	Engagements
Lifetime Post organic reach	0.337446	Visualizations
Lifetime Post Total Reach	0.338373	Visualizations
Lifetime Post Total Impressions	0.364931	Visualizations
Lifetime Post Organic Impressions	0.374777	Visualizations

Model (Y)	MAD	Source
Lifetime Post Consumptions	0.409569	Visualizations
Lifetime Post Consumers	0.426844	Visualizations
Lifetime engaged users	0.434556	Visualizations
Lifetime Post reach by people who like your Page	0.462771	Visualizations
Lifetime People who have liked your Page and engaged with your post	0.471702	Visualizations
Total Engagements	0.504792	Visualizations
Lifetime Post Impressions by people who have liked your Page	0.522502	Visualizations

Source: Results Computed

In order to understand the weight of five inputs and to identify the factors related in doing organic promotion through Facebook company pages, SVM Weight was performed. The five inputs were feed into the system and respect to the model of Lifetime post Organic Reach. The results of SVM Weight is ranged between 0 and 1. The range explain the importance among the inputs respect to the label. The results shows (table 5) that page likes have a major contribution than type, month, day and hour. Page total likes holds a very important rule to support the organic reach. This event is caused by the rule of Facebook. Whoever liked a page will automatically be a follower and see the publications in their feed (Facebook dashboard). Thus, whenever the company page post a publications, the publications will always appear in its follower feed. Therefore, the first strategy to have better organic viewer is to have more follower in company pages

Table 5. Results of SVM Weight

Attributes	Weight
PAGE TOTAL LIKES	1
Type	0.704
Month	0.385
Day	0.072
Hour	0

Type of publications occupies second most important position (table 5). There are four types of publications such as link, photo, status and video (table 6). The research results show that, in term of type, link appear as the most important factors in supporting organic reach performance. Since this company is educational company and their focusing is to promote study in Taiwan, link post usually aimed

to announce scholarship results or others information related to requirements to study in Taiwan. That's why, link post sometimes is the most post awaited than others and when it is published, more people will start to discuss, share and eventually reach more people.

In this case, even though link shows the most important factor to support the organic reach, it doesn't suggest the manager to simply post link publications alone, but to mix with pictures and link is better. The reasons are the importance of link is 1 (table 6), and picture is 0.86. The difference is quite close compared to video the contribution only 0.23. The other reason is picture also contain a special meaning that described particular purpose (Hum et al., 2011.) and easily understood by customer. This results are also supported by Malhotra (2013). He found that post picture usually can communicate effectively in delivering special message. Thus, to get more customer from organic reach, focusing publications on combination of link and picture is the best.

Table 6. Results of Type SVM Weighting

Attributes	Weight
Type = Link	1
Type = Photo	0.860989
Type = Video	0.231214
Type = Status	0

The third most important factor that affect the organic performance is month. The research show that (table 7), publications published in March reach more people than another months. The reason is the registration date to apply Taiwan scholarship in late march. Usually, company page get more engagements and reach more people at this month. This insight could be implemented in doing product or service promotion. Since more people watch out the page during March, then putting promotion in March will be better than other months.

Table 7. Results of Month SVM Weighting

Attributes	Weight
Month = March	1
Month = September	0.98632
Month = January	0.884519
Month = June	0.632139

Month = August	0.561879
Month = November	0.54282
Month = October	0.417293
Month = February	0.416405
Month = July	0.366241
Month = April	0.2921
Month = December	0

September occupied the second most important month in supporting organic reach. During September Company pages usually post some guidelines and related information regarding how to apply scholarship in Taiwan. Therefore, in September more questions usually come to company's table work. Eventually, since March and September is registration time to apply study to Taiwan either with or without scholarship, promote special products or services would perform much better. This information also can be used to determine the time of special event such as group discussion time, promotion via video call, or even offering discount for special products.

Table 8. Results of day SVM Weighting

Day	Weight
Day = 2 (Tuesday)	1
Day = 3 (Wednesday)	0.917952
Day = 4 (Thursday)	0.53814
Day = 7 (Sunday)	0.292136
Day = 1 (Monday)	0.260216
Day = 6 (Saturday)	0.142958
Day = 5 (Friday)	0

Since Sunday and Friday is pray day for Muslim and Christian people, there is less people reached in these days and the contributions of these day is less compared to Tuesday and Wednesday. The results is different with previous research, which Friday is the most relevant day (Moro et al., 2016). The different

results are caused by local cultural in Indonesia. There are more 80% of Indonesian populations are holding Muslim and Christian religion. Since Friday is Muslim pray day, therefore the result is confirmed by putting Friday as the least important day in reaching people through Facebook pages.

Table 9. Results of Hour SVM Weighting

Attributes	Weight
Hour calculation = 4th	1
Hour calculation = 2nd	0.976203
Hour calculation = 5th	0.700454
Hour calculation = 3rd	0.430723
Hour calculation = first	0

As hours have least contribution to page performance, some researcher don't put more efforts in digging and explore more knowledge inside it (e.g. Moro et al., 2016). In this research, even though the contribution is least, the extraction was still studied. Since target customers of this company are students and normally school finished at 15.00, we divided hours into five groups (section 3). One of important contribution in this paper is found that there are time difference between post published in page and post published date extracted from admin page. The time differences were caused by time different zone. Post published in company page has 15 hour difference to time published extracted from admin page. Therefore, there are different day and time post between data extracted from Facebook and data from admin page. If researcher only use the date extracted from Facebook page the results will be bias. Thus, time adjusting has to do before running the research.

The results show that, group 4th has major contribution to the organic performance. Group 4th is range from 15.01-20.00 pm. It means, publications that published at around 15.01-20.00 pm has more contribution than group 1st (00.01-05.00 am), group 2nd(05.01-10.00 am), group 3rd (10.01-15.00 pm) and group 5th (20.01-24.00pm). The reasons behind are the target customers. Since the target customer are students which normally will be at school around 08.00-14.00, the post published would be better after that time.

5. MANAGERIAL IMPLICATION

This research focus on identifying strategy to reach more people through organic way. Several previous research focus on relationship and prediction only

(e.g. Moro et al., 2016), but in order to assist Small and Medium Size Enterprises (SMEs) which has limitation in financial way, organic reach strategy is one of the most useful technique. Organic reach strategy means company doesn't need to pay money in promoting their product or services through Facebook. Thus, based on data mining technique, several strategy were identified.

In this case, the data was taken from a Small Company Facebook pages which is promoting study in Taiwan either with scholarship or without scholarship. Using Support Vector Machine Weight, then total page likes of the company pages were found the most important factors in supporting organic reach. Then, followed by type of post, which is link is the most relevant post and picture is in the second position. Since the difference of relevance between link and picture is pretty similar, then we suggest to combine the picture and link in generating more organic reach.

Month occupied the third position after page total likes and type of publications. March and September have a greater contribution than another months. For weekday, Tuesday and Wednesday have more relevance than other weekday and the last factor is hour. Hours have least contribution compared to page total likes, type of publications, month post, and weekday post published. In this paper, we also prove that, page total likes is the most important factor that contribute best to reach people through organic reach, this result is different with previous research which type has a greatest relevance (Moro et all., 2016). The research that conducted by Moro was combination between paid reach and organic reach, therefore the research results also different.

Finally, this research come up with a decision map on what strategy should the company apply when published a post on their company Facebook pages (figure 2).
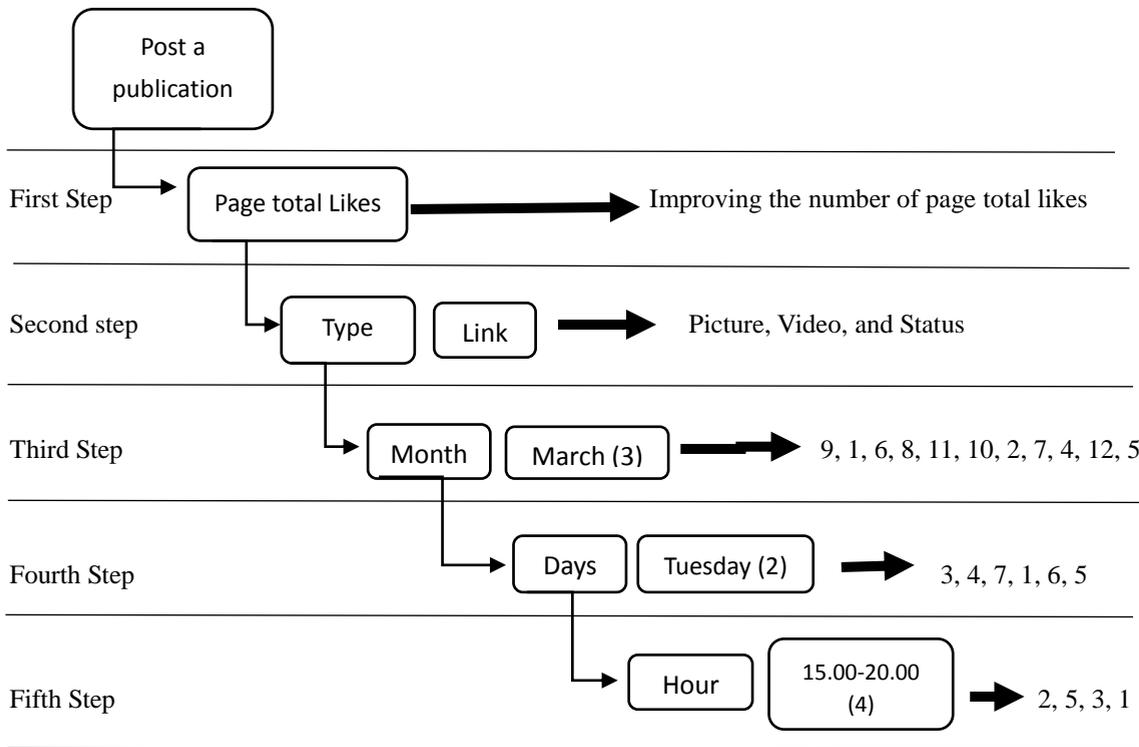
Fig. 2. Publication strategy (Managerial Implication)

6. CONCLUSION

The main goal of this research is to identify factors that affect Facebook pages performance through organic reach and provide a managerial implication in publishing a publication. Organic reach strategy is a strategy to reach more people in Facebook through organic strategies or in other words to run free promotions via Facebook without pay any advertisement fee. Support Vector Machine was used in modelling each performance of 13 potential models using five inputs generated from one company Facebook pages from Indonesia. In order to get the weight of each variable inputs, Support Vector Machine Weight was performed.

Based on this research, Comments, likes, and share have the smallest error than the other potential models. Moreover, comments, like and share are engagements variable, so in reaching more people, lifetime total organic reach was selected as the best model. we found that total page likes is the most important

factor that affect the company page performance in reaching more people through Facebook. Type of publications take the second most important factors that affect the organic Facebook reach then followed by month in third position, day in fourth position and hour in last position. Eventually, to promote and reach more new potential customer through Facebook page, we come up with managerial implication on whether to post a publications in Facebook page (fig 2). Analyzing on how customer engage such, comments, like and share would be a future research. Understanding customer comments using text mining method potentially benefit to company in.

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THE RELATIONSHIP BETWEEN MONEY SUPPLY, PRICE LEVEL AND ECONOMIC GROWTH IN PAKISTAN: KEYNESIAN VERSUS MONETARIST VIEW

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Abstract: *The objective of the study is to examine the relationship between money supply, price level and economic growth in the context of Pakistan by using Autoregressive Distributed Lag (ARDL) model, covered a period of 1980 to 2016. The results confirm the long-run relationship between the variables while using broad money supply as a response variable. However, in the price and income modeling, the variables do not support the cointegration relationship between the variables. The causality results confirmed the unidirectional relationship running from income to money supply, which implies that income do causes money supply in the short run, whereas money supply leads to inflation to support Monetarist view of inflation in a country. The results conclude that economic growth is imperative to stabilize money supply and price level through sound economic policies in a country.*

Keywords: *Money supply; Income; Price level, ARDL; Pakistan.*

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1. INTRODUCTION

1. Introduction

Monetarist believes that money supply leads to inflation, as it's served as store of value used for speculation purpose. Money supply may rise to the general price level, i.e., a small rise in price level is considered as a stimulus for economic growth but if this trend goes beyond the limits, it adversely affects the economies in the form of high price level (Davidson & Weintraub, 1973). The relationship between income, money and price level is widely debatable topic now-a-days. The speculative demand for money plays a vital role in boosting future returns in the form of income, which empshzied the need to study national income accounting in a given context (Goldfeld & Sichel, 1990). The practicing for printing new currency may raise some serious long term and short term repercussions, for example, we consider a case of Pakistan economy, where the price level substantially goes beyond to the limit due to economic depression in the 1990s, nominal GDP increases but the purchasing power remains the same with a factor of just rise in the price level (Agha & Khan, 2006). There is a very close link between money supply, price level and national income. Therefore, we intend to find out the relationship among the variable with reference to Pakistan in the light of Monetarist and Keynesian literature.

There are majorly two schools of thought that have strong viewpoints regarding the role of money, income and price relationship i.e. Monetarists school and Keynesian school (Lavoie, 1984). According to the Monetarist, money has a leading role in determining prices and income in the economy. They proposed the quantity theory of money (QTM) by Milton Friedman, which explains that there is a proportional relationship between price level and the amount of money that is circulating in economy. If money supply increases the same level rise can be seen in the price level of goods and services in the country, therefore, by the increase in money supply the people will buy same amount of goods at higher prices. For the progress and expansion of economic activities money supply is a key factor. Prices should remain stable in the economic system, because inflation has worse effect on the economy (Friedman, 1989).

Keynesians suggested that the change in income brings change in money stock due to change in aggregate demand of the economy. They focused much on the demand side factors of the economy. They are in opinion that economy can be controlled at best by the demand that is made for goods and services. It takes a lot of time for the economic system influenced by the monetary actions to give the

results. Keynesians have a strong suggestion that prices are somewhat less flexible (Ball & Romer, 1990).

There are controversies among different school of thoughts regarding the relationship of income, money and price and also about their interrelationships. These variables are considered very much important and a lot of work has been done about the working of them across countries because links between them if defined in a clear way provide a strong background to devise monetary policy and effective implications. Empirical evidences provided ambiguous results therefore; there is a need to find out more strong evidences to support the links among the money-income-prices in the developing country like Pakistan.

New classical and new Keynesians are in a thought that the monetary policies have deeper effect to influence the economy. Monetary policies if devised properly play vital role and help the government to overcome the problem of unemployment, inflation and the output level. So it is very crucial to investigate that either the supply of money has an effect on the level of output or the level of output changes may bring change in supply of money (Hall, 1989).

This study intends to investigate the money-income-price nexus by employing an Autoregressive Distributive Lag (ARDL) model because this methodology overcomes the problems of autocorrelation and heteroskedasticity among the variables by taking sufficient lags for the regressors and regressand. The main research question is how real GDP is caused by fiscal and monetary policy by investigating the effectiveness of monetarist and Keynesian school of thoughts.

2. LITERATURE REVIEW

The investigated empirical literature of different regions over different time periods gives conflicting results among the relationship of money, income and price level. Hussain (1982) done the conclusive findings among the stated macroeconomic factors in Pakistan. The results conclude that economic activities in the country are more prone to fiscal actions as compared to the monetary activities and they are faster in pace and can be predicted. The drawback of the model is single equation it is not derived by the larger model so there is a chance of omission of important information. Hussain and Bilquees (1991) and Sims (1972) found interesting results, i.e., (i) from monetary base to GNP there is a unidirectional causality, (ii) The same causality is running in between M2 to GNP and GNP to M2 via two way linkages. The findings of the results have some sensitivity issues regarding lags in the Sims test but there is no justification about

the lag of one period that is used in the study either no statistical and economic justification is provided, test which is a t-test of a single coefficient to show the direction of causality. VAR model is used to analyze the result of monetary issues in Pakistan and this approach is used by Chishti et al. (1992). The findings confirmed the unidirectional causality running from money supply to output, the price has no effect to change in money but money do cause a change in price level. Momen (1992) selected a panel of 10 countries including Pakistan; these countries mostly are agricultural and industrial economies. The results show that in industrial countries, causality is running from money supply to real GDP that confirm the monetarist view, but in countries which are agricultural base like Pakistan the causality runs in reverse direction. Ahmed (2002) showed the causality relationships among some crucial macroeconomic variables and found the bidirectional causality running between money supply and price level in Pakistan. The limitation of the study is to ignore the dynamic analysis. It does not apply the variance decomposition (VDCs) and impulse response function (IRFs), which may gives sound inferences in inter-temporal framework. Mehmood and Arby (2005) examined the long run and short run association among income, money and price in Pakistan. The results argued that the main target is the money supply not the interest rate. It shows improvement in the past studies but with some limitations, i.e., (a) F- test is used which is bi-variate causality test not the multivariate one. The test named likelihood ratio can do this task (Enders, 2004). Abbas and Hussain (2006) examined the bi-variate and tri-variate causal association between money and income and between money and price level in Pakistan. The end result shows the bi-variate causality between money and prices, as there is monetary expansion so the inflation is largely increased in a country. Money supply is the main predictor of the study. An investigation is further done by Khan (2008). The monetary policy shocks leads to the following outcomes (I) there is increase in industrial output which comes back to its original position over 23 to 32 months, (ii) there is an increase in inflation rate, (iii) the dominant factors are nominal shocks in explaining the changes in inflation. The study has following apprehensions, i.e., the proxy of GDP is used which is industrial production index (IPI) 7 percent increment is realized in CPI during 12 months after the shocks and this goes to 90 percent during 18 months. So there is some complication by using IPI as a proxy of GDP. Hussain and Rashid (2009) investigated the relationship between money supply and two other macroeconomic variables i.e. the price level and income. The active role is played by the money supply to change the price level during the sample period. The following are the limitations of the study, i.e.,

(a) the bi-variate causal analysis is used, while multi-variate analysis is deem desirable, (b) The annual data includes pre-1971 period, which may raise a problem of Bangladesh data included in a country, (c) OLS estimation technique is used, while many other robust techniques available. Demery et al. (1984) investigated the data in case of West Germany. The study found that money growth affects real variables. Jiranyakal & Brahmasrene (2007) found the causal relationship between economic development & size of the government, and showed that there is unidirectional causality among economic growth, public spending & money supply. Lee and Li (1983) documented causality among money income & price in Singapore and the found bidirectional causality between income & money supply and unidirectional causality is running from money supply to price level. Khan and Siddiqui (1990) found unidirectional causality running from income to money supply and bidirectional causality between money supply & price level in Pakistan. Giap Tan and Cheng (1995) found bidirectional causality between money supply and output of Malaysia. Bengali et al (1999) examined bidirectional causal relationship between money and income and unidirectional causal relationship from money supply to price level in Pakistan. Ashra et al (2004) found bidirectional causality between money supply & price level in India. Table 1 shows some literature support for Monetarist and Keynesian theory across countries.

Table 1. Literature Support to Monetarist and Keynesian across Countries

Authors	Conclusion supports
Hussain and Rashid (2009)	Monetarist
Khan (2008)	Monetarist
Demary et al. (1984)	Monetarist
Ahmed (2002)	Bidirectional causality
Mehmood and Arby (2005)	Monetarist
Jiranyakul & Brahmasrene (2007)	Unidirectional causality
Hussain & Bilquees (1991)	Unidirectional causality
Hussain (1982)	Keynesian
Momen (1992)	Monetarist
Chishti et al. (1992)	Monetarist
Giap Tan and Cheng (1995)	Bidirectional causality
Sims (1972)	Unidirectional causality

3. DATA AND METHODOLOGY

The study used money supply, price level and economic growth in the context of Pakistan by using a time series data from 1980 to 2016. Gross Domestic Product (GDP) served as a proxy for country's income in current US dollar, broad

measure of money supply (M2) measured in annual % of broad money growth and use as a proxy of money. M2 comprises of currency in circulation, deposits with state bank of Pakistan, demand deposits, time deposits and resident foreign currency deposit that are in scheduled banks. Consumer price index is served as a proxy for price level with the base year (2010=100).

3.1.   Data Sources

The data is collected from World Development Indicator (WDI) and Economic Survey of Pakistan, various issues. The data is gathered about 36 years for the country Pakistan. The casualty among money supply, income and price level give us conclusive findings about possible policy adoption in a given country context.

3.2.   Methodology

The followed model is used for empirical illustration, i.e.,

$$GDP_t = a_1 + a_2 M2_t + a_3 CPI + U_t \tag{1}$$
$$M2_t = a_1 + a_2 GDP_t + a_3 CPI + U_t \tag{2}$$
$$CPI_t = a_1 + a_2 GDP_t + a_3 M2_t + U_t \tag{3}$$

Where, GDP shows Gross Domestic Product, M2 shows broad money supply, CPI shows Consumer price index, 't' is time period, and μ is error term.

The Auto Regressive Distributed Lag (ARDL) model is used for empirical illustration, which is developed by Pesaran et al. (2001). ARDL is used because of several important reasons of the technique. It can be easily applied to, without taking it in to account that the variables in the study are stationary at level or at first difference. It provides the more statistically significant approach even for the small samples than any other technique. When regressors in the model are endogenous, so there is unbiased long-run estimations and it is valid to test according to bounds testing approach. The data generation of the model is taken by sufficient number of lags when the modeling is general to specific. ARDL helps in the derivation of Error Correction Term (ECM) through linear transformation without ignoring the long -run information (Boutabba, 2014)

ARDL can be applied even if the variables are I (0) and I (1). However if the variables are having I(2) the F-statistic that is given by Pesaran et al. (2001) become invalid. The ARDL procedure implement the unit root test only that none of the variable is integrated at I (2) or beyond that. To check that the variables are stationary or not we use the unit root analysis, to see long run relationship among variables the auto regressive distributed lag model and to check short run relationship Error correction method has been implemented.

3.2.1. Unit root test

The most popular technique used to convert data from non stationary to stationary (Mohammad, 2009). The error term for two consecutive time period is uncorrelated then the Dicky-Fuller test can be applied as follows:

$$\Delta Y_t = \alpha_2 \delta Y_{t-1} + \varepsilon \ldots \text{with no Trend and intercept}$$
$$\Delta Y_t = \alpha_1 + \alpha_2 \delta Y_{t-1} + \varepsilon \ldots \text{with drift}$$
$$\Delta Y_t = \alpha_1 + \alpha_2 t + \alpha_3 \delta Y_{t-1} + \varepsilon \ldots \text{with Trend and Drift}$$

Three models variables can be verified for the process of stationary by the above procedure. When supposition of the error term is uncorrelated is relaxed then the testing procedure of Augmented Dicky-Fuller is most widely used and it is as follows:

$$\Delta Y_t = \alpha_2 \Delta Y_{t-1} + \delta Y_{t-1} + \varepsilon \ldots \text{with no intercept and trend}$$
$$\Delta Y_t = \alpha_1 + \alpha_2 \Delta Y_{t-1} + \delta Y_{t-1} + \varepsilon \ldots \text{with intercept}$$
$$\Delta Y_t = \alpha_1 + \alpha_2 t + \alpha_3 \Delta Y_{t-1} + \delta Y_{t-1} + \varepsilon \ldots \text{with trend and intercept}$$

3.2.2. Cointegration Analysis

The ARDL procedure is going to be estimated through the following equation, i) when the change in money supply bring change in GDP, i.e.,

$$\Delta GDP_t = \alpha_0 + \sum \alpha_{1i} \Delta GDP_{t-i} + \sum \alpha_{2i} \Delta MS_{t-i} + \sum \alpha_{3i} \Delta CPI_{t-i} + \lambda_1 GDP_{t-1} + \lambda_2 MS_{t-1} + \lambda_3 CPI_{t-1} + \mu_t \ldots \ldots (1)$$

ii) when there is a change in income to cause a change in money supply, i.e.,

$$\Delta MS_t = \beta_0 + \sum \beta_{1i} \Delta MS_{t-i} + \sum \beta_{2i} \Delta GDP_{t-i} + \sum \beta_{3i} \Delta CPI_{t-i} + \lambda_1 MS_{t-1} + \lambda_2 GDP_{t-1} + \lambda_3 CPI_{t-1} + \mu_t \ldots \ldots (2)$$

iii) when price is dependent variable, it brings change in money supply and income, i.e.,

$$\Delta CPI_t = \beta_0 + \sum \beta_{1i} \Delta CPI_{t-i} + \sum \beta_{2i} \Delta GDP_{t-i} + \sum \beta_{3i} \Delta MS_{t-i} + \lambda_1 CPI_{t-1} + \lambda_2 GDP_{t-1} + \lambda_3 CPI_{t-1} + \mu_t \ldots \ldots (3)$$

The first difference operator is denoted by the symbol Δ, α_0 is the intercept in equation system and residuals are denoted by μ_t the variables are GDP, M2 and CPI which are explained above. All the terms which are having summation sign with that represent the error correction dynamics; the remaining part of the equation which is having the sign λ with it depicts the long run relationship. The time related changes can be incorporated with this equation. The null hypothesis of no cointegration is tested by joining both F-statistic and Wald statistic in the bounds testing procedure.

The two sets of critical values for given significance level is reported by Pesaran et al. (2001) and Narayan & Smyth (2005). The assumption is that one set

of critical values included in ARDL model are stationary at level that is I(0), while the calculation of other is assumed to be stationary at first difference that is I(1). If the calculated value of test statistic exceeds the upper critical bounds value, then the null hypothesis is rejected, if the computed values fall within the bounds then co integration test becomes inconclusive. When this is going to happen the error correction term is a useful way to show co integration, If the computed value of F-statistic is lower than the lower bounds value

The cointegrating relationship is specified by the above equations, after that the reduced form of the equation is used for the long run conditional relationship. So the short run causality is specified by the following ARDL technique of testing.

$$\Delta GDP_t = \alpha_0 + \sum \alpha_{1i}\, \Delta GDP_{t-i} + \sum \alpha_{2i}\, \Delta MS_{t-i} + \sum \alpha_{3i}\, CPI_{t-i} + \eta ECT_{t-1} + \mu_{1t} \dots\dots (4)$$
$$\Delta MS_t = \beta_0 + \sum \beta_{1i}\, \Delta MS_{t-i} + \sum \beta_{2i}\, \Delta GDP_{t-i} + \sum \beta_{3i}\, \Delta CPI_{t-i} + \eta\, ECT_{t-1} + \mu_{1t} \dots\dots.. (5)$$
$$\Delta CPI_t = \gamma_0 + \sum \gamma_{1i}\Delta CPI_{t-i} + \sum \gamma_{2i}\, \Delta GDP_{t-i} + \sum \gamma_{3i}\Delta MS_{t-i} + \eta ECT_{t-1} + \mu_{1t} \dots\dots\dots.. (6)$$

Here, Δ is the operator use for the difference and ECT is the error correction term that is derived when the long run cointergration analysis is done for the above ARDL model.

Using equation 4, 5, 6 the Granger-causality test is applied. According to the Engle & Granger (1987) when the Granger causality is performed at first difference by using vector auto regression modeling it will be misleading. That's why we introduce here the error correction term which shows not only the causality direction but also gives the difference between long run and short run causality. The confirmation of the long run causality is when there is a negative sign and the lag EC term is statistically significant present in ARDL model.

4. EMPIRICAL RESULTS

Table 2 shows the unit root estimates for ready reference.

Table 2. Results of ADF Unit Root Test

Variables	Augmented Dickey Fuller(ADF)					
	LEVEL			1st difference		
	ADF Statistic	Critical Values	P-values	ADF Statistic	Critical Values	P-values
Ln(GDP)	0.487	1% -3.626 5% -2.945	0.983	-5.709	1% : -3.632 5% : -2.948	0.000 *
Ln(CPI)	-0.130	1% : -3.699 5% : -2.976	0.936	-4.054	1% : -3.711 5% : -2.981	0.004 *
Ln(M2)	-3.893	1% : -3.679 5% : -2.967	0.005	-4.286	1% : -3.689 5% : -2.971	0.002 *

Note: * Level of significance at 5%.

Akaike information criterion is used to test the unit root with the lag length 9 where GDP, CPI and M2 are stationary at first difference having trend only. Table 3 shows the Bounds test for cointegration among income, money supply and price level. The cointegration among the variables is accepted on the basis of F-statistics. The criteria are that if significance of lagged values of variables present in the study rejects the null hypothesis, which is the hypothesis of no cointegration. In the present findings lag length is fixed up to four and the optimal lag length is fixed by AIC criterion in the ARDL model.

Table 3. Bounds Test Approach to Cointegration

| Variables | Critical value bound | | | F-statistics | Cointegration |
	Significance	Upper bound	Lower bound		
Ln(GDP)	At 10% At 5 % At 2.5% At 1%	3.17 3.79 4.41 5.15	4.14 4.85 5.52 6.36	0.391	No Cointegration
Ln(CPI)	At 10% At 5 % At 2.5% At 1%	3.17 3.79 4.41 5.15	4.14 4.85 5.52 6.36	1.471	No Cointegration
Ln(M2)	At 10% At 5 % At 2.5% At 1%	3.17 3.79 4.41 5.15	4.14 4.85 5.52 6.36	9.957	Cointegration

The results show that GDP and CPI model both exhibit no cointegration relationship between the studied variables, while in third model that is related with money supply confirmed that the model exhibit a long-run and cointegrated relationship between the variables. The value of F-statistic for M2 model shows the estimated value of 9.957 that is significant at 99% confidence interval, which is estimated is higher than the upper bound value. Hence, we conclude that there is a long run cointegration relationship among prices and income when money supply is dependent variable. Price modeling and income function both does not confirm the cointegrated relationship between the variables, as F-statistic values are 1.471 and 0.391 fall in the lower bound value. The causal relationship and dynamics are estimated for the variables, i.e., price level, income and money supply by using F-statistic. Table 4 shows the empirical results of short –run causality for money supply, price level and income model in a given country context.

Table 4. Empirical results for short run causality

1. M2 as dependent variable				
Variables	Coefficient	Standard error	t-statistics	P- value
Δ(LM2(-1))	0.346	0.163	2.116	0.043 **
Δ(LGDP)	0.968	1.141	0.848	0.303
Δ(LGDP(-1))	2.972	1.194	2.488	0.019**
Δ(LCPI)	0.155	0.631	0.246	0.507
2. GDP as dependent variable				
Δ(LCPI)	0.764	0.455	1.678	0.083***
Δ(LCPI(-1))	-0.558	0.445	-1.254	0.219
Δ(LM2)	0.025	0.025	0.973	0.338
3. CPI as dependent variable				
Δ(LCPI(-1))	0.552	0.155	3.545	0.001*
Δ(LCPI(-2))	0.176	0.168	1.051	0.303
Δ(LM2)	0.013	0.009	1.377	0.414
Δ(LGDP)	0.178	0.065	2.737	0.011**
Δ(LGDP(-1))	-0.080	0.090	-0.889	0.382
Δ(LGDP(-2))	0.159	0.067	2.356	0.026**

Note: *, **, *** represent 1%, 5% and 10% level of significance.

Table 3, Part (a) shows the result of short run causality, which explains that income has a positive impact on money supply, which implies that higher income largely support to increase more investment in a country that exceeds money supply in a country (see, Putnam & Wilford, 1978). In part (b), the relationship between higher price level and country's economic growth is positive, which implies that at a certain threshold, higher price level support to increase per capita

income, however, after pass certain threshold, changes in price level may lead serious economic distortions in a country that need to be controlled by appropriate economic policies (Sidrauski, 1967). In part (c), the empirical results confirmed that income enlarge the price level in a country to achieve short-term objectives, while in the long-run, it is need to limitize higher price level to support country's socio-economic objectives (see, Cunado & De Gracia, 2005). The pair wise Granger causality shows that if the p values are less than the specified level of significance, the null hypothesis is going to be rejected and alternative hypothesis will be selected as shown in Table 5.

Table 5. Granger Causality

Null Hypothesis	F-statistics	P-Values
Ln(GDP) does not Granger Cause Ln(M2)	3.598	0.039**
Ln(M2) does not Granger Cause Ln(GDP)	0.655	0.526
Ln(CPI) does not Granger Cause Ln(M2)	0.933	0.404
Ln(M2) does not Granger Cause Ln(CPI)	2.772	0.078***
Ln(CPI) does not Granger Cause Ln(GDP)	0.368	0.904
Ln(GDP) does not Granger Cause Ln(CPI)	1.754	0.190

Note: **, *** represents 5% and 10% level of significance respectively.

The results show that GDP Granger cause money supply but this relationship not confirm by other way around, which implies that economic growth is imperative for broad money supply in a country. The results further confirm the one –way linkage running from money supply to price level in a country, which confirmed the Monetarist view of inflation **(see, Fischer & Mayer, 1981).** Table 6 shows direction wise causality among the variables for ready reference.

Table 6. Direction wise causality

Variables	Directions	Symbols
LGDP and LM2	Unidirectional	→
LM2 and CPI	Unidirectional	→
LCPI and LGDP	No Direction	#

The result implies that when there is a rise in income, there should be a rise in money supply to overcome the gap generated by increase in income. When inflation rate boosts up in the economy, the inflation can be accommodate by increase in money supply and this money supply increment again increases the price level in the economy. When price level increases production is going to increase because producers can get higher gains by increase in prices then there is an increase in income of the country. Figure 1 shows the confidence ellipse to check model stability.
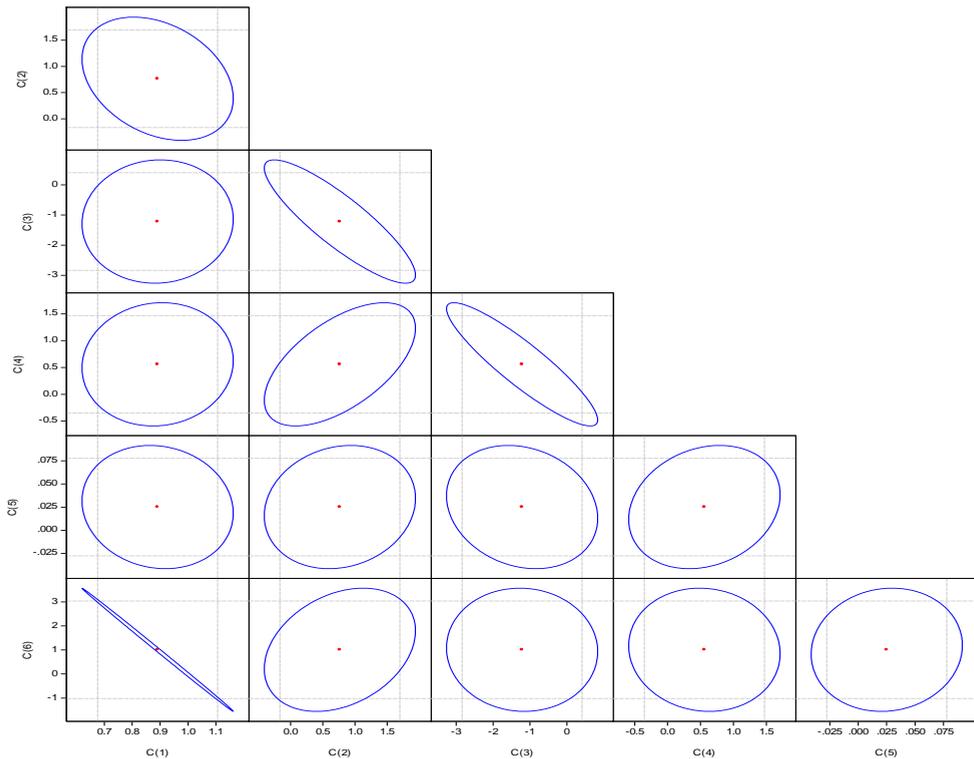
Figure 1. Confidence Ellipse

Figure 1 shows the corresponding confidence interval for the individual coefficients. The above figure explains that according to coefficient estimates these are highly correlated, if the coefficient estimates are independent of each other the ellipses would be exactly like circles. It shows that model is stable in the long run at 5% level of significance.

5. CONCLUSION AND POLICY IMPLICATIONS

The study analyze the long-run and causal relationship between money supply, price level and economic growth in a context of Pakistan by using the data from 1980-2016. The investigation of the variables for long run cointegration is determined by the ARDL bounds test for cointegration. The bounds testing approach confirmed that the model exhibit the long-run and cointegrated relationship between the variables when broad money supply served as a regressand, while in other two models, i.e., price model and income model, both does not fall in the upper bound critical values, hence we may not conclude in favor of cointegrated relationship between the variables. The short-run dynamics show that i) economic growth positively influenced broad money supply, ii) price level increases country's economic growth, and iii) economic growth increases price level in a country. The causality result confirmed the one –way linkages running from economic growth to money supply, and money supply to price level, which confirmed the Monetarist view of inflation in a country. The results conclude that fluctuations in price level in the short run must be stabilize with cautions through the active monetary policy, as if it will not to do with cautions it will be serious impact and intensify the price fluctuations in long run. Money supply is allowed to grow as per the real output of the economy. When money growth is increasing excessively it causes increase in price level in a country. The contractionary monetary policy is imperative to stabilize country's excessive money supply in a country.

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DOES CORRUPTION MATTER FOR UNEMPLOYMENT IN SADC COUNTRIES?

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Abstract: *Is corruption, the main source of unemployment in the SADC countries? Do the effects of corruption outweigh those of income inequalities, human capital and government revenues in explaining the unemployment rate within the SADC area? Through these questions, the objective of our paper is to propose targeted policies that can enable decision-makers to reduce the unemployment rate within the SADC area. Through a panel vector autoregressive model, our empirical investigation on a sample of nine (09) SADC countries reveals that the education level and income inequalities contribute the most to explain the total unemployment rate. However, for the youth unemployment, corruption is the main factor followed by the level of education. To reduce total unemployment in the area, SADC countries need to reduce income inequalities and the mismatch between education and the labour market needs and/or countries' development programs. For the youth unemployment, the reduction of corruption to all its forms should be the priority of political and economic decisionmakers.*

Keywords: *Unemployment, youth, corruption, income inequality, education, public policy.*

JEL Classification: *J40, J48, J64, O15*

1. INTRODUCTION

The questions about the factors that influence the unemployment rate and the policies to be implemented to eradicate it are not new issues. Since Nickell (1979), there has a succession of works that develop economic, institutional and social policies to reduce the level of unemployment rate in economies (Mincer, 1991; Perugini and Signorelli, 2010; Rendahl, 2016). Indeed, the level of unemployment rate represents a macroeconomic condition, for a country. Thus, its reduction is a major concern for economic and political decision-makers.

Ten years after the 2007 financial crisis and the great recession of 2008, the employment levels in developed countries are returning to their pre-crisis dynamics

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or trends (Boz and Tesar, 2018). However, in developing countries and in sub-Saharan Africa in particular, the unemployment rate is rising, despite the efforts of political and economic decision-makers. This constitutes a recurrent problem in sub-Saharan African countries. Several institutions, through economic, institutional and social policies, are trying to reduce the level of unemployment, especially among young people, without success. Indeed, the unemployment is an economic problem whose damage is more pronounced among youth than the total population (Perugini and Signorelli, 2010; Condratov, 2014). Moreover, this young class is the most represented in the African population. It is in this sense that the youth unemployment (aged 15-24) has attracted the attention of researchers and especially political and economic decision-makers since the advent of the 2007 financial crisis and the general recession of 2008 (Bell and Blanchflower, 2011; O'higgins, 2012; Katz, 2014).

With an average unemployment rate of 7.58% and a youth unemployment rate estimated at 13.47%, the SADC, economic region of Southern Africa, present one of the highest levels of unemployment among economic regions in the world, this comparatively to developing countries (5.43% for total unemployment rate and 10.44% for youth). These levels of unemployment rate within the area, constitute a real challenge for the public and economic authorities. The desire of these authorities is to reduce these levels of the unemployment rate and especially to have a large middle class necessary to create and generate economic growth. Despite the efforts of public authorities and institutions to reduce the level of unemployment and especially combat the sources of this phenomenon, the task keeps hard, and not significant, are the results.

However, the authorities, in order to stabilize their economic and social activities, are seeking to eradicate this scourge. This leads countries to research and analyze the causes of unemployment in the area. O'Reilly et al. (2015) argue that to solve the unemployment problem within a geographic entity, it is important to seek to understand the causes. According to O'Reilly et al. (2015), what could explain these levels of the unemployment rate in the SADC area? And how can we resolve this problem, especially among youth? In relation to the first question, theoretically, there are huge controversies about the causes of unemployment within a region.

For neoclassical theory, the unemployment rate is a natural phenomenon that results from the trade-off between labour supply and demand. Among Keynesians, however, this is due to insufficient demand for labour. The Keynesian theory also suggests that one of the sources of unemployment rate within an area is the

inefficiency of public policies (Battaglini and Coate, 2011, 2016; Condratov, 2014; Rendahl, 2016). The low mobilization of public resources necessary to conduct expansionary fiscal policies can lead to higher the levels of unemployment rate within an area. As other determinants of the unemployment rate within an area, the economic literature identifies the human capital (Nickell, 1979; Mincer, 1991 and Condratov, 2014) and the increase in income inequality within countries (Helpman et al., 2010). More, a person is educated, less is the probability to be unemployed (Mincer, 1991). Hence, a country with a high proportion of an educated population will have a low level of the unemployment rate (Mincer, 1991 and Condratov, 2014).

Moreover, when national wealth is held by a minority, and income is poorly redistributed, the outcome within a country is the increase in the unemployment rate. More recently, theory on the determinants of unemployment within regions has focused more on institutional determinants. Indeed, it is increasingly clear that the institutional environment of a country or region can influence the economic activity and the unemployment rate (Asiedu and Freeman, 2009; Ali and Krammer, 2016; Ali and Saha, 2016, 2017; Bouzid, 2016). Thus, since the works of Myrdal (1968), Mauro (1995, 1997, 1998) and Tanzi (1998a, 1998b), the literature has identified the corruption, the most recurrent problem when we refer to the economic and social development, as a factor that can influence the level of the unemployment. The corruption is an old phenomenon that is at the source of unemployment levels in both developed and developing countries (Asiedu and Freeman, 2009; Ali and Krammer, 2016; Ali and Saha, 2016). Thus, to reduce unemployment, we must seek to solve and eradicate the level of corruption in the countries. That is why, since the 1980s, the fight against corruption has been a priority of international policies and development debates.

Faced with these different economic and institutional sources of unemployment, it can be possible for a political or economic decision maker, to make mistakes in the elaboration of economic policy to solve the problem of unemployment in the SADC area. In addition to this, despite the multitude of works carried out in the literature on the economic, institutional and social determinants of the unemployment rate, one of the limitations, to our knowledge, is that it does not prioritize the factors that may influence the total unemployment rate on the one hand and the youth unemployment rate in a country or region on the other. This could help to propose prioritized and targeted economic and institutional policies that will enable policymakers to effectively address the problem of total unemployment and in particular, the youth unemployment rate in the SADC area.

With regards to the unemployment in the SADC countries, to help to solve this problem and fill this gap in the literature, our paper analyzes on the one hand the effects of income inequality, government revenue, human capital and control of corruption on the total unemployment rate and in particular that of youth in the SADC area. On the other hand, our paper seeks to determine the economic, social or institutional phenomenon that contributes the most to the explanation of the unemployment within the SADC area, in order to prioritize the factors. To achieve our objectives, we adopt a panel vector autoregressive model for a sample of nine (09) SADC countries, over a period from 2007 to 2016, a decade since the advent of the 2007 financial crisis. We hypothesize that corruption is the dominant factor in the explanation of the two types of unemployment included in our analysis.

The analysis performed reveals that the control of corruption and the increase in government revenues in the SADC countries, allow, to reduce the level of unemployment (total and youth). However, the rise in income inequality and education levels contribute, to increase the unemployment rate (total and youth). We explain this last result by the mismatch between the education/training and the labour market needs and/or the development programs of the countries. Hence, there is a need to reorient the education system of SADC countries. We, therefore, conclude that to reduce the total unemployment rate in the SADC countries, in order, we should seek to reduce the income inequality, then, a better orientation of education and training to labour market needs and finally make enormous efforts in the mobilization of government revenues. Concerning the reduction of the level of youth unemployment, the eradication of corruption and the reorientation of education and training within the area should be the priorities of political and economic decision-makers.

The rest of our paper is structured as follows. First, section 2 presents a literature related to our research issue. The section 3, then presents the stylized facts to better understand the evolution of unemployment rates in the SADC area. Section 4 presents the data and the methodology needed to achieve our objectives. After, the section 5 presents and discusses the results. Finally, section 6 concludes our paper.

2. LITERATURE REVIEW

The unemployment is a multidimensional concept that incorporates economic, political, institutional, social aspects; but also, an interesting academic and political issue (Acemoglu, 1995). Thus, several factors can influence the level of the unemployment in a country/area. In the first part of this section, we present a

literature review first, on the traditional determinants of the level of the unemployment and then on those specific to the youth unemployment. In the second part, we present a review of the direct and indirect effects of corruption on both types of the unemployment rate. What explains the level of unemployment within a region or geographical entity? Which factors can influence the level of unemployment? Which economic or social phenomena must be influenced to reduce the level of unemployment in an area?

To answer all these questions, the traditional economic theory suggests that, the inefficiency of a geographic entity's public policies is the main cause of rising unemployment. According to Keynesian theory, the low mobilization of public resources and inefficient economic policies remain one of the main factors in the rise in the unemployment rate in an area. Indeed, for Battaglini and Coate (2011), the implementation of expansionary fiscal policies reduces the level of unemployment. Thus, a very important role of fiscal policy is to reduce the level of unemployment and stabilize the economy. However, the conduct of expansionary fiscal policies requires a strong mobilization of public revenues. Thus, when some country experiences enormous difficulties in mobilizing revenues, this can render fiscal policies ineffective and consequently increase the level of unemployment (Battaglini and Coate, 2011; Rendahl, 2016).

The central government revenues are mostly intended to finance the sectors of the economy (education, health) through public expenditures channels (public investment). That is why political and economic decision-makers, for the most part, use budgetary policy to combat the scourge of unemployment, especially among young people. The consequence of these operations, when countries present difficulties in mobilizing revenues, is the increase in the level of public or central government debt in the countries (Battaglini and Coate, 2011). In addition to the inefficiency of public or fiscal policies, the economic literature identifies the level of human capital as a determinant of the unemployment rate in a country. At the level of human capital, we are more interested in the level of education of the population of a geographical entity.

Nowadays, the global economic system is anchored more on the knowledge economy at the place of the industrial economy (Condratov, 2014). Over the years, human capital has become one of the central drivers of economic growth. Theoretically, it is argued and demonstrated that one of the major benefits of education is the low risk of unemployment for a person with a high level of education. For Nickell (1979), one of the pioneers of quantitative analysis of the relationship between education level and unemployment, there is a natural advantage

for the more educated to easily obtain employment compared to the less educated. In addition, they have a greater capacity to generate more income for a company and greater job stability. More educated a person is, less is the probability to be unemployed (Nickell, 1979; Mincer, 1991). Consequently, a country with a high proportion of an educated population will experience low unemployment (Nickell, 1979; Mincer, 1991; Condratov, 2014). The latter conclusion may be controversial. Indeed, as is often the case in Africa, it can happen that the level of unemployment in a region or a geographical entity is high, despite the high proportion of educated people (secondary and tertiary levels). Theoretically and practically, this phenomenon can be explained by greater competition in the labour market and by the mismatch between the qualifications or expertise of job seekers and job offers.

In addition to the inefficient public policies, human capital, the economic theory identifies as an additional source of unemployment, the income inequality within a geographical entity (Helpman et al., 2010). First, the income inequalities can influence the level of unemployment in function of trade openness of the countries. When income inequalities exist within in country and when the country is opened to the rest of the world, then the high competitiveness of foreign goods and services increases the production cost of local companies. To reduce the production cost, the local companies of a country, reduce the labour force that contributes, to raise the unemployment within a region (Helpman et al., 2010; Kebalo, 2017). Besides this, the fact that the national wealth is held by a minority and poorly redistributed can explain the level of unemployment of a country or an area. It is in this sense that Kebalo (2017) argues that, it is necessary for African countries, in order to reduce the level of unemployment and promote their economic growth, to significantly reduce their economic openness and inequality.

Another factor that can influence the level of unemployment in a region or geographical entity is the weight of the informal sector (shadow economy) in the economy. Theoretically, it is argued that when the weight of the informal sector increases in an economy, there is an increase in the level of unemployment. Empirically, Dell'Anno and Solomon (2008), in examining the relationship between the two phenomena, finds that in the US, there is a positive, significant and structural relationship between the informal sector (shadow economy) and the unemployment rate. Enste (2003) finds a positive and bilateral causal relationship between the weight of the informal sector and the level of unemployment. When the informal sector dominates economic activity, then there will be an increase in the level of unemployment. Similarly, when unemployment is high in an economic sector, agents are more likely to turn to the informal sector, which increases its

weight. How does the informal sector (shadow economy) increase the unemployment rate in a geographical entity? The rise of the informal sector represents a problem for the implementation of a good fiscal economy policy. Indeed, it is difficult and laborious to collect taxes (labour and corporate taxes,...) from the informal sector contributing to the increase in revenues, necessary to finance public expenditures and for the good conduct of economic policies. But one advantage of the informal sector is that it can absorb a part of the unemployment rate in an economy.

If the traditional determinants of unemployment are fiscal policy, human capital (level of education), income inequality and the weight of the informal sector (shadow economy), there are specific additional determinants with regard to the youth unemployment rate (Contini, 2010). The significant reduction of youth unemployment remains one of the greatest social concerns and a challenge for all political and economic decision-makers. Indeed, according to Contini (2010), youth unemployment, the most dominant segment of the world population, represents a function of the macroeconomic condition of a geographical entity. Theoretically, it has been shown that unemployment is an economic problem whose extent of damage is more pronounced among young people than among the adult population (Perugini and Signorelli, 2010; Condratov, 2014; Krugman, 2012; Hurd and Rohwedder, 2010; Bell and Blanchflower, 2011; Katz, 2014). With regards to the determinants, the youth unemployment is undoubtedly due to the low level of education and also to the lack of professional experience of individuals in this age group (15 to 24 years).

The lack of professional experience of young people represents a risk for any company and especially a handicap for the youth class compared to adults. The second factor that can influence the level of youth unemployment is the business cycle and the economic growth of a country or region. Indeed, the level of youth unemployment is sensitive to the business cycle than that of adults (Condratov, 2014). During periods of recession, youth unemployment is higher than adult unemployment (Hurd and Rohwedder, 2010; Bell and Blanchflower, 2011; Krugman, 2012; Katz, 2014; Blanchard et al., 2014). In addition, Tomíc (2016) by analyzing the determinants of youth unemployment in 28 countries of the European Union and over the period 2002 to 2014; shows that the level of youth unemployment is more pronounced in countries with low economic growth, more income inequality, with a high public debt, and a low level of infrastructure. Apart from the economic cycle and economic growth of a country or region, youth unemployment rates are influenced by the labour market dysfunctionalities

(minimum wage), labour market reforms (Condratov, 2014) and corruption (Bouzid, 2016; Tomic, 2016).

The labour market reforms appear to play an important role in explaining the level of employability of youth in a region or geographic entity. Bouzid (2016), in analyzing the causal relationship between the level of corruption and the level of youth unemployment, seeks to show how corruption through bribes in state institutions, can generate employment opportunities, and therefore call into question the efficiency of the workforce in enterprises. With corruption, young people, risky for companies, less qualified, can claim jobs or positions of high quality. Thus, their lack of efficiency will have an effect on production, leading the company to stop hiring. Finally, another additional factor in the level of youth unemployment is the lack of or barriers to labour mobility in regions or countries (Tomíc, 2016). However, for Mauro (1995), corruption remains the most recurrent problem when we refer to economic and social development, and consequently to unemployment. Corruption is an old phenomenon that is at the source of unemployment levels in both developed and undeveloped countries (Ali and Krammer, 2016; Ali and Saha, 2016; Asiedu and Freeman, 2009; Tanzi, 1998b). That is why, since the 1980s, the fight against corruption has been at the forefront of international policies and development debates. Theoretically, it is quite demonstrable that the institutional environment can influence the economic and social development of a geographic entity (Ali and Saha, 2016; Bouzid, 2016).

Since Tanzi's (1998b) work, the level of corruption has been at the middle of all economic activity and must be introduced into the analysis of the relevance of regional and global economic policies, thought or implemented. Theoretically, it is clear that the level of corruption can influence the level of unemployment. And this is possible through several channels. First, corruption increases the level of unemployment by affecting public expenditures. Through the diversion of public revenues necessary for the proper conduct of public policies, the increase in corruption negatively affects public expenditures by reducing the public revenues (Tanzi and Davoodi, 1998; Tanzi, 1998b). Thus, with little revenues mobilized, the education sector and others employment generating sectors can be affected, making fiscal policies less effective. Second, corruption affects the level of unemployment by reducing the level and productivity of a country's public investment (Dissou and Yakautsava, 2012). Consequently, corruption has a negative effect on the economic growth of countries (Mauro, 1995, 1997) and consequently on the level of youth unemployment. The results are the same with those of Ajie and Wokekoro (2012), Matthew and Idowu (2013) and Enofe et al. (2016) who, by studying the penalties

of corruption on economic growth and employment, show that the corruption penalizes economic growth and increases the unemployment and poverty. Third, corruption affects the unemployment rate through the rise in income inequality in a country (Tanzi and Davoodi, 1998). However, in reference to Helpman et al. (2010), it is shown that the increase in income inequality within a geographical entity increases its level of unemployment. Fourth and finally, the corruption reduces the level of foreign direct investments needed to create, sustain economic growth and therefore reduce the level of youth unemployment, because the youth unemployment rate is strongly influenced by the business cycle and the economic growth (Wei, 1997a, 1997b).

At the end of our literature review, we noted that the traditional determinants of the unemployment rate are the inefficiency of public policy (Battaglini and Coate, 2011; Rendahl, 2016), the human capital (Nickell, 1979; Mincer, 1991; Condratov, 2014), income inequalities (Helpman et al., 2010) and the weight of the informal sector (Dell'Anno and Solomon, 2008; Enste, 2003). To these traditional determinants, are added, some specific determinants of youth unemployment rate such as the economic cycle and economic growth (Hurd and Rohwedder, 2010; Katz, 2014), migration (Tomić, 2016), and labour market dysfunctionalities (Condratov, 2014). Finally, the literature reveals the effect of corruption on the dynamics of the unemployment rate (Bouzid, 2016).

Despite the multitude of work performed in the literature on the economic, institutional and social determinants of the unemployment rate, one of the limitations in our knowledge of the literature review is that, it does not rank the factors that can influence the total unemployment rate on the one hand, and the youth unemployment rate of a country or region on the other. To fill this gap in the literature, our paper analyzes the effects of income inequality, government revenues, human capital and corruption on the total unemployment rate and in particular that of youth in the SADC area. The countries in this region represent our field of investigation. On the other hand, our paper seeks to determine the economic, social or institutional phenomenon that contributes most to unemployment in the SADC area in order to prioritize/rank the factors.

3. STYLIZED FACTS

Why are SADC countries seeking to reduce their unemployment levels? Indeed, since the financial crisis of 2007, the average unemployment rate in the SADC region is one of the highest in the world (7.58% for total, and 13.47% for

youth; see figure 1 below), this comparatively to the developing countries (5.43% for total unemployment and 10.44% for youth). This level of the unemployment (especially among young people) in the SADC region is a real challenge for public and economic authorities. Thus, the desire of the authorities is to seek to reduce the level of unemployment and especially to have a large middle class necessary to create and generate economic growth.

Despite the efforts of public authorities and institutions to reduce the level of unemployment and especially combat the sources of this phenomenon, the task is difficult, and not significant are the results. However, in reference to O'Reilly et al. (2015), to solve the unemployment rate problem within a region, it is important and necessary to analyze the behaviour of the unemployment rate over the countries of the region. In this sense, this section analyzes the behaviour of the total and youth unemployment rates within the SADC area. We present stylized facts on nine (09) countries of the region (see table 3 in appendices).

Figures 1 and 2 below present the evolution of the total and youth unemployment rates of nine SADC countries. When we analyze the two figures carefully, we notice that the average total unemployment rate and that of young people in the SADC region are more driven by the level of unemployment of some countries such as South Africa (24.31% and 49.84% respectively), Mozambique (23.91% and 41.15%), Lesotho (25.43% and 34.86%) and Botswana (17.04% and 32.39%). This group of countries has a very high level of unemployment within their economies. In an antagonistic way, we have the Madagascar which is the best pupil concerning the reduction of the level of unemployment within the area; both for the total population (2.98%) and the youth (4.77%).

Total unemployment rate
(in % of total labour force)

Youth unemployment rate
(in % of total labour force ages 15 – 24)
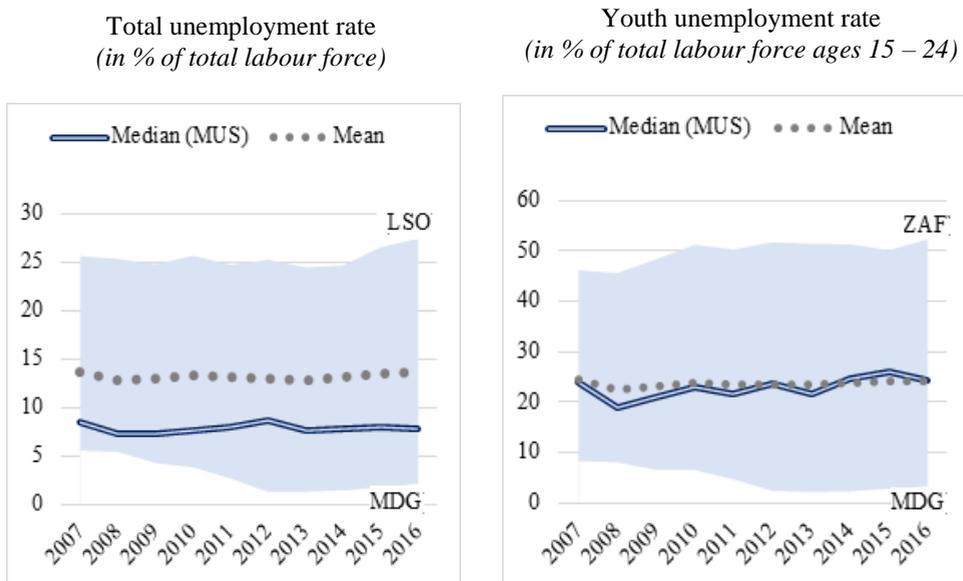
Note: MUS for Mauritius, LSO for Lesotho, MDG for Madagascar, ZAF for South Africa.
Source: authors with data from the International Labour Organization, ILO (2017).

Figure 1. Evolution of the unemployment rate of the nine SADC countries in our sample

By referring to the averages and median (Mauritius' unemployment rate) of the computed unemployment rates (7.58% for the total, and 13.47% for youth), there is concealed within the SADC area, a geographical and economic heterogeneity with regard to the behaviour of unemployment rates. First, we have the group of countries such as South Africa, Mozambique, Lesotho, Botswana and Mauritius which have high levels of unemployment and which must make enormous efforts to reduce this level of unemployment within their economies; especially that of young people. Secondly, we have countries such as Angola, Malawi, the Democratic Republic of Congo and Madagascar with low unemployment rates. We believe that one of the differences between the two groups of countries regarding the level of unemployment could be the high weight of the informal sector and the lack of real data on the level of unemployment in these countries. This did not provide the real unemployment rate for the countries of the group 2.

We seek to propose the economic policies that would help significantly to reduce the level of unemployment in the SADC area. For this, it would require to

conduct the countries of Group 1, such as Mozambique, Lesotho, Botswana, Mauritius and South Africa, to significantly reduce their unemployment rates. However, in reference to O'Reilly et al. (2015), to reduce the level of unemployment, it will be necessary to seek to determine the causes. In the following section, we present the data and methodology deemed adequate to achieve our objectives. Indeed, our first objective is to analyze the effects of some determinants of the level of unemployment on the unemployment rate (total and youth) of the SADC countries. Our second objective is to prioritize/rank these determinants of the unemployment rate in order to facilitate the implementation of targeted economic policies to combat the level of total unemployment, and that of youth in particular, in the SADC area.
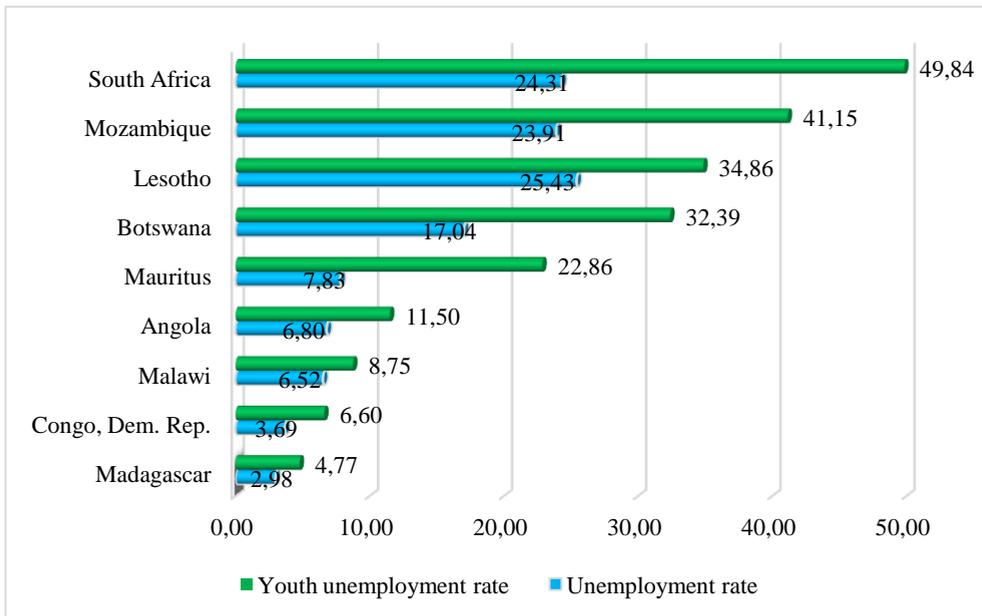
Note: Total unemployment rate (in % of the total labour force) and youth unemployment rate (in % of total labour force ages 15 – 24)
Source: authors with data from the International Labour Organization, ILO (2017).

Figure 2. Cross-sectional evolution of
average unemployment rate of the SADC countries

4. DATA AND EMPIRICAL STRATEGY

4.1 Data

In order to prevent a political or economic decision-maker to make mistakes in the elaboration of economic policies to solve the unemployment problem within SADC, we set ourselves the objectives, to analyze first, the effects of some determinants of the level of unemployment (total and youth). Then, we prioritize/rank these determinants of unemployment so that it facilitates the implementation of effective and targeted economic policies in the fight against this scourge within the region. It is in this sense that we retain in this paper some traditional determinants of the level of unemployment such as the level of education (human capital), the income inequality, the central government revenue, and an institutional variable, the level of corruption. We use these variables to answer our research question: "between income inequality, government revenue, human capital and corruption, which contributes the most to the rise in the total unemployment rate, especially for youth, in the SADC region?".

Definitions of variables

To achieve our various objectives, the variables considered in our study are the following. We have:

✓ The total unemployment rate ($URate_{it}$) which is measured as the level of unemployed people wishing to work as a percentage of the total labour force,

✓ The youth unemployment rate ($YURate_{it}$) which is measured as the level of unemployed youth as a percentage of the active population therefore the age is between 15 and 24 years,

✓ The level of corruption control (Coc_{it}): it reflects the perceptions of the extent to which public power is exercised for private purposes, including small and large forms of corruption, as well as the "capture" of the state by elites and private interests. This index is between -2.5 and 2.5. Thus, when a country presents an index close to 2.5, it is said that there is a very good governance environment in the country. If not, we are talking about an environment of bad governance,

✓ The income inequality which is approximated in our analysis by the growth rate of gross domestic product per capita Δy_{it},

✓ The human capital Edu_{it} quantified by secondary education level; and finally,

✓ The government revenues $TRev_{it}$ of each country to analyze the effect of fiscal policy on the level of unemployment.

The data sources and measures used in our paper are presented in table 4 in appendices.

Variables properties

Before proceeding to the presentation of our methodology and estimation techniques, it is important that we perform a unit root test. For this, we perform the unit root test of Levin et al. (2002) which indicates that all the variables considered and listed above, are stationary (see table 5 in appendices). The descriptive statistics for the variables are presented in table 4 in the appendices.

Choice and justification of our analysis period

To achieve our objectives, we are working on a sample of nine (09) SADC countries (see table 3 in appendices), over a period from 2007 to 2016, a decade since the advent of the 2007 financial crisis. The choice of this period is motivated, on the one hand, by the availability of data for the countries and, on the other hand, by the desire to better understand the behaviour of the unemployment rate of the SADC countries over the last decade. This will enable us to propose economic policies that can potentially help address the problem of unemployment if these policies are taken into account by the institutions.

4.2 Methodology and empirical strategy

With regard to the methodology to address the issue of sources of unemployment in countries of an economic region, fixed effects and long-run models are often used (Tomić, 2016; Bouzid, 2016). The first bias of its analyses is that they do not take into account the endogeneity of the determinants of unemployment. Indeed, the determinants of unemployment can be explained among themselves. The second methodological bias in the literature is the lack of calculation of the contributions of the determinants of the unemployment rate. The calculation of the contribution of the factors influencing the level of the unemployment makes it possible, first, to rank these factors. Second, it helps to develop the economic policies needed to effectively combat the factors influencing the level of unemployment and hence the level of unemployment within a region. To account for these methodological shortcomings and also to achieve our objectives, we use a panel vector autoregressive model (PVAR) for nine (09) SADC countries (see Table 3, appendices)

How does the PVAR model help us achieve our objectives?

The panel vector autoregressive models (PVAR) are built on the same logic as standard VAR models and have the same structure in the sense that all variables are endogenous, but with the addition of an inter-individual dimension (i). These are models that are particularly interesting and almost perfect for analyzing the interactions between variables, the reactions of an economic or social indicator, following a shock, on a group of countries within a region. The responses of an indicator to shocks or changes in variables can be analyzed through the analysis of impulse response functions; while the contributions of factors to the explanation of an indicator can be analyzed through the variance decomposition of forecast errors (Canova and Ciccarelli, 2013). Through the PVAR model, we first seek to analyze the reaction of the level of unemployment for each variation in the control of corruption, per capita income, human capital, and state income. In other words, it is a question of seeing how the unemployment rate (total and youth) reacts for each variation of the other variables. This analysis is done through the interpretation of impulse response functions. Second, through the analysis of the variance decomposition of forecast errors, we seek to quantify the contribution of each variable to the explanation of the level of unemployment in the SADC area. The rest of the methodology based on the PVAR model is presented in appendices.

Model

We, therefore, consider two (02) models in our investigation. One model for the total unemployment rate and another for the youth unemployment rate X^t and X^y correspond respectively to these two models. We thus have in order the vectors:

$$X^t = (URate_{it}, Coc_{it}, Edu_{it}, \Delta y_{it}, TRev_{it}),$$

and

$$X^y = (YURate_{it}, Coc_{it}, Edu_{it}, \Delta y_{it}, TRev_{it}).$$

where $URate_i$ et $YURate_i$ represent the total unemployment rate and the youth unemployment rate respectively. Coc_i represents the corruption control index, Edu_i the level of secondary education, Δy_i the per capita gross domestic product growth rate et finally $TRev_i$ the government revenue.

In function on these two vectors, we have standard PVAR models as follows:

$$X_{i,t}^j = \beta_i + \Gamma(L)X_{i,t} + \varepsilon_{i,t}, (1)$$

where $j = \{t, y\}$, $\Gamma(L) = \Gamma_1 L^1 + \Gamma_2 L^2 + \Gamma_3 L^3 + \cdots + \Gamma_p L^p$ is the polynomial matrix of the lag operator L; β_i is the vector of individual fixed effects (specific to each country or economy) and $\varepsilon_{i,t}$ is finally the vector of idiosyncratic errors.

5. FINDINGS AND DISCUSSIONS

At the end of our econometric approaches, and after estimating our two models with a lag p = 1, we obtain results based, on the one hand, on the analysis of impulse response functions and, on the other hand, on the contribution of variables to the explanation of the total and youth unemployment rates. Recommendations for targeted economic policies to reduce each type of unemployment are proposed at the end of the section.

5.1 Analysis of the reactions of the unemployment rate in the SADC area?

Independently of the level of total unemployment or for young people, the trend of the results is the same (table 1 and 2). In SADC countries, a better control of corruption contributes, to reduce the unemployment rate. However, the decline effect is more pronounced for the youth than for the total unemployment rate. These results corroborate with those found by Bouzid (2016), Matthew and Idowu (2013), and Enofe et al. (2016). Similarly, increased government revenue mobilization allows countries to reduce the level of unemployment. This time, the decline effect is more pronounced for the total unemployment rate than for the youth rate. A trend that seems to corroborate with the results of Battaglini and Coate (2011) and Rendahl (2016). Indeed, better revenue mobilization within a country allows the authorities to have enough resources to implement effective fiscal policies, which in turn reduces the level of unemployment in our case. Thus, as Tanzi and Davoodi (1998) and Tanzi (1998b) have argued, with better control of corruption within a region, this would allow the different tax systems of an economy to mobilize more public revenue needed to implement public and social policies to reduce unemployment. Apart from that, by reducing income inequality as Tanzi and Davoodi (1998) have argued, the control of corruption can reduce the level of unemployment, especially among young people.

Table 1. Responses of the total unemployment rate in the SADC area

t	Coc_i	Δy_{it}	Edu_i	$TRev_i$
1	-1,386	-0,049	0,054	0,002
2	-0,661	0,036	0,099	-0,010
3	-0,304	0,023	0,049	-0,021
4	-0,058	0,004	0,038	-0,018

Table 2. Responses of the youth unemployment rate in the SADC area

t	Coc_i	Δy_{it}	Edu_i	$TRev_i$
1	-5.752	-0.065	0.080	-0.008
2	-0.405	0.063	0.121	-0.002
3	-0.467	0.009	0.053	-0.015
4	-0.595	-0.002	0.048	-0.012

Note: t for periods
Source: Authors with data provided

Beyond the effects of corruption control and public revenues that reduce the level of unemployment rates, our analysis highlights the problem of income inequality in the creation of unemployment in countries. Our results show that, within the SADC area, rising income inequality is contributing to higher levels of unemployment. Results that corroborate those of Helpman et al. (2010). Inequalities in the distribution of income and the acquisition of national wealth have as effects, the increase of unemployment rate within an economic region and more specifically within SADC area.

With regards to the human capital effect, our results show that the improvement in human capital or in the level of education contributes to raising the level of unemployment on the labour market in SADC countries. Surprisingly results. But not for us. Through the MDGs, the SADC countries have improved their level of education. Despite this, the level of unemployment is rising. Normally, the economic literature argues that the improvement of the level of human capital contributes, to reduce the unemployment rate. However, this is not the case within the SADC. Two reasons can explain this result. Firstly, we have strong competition in the labour market and, secondly, we have the mismatch between the qualifications or expertise of job-seekers and job vacancies. The high level of unemployment in SADC, either total or youth unemployment, is explained by the inadequacy of training provision in relation to labour market needs and development programs. Hence the need to seek to reform the education systems of African countries, taking into account their needs and their development programmes.

5.2 Which variables contribute the most to the explanation of the unemployment rate within the SADC countries?

After analyzing the responses of the unemployment rate to changes in human capital, government revenue, income inequality and corruption control, it is important to identify the variables that contribute the most, to the explanation of the unemployment rate within the SADC area. The idea is to prioritize/rank our variables so that targeted, priority and effective economic policies can be proposed to address the unemployment problem in the SADC area. The figure 3 below shows the contributions of human capital, central government revenues, income inequality and corruption control to the explanation of the level of unemployment within the SADC area. Overall, the level of human capital and income inequality are the most important determinants of the level of total unemployment in the SADC region. Comes in third position, the mobilization of public revenues as a determining variable of the level of unemployment in the SADC countries. The

importance of corruption remains marginal. However, when we look at the youth unemployment rate, our framework shows that corruption is one of the main causes within the SADC countries. Corruption is then followed by the level of education.

Thus, it is clear that in order to reduce the overall unemployment rate in SADC countries, the first step should be to reduce income inequality and encourage a better orientation of training or education in relation to labour market needs. Second, countries should make enormous efforts in the mobilization of the revenues needed for the formulation and effective conduct of economic and social policies. As regards reducing the level of youth unemployment, decision-making authorities (political and economic) should seek to combat corruption in all its forms effectively. By significantly reducing the level of corruption in the SADC countries, the authorities can be sure to significantly reduce the level of youth unemployment. But which economic policies or measures should be implemented to significantly reduce the level of total unemployment and that of youth in particular? The following subsection presents some proposals for targeted economic policies that could help to eradicate the unemployment problem in the SADC countries.
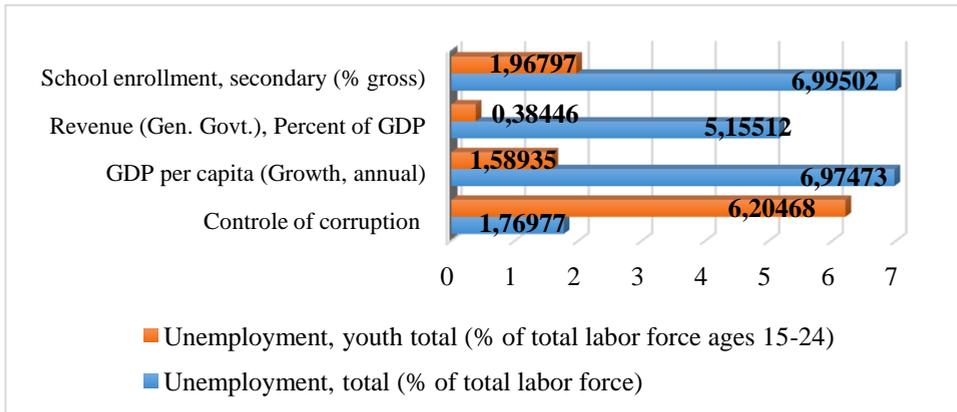
Source: authors with data provided.

Figure 3. Contributions of variables (in %) to explain
the unemployment rate in SADC

5.3 Recommendations for targeted policies to reduce the level of unemployment within the SADC countries

In this subsection, we propose economic policies or measures to be put in place to reduce the level of unemployment in SADC countries. Targeted measures

are proposed for each category of unemployment. We propose priority policies to minority policies.

✓ **How reduce the total unemployment rate within the SADC countries?**

We have argued in our work that in order to reduce the overall level of unemployment in the SADC countries, the first step should be to seek to reduce income inequality and better orient education to labour market needs. Second, countries should make enormous efforts to mobilize the revenues needed to develop better economic and social policies. Thus, to reduce the income inequalities, we suggest that the decision-making authorities put in place a tax system taxing the most, the highest incomes and the small minority that monopolizes national wealth; so that this can be redistributed to people with low incomes.

With regards to the human capital, we propose to decision-makers to reform the secondary and tertiary education system so that it corresponds to the needs of the labour market and the development programmes of the countries. The objectives of the vast majority of sub-Saharan African countries can be summarized in the electrification of Africa, agriculture and the industrialization of Africa. In view of these different visions, countries may already seek to reorient the education system towards the training of electrical and mechanical engineers, agronomists and agricultural economists and engineers for the next ten years, for example. It will be necessary to seek to create regional universities specifically for the medium and long-term needs of countries. This will make it possible to structurally transform countries and consequently reduce the level of unemployment. It is the economic transformation that creates added value and reduces the level of unemployment. Finally, to improve the level of revenue mobilization, we thought it would be interesting and beneficial to reform the tax system in SADC countries. In this sense, we propose the establishment of national revenue offices that centralize the state's public revenues; and legal institutions that advocate more transparency and more control of corruption in the collection of revenues.

✓ **How reduce the youth unemployment rate within the SADC countries?**

With regards to the reduction of the youth unemployment rate, our results have led us to suggest to the policies makers to seek to combat corruption in all its forms effectively and to reorient the education system according to the needs of the labour market and the development programs of the countries. By significantly reducing the level of corruption and reorienting the education or

training system within the area, the SADC public authorities can be certain to reduce the youth unemployment rate.

However, the corruption problem cannot be fully eradicated. Probably no country could be without corruption (Tanzi, 1998b). However, incentives measures or policies can be put in place to discourage and reduce the level of corruption within SADC countries. According to Tanzi (1998b), we propose some directives/policies to reduce the level of corruption within the SADC countries.

First of all, there must be an honest, total and visible commitment by public authorities to the fight against corruption, for which they must first be irreproachable with regards to corruption and show a zero tolerance. We propose that public authorities develop penalties (taxes and sanctions) against any act of corruption to discourage and reduce it. Secondly, we propose to the public authorities to reduce the income inequalities and make regulations such as the tax incentives and ensure that those retained are transparent and non-discretionary as possible. Finally, to reduce the level of unemployment, we propose to the public authorities to make efforts to increase the level of wages and put in place incentives to adopt honest behaviour. We know that reducing corruption allows, to reduce the level of unemployment. But according to Enofe et al. (2016), it is also possible that reducing the level of unemployment could reduce the level of corruption.

6. CONCLUSION

In this paper, we set up an empirical investigation to analyze the effects of corruption, income inequality, education (human capital) and central government revenues on the total and youth unemployment rates in the SADC countries. The originality of the paper consists in computing the contributions of these factors to the explanation of the two types of unemployment within the SADC area. Our paper seeks to determine the economic, social or institutional phenomenon that contributes the most, to the explanation of unemployment in the SADC area, in order to rank them. The idea of our paper is to propose hierarchical and targeted economic and institutional policies, which will enable economic and political decision-makers to solve the problem of total unemployment and in particular that of young people within the SADC area. To achieve our objectives, we adopt a panel vector autoregressive model for a sample of nine (09) SADC countries over the period 2007-2016; a decade since the advent of the 2007 financial crisis. The choice of this period is motivated, on the one hand, by the availability of data for

the countries and, on the other hand, by the desire to better understand the behaviour of the unemployment rate of the SADC countries over the last decade.

This analysis first, reveals that the control of corruption and the increase in government revenues within the SADC area allow, to reduce the level of unemployment (total and youth). On the other hand, the increase in income inequality and also education levels, contribute, to raise the unemployment rates. We explain this last result by the mismatch between education/training and the labour market need and/or the development programs of the countries. Hence it necessary to reorient the education system of the SADC countries. Second, with regard to contributions of the determinants, it appears that, overall, the level of human capital and income inequality are the main variables that contribute the most to explain the level of total unemployment within the SADC area. Comes in the third position, the mobilization of government revenues as a determinant variable of the level of unemployment in the SADC countries. However, with regard to the youth unemployment rate in the area, corruption is one of the main causes. We, therefore, conclude that in order to reduce the level of total unemployment in the SADC countries, we should seek to reduce income inequality, then a better orientation of education and training to labour market needs and finally make enormous efforts in the mobilization of government revenues. With regards to the reduction of the level of youth unemployment, the eradication of corruption and the reorientation of education and training within the region should be the priorities of political and economic decisionmakers

Acknowledgements

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1. Appendices

1.1. *Presentation and proprieties of the sample and data*

Table 3: List of countries and acronyms

List 1	Acronyms	List 2	Acronyms
Angola	AGO	Mauritius	MUS
Botswana	BWA	Malawi	MWI
Lesotho	LSO	South Africa	ZAF
Madagascar	MDG	Congo, Dem. Rep.	ZAR
Mozambique	MOZ		

Source : Authors

Table 4: Data, sources, definition and descriptive statistics

	Label	Source	Mean	Min	Max
Δy_{it}	GDP per capita growth (%)	WDI	2.439	-9.22	18.30
Edu_{it}	School enrollment, secondary *(% gross)*	WDI	54.195	17.78	98.82
$TRev_{it}$	Revenue (Gen. Govt.), *Percent of GDP, Percent*	IMF	25.892	9.47	53.73
coc_{it}	Contrôle of corruption	WGI	-0.318	-1.44	1.04
$URate_{it}$	Unemployment, total *(% of total labour force)*	ILO	13.167	1.30	27.42
$YURate_{it}$	Unemployment, youth total *(% of total labour force ages 15-24)*	ILO	23.635	2.23	52.29

Note: WDI for World Development Indicators (2017), IMF for International monetary fund, Sub-Saharan Africa Regional Economic Outlook (2017), ILO for International Labour Organization (2017).
Source: authors with data provided.

Table 5: Panel unit root test (Levin, Lin Chu, 2002)

	Δy_{it}	Edu_{it}	$TRev_{it}$	Coc_{it}	$URate_{it}$	$YURate_{it}$
t-stat	-6.1056	-15.6528	-1.7844	-2.2838	-3.9133	-4.4138
Prob.	(0.0000)	(0.000)	(0.0372)	(0.0112)	(0.0000)	(0.0000)

Note: Levin et al. (2002) test a common unit process in the data
Source: Authors with data provided.

1.2. *Estimation of the Panel VAR model*

Selection of the optimal lag p

For the estimation of the vector autoregressive model on panel data, we have chosen an optimal lag $p = 1$ that minimizes the information criteria developed by Andrews and Lu (2001) such us (1) the moment and model selection criteria based on the Bayesian information criteria (MBIC; Schwarz, 1978; Rissassen, 1978; Akaike, 1977), (2) the moment and model selection criteria based on the Akaike information criteria (MAIC; Akaike, 1969) and (3) the moment and model selection criteria based on the Hannan-Quinn information criteria (MQIC)

Stability test of the PVAR

After the choice of the optimal lag p identified and the estimate of the baseline model, it is important to check the state of the stability of our PVAR model by computing the modulus of each eigenvalue of the estimated model. Hamilton (1994) have shown that a vector autoregressive model is stable if all the modulus of the associated matrix are strictly lower to the unity. This stability analysis is used to validate empirically a vector autoregressive model. The stability implies that the VAR in panel data is invertible and has a vector of infinite-order of moving average. This, provides a known interpretation of the impulse response functions and that of the forecast errors of variance decomposition estimated. The results of the stability test are illustrated on the figure 4. They indicates our two model (Total unemployment and youth unemployment models) are stable.

Model 1: unemployment rate, total
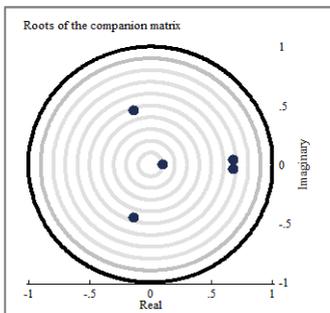
Model 2: Youth unemployment rate, total (15-24)
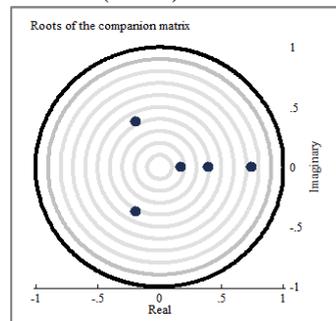
Source: authors with data provided.

Figure 4: Stability test

Variance decomposition of forecast errors

Table 6. Variance decomposition of forecast errors (Model 1)

		$URate_{it}$	Coc_{it}	Δy_{it}	$TRev_{it}$	Edu_{it}
$URate_{it}$						
	1	100	0	0	0	0
	2	84,789	1,654	7,853	3,904	1,799
	3	82,013	1,770	7,029	3,499	5,689
	4	80,477	1,800	7,045	4,114	6,565
	5	79,105	1,770	6,975	5,155	6,995
Coc_{it}						
	1	0,478	93,005	0,008	4,338	2,171
	2	4,873	81,517	0,557	4,080	8,973
	3	4,553	76,900	0,531	6,169	11,846
	4	4,362	72,958	0,545	8,398	13,737
	5	4,601	70,150	0,524	9,772	14,954
Δy_{it}						
	1	38,505	0	43,288	18,207	0
	2	59,075	0,284	26,829	11,416	2,397
	3	58,716	0,330	27,141	11,345	2,469
	4	58,897	0,337	26,920	11,381	2,462
	5	58,957	0,351	26,860	11,356	2,476
$TRev_{it}$						
	1	18,607	0	0	81,393	0
	2	14,156	3,988	1,525	76,783	3,549
	3	18,015	5,635	1,492	69,659	5,200
	4	17,531	6,353	1,449	69,271	5,396
	5	17,256	6,656	1,450	69,153	5,486
Edu_{it}						
	1	31,180	0	14,487	5,436	48,897
	2	23,110	2,600	9,332	10,893	54,065
	3	21,028	2,500	7,524	15,309	53,639
	4	18,845	2,213	6,651	19,816	52,476
	5	17,866	2,081	6,142	22,387	51,524

Source: Authors with data provided

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Table 1. Variance decomposition of forecast errors (Model 2)

		$YURate_{it}$	Coc_{it}	Δy_{it}	$TRev_{it}$	Edu_{it}
$YURate_{it}$						
	1	100	0	0	0	0
	2	91,850	6,123	1,313	0,215	0,499
	3	90,510	6,055	1,581	0,254	1,600
	4	90,190	6,112	1,572	0,327	1,800
	5	89,854	6,205	1,589	0,384	1,968
Coc_{it}						
	1	0,161	99,839	0	0	0
	2	6,610	88,819	0,420	0,005	4,147
	3	6,299	86,543	0,437	0,239	6,481
	4	6,226	84,812	0,477	0,618	7,867
	5	6,324	83,554	0,484	0,804	8,835
Δy_{it}						
	1	31,435	0,172	62,102	6,292	0
	2	54,513	0,106	37,086	5,381	2,914
	3	54,959	0,562	36,342	5,303	2,834
	4	54,832	0,712	36,278	5,341	2,837
	5	54,912	0,722	36,185	5,328	2,853
$TRev_{it}$						
	1	1,186	1,604	0	97,211	0
	2	1,287	2,217	6,223	86,907	3,366
	3	3,422	2,681	6,335	80,892	6,670
	4	3,364	2,869	6,258	79,675	7,835
	5	3,342	2,848	6,279	79,298	8,234
Edu_{it}						
	1	22,256	2,898	6,519	0,041	68,287
	2	25,490	11,930	3,889	0,562	58,129
	3	23,018	12,622	3,430	1,181	59,748
	4	21,601	13,155	3,322	2,090	59,833
	5	21,124	13,213	3,251	2,529	59,882

Source: Authors with data provided.

MIGRATION AND MOBILITY AS A FACTOR OF SUSTAINABLE DEVELOPMENT IN EUROPE

MARZENA SYLWIA KRUK [*]

Abstract: *Contemporary discourse on the international and national level of individual countries concerning the dilemma of sustainable development and the future of societies pays particular attention to the phenomenon of migration in Europe. The article aims to identify social factors, especially migration processes, affecting sustainable development in Europe and Poland.*

Synchronization of economic, social and environmental capital is to prevent the creation of one-line development plans. In addition, it is intended to eliminate potential conflicts related to uneven development.

The starting point for the considerations is the definition proposed by I. Sachs "Sustainable development is a process by which it is possible to harmonize the exploitation of all natural resources, direct investment and technical and institutional changes, as well as meet the current and future needs of people according to the production and assimilation capacity of ecosystems" (Sachs, 2000) [Own translation from Polish].Specific questions and research problems arise

☐ *What impact do contemporary migration processes have on sustainable development?*
☐ *Is sustainable development possible in a situation of growing social disproportions?*
☐ *How do economic migrants affect sustainable development?*
☐ *Foreign students, (migrants), as the capital building large urban centers.*

Keywords: *migration, sustainable development, European Union, Poland*

1. INTRODUCTION

Impact of migration on sustainable development in Europe and Poland

Sustainable development concerns not only the economic, industrial, ecological, but also social sphere. In recent years, we see an increase in the migration balance, which affects the development of large urban agglomerations and the deficit of development of small towns. This is evident from the example of migration from Poland to EU countries. The most-chosen countries of immigration

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of Poles are Great Britain (17% of those leaving Poland in 2004-2007), Germany (16%), Italy (11%), Ireland (9%), Norway (5%), USA (2%), other countries (18%) (Central Statistical Office 2011).

Participation of immigrants in building (economic and social) sustainable development

In addition to expatriates, who would not have difficulties finding a job in Poland, i.e. highly qualified people coming from metropolitan centers, many of those who leave Poland are people from economically underdeveloped regions, from villages and small and medium-sized cities going abroad before attempting to enter the labor market in Poland, and at the same time poorly educated (the graduates of narrowly profiled vocational schools) (Central Statistical Office 2011). The main countries from which immigrants are recruited in Poland are countries belonging to the former USSR, primarily Ukraine, Russia and Belarus. A relatively large immigrant group are also citizens of highly developed countries: Germany, the United States, France and Great Britain as well as Vietnam. Every third foreigner living in Poland comes from a country directly neighboring with us. Particularly noteworthy are the two main features of immigrants living in Poland. First of all, they are usually very well educated (as many as 36% of those graduated from higher education institutions) and dominated by a group of people of working age. 80% are between the ages of 20-59, which means that we deal primarily with the immigration of professionally active people, and not full foreign families.

We also note increased migration for educational purposes. One of the goals of sustainable development is access to education and the fight against social exclusion. Creating educational opportunities for young people from less developed regions. Another important issue is the migration of young people for educational purposes, who choose large urban agglomerations and build the innovative capital of the city to which they emigrate and in which they stay after completing the education stage. In Poland, large urban centers are becoming metropolises, e.g. Warsaw, Wrocław, Gdańsk, and small towns are depopulating. Sustainable development applies not only to cities but also to countries (the expansion of students from Ukraine to Poland). Research carried out under the European Eastern University project (EEU 2016) shows that young people from Ukraine are interested in studying in EU countries.

2. SUSTAINABLE DEVELOPMENT GOALS:
ECONOMIC, ECOLOGICAL AND SOCIAL, AND MIGRATIONS

2.1 The goals of sustainable development

Sustainable development involves maximizing the net benefits of economic development while protecting and ensuring recovery of usability and quality of natural resources during the long period. Economic development must then mean not only an increase in per capita income, but also improvement of other elements of social well-being. It must also include the necessary structural changes in the economy as well as the whole society. [own translation from Polish] (Pearce,Turner 2001). Definitions of sustainable development, despite different interpretations of this term, indicate the need to combine economic, ecological and social objectives in the development. This means that the concept is a long-term process that aims to combine three dimensions, i.e. social, and economic development as well as environmental protection. All these elements of the triad, i.e. society – economy – environment, should develop fairly evenly, and therefore none of them should dominate the others (Szadziewska, 2010: 159).

The concept of sustainable development requires:
- comprehensive and systematic recognition of economic, social and natural phenomena, which means the necessity of respecting their interdependence and treating environmental protection as an inseparable part of development processes;
- selection of development priorities (mainly production and consumption) that will not limit or interfere with development (the main task is eradication of poverty and improvement of quality of life); their selection should take into account an appropriate set of economic, ecological and social criteria, a balance of costs and benefits, and the use of instruments specifically created for this purpose, which enable implementation of priorities;
- -treatment of the natural environment as an organic whole (ecosystem), which is subject to constant developmental processes of an evolutionary character and sporadic revolutionary type transformations
- evaluation of changes in the environment through a new paradigm of values, i.e. the ecosystem's ability to sustain development;
- taking into account the problem of cultural delay by adjusting the level of public awareness (including ecological awareness) to economic changes

(Kryk, 2004: 9-10). The concept *sustainable development* should be identified with the constant development of specific sectoral policies, in particular, environmental, economic and social policy. Indicators of sustainable development in Poland in the social aspect are: demographic change, education, social integration, access to the labour market, public safety **and migrations** (Report CSO 2011).

One should consider the triad of goals: **economic, ecological and social, and migrations**. The 2030 Agenda for Sustainable Development is a plan for the development of the world, assuming, by 2030, the elimination of poverty, a decent life for all and the provision of peace. The agenda includes 17 Sustainable Development Goals and 169 related tasks. Sustainable Development Goals and related tasks are monitored by appropriate indicators. They are global and are to be implemented around the world, taking into account the conditions of individual countries, their capabilities and level of development as well as compliance with national strategies and priorities (Report 2012). Annex 4 indicates the exact goals of sustainable development regarding migration.

2.2 Impact of demographic change and migration on sustainable development

In general, one can mention two basic approaches to sustainable development:

- The first approach is of practical and economic nature and is identified with the paradigm of environmental protection and shaping. In this sense, sustainable development is perceived as a reconciliation of traditional economic growth with ecological conditions (environment)

- The second view on sustainable development is ideological and related to the philosophy of history. This understanding challenges the current patterns of civilization development and focuses on the search for new social behaviors and goals, and thus the context of new forms of civilization development. Sustainable development holistically captures individual elements of civilization. It includes the management of natural, economic and human resources, space management, institutional solutions, moral sphere, awareness development or the choice of a specific model of life. In essence, therefore, it is about searching for and formulating a new, optimal, ecological and satisfying vision of civilization (Piontek, 2002).

Table 1. The main goals of the concept of sustainable development and migration

Sustainable development: Dimensions		
Economics	Environment	Society
- Economic stability - Management - Risk management	- Environmental protection - Pollution prevention - Logistics - Sources of resources - Control of chemical substances	- Political stability - Solidarity - Equality - Occupational health and safety - Employment
Migrations: – Economic migrants – Refugees		

Source: Piontek, 2002

The concept of *sustainable development* was recognized as a new philosophy appropriate for global challenges, which included: climate change and clean energy, sustainable transport, sustainable consumption and production, protection amagement of natural resources, public health, social and demographic inclusion and migration, the challenges of global poverty and stable development (Kronenberg, Bergier, 2010). The definition emphasises the three indispensable features, including:

- sustaining itself consisting in creating reserves and stimuli for further developmet,
- stability, understood as a permanent maintenance of development through long-term operation and
- balancing understood as the necessity of maintaining proper proportions in resource management (Florczak, 2009).

Most often, the concepts of sustainable development are considered in macroeconomic terms, referring to the development of the world and civilizations or individual regions, taking this into account one should notice the direct impact of demographic changes and migration on sustainable development.

Demography is a fundamental development factor because the size, age and geographical distribution of a country's population determine the demand for land, water, food and jobs.

According to UN World Population Prospects – if current trends continue, the global population (currently 7.3 billion) will reach 8.5 billion in 2030 and 9.7 billion in 20150. However, the growth will be unevenly distributed: Africa will be the region with the fastest growth by 20150, while the population in Europe is expected to decline after 2020. More than half of the global population growth forecast for 2050 will only take place in nine countries – in India, Nigeria,

Pakistan, Ethiopia, Tanzania, the United States, Indonesia and Uganda. The EU recognizes that good migration management stimulates economic growth and should be included in the program for the post-2015 period (Council on Foreign Affairs, December 2014). The Union also adopted its own policies, in particular through a global approach to migration and asylum.

3. MIGRATION MANAGEMENT AND SUSTAINABLE DEVELOPMENT

3.1 Migration and the labor market

Sustainable development requires systemic thinking and cooperation of specialists from many fields. According to political declarations, to ensure sustainable development, environmental protection should be an integral element of individual sectoral policies. The EU Sustainable Development Strategy also requires sustainable development to be the overarching goal of all policies. Each proposal for a new policy should be assessed in terms of its impact on the economy, society and the environment, both within the EU and abroad.

The European Parliament spoke on the link between migration and development, including in its large-scale resolution (2005/2244), which refers to the integration of migration into EU development policy, dialogue with third countries, the role of remittances and diasporas, "brain drain", circular migration and other issues. The Parliament also called for protection of the rights of migrants, in particular women (Manrique Gil, 2015), European Parliamentary Research Service, Directorate-General for External Policies, EU and Eulalia Claros.

From the perspective of Guy Standing, the **concept of a precariat** was popularized by Guy Standing in the book "The Precariat: The New Dangerous Class ", (2011). Standing is not the author of the title concept. Earlier, it was used by French sociologists in the 1980s for a synthetic description of the situation of temporary employees (Barbier, 2005). The definition of precariat formulated by Standing is to cover many existing categories considered to be in a worse situation on the labor market, e.g. poor employees, temporary employees (no permanent contracts, no protection against dismissal, no leave), forced to be self-employed, trainees. The key to the concept of precariat is to understand what is its opposite, that is, safe and reliable work, good quality work. Standing distinguishes seven forms of work-related security (Standing, 2014: 49):

a) Labour market (policy for full employment);
b) Employment (protection against arbitrary dismissal);

c) Workplaces (chances of keeping your place in the organization, for professional development with this place);
d) Occupational health and safety
e) Chances of getting qualifications
f) Income (wage regulation, social security through social insurance)
g) The right of association and the right to strike.

Table 2. Foreign migration rate – international comparison[1]

Country	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Austria	6.6	6.1	3.0	2.8	2.9	2.1	2.6	3.7	5.2	6.5	7.7	13.0	-
Belgium	3.2	4.7	4.9	5.5	5.9	5.9	7.9	6.3	4.3	2.3	3.2	5.5	-
Bulgaria	-2.1	-2.2	-2.3	-2.3	-2.4	-2.5	-2.4	-0.7	-0.3	-0.2	-0.3	-0.6	-
Cyprus	9.7	11.0	13.7	19.9	21.1	22.0	19.2	21.3	-0.7	-14.0	-17.3	-2.4	-
Czech Republic	1.3	3.0	2.9	7.7	6.5	2.4	1.4	1.6	1.0	-0.1	2.1	1.5	-
Germany	1.0	1.0	0.3	0.5	-0.7	-0.1	1.6	3.7	4.9	5.6	7.2	14.3	-
Denmark	0.9	1.2	1.9	3.7	4.6	2.8	3.0	2.4	3.0	3.8	4.8	7.4	-
Estonia	-2.7	-3.8	-4.0	-2.1	-1.5	-1.8	-2.8	-2.9	-2.8	-2.0	-0.5	1.8	-
Greece	2.6	2.9	2.2	2.1	2.1	1.3	-0.1	-2.9	-6.0	-5.4	-4.3	-4.1	-
Spain	15.5	14.5	14.9	17.2	9.5	3.0	1.6	1.4	-3.0	-5.4	-2.0	0.0	-
Finland	1.3	1.7	2.0	2.6	2.9	2.7	2.6	3.1	3.3	3.3	2.8	2.3	-
France	3.2	3.0	1.8	1.2	0.9	0.5	0.6	0.3	1.1	1.5	0.9	1.0	-
Croatia	3.4	2.5	2.3	2.1	1.4	0.2	-1.0	-0.9	-0.9	-1.1	-2.4	-4.3	-
Hungary	1.8	1.7	2.1	1.4	1.6	1.7	1.2	1.3	1.6	0.6	1.1	1.5	-
Ireland	12.2	15.2	22.2	16.9	3.7	-4.2	-5.6	-7.4	-7.4	-5.5	-3.2	12.9	-
Italy	6.3	3.5	2.7	7.5	6.1	3.6	3.4	1.3	6.2	19.7	1.8	0.5	-
Lithuania	-9.5	-15.4	-7.5	-6.7	-5.1	-10.1	-25.2	-12.6	-7.1	-5.7	-4.2	-7.7	-
Luxembourg	9.6	13.1	11.3	12.5	15.8	13.2	15.1	**21.2**	18.9	19.0	19.9	19.6	-
Latvia	-6.8	-4.9	-4.0	-3.6	-10.3	-16.1	-17.1	-9.7	-5.9	-7.1	-4.3	-5.4	-
Malta	4.8	4.0	0.1	3.8	5.7	5.6	0.2	4.0	7.4	7.6	7.1	9.7	-
Netherlands	-0.6	-1.4	-1.6	-0.1	1.9	2.3	2.0	1.8	0.8	1.2	2.1	3.2	-
Poland	-0.2	-0.3	-0.9	-0.5	-0.4	0.0	0.1	-0.3	-0.1	-0.7	-0.3	-0.3	-
Portugal	1.4	1.5	1.6	2.1	0.9	1.5	0.4	-2.3	-3.6	6.9	-2.9	-1.0	-
Romania	-4.5	-4.0	-4.1	21.9	-8.0	-5.4	-2.4	-2.4	-1.1	0.2	-0.8	-2.3	-
Sweden	2.8	3.0	5.6	5.9	6.0	6.7	5.3	4.8	5.4	0.4	7.9	8.1	-
Slovenia	0.8	3.2	3.1	7.1	9.2	5.6	-0.3	1.0	0.3	0.2	-0.2	0.2	-
Slovakia	-0.2	-0.1	-0.1	0.4	0.4	-0.1	0.9	0.5	0.6	0.4	0.3	0.6	-
EU-27	3.4	3.1	2.8	3.1	2.4	1.4	1.5	1.5	1.8	3.5	2.2	3.8	-
EU-28	3.4	3.1	2.8	3.1	2.4	1.4	1.5	1.4	1.8	3.4	2.2	3.7	-
Great Britain	4.3	4.9	4.5	4.9	4.1	3.8	4.2	3.4	2.6	3.8	4.9	5.1	-

Source: Central Statistical Office, Sustainable Development Indicators.
CSO Foreign Migration Rates (Katowice), 2016.

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[1] **Balance of migration-** this is a negative or positive difference between the inflow of immigration and the outflow (emigration) of the population.
Foreign migrations, going abroad and arriving in the country to settle (permanently reside) or for temporary stay.
Foreign migration rate is defined as the quotient of foreign migration for permanent residence to the number of population in a given year per 1,000 inhabitants (CSO).

In addition, Standing distinguished 10 definition features of the precariat. The first one referred to the relations of production, and here the precariat is to be deprived of all forms of security distinguished above, which has structural determinants in global capitalism. The second concerned distribution relations and broadly understood income.

Negative aspects of globalization include the emigration of talented and educated people, usually from poorer countries to more developed ones, which made underdeveloped countries have no chance of being able to develop further (without educated specialists and resources of specialized workforce). A negative phenomenon is also the development of large, international corporations, which monopolize various markets gradually, and are able to block the activities of smaller, domestic companies, and even cause their bankruptcy. Sustainable development also means that countries should cooperate with each other and integrate, but considering basic values such as health and environmental protection and respect for the rights of weaker and poor people (Pawłowski, 2013:7-8).

3.2 The concept of migration management and cooperation for sustainable development

The global approach to migration and asylum means the implementation in bilateral political dialogue and operational cooperation of capacity building in 2012 and in 2013. The Commission has allocated over EUR 200 million to more than 90 migration projects in developing countries.The EU also has a budget for migration and asylum under the Development Cooperation Instrument, which provides EUR 357 million in 2014-2020 to maximize the impact of human mobility on development and to support migration management and management of migratory flows, in particular regarding migration (Manrique Gil, 2015).

Within the institution, law and politics are defined, educational, administrative and other activities are carried out, connected with the functioning of society, including the reference to its connections with the natural environment. Institutions operate thanks to social capital, i.e. human resources combined with numerous dependencies. Social capital is therefore crucial from the point of view of sustainable development, both as a regulator of the impact of the economy on the environment, and a basis for future development. At present, the crises of institutions in the EU indicate the need for reforms including migration policy.

Some of them can be counteracted by greater public involvement in all processes that affect it. Such a civil society can actively participate in building sustainable development. One of the important aspects of civil society is the

participation of citizens in planning local development and in addressing their conflicts at the interface between the economy, society and the environment. The ultimate goal of sustainable development is the quality of life (ability to meet needs) for current and future generations (Kronenberg, Bergier, 2010: 24).

This also requires action at local level. Sustainable development is a process. Migration is an important element of demographic changes taking place at the national level, it can partially offset the effects of an aging population; it also has an impact on the size of resources, the labor force and the economic development of the country.

4. CONCLUSION

Globalization has two sides: as every process, it brings with it many threats as well as positive aspects. It is important how this process will happen and how people will guide it. Countries can cooperate with each other; there should be foreign and international trade, flow of goods, services and people. However, it should be balanced – then it will actually lead to development not only locally, but also globally. A selfish vision of globalism. A more conscious and active society has a key role to play in sustainable development. On the one hand, the tool to achieve it (the regulator of the impact of the economy on the environment), and on the other – the state of social capital determines the nature of development (high-quality social capital ensures the continuity of development vision and planning its implementation) (Kronenberg, Bergier 2013: 28).

Sustainable development today requires:
- knowledge, education and public involvement, including human resources management and conflict resolution at the interface between the economy and society and the environment.
- due to the increased migration flows, it is now necessary to create a management system for the migration flows of people at international and national level.
- reconciliation at the institution level.
- sustainable development requires systemic actions

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FINANCIAL DEPTH AND EFFICIENCY, AND ECONOMIC GROWTH NEXUS IN OIL-EXPORTING COUNTRIES

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Abstract: *This paper aims to examine the financial depth and efficiency and economic growth nexus in the context of Saudi Arabia and Oman. In particular, this paper addresses on how financial depth and efficiency relate to economic growth and the causal relation between financial depth and efficiency and the economic growth in Saudi Arabia and Oman. Methodological wise, this study employs a panel data of Saudi Arabia and Oman over the period of 1990 – 2015 and uses the determination of line of best to analyze the causal relations. The empirical results show that financial deepening have desirable effects on the economic growth in Oman, while increasing financial depth and efficiency has detrimental impact to economic growth of Saudi Arabia. Based on these empirical facts, we conclude that the financial deepening in Saudi Arabia is not an economic prioritized strategy, but financial deepening is an economic prioritized strategy in Oman. Two main policy implications are reached.*

Keywords: *Financial Depth and Efficiency, Economic Growth*

1. INTRODUCTION

As the oil based economy (OBE) countries are trying to escape from its oil dependent economic profile, the health of the financial and banking system in these countries is crucial. Saudi Arabia and Oman are among the OBE that should consider the financial depth in fostering economic growth because their national development plan focuses on diversification, industrialization, and privatization, with the objective of reducing the oil sector's contribution to GDP by 2020.

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The transformation of the OBE to non-oil economy requires full diversification of the financial products and services in the country. The traditional and common products of financial institutions such as deposit, loan, transfer and others will be shook on the transformation. Many studies done on the contribution of the capital market encourage economic growth (Hassan, Koetter, Lensink and Muster, 2016; Saqin, 2013; Ibrahim, 2013; and other). From this empirical evidence the examination of the financial depth and economic growth is very important in the aspect of determination of the effective both financial related economic growth particularly in the oil-economy transformation in Saudi Arabia and Oman. This paper aims to examine the financial depth and efficiency and economic growth nexus particularly in addressing the how the financial depth and efficiency relates to economic growth in the Saudi Arabia and Oman, and the causality effects of the financial depth and efficiency on the economic growth in Saudi Arabia and Oman.

2. RELATED STUDIES

The financial depth and efficiency in the country is claimed to have positive impact on the economic growth. Hassan, Koetter, Lensink and Muster (2016) concluded that the financial depth encourages the economic growth, but independency of the financial institution is likely to harm the economy. The improvement of the capital markets in the country will fosters the economy in a country (Bangini, Malgorzata, Smagi, and Witkowski, 2017). Saqin (2013) provided the evidence in the developing countries that the efficiency of the financial system highly positively influences the economy. It increases the speed of the economy growth. More efficiency banking sector accelerates the economic growth (Caporale, Rault, Sova, and Sova, 2014). The credit to the private sector and banking deposits are negatively related with growth in Mediterranean countries (Ayadi, Arbak, Sami and De Groen, 2013). Their findings contradicting to the findings of Bangini, Malgorzata, Smagi, and Witkowski (2017) did in the CESGE countries. On other hand, Ibrahim (2013) confirmed the positive effects of the financial depth and the economic growth in the Saudi Arabia. Al-Zubi, Al-Rjoub, and Abu-Mharebi (2006) found the public credit to domestic credit foster economic growth in Arab countries. Marashdeh and Al-Malkawi (2017) studied in Saudi Arabia found the improved financial systems fosters the economic growth. The positive impact of the domestic credit to the private sector in MENA countries is evidence by the study of Osahin and Uysal (2017). Ghannouchi and Radic (2017)

support the Osahin and Uysal (2017) study. Fritzer (2017) found the financial depth have the secondary effects on the economic growth. This means, the financial system in a country have no direct impact on the economic growth. Nasir, Ali and Khokhar (2014) found the financial depth has long run relations in OBE. The finding supports the study of Yusitzade and Mammadova (2015).

3. METHODOLOGY

The study used the regression model that aims to test the causality effect of the financial depths and efficiency on the economic growth in Saudi Arabia and Oman. The correlation analysis was done on the panel data of 1990 -2015 sampled from the Saudi Arabia and the Oman.

4. FINDINGS AND DISCUSSION

The study aimed to examine the financial depth and efficiency and economic growth nexus particularly in addressing the how the financial depth and efficiency relates to economic growth in the Saudi Arabia and Oman, and the causality effects of the financial depth and efficiency on the economic growth in Saudi Arabia and Oman.

The empirical evidenced the high disparity of the financial depth and efficiency (53.3 per cent of GDP) over the 25 years in the Saudi Arabia. The real GDP increased in the multiple of 1.5 over the 25 years, while the financial depth and efficiency increases in the multiple of 4.4 over the 25 years (Table 1).

Table 1: Descriptive Statistics for Financial Depth and efficiency, and real DGP in Saudi Arabia

	N	C	Range	Minimum	Maximum	Mean	Std. Deviation
FDE	26	SA	53.50	-10.20	43.30	20.6538	17.19489
		OM	49.8	14.20	64.00	33.5077	10.69987
RGDP	26	SA	7080.60	14232.20	21312.80	1.6834E4	2311.04391
		OM	18767.8	1490.20	20258.00	1.7577E4	1518.35229

Source: SPSS Analysis (2018)

Table 1 shows the descriptive statistics on the financial depth and efficiency, and real GDP in the Saudi Arabia and Oman, sampled from 1990. The table evidenced the financial depth and efficiency in averaged at the 20.65 percent and 33.51 percent of the GDP in Saudi Arabia and Oman respectively. This means the financial sector in the Oman contribute more than 60 percent on the GDP. From

this empirical facts, the financial sector in the Saudi Arabia have little impact on the Saudi economy.

The correlation analysis found the financial depth and efficiency, and real GDP in Saudi Arabia found to be strong negatively correlated at 823 (- 823), significant at the 0.01 level (2-tailed). This finding evidenced the strong correlation of the financial depth and efficiency, and economic growth in the Saudi Arabia, this does not means the increases of the financial depth and efficiency in the Saudi Arabia, reduces the economic growth, but relates.

Table 2: Correlations Analysis on Financial Depth and Efficiency,
and Real GDP in Saudi Arabia

		FDE		**RGDP**	
		Saudi Arabia	**Oman**	**Saudi Arabia**	**Oman**
FDE	Pearson Correlation	1	1	-.823[**]	.408[*]
	Sig. (2-tailed)			.000	0.39
	N	26	26	26	26
RGDP	Pearson Correlation	-.823[**]	.408[*]	1	1
	Sig. (2-tailed)	.000	0.39		
	N	26		26	26

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Source: SPSS Analysis (2018)

Table 2 shows the correlation analysis of the financial depth and efficiency, and real GDP on the Saudi Arabia and Oman, sampled from 1990 to 2015. The financial depth and efficiency and economic growth strongly negative related in the Saudi Arabia, and moderately positive relates in the Oman. This implies the growth of the financial sector in the Saudi Arabia will be not encouraged, but on the other hand, the growth of financial sector will be the priority in the Oman.

The causality effects of the financial depth and efficiency, and economic growth was done by using the regression model (equation and line of best fits). The study found that the financial depth and efficiency have negative effect on the economic growth. This means that the increase of the financial depth and efficiency in the Saudi Arabia decreases the opportunity for economic growth.

The negative linear relationship between the financial depth and efficiency, and economic growth in Saudi Arabia is determined at the Rsq. 67.7 percent, -0.006 coefficient, at the significant level of 0.000 (Table 3).

Table 3: The summary of the Model and Parameter Estimates
Dependent Variable: FDE

Equation		Model Summary					Parameter Estimates	
		R Square	F	df1	df2	Sig.	Constant	b1
Linear	Saudi Arabia	.677	50.337	1	24	.000	123.720	-.006
	Oman	.166	4.788	1	24	.039	-17.010	.003
The independent variable is RGDP.								

Source: SPSS Analysis (2018)

Table 3 shows the regression model for financial depth and efficiency, and real GDP data sampled from 1990-2015 in the Saudi Arabia and Oman. The model is better determined at 67.7 percent at significance level of 0.000 in the Saudi Arabia, and determined at 16.6 percent at the 0.039 level of significance in the Oman.

Figure1: The comparison of the line of best fits of the financial depth and efficiency, and economic growth in Saudi Arabia and Oman
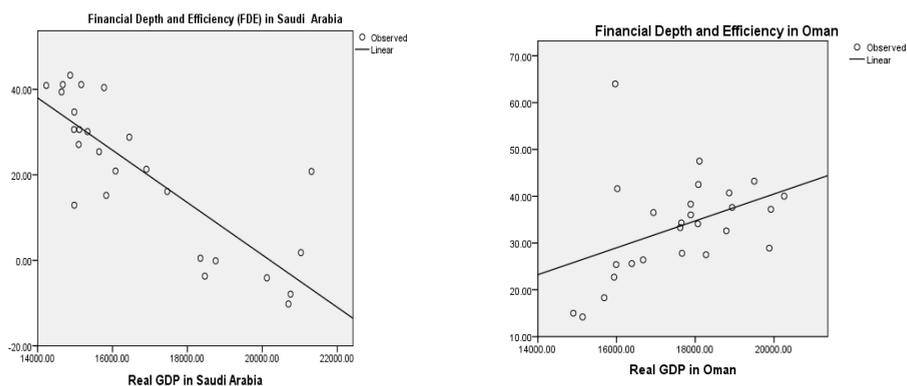
Source: SPSS Analysis (2018)

Figure 1.shows the line of the best fits of the financial depths and efficiency, and economic growth in Saudi Arabia and in the Oman. The data sampled from 1990 to 2015, analyzed and revealed the positive (moderate) relationship between financial depth and efficiency, and economic growth in the Oman and strong negatively in the Saudi Arabia. This means, the financial depth and efficiency in Saudi Arabia not supports/foster the economic growth and this is versa vice versa in the Oman, where the growth

and effectiveness of the financial sectors in Oman increases the opportunity for economic growth. From this empirical evidence, we learn that, Saudi Arabia and Oman highly differs in designing (planning) their economic mix.

5. DISCUSSION OF THE RESULTS

This study evidence the financial depth and efficiency, and the economic growth strong correlated in the Saudi Arabia (strong negative correlation) and moderate correlation in the Oman (moderate positive correlation). This finding contradicts to Ibrahim (2013) who confirmed the positive effects of the financial depth and the economic growth in the Saudi Arabia. On the other hand, this study supported by Hassan, Koetter, Lensink and Muster (2016) who concluded that the financial depth encourages the economic growth, but independency of the financial institution is likely to harm the economy. This study evidenced the improvement of the capital markets in the country will fosters the economy in a country (Bangini, Malgorzata, Smagi, and Witkowski, 2017). This study in Oman supports the Saqin (2013) study which provided the evidence in the developing countries that the efficiency of the financial system highly positively influences the economy. It increases the speed of the economy growth. More efficiency banking sector accelerates the economic growth (Caporale, Rault, Sova, and Sova, 2014), this is true as evidenced in Oman but, the fact is not true in the Saudi Arabia, where the strong negative relations is evidenced. The credit to the private sector and banking deposits are negatively related with growth in Mediterranean countries (Ayadi, Arbak, Sami and De Groen, 2013), this is true in Saudi Arabia, but it is not true in the Oman. The differences of the economic structure in Saudi Arabia and the Oman are the probable reason to have difference influences on the financial depth and efficiency, and economic growth.

6. CONCLUSION AND POLICY IMPLICATION

In summary the paper evidenced the strong negative linear relationship between financial depth and economic growth in the Saudi Arabia, and moderately positive relations in the Oman. The growth of financial sectors in the Saudi Arabia has undesirable effects on the economic growth, quite difference in the Oman. In the Oman the growth of the financial sectors have desirable effects on the economic growth, it increases the real GDP. Basing on these empirical facts, in both countries, we conclude that the financial deepening in the Saudi Arabia is not

an economic prioritization strategy, but in the Oman the financial deepening is an economic prioritized strategy.

The paper has two main policy implications, one for each country of the study. The growth of the Saudi Arabia's economy does not depend on the growth of the financial sector, but has a negative influence. Therefore, for the better economy in the Saudi Arabia, the growth of the financial sector will be discouraged! The policy implication is the increases or promoting for financial deepening in the Oman for the economic growth, as this study evidenced the positive relationship between the financial depth and efficiency, and economic growth in the Oman.

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CASE STUDY

ORDOLIBERAL ROOTS OF ECOLOGICAL MARKET ECONOMY

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Abstract: *Western Germany introduced the model of a Social Market Economy after World War II. This model has become an example of socio-economic reforms for many European countries. In the initial phase of the development of the new socio-economic policy concept, the postulate of "prosperity for all" was especially appealing as it considers economic policy and social policy as a whole. In subsequent years of development, particularly at the end of the twentieth century, the model of a Social Market Economy has become a source of foundation for creating new concepts and ideas that would include more aspects of responsible and sustainable development combined with proper care for resources and the natural environment.*

In the view of this, the aim of this paper is to attempt to answer the question of to what extent the Social Market Economy model can lay the foundation for sustainable, responsible and ecological development. In order to be able to answer such a research question, the author based his reasoning and analyses on the theory of ordoliberalism and the following research methods: factual analysis, comparative analysis and analysis of selected publications. The main findings of the research are that the concept of Social Market Economy contains numerous elements that can foster the implementation of the sustainable, responsible and ecological development of countries and societies.

Keywords: *Social Market Economy, Ecological Market Economy, Sustainable Davelopment, Ordoliberalism.*

1. INTRODUCTION

The 21st century has brought a number of political, economic, social and above all ecological challenges. The current model of socio-economic development based on capitalism has led to a multiplication of world wealth but also contributed to growing disparities in the level of development and numerous imbalances in the global economy. A side effect of the development of mass

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production and consumption growth is the increasing demand for natural raw materials and the burdening of the environment on an unprecedented scale. In 2016, humanity for the first time in the history of the world began to consume more natural resources than nature is able to reproduce[2]. This means that if we do not radically and globally change the current model of economic development, the world will face a catastrophe.

The negative effects of excessive exploitation of the natural environment are more and more visible and severe. The costs of combating global warming or various climate anomalies are growing every year. The efforts of numerous experts, politicians or scientists focus not only on the development of effective ways of environmental protection but also on the elaboration of completely new paradigms in social sciences and the devising alternative to today's capitalism, the concept of social, economic and ecological development. One of such approaches is the concept of ecological market economy, also known as the eco-social market economy, which has been gaining popularity for nearly four decades. There is a question arising in this context of whether it is a completely new concept of the societies development, or maybe an evolutionary model of the Social Market Economy, which has been known since the mid-twentieth century and originates from ordoliberal ideas? This paper attempts to answer this question.

Ordoliberalism is a German version of liberalism. The origins of this theory date back to the 1930s, and reached its peak in the 1950s and 1960s in the Federal Republic of Germany. The ideas and thoughts of the inventors of ordoliberalism were included in the concept of Social Market Economy introduced in West Germany in 1948, which on the one hand contributed to the dynamic and long-term economic development of this country, and on the other, led to reducing property and social disparities and, above all, for material and social advancement of broad social strata. Moreover, basing the socio-economic development of West Germany on the concept of Social Market Economy derived from ordoliberalism and placing a human being in its center have proved that it is possible to use the positive forces inherent in the capitalist system while limiting the unfavorable tendencies that the free market brings. According to A. Grabowski, "ordoliberalism was the third way between capitalism (based primarily on the "invisible hand of the market", protectionism, subsidies and monopolies) and communism (with a centrally planned

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[2] *Ab sofort liegt die Erde im Minus*, "Die Welt", http://www.welt.de/157551951 [Access: 08.01.2018].

economy)"[3]. In this context, it can be hypothesized that ordoliberal theory can provide a favorable basis for creating the assumptions of socio-economic policy and shaping different concepts of socio-economic order, including the concept of sustainable development analyzed in this paper and ecological market economy.

Ecological market economy, conversely, is a relatively new concept in the literature. In the opinion of B. Famielec, "ecological economics began to develop in the eighties of the twentieth century as a separate school and science "of the implementation of sustainable development assumptions". Despite the huge achievements visible in the literature, no solid theoretical analysis of this category has been made so far"[4]. E. Herlyn and F. Radermacher share this opinion and claim that the concept of the eco-social market economy, which emerged around 35 years ago, was an approach to the operationalization of the sustainable development concept"[5]. The concept of sustainable development can be considered as the development and evolution of the concept of Social Market Economy. In general, the goal of this concept is socio-economic development in the long-term perspective. It means that the mechanisms, which limit the destructive influence of economic factors on the social and ecological sphere should be incorporated into the economic policy of the state. However, it should be noted that ecological issues play an essential role in the concept of sustainable development[6].

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[3] A. Grabowski, *Ordoliberalna kategoria własności na przykładzie poglądów Waltera Euckena i Wilhelma Röpkego*, „Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach". Nr 260, Katowice 2016, s. 28.

[4] B. Famielec, *Rozwój zrównoważony a ordoliberalna koncepcja ładu gospodarczego*, w: P. Pysz, A. Grabska, M. Moszyński (red.), *Ład gospodarczy a współczesna ekonomia*, Wydawnictwo Naukowe PWN, Warszawa 2014, s. 198.

[5] E. Herlyn, F. Radermacher, *Ökosoziale Marktwirtschaft: Wirtschaften unter Constraints der Nachhaltigkeit*, www.daad.de [Access: 09.01.2018], s. 1.

[6] J.D. Sachs, *From Millennium Development Goals to Sustainable Development Goals*, "The Lancet" 379.9832 (2012), s. 2206-2211; D. Griggs, M. Stafford-Smith, O. Gaffney, J. Rockström, M.C. Öhman, P. Shyamsundar, W. Steffen, G. Glaser, N. Kanie, I. Noble, *Sustainable development goals for people and planet*, "Nature" No. 495 (2013), s. 305-307.

2. THE ESSENCE OF ORDOLIBERALISM AND THE
SOCIAL MARKET ECONOMY

Ordoliberalism can be considered as one of the variants of liberalism, whose characteristic feature is thinking in terms of order (Ordnung). It derives from German historicism – an idea that emphasizes the special role of state authority and rejects ideas about a self-regulating economy[7]. J. Bokajło believes that ordoliberalism" is a philosophical and political concept which was to be a response to the crisis of capitalism, supported by the principle of laissez-faire and also the centrally planned economy"[8]. In practice, this meant that the ordoliberals were in favor of the so-called "The third way" that would be a solution between unhampered economic freedom and the limitations of central control. In the opinion of E. Mączyńska, "the basis of ordoliberalism as a theoretical concept in economics are the ideas of "ordo", whose essence is to shape the order corresponding to the human nature and ensuring the balance of the economy"[9]. The key factor in this respect is the role of a strong state, which will not only be limited to the function of a "night watchman", but will also actively organize and initiate competition in the framework of an economic order based on free competition[10].

The origins of the new neoliberal school can undoubtedly be traced to the development of social-liberal economic thought from the late nineteenth century and attempts to search for new paradigms in the social sciences, which were caused by the outbreak of the global economic crisis of 1929-32[11]. The emergence of the crisis led to the rejection of some theories in the social sciences and intensified the search for new paradigms. It was the global economic crisis of the early twentieth century that gave impetus to the development of ordoliberal thought in Germany, despite the general critical attitude towards liberal theory[12]. Ordoliberals criticized

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[7] M. Dahl, *Niemiecki model społecznej gospodarki rynkowej jako wzór dla polskich przemian systemowych po 1989 roku*, Dom Wydawniczy ELIPSA, Warszawa 2015, s 45.

[8] J. Bokajło, *Społeczna Gospodarka Rynkowa jako instrument walki politycznej wpływający na kształt ładu społeczno-gospodarczego RFN – prolegomena*, in: P. Pysz, A. Grabska, M. Moszyński (ed.), *Spontaniczne i stanowione elementy ładu gospodarczego w procesie transformacji – dryf ładu czy jego doskonalenie?*, PTE, Warszawa 2014, s. 299.

[9] E. Mączyńska, *Ordoliberalizm – użyteczność w warunkach nieładu instytucjonalnego*, in: P. Pysz, A. Grabska, M. Moszyński (ed.), *Ład gospodarczy a współczesna ekonomia*, PWN, Warszawa 2014, s. 111.

[10] J. Bokajło, *Społeczna ...*, op. cit., s. 301.

[11] R. Ptak, *Vom Ordoliberalismus zur Sozialen Marktwirtschaft. Stationen des Neoliberalismus in Deutschland*, Opladen 2004, s. 23.

[12] Ibidem, s 23.

the political and economic instability of the Weimar Republic and the related weakness of the state against the various groups of the interested, whose activities had a negative impact on the overall socio-economic life of the state. As a result of observations, the ordoliberals have made a critical claim to the assumptions of classical liberalism with a self-regulating market mechanism[13]. They were in favor of the active role of the state in establishing the rules of the free market functioning while underlining the importance of freedom. According to F. von Hayek, in the face of the global crisis of the first half of the twentieth century and its negative consequences felt by Germans, the ordoliberals formed a group of people who contrary to common opinion, were in favor of maintaining and even developing freedom in socio-economic life[14].

One of the main principles of ordoliberalism is the freedom of the individual because it allows making independent choices. With this, self-fulfillment of individual people and maintenance of human dignity are possible[15]. According to L. Erhard, people are fully free when they are able to limit themselves in a situation where freedom would mean harm to others or mere arbitrariness[16]. The researcher believed that the best way to secure individual freedom is to limit state power, which in his opinion is achievable only in market-oriented economic system[17].

Competition is very important because it allows eliminating the problem of planning and rationing while ensuring freedom of consumption. In addition, it enforces innovations, technological progress, creativity and discipline on market participants, thanks to which it contributes to the increase of production efficiency and enables the division of income and profits by performance. Another advantage is the prevention of the monopoly formation and the limitation of the economic and political influence of authorities, which ensures freedom for citizens even outside the economic zone. Due to the fact that competition requires high performance from market participants, there will always be tendencies among entrepreneurs to

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[13] E.W. Dürr, *Wesen und Ziele des Ordoliberalismus*, Winterthur 1954, s. 63.

[14] F.A. von Hayek, *Die Wiederentdeckung der Freiheit - Persönliche Erinnerungen*, in: *Produktivität, Eigenverantwortung, Beschäftigung. Für eine wirtschaftspolitische Vorwärtsstrategie*, VDMA, Institut der deutschen Wirtschaft, Köln 1983, s. 9-22.

[15] M. Dahl, *Polska i niemiecka polityka konkurencji w świetle teorii ordoliberalizmu i koncepcji społecznej gospodarki rynkowej*, „Myśl Ekonomiczna i Polityczna" Nr. 3(42)2013, Uczelnia Łazarskiego, Warszawa 2013, s. 75.

[16] P. Pysz, *Społeczna gospodarka rynkowa. Ordoliberalna koncepcja polityki gospodarczej*, PWN, Warszawa 2008, s. 100-103.

[17] O. Schlecht, *Ordnungspolitik für eine zukunftsfähige Marktwirtschaft,* FAZ, Frankfurt a.M. 2001, s. 15.

limit it. Therefore, the most important role of the state should be ensuring conditions for intense competition[18].

For L. Erhard a very important element of the state's activity was to complement the state economic policy with social policy to guarantee the needy a dignified life. This means that in ordoliberalism social policy is an integral part of economic policy, assuming that from the sense of responsibility, first and foremost, individuals must take care of their safety themselves. The only condition which enables them to receive state aid is when individuals fail after using all the opportunities[19].

The principles of the economic order formulated by W. Eucken are essential for the efficient functioning of the competitive economic order, i.e. the recognition of private property as the basis of functioning of the market economy, ensuring stable and exchangeable money, guaranteeing free price formation, guaranteeing open markets and freedom to contract and settle, ensuring that business owners bear the full responsibility for decisions and actions taken as well as the recognition of stability as a basic requirement of economic policy[20].

Compliance with the principles constituting the economic order does not yet guarantee an economically efficient and socially acceptable management process. In connection with this, W. Eucken also defined the principles governing the economic order that translate into specific activities in economic practice[21]. By that, W. Eucken meant all these areas, which we usually identify with competition policy, social policy, economic policy or structural policy[22]. The author defines four regulatory principles pertaining to current activities in the management process. These are [23]: 1) control of monopolies, 2) income policy, 3) economic account, and 4) regulations concerning anomalies on the supply side. At the same time, as P. Pysz rightly noted, "the policy of shaping a competitive economic order based on the constitutive principles and the policy tools which are used to implement its regulating principles should constitute a compact whole"[24].

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[18] L. Erhard, *Wohlstand für alle*, ECON Verlag, Düsseldorf 2000, s. 9.

[19] M. Dahl, *Niemieckie doświadczenia ze społeczną gospodarką rynkową – państwo opiekuńcze, czy państwo socjalne?*, „Optimum. Studia Ekonomiczne" Nr 1(41), Wydawnictwo Uniwersytetu w Białymstoku, Białystok 2009, s. 136.

[20] W. Eucken, *Grundsätze der Wirtschaftspolitik*, Wyd. 7, UTB, Tübingen 2004, s. 254-291.

[21] M. Dahl, *Polska i niemiecka ...*, op. cit., s. 80.

[22] D.H. Enste, *Soziale Marktwirtschaft aus ordnungspolitischer Sicht*, Roman Herzog Institut e.V., München 2006, s. 5-8.

[23] W. Eucken, *Grundsätze ...*, op. cit., s. 291-304.

[24] P. Pysz, *Społeczna ...*, op. cit., s. 74.

Ordoliberalism considers a market economy and private ownership to be the key elements of the economic system. Unlike other liberal trends, ordoliberalism also does not give the market mechanism a key role in regulating social processes. Hence, the postulate of coordination of political and economic goals as well as state supervision of the establishment of an efficiently functioning market system[25]. This approach seems to be a fundamental difference between ordoliberalism and neo-liberal doctrine, which was well-known at the end of the twentieth century. The neo-liberal doctrine stated that a functioning market system is able to shape itself without the help of the state. The experience of countries that were undergoing systemic transformation confirms the validity of ordoliberal assumptions in this area.

Ordoliberals also detected a serious risk related to the efforts of private entities to create monopolies, which would lead to limiting market competition. However, it should be mentioned that in exceptional situations the ordoliberals allowed the existence of so-called technical monopolies, whose activity would be related to production and services of fundamental importance to society. The consequence of this approach was also the agreement on limited existence in the market economy of such elements as state property, e.g. in the banking or mining sector[26]. The ordoliberals also detected threats to the freedom of competition flowing from the state, mainly through exerting a negative influence on entrepreneurs. This problem was to be solved by limiting the role of the state in creating a legal and institutional framework for the development of economic activity.

The aim of competition proposed within ordoliberalism is first and foremost the fair distribution of income generated by society. This trend is based on the assumption that a comprehensive approach to the realities of economic life is necessary[27]. The state should strive to provide protection to vulnerable individuals, prevent injustices and create conditions to guarantee social peace and the harmonious life of different social strata because it is the only way to achieve and then maintain prosperity. It is important that the state, through its activities, does not suppress the initiative of individual units[28].

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[25] W. Piecuch, *Ordoliberalizm i społeczna gospodarka rynkowa*, http://www.wpia.us.edu.pl/sites/wpia.us.edu.pl/files/addressbook/9212/eak2_artykul.pdf, [Access: 11.01.2018], s. 5.

[26] Ibidem, s. 6.

[27] E. Mączyńska, P. Pysz, *Liberalizm-neoliberalizm-ordoliberalizm*, pobrano z www.pte.pl, [Access: 11.01.2018], s. 11.

[28] W. Piecuch, *Ordoliberalizm …*, op. cit., s. 7.

To simplify, we can say that ordoliberalism is in favor of a strong state as an entity that guarantees smooth functioning of the free market within the framework of the established economic order. The postulate of a strong state is therefore very important because in the opinion of the thinkers of the ordoliberal school it is the guarantor of limiting the power of economic entities, and thus forms the basis for creating an economic order based on free competition[29]. In this context, the state policy of competition is of crucial importance, which aims to stop the concentration of economic power in the form of creating monopolistic structures.

In the first half of the 20th century, ordoliberalism was an alternative to totalitarian socio-economic systems, which at all costs sought to limit the promulgation of liberal theories and their impact on political, social and economic life. One of the most prominent representatives of ordoliberalism was undoubtedly W. Eucken, but a significant influence on the development of theory was also made by F. Böhm, A. Rüstow, W. Röpke, and A. Müller-Armack. It was A. Müller-Armack together with L. Erhard who developed the concept of Social Market Economy, which was a combination of freedom of management on the market with the postulate of social justice on the basis of ordoliberalism. Quoting T. Włudyka, the doctrine of Social Market Economy assumes[30]:

- "learning and shaping and constantly analyzing the social, political and legal conditions and limits of economic order (the role of science and doctrine),
- accepting and implementing a system that rejects political intervention in market rights being the subject of competition,
- the task of the authorities is to create legal and factual conditions through an economic constitution for an open market and competition,
- dynamic market processes operating within private ownership and competitive market, but should be monitored and regulated; in case improprieties that breach economic freedom and equal opportunities are discovered, such order *(ordo)* guarantees the proper development of individuals and freedom of choice with the principle of individual responsibility (subsidiarity)
- the free market must, however, take into account both general (social) interests and individual interests (the role of the state),

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[29] G. Braunberger, *Das verwaiste Erbe der Freiburger Schule*, "Frankfurter Allgemeine Zeitung", 19.06.2008.
[30] T. Włudyka, *Ordoliberalizm i społeczna gospodarka rynkowa w Niemczech*, Warszawa 2013, s. 70.

- laissez-faire and a completely free market cannot exist because the interests of consumers must be protected,
- economic policy must be constructed as a shared economic and social goal with strong reciprocal feedback,
- the main guarantor of equal opportunities is the elimination of group privileges and the fight against monopolies and cartels,
- the individual's freedom and democracy, as well as the right to criticize oneself, must be carefully protected within the framework of legal responsibility and freedom of discussion,
- the economic and legal order is organically linked to ethics and morality".

The abovementioned A. Rüstow and W. Röpke in their research focused on the search for an alternative to the laissez-faire policy, thus creating the foundations of the so-called sociological neoliberalism. The vision of both authors is that active state policy contributes to the improvement of the social structure in the state[31].

The core of the Social Market Economy is a harmonious combination of social and economic goals in the policy pursued by a state. The analyzed concept boils down to the coherence between the principle of economic freedom and the principle of social justice. The role of the state, however, is to create a social order that would give citizens freedom and allow to maintain personal dignity, while ensuring economic prosperity and social justice. The essence of the Social Market Economy is based on the fact that both its spheres – economic and social – are equal. Their harmonization is achieved not only by means of state interference. It also requires specific pro-social attitudes of participants in economic life. An important role in creating these attitudes is played by corporate social responsibility, which serves not only the owners of capital, but is also closely related to other social groups. This means that private property assumes social obligations, which entails taking public interest into account in business and responsibility for the effects of actions taken.

3. GENESIS AND MAIN ASSUMPTIONS OF SUSTAINABLE DEVELOPMENT AND THE CONCEPT OF ECOLOGICAL MARKET ECONOMY

The dynamic development of the world economy which has been observed from the second half of the twentieth century has led to unprecedented economic growth, but also to growing social disproportions and the burden on the natural

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[31] V. Barth, *Die Soziale Marktwirtschaft. Ideen der Gründerväter und praktische Umsetzung*, Gütersloh 2011, s. 11-12.

environment. Global production of goods and services has increased sevenfold since 1950. The number of inhabitants of the Earth, which in 1950 amounted to 2.5 billion, exceeded 7 billion in 2012. In the same period, there was a fivefold increase in fishing, meat production and energy demand. The emission of carbon dioxide – the main greenhouse gas responsible for global warming – has increased fourfold. The rapid development of agriculture in the twentieth century has led to an increase in the consumption of drinking water by 600% [32]. However, this has not translated into an improvement in the quality of life of the majority of the world's population. In the second decade of the 21st century, still 20% of the population has no access to drinking water, 40% to electricity and sanitation, and 800 million people suffer from malnutrition. L. Pawłowski aptly notes that "only one-fifth of humanity lives in industrialized countries, with excessively high, pollution generating production and consumption levels. The other four-fifths are residents of developing countries, mostly living in poverty"[33].

The liberal capitalism, which dominates in most countries is based on competition and unlimited growth of production and consumption. Therefore, it causes a growing demand for land resources and also for non-renewable ones. Forecasts predict that by 2050 the number of the global population will increase by another 3 billion people, which will cause additional pressure on the natural environment. Competition has a beneficial effect in terms of economic relations as it contributes to the increase of efficiency, innovation and progress. Nevertheless, it has a disintegrating effect on social relations, because it prefers economic domination instead of cooperation. It is becoming evident both within individual countries and internationally. In this situation, it is necessary to search for alternative ways of socio-economic development of countries. Both the concept of sustainable development and ecological market economy are part of this discourse.

According to the economic lexicon, the ecological market economy should be understood as the type of the socio-economic system of the state, which focuses on sustainable economic development, social justice and environmental protection[34]. Complementarity and coherence of economic policy with social policy is the basic postulate defined in the concept of Social Market Economy,

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[32] L. Pawłowski, *Rola monitoringu środowiska w realizacji zrównoważonego rozwoju*, "Rocznik Ochrony Środowiska", 2011 vol. 13, s. 338, www.ros.edu.pl [Access: 15.01.2018].

[33] *Ibidem*, s. 338.

[34] *Soziale ökologische Marktwirtschaft*, http://www.wirtschaftslexikon.co/d/soziale-oekologische-marktwirtschaft/soziale-oekologische-marktwirtschaft.htm [Access: 10.01.2018].

hence the question is if the ecological market economy is a continuation and extension of this concept.

The basic purpose of the Social Market Economy was to bring "prosperity for all", while in relation to the ecological market economy we can define this goal as "increasing quality of life for all, today and tomorrow"[35]. The guiding idea of this approach is the desire to provide future generations with the same conditions of existence as the current generation. This means that an ecological market economy is a kind of social order in which there is a balance between ecological, economic and social goals. At the same time, particular attention is paid to the negative effects on the natural environment related to the functioning of the market economy.

In the literature, the ecological market economy is often referred to as the so-called "Green economy". This concept derives from the notion of eco-development, which was popular in the past especially in Anglo-Saxon literature. Eco-development can be understood as "economic development in line with the requirements of environmental protection of human life, but with special emphasis on nature conservation"[36].

Currently, the concept of eco-development has basically been replaced by the term "sustainable development". In the so-called The Brundtland Report – *Our Common Future* it is defined as a development that "satisfies the present needs without jeopardizing the ability to meet the needs of future generations"[37]. The definition used by the UN is very similar. According to it, "sustainable development of the Earth is a development that meets the basic needs of all people and preserves, protects and restores the health and integrity of the Earth's ecosystem, without jeopardizing the ability to meet the needs of future generations and without exceeding the long-term limits of Earth's ecosystem capacity"[38].

The idea of sustainable development can be considered as the key guiding idea of the ecological market economy that is analyzed in this article. It assumes a self-sustaining development in which natural raw materials are replaced by secondary raw materials generated from waste and energy needed for development is obtained from natural sources. Therefore, the concept of sustainable development is a broader

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[35] *Ökosoziale Marktwirtschaft für eine zukunftsfähige Gesellschaftsordnung*, Ökosoziales Forum Österreich, Wien 2012, s. 2.

[36] K. Górka, M. Łuszczyk, „*Zielona gospodarka" i gospodarka oparta na wiedzy a rozwój trwały*, „Optimum. Studia Ekonomiczne" nr 3(69)2014, Białystok 2014, s. 25.

[37] *Our Common Future. Report of the World Commission on Environment and Development*, http://www.un-documents.net/our-common-future.pdf [Access: 15.01.2018].

[38] *Sustainable Development: From Brundtland to Rio 2012*, www.un.org [Access: 15.01.2018].

concept than eco-development as it includes not only economic and ecological aspects but also political, spatial or even philosophical aspects.

The concept of sustainable development, which we can consider to be an evolution of the Social Market Economy model, played a key role in shaping the way of thinking about mutual relations between society, economy and natural environment resources in the second half of the 20th century. To a large extent, it was a response to the ongoing globalization process, which on one hand favored the dynamic development of the global economy, but on the other hand contributes to the increase of poverty and social inequalities, increases income and property disparities and, above all, results in an growing and excessive environmental burden. As a result, it has negative consequences for the functioning of societies and the economy itself. The concept of sustainable development is based on the assumption that a compromise solution between further economic development and the preservation of the environment in the best condition is possible. It pays special attention to the interdependence of the economic development of society and the quality of the environment. It gives the world the opportunity to preserve the existing environmental values and highly impacts reducing pollution and degradation of the natural environment. The implementation of this concept is on the one hand a necessity in our times, and, on the other hand, it testifies to our responsibility for future generations [39].

4. CONCLUSION

In conclusion, the sources of both the concept of sustainable development and the ecological market economy largely revert to the Social Market Economy. It combines the material tasks of the economy with the realization of social values. The experience of numerous European countries confirms the fact that it is possible. The concept of sustainable development and the ecological market economy contain numerous demands that we can find in the Social Market Economy. In addition, this concept is more extended as it considers also ecological aspects. An important element combining all three concepts, namely the Social Market Economy, sustainable development and the ecological market economy is the principle defined by the ordoliberals. Its key point is that economic entities should bear full responsibility for damage caused to the society and the external

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[39] E. Mazur-Wierzbicka, *The Place of Sustainable Development in the Polish and the EU Ecological Policy at the Beginning of the XXth Century*, „Nierówności Społeczne a Wzrost Gospodarczy", No. 8, 2006, s. 317.

environment. This postulate has been repeatedly ignored and marginalized in numerous doctrines and models of socio-economic development. Its inclusion in the concept of sustainable development and the ecological market economy is an important element in the implementation of the responsible and sustainable development of countries and societies. Such elements of the concept of sustainable development as rational management of natural resources and environmental protection, economic growth and fair distribution of benefits as well as social development combined with social justice are also key aspects of the Social Market Economy model.

Another important assumption of the Social Market Economy model that can support responsible, sustainable and ecological development is the postulate of a strong state that creates a legal framework for business entities' functioning and ensures its observation. The protection of the natural environment, the pursuit of social justice and the reduction of growing social disparities force a state to be actively involved in terms of state intervention and create an efficiently functioning justice system. The theory of ordoliberalism and the concept of Social Market Economy, unlike other liberal theories, take this fact into account.

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APPLICATION OF ARTIFICIAL INTELLIGENCE IN INVESTMENT BANKS

VEDAPRADHA. R *, HARIHARAN RAVI **

Abstract: *Banks are automating their processes, migrating their infrastructure and applications to the cloud to create a seamless customer journey. Transformative technology has enabled banks and financial institutions to automate their operations based on advanced data-driven. Banks are adopting AI based anti-money-laundering, anti-fraud, compliance, credit-underwriting and smart contracts technology in their operations. These applications have been embraced by the investment banks as regulatory framework are failing to combat conventional way in combating against money laundering. Artificial Intelligence will focus on cognitive application in functional areas of business along with investment and compliance sectors of financial services industry. Adopting AI based anti-money-laundering, anti-fraud, compliance, credit-underwriting and smart contracts technology in their operations.*

Keywords: *Artificial Intelligence (AI), Business Intelligence (BI), Technology Enabled Service (TES), and Datafication.*

JEL Classification: *G24*

1. INTRODUCTION

Investment Banks are adopting computer programs to enhance capabilities of business by the implementation of sophisticated artificial intelligence to curb fraudulent practices, improve customer response, offer standard customer service, enable virtual assistant to offer real time solutions, digital documentation etc. The paradigm shift in banking and financial serves has strategically focuses on transformational changes in 2018. Improved infrastructure, data mining etc. have redefined the banking operations with the help of machine intelligence. They are applying big data analysis to collect information about their customers like income, work profile, personal details, and credit worthiness to offer various banking

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products through ATMs like loan facility. The user has to accept the terms and conditions post verification through registered mobile number.

2. LITERATURE REVIEW

Information technology and Telecommunication play a significant role in the sustainability of any business focusing on amplification, simultaneous causality, and multi-dimensional trust have improved the future research on mobile banking payments (Donner & Tellez, 2008). DeLone and McLean's model have been adopted to analyse the customer's satisfaction with the usage of mobile applications. System quality and information quality significantly influences the customer's satisfaction and trust (Lee & Chung, 2009). Business strategies and technology are integrated to revamp the business model based on the core competencies to address the research account executives in offering direct interface from the business units directly (Chester, 1994). Investments on the technology are very huge in quantum and its effects must be clearly considered before implementations the merits of such applications are intangible in nature and productivity can be valued in connection with economic value of the information technology(Brynjolfsson & Hitt, 2000). Banks play a significant role in the economic development of any nation that influences in implementation of regulatory policies to monitor economic activities and economic growth which can be possible only with the sophisticated technology enabled solutions (Hariharan.R & Raja Jebasingh, 2016). Information technology is highly successful when applied in the area of business process re-engineering to ensure the capabilities of their sustainability to compete and create an edge over others (Attaran, 2004). Central banks can apply innovations to their banking practices and policies to obtain transparency and a framework facilitating the improvement in the efficiency and to curb fraudulent practices (Lagarde, 2018). Global business calls for solutions offered at global level integrated with artificial intelligence creating a unified framework or policies in the areas like crypto currency, customized hacking at personal level legally, automation of business models etc (Erdélyi & Goldsmith, 2018).

3. ARTIFICIAL INTELLIGENCE (AI)

Artificial Intelligence will focus on cognitive application in functional areas of business along with investment and compliance sectors of financial services industry. This seems to be a crucial leap in advancement from advanced robotics towards machine learning and predictive analysis. Most of the banks in the industry

are focusing on developing the AI to gain the competitive edge that enables them to achieve betterment in speed, accuracy, cost effective-efficiency, and customer satisfaction. Ex: Chatbots.

3.1. Impact of AI in Investment Banking

Artificial Intelligence is a branch of computer science that focus on creating intelligent machines. Some of the activities performed by these includes problem solving, planning, reasoning, learning, etc. It is helping the banking industry to serve the customers better and offer more relevant products through right channel.

Chatbots are currently applied by the industry which are automated service assistants offering customers, the convenience of resolving their queries via online messaging system through devices like Personal computer, laptops, and smartphones eroding the personal visit to their branches. Ex: Nina, Swedbank's AI chatbot.

AI algorithms can be developed to produce highly refined investment strategies that ensures high velocity data to outsmart the competition and enhancing value to the customers. Management of customer data appears to be prominent area where the application of AI is constantly progressing. Ex: COIN (Chase's Contract Intelligence) from JP Morgan. Money laundering can be curbed with the application of AI in banking industry.

3.2. Combating Money Laundering

Money laundering has been a major challenge for the financial services and banking industry faced at the global level. AI has proved to be crucial silver lining to overcome this issue. The technology allows the bank to prevent potential money laundering activity by analyzing internal, publicly available and transactional data within customer's wider network. Some of the techniques applied as combating measures includes machine learning, deep learning, data mining and analytics etc.

The ability of implementing AI in banking can get away from the below pain points.

a) **Risk Assessment:** Large volumes of complex data are involved in due diligence, risk assessment, monitoring that facilitates effective lending practices.

b) **Financial Landscape:** AI enables the firms to learn and adapt to changing environment, inputs various changes in the area of finance and banking system.

c) **Value addition:** Automotive repetitive tasks handled by humans are replaced which has reduced the cost and increased the accuracy levels and speed adding great value to the customers.
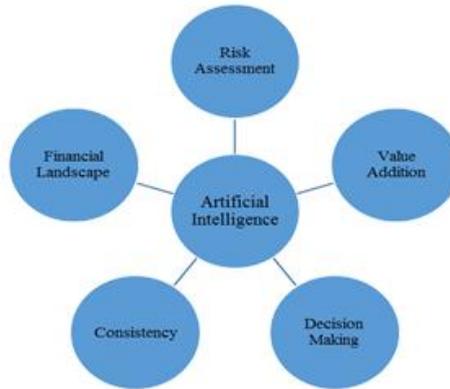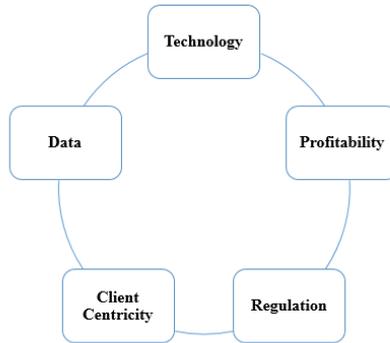
Source: Author's own creation

Fig 1. Capabilities of AI in Investment Banks

d) **Consistency:** The AI emphasis the banks to be more specific and consistent in their operations leading to cost effective and address to customer queries efficiently.

e) **Decision Making:** Errors can be completely evaded or reduced by improving the quality of decisions made at different levels of management that also ensures better forecasting.

3.3. Influencing Trends

The Investment banking has been no exclusion when it comes to the application of influencing trends through technology in banking. Some of the leading trends are:

a) **Profitability:** Investment banks primarily targeting on improving their revenues post financial crunch in 2008 concentrating on reducing cost, improving delivery functions in near shore & offshore localities, adopting strategy to gain edge through deliver sub-optimal returns.

b) **Regulation:** Stringent regulatory framework have influenced these banks by creating impact on capital formation reducing market liquidity, disincentives to hedge portfolios etc. Many banks are expected to transform and re-engineer their business operations to cater to new regulations.

Source: Author's own creation

Fig 2. Component of Influencing Trends in Investment Banking

c)   **Client centricity:** Client relationship management has more technology driven to ensure effectiveness, rationalization, measurement of their strategic performances, creating an e-platforms from front office through back office operations fully integrated designed to offer cross products, etc. are the need of the hour that has led to transform the business operations.

d)   **Data:** Adopting big data analytics, data governance, data knowledge management, have been embraced that facilitate in generating more revenue, enhance core banking solutions, based on the technological innovation empower these banks to operate at a much robust pace and to create better client approach.

e)   **Technology:** Investment is such a pivotal area that calls for enormous level of change management by adapting and thriving to sustain in the industry through streamlined architecture that improves process efficiency, work within regulatory framework, and to create competitive edge by embracing technology like cloud services, FinTech, RegTech, Artificial Intelligence etc. (Laurent Chemla. (2017).

4. CONCLUSION

Banks are automating their processes, migrating their infrastructure and applications to the cloud to create a seamless customer journey. Despite the increasing and better application of AI in banking and financial industry contributing towards innovation, its adoption in the industry is still at the stage of infancy. Low level of maturity, infrastructure, reluctant industry adoption, increased technical complexity, reduced transparency, attrition of manpower

have posed as the threats which are preventing banks from embracing this technology. Emerging trends of AI comprises of Lean and Augmented Data Learning, Generative Adversarial Networks, Deep Reinforcement learning, Capsule Networks, and Deep Learning Theory. Chatbots and Artificial Intelligence algorithms are the innovative techniques adopted by banks for better customer service experience.

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On Smart Contracts and Organisational Performance: A Review of Smart Contracts through The Blockchain Technology

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Abstract: *As the Blockchain technology is gaining momentum in popular culture through Cryptocurrencies, its full implication and application to businesses, on a concrete and factual level, is still seen to be in its infancy stage. While the technology provides numerous advantages regarding stability, trust, speed and others, the robustness of the technology is not widely disseminated. This is further coupled by the common notion of resistance to change in business management processes. This paper explores the concept of Smart Contracts through the blockchain technology and its relevance to the business sector and further outlines the advantages and limitations of its applicability as of date.*

Keywords: *Smart Contracts; Blockchain; Security; Efficiency.*

1. Introduction

The emergence of advanced technologies has led to increased competition between business as each try to utilize the latter to bolster the employees' productivity and general performance of the firm (Chen, Chiang, & Storey, 2012). As a result, technology has become a critical backbone of organizational operations and a core driver of organizations' innovations and competitiveness. According to Iansiti and Lakhani (2017), business enterprises have shifted from the traditional ways of business and have consequently adopted modern, more reliable and cost-efficient mechanism; smart contracts are one of these mechanisms.

Any financial transaction that is carried out by an organization with third parties can be viewed as a form of a contract, however simple, or complex the transaction is. Essentially, financial openness and transparency

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are one of the core aspects of successful organization management as it creates an environment that is conducive not only for investment but also for the establishment of trust with different organization stakeholders (Chen et al., 2012).

The blockchain technology is a common buzzword today, perhaps due to the unique technology that it is based on. According to Swan (2015), a blockchain is a chain of transaction records, usually referred to as blocks, that grows autonomously, and all the records are linked together to form a chain, and secured through cryptographic techniques. A block may contain one or more records, and each block holds the hash function of the preceding block, the transaction data, and timestamp. Once the block is completed and committed, it is chronologically added to the blockchain and cannot be modified (Swan, 2015).

These characteristics of the blockchain technology make it highly useful as it is secure, reliable and the ability to monitor the digital transaction is warranted (Kosba, Miller, Shi, Wen, & Papamanthou, 2016). The blockchain technology has vastly been used in cryptocurrencies such as Bitcoin and Ethereum. A cryptocurrency can be viewed as a virtual or digital currency that entails the use of cryptography in order to promote the security of the financial transaction. As such, a cryptocurrency can be used as a secure medium of exchange as it utilizes high cryptography to ensure verifiability of asset transfer, control of unit creation and evades regulations that may otherwise be imposed by bodies such as government institutions (Iansiti & Lakhani, 2017).

Organization performance is greatly determined by the strategies employed by the management in streamlining organizational processes, operations, and bolstering the employees' productivity. Being a new technology, smart contracts through blockchain technologies bear the ability to positively or negatively impact the performance of a firm; hence, such a study is critical.

A smart contract can be defined as a self-executing contract that utilizes blockchain technology to digitally enforce, verify or facilitate the performance or negotiation of a contract (Christidis & Devetsikiotis, 2016). Owing to the security and decentralized system exhibited by blockchain technology, smart contracts can foster transaction credibility between contracting parties without the necessity of third parties as exhibited in normal contracts.

2. BACKGROUND

The technological revolution has seen the emergence of new systems and technologies that are more efficient and reliable (Swan, 2015). Likewise, the smart contract technology is made to replace the traditional forms of contracts in an effort to promote transactional safety, efficiency and reduce possible contract breaches. Kosba et al. (2016) argues that the smart contracts systems, which are based on blockchain technology have emerged. This is as a result of the efficiency, reliability, and security that has been noted in the decentralized cryptocurrencies such as, Litecoin, Ethereum, and Bitcoins among others, which the authors pinpoint that they may be the future of online financial transactions. Essentially, Smart contracts are built on a novel blockchain that is characterized by distributed consensus, assuming the existence of no conflicting computation resources (Kosba et al., 2016).

Luu et al. (2016), examined the security of transactions in smart contracts by investigating the smart contracts that run on the Ethereum blockchain technology. According to the authors, the Ethereum smart contract system has presently seen increased adoption and holds virtual coins tuning to millions of dollars (D'Alfonso, Langer, & Vandelis, 2016; Luu et al., 2016). It is worth noting that majority of the smart contract system today are often run in synchrony with the respective cryptocurrencies. As at present, Bitcoin and Ethereum have established smart contracts systems that run under the underlying blockchain technology. To examine the security of the smart contracts, Luu et al. (2016) introduced various bugs that were made to manipulate the Ethereum smart contacts blockchain for financial benefits. Apparently, it was unveiled that though the system is significantly secure, there exist various gaps with respect to the distributed semantics of the blockchain technology under which the system runs. The authors denoted the need for the enhancement of the Ethereum operational semantics to tighten the security of the system (Luu et al., 2016). The researchers further unveiled the existence of the DAO bug, which makes blockchains vulnerable to DAO exploits; Ethereum cryptocurrency lost more than $60 million in 2016 as a result of this vulnerability (Luu et al., 2016).

The security of smart contacts has as well been discussed by G. W. Peters and Panayi (2016), who insist that precautions must be taken in

rolling out the smart contract system in order to ensure that the system is not prone to vulnerabilities that otherwise mess up the digital assets.

On a different point of view, G. W. Peters and Panayi (2016) suggest that the emergence of blockchain technology may disrupt the banking industry in the new future by facilitating digital assets, automated banking ledgers, smart contracts and global money remittance. This implies that it is high time for business organizations and financial institutions to start considering cryptocurrencies as a mode of payment, and smart contacts and a possible replacement of the traditional business contracts (Day, 2017; Zyskind, Nathan, & Pentland, 2015). Business organizations that do not adjust to the prevailing technologies are more often than not caught unaware, and the technology becomes disruptive to their business processes and operations. Nevertheless, in the banking context, G. W. Peters and Panayi (2016) explain that the blockchain based technologies must be extremely smart in order to evade vulnerabilities that otherwise can be used by malicious attackers to propagate fraud or swindle the blockchain participants their virtual money (G. W. Peters & Panayi, 2016). Attacks on blockchain systems may be hard to detect and control and hence sufficient security measures must be put in place before rolling them in the banking context (Apostalaki, Zohar, & Vanbever, 2017; Conti, Kumar, Lal, & Ruj, 2017; L. Eyal & Sirer, 2014; Xu, 2016).

Omohundro (2014) takes a machine learning perspective with respect to smart contracts. The authors argue that the blockchain technology, smart contacts, and cryptocurrencies have resulted in new opportunities for the application of machine learning and artificial intelligence (AI) in general. Zhang, Cecchetti, Croman, Juels, and Shi (2016) argue that the smart contacts can be made smarter, by enhancing their ability to interpreted real-world knowledge and make more reasonable, logical and sound decisions in online commerce. By integrating AI into smart contracts and cryptocurrencies, it is possible to ensure that the blockchain follows specific safety and measures in order to promote the safety and reliability of the transactions (Back et al., 2014).

A study by Christidis and Devetsikiotis (2016) on the internet of things and the emergence of smart contracts showed that a combination of internet of things and blockchain technology, which is the core framework of smart contracts, is an efficient and powerful technique that can trigger wide-scale transformation on how financial transactions are carried out or

how a firm interacts with its business partners across different industries. As such, the authors argue that smart contracts, internet of things and the blockchain technology use can pave the way for new distributed applications and novel business models and processes (Christidis & Devetsikiotis, 2016). This is because the blockchain technology allows the establishment of a distributed peer to peer network (Marsal-Lluïsa, 2018; Swan, 2015) that allows for verifiable interaction between the participants without the necessity of a trusted partner (Crosby, Nachiappan, Pattanayak, Verma, & Kalyanaraman, 2015; Papadopoulos, 2015). Christidis and Devetsikiotis (2016) further denote that the blockchain technologies upon which the smart contracts are built, allow for cryptographic automation of workflows and processes that are time-consuming.

There exists a wide array of smart contracts, depending on the type and purpose of the contract (Gatteschi, Lamberti, Demartini, & Pranteda, 2018). However, though smart contracts are programmed to self-execute, some usually depend on the information that they gain from the external sources, such as financial instruments transactions (I. Eyal, Gencer, Sirer, & Van Renesse, 2016). As such, having authentic data feeds into the system is very critical in enhancing the security, performance, and authenticity of the transactions. Zhang et al. (2016) developed and rolled out a Town Tier (TC) system that is made to categorically act as a bridge between the blockchain and the information sources (mostly websites) in order to authenticate the information that is fed to the system. The main purpose of TC is to promote confidentiality, reliability, and integrity of smart contracts. Essentially, though smart contracts seem to have a bright future across all the industries, their security threshold seems questionable because a mentioned, some contacts rely on data that is external from the blockchain and the reliability, and trustworthiness of such data cannot always be guaranteed, owing to the fact that the chain holds millions of transactions (Pilkington, 2016).

3. HOW THE BLOCKCHAIN WORKS

Essentially, a blockchain can be perceived as data structure that is shared and replicated across machines on the network. According to Cuccuru (2017), this technology was first introduced by Bitcoin, one of the leading cryptocurrencies across the globe (Marvin, 2017; Papadopoulos,

2015). In the words of Gatteschi et al. (2018), the introduction of the blockchain technology has aided business organization in transitioning from the traditional forms of contracts and the adoption of smarter and more robust contracts that do not require the intervention by any party. Gatteschi et al. (2018), further argues that the use of the blockchain technology in cryptocurrencies and smart contracts aids in keeping a powerful decentralized ledger of transaction that defines who owns what in the network (Pop et al., 2018; Ream, Chu, & Schatsky, 2016).

It is however critical to understand that blockchain is technology by itself and, hence, does not require cryptocurrencies for it to function. The blockchain technology can be adopted in a wide array of operations and transactions that can be carried out in a decentralized manner (Crosby et al., 2015). Therefore, the blockchain can be perceived as batched and time stamped blocks of records whereby each of the blocks contains the hash reference of the previous block (Vigna & Casey, 2015). Such an aspect results in chain of block. The machines in the network and which have access to the formed chains of block can decipher the message and interpret the state and message being send across the network (D'Aliessi, 2016; Jesus, Chicarion, Albuquerque, & Rocha, 2018).

On a different point of view, it is also critical to examine how the blockchain network operates to gain a comprehensive understanding of smart contracts implementation through blockchain technology. A blockchain network can be perceived several nodes / computers/ machines that that have access to a given chin of blocks, and which are able to perform operations on the blocks, based on the information that each of the machines or node holds (Bö hme, Christin, Edelman, & Moor, 2015; Marsal-Lluïsa, 2018). For instance, a given node in the blockchain network can act as the main entrance of various users of the blockchain into the network; it is also worth noting that the users are as well able of transacting on the network through their specific nodes. The result of the blockchain is a sophisticate peer to peer network that is quite secure.

Farhana, Bappy, Prince, and Yasmeen (2016) explains that in interacting with the blockchains, the users usually use a set of public and private keys. Analytically, the public and private keys are cryptographic approaches that are used to warrant safe transactions through encapsulation of the data being transmitted (Chuen, 2015). As such, unless a user has the key, they are unable to decipher the message being transmitted. The use of

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the private keys by the users in the blockchain network is made for signing their own transactions; the public key on the other hand are used to address the users. As denoted by Gregg (2014) and Kuhn, Hu, Polk, and Chang (2001) among others, the use of the asymmetric cryptography through the public and private keys promotes non-repudiation, integrity and authentication. The users broadcast the signed tan actions to the one-hop peers in the network (Piatek, Isdal, Krishnamurthy, & Anderson, 2008).

The one-hop peers in the network are typically the neighbouring peers (Lua, Crowcroft, Pias, Sharma, & Lim, 2004). These nodes are credited with the responsibility of first validating the transactions prior to broadcasting them further or other peers in the network. If the transaction is deemed valid, then, it is discarded. This process continues until the transaction is spread throughout the entire blockchain network., It is critical to note that the validation process by every one-hop node in the network makes it literary impossible for invalid transactions to be broadcasted. This then reaffirms the issues of security and authenticity of the transactions.

The validated transactions by the nodes in the network within a given time are them collected batched and time stamped as a candidate block. The process of collection, validation and time stamping is usually referred to as mining. The node that perform this function the re-broadcasts the black again, back to the blockchain network for further action. It is however critical to note that a consensus is often reached in selecting the mining node as well as the constituents of the block.

The network nodes are again tasked with the responsibility of re-verifying the authenticity of the re-broadcasted block, by checking whether all the transactions held by the block are valid, and whether the has reference values for the previous block are accurate. The block is discarded if either of the set conditions is violated. Else, it is added to the chain of blocks and the information it contains is updated on each of the node, so as to ensure commonality of the information broadcasted as well as up-to-date view of the block status. It is however critical to note that his process occurs for every transaction to ensures security is maintained.

4. LINK BETWEEN SMART CONTRACTS AND DEVELOPMENT

The success of an organization is greatly depended on a wide array of factors. Slater (2004) explains that the ability of the organizational leaders to

adopt reliable, yet secure and efficient technologies is very critical. In line with this, Slater (2004) explains that today, the competitiveness of an organization is a multifaceted construct that must be addressed through the implementation of a various strategies. Technology has become a critical measure of organizational effectiveness, efficiency and performance; any organization that does not match with the emerging trends therefore risks being phased out by the competitor firms. On the same note, Brown and Harvey (2006) explains that an organization should focus on technologies whose implementation will aid in smoothening organizational process, will enhance the organizational relations with partner organizations and will eliminate inefficiencies that result from lapse in operations management and process automation.

As earlier defined, a smart contract is simply a self-executing script, based on the conditions. As such, the dimensions and applications of the smart contract in organizational settings are many (Kim & Laskowski, 2018). Typically, smart contracts can be implemented in various areas, ranging from contracts with the suppliers to contracts with the retailers, resellers and the end customers. The fact that the latter is self-executing it brings issues of integrity and openness. In an organisational setting, the technology bears the ability of positively improving the financial openness of a firm, by promoting safety, security, accuracy and integrity of the organizational financial transactions

On a different point of view, it is critical to look at what entails validity of transaction in smart contract. To better understand the issue of validity, it is vital to think of the blockchain network as a group of no trusting computers or machines, that perform read or write on a common database (Marvin, 2017; Wright & Filippi, 2015). Therefore, since the machines are non-trusting (Crosby et al., 2015), they must ensure close monitoring of one another for any transaction that is being made to the general ledger (the database) for safety purpose. To prevent possible conflicts between these machines, a set of conditions o rules must be set. To begin with, the blockchain network must ensure that that the distributed environment is protected. This is achieved by helping the different users in the network to reach a common consensus on the status of the transactions. This is achieved by ensuring that every transaction must conform to specific rules. Before being committed to the shared database.

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The rules and conditions for the execution of the transactions are basically embedded in each of the blockchain network client. Therefore, each client machine in the network understand what is expected of the transaction that they are executing, and the peer nodes also do understand what to expect from transactions of other machines in the network. Consequently, whenever a client performs a transaction, since the transaction are replicated across all the machines in the blockchain network, each of the client checks whether the transaction confirms to the pre-programmed rules, before being relayed further across the network (Christidis & Devetsikiotis, 2016).

To better understand this concept of validity of reactions and which forms the core of smart contracts and associate security measures, it is prudent to first understand how also the shared database works in a blockchain technology. Literally, a database usually is made of tables. Each table contains a set of rows. Essentially, a row can be perceived as a single record and transaction is any action that seeks to create or manipulate one or more of the records (Elmasri & Navathe, 2011, p. 50). However, in blockchain environment that is characterised by a shared database model, each of the records/rows can be mapped to a specific private and public key. The private key is usually held by the owner of the record/transaction, while the public keys are held by other machines in the network. The public keys aids in controlling the editing of each of the record, as before the transaction is committed, all the machines in the network must be in consensus.

The following of the defined rules by each of the nodes in the network results in authenticated and time stamped blockchain that defines the network activity of the nodes (Pop et al., 2018). Owing to the defined rules in each of the nodes, the users do not have to trust each other as their activity is already predefined by the set conditions. This gives rise to the concept of trust less environment, whereby trust emerges as an inherent property of the pre-set conditions embedded on the nodes with respect to the specific blocks within the network as well as the resultant interaction of the nodes (Guo, Zhang, Thalmann, Basu, & Yorke-Smith, 2014).

5. Advantages of smart contracts

5.1 Accuracy

Information regarding a contact is expressed in a conditional format, using the if-then statements. For instance, when ordering a specific service package *if customer x pays x units of y, then immediately credit the recipient of the amount and open the service package for customer x*. Since most of the contracts entail the exchange of cash. Then the smart contracts can be synced with cryptocurrencies such as Ethereum, Lite Coin or Bitcoin among others, an aspect that would further enhance the robustness, accuracy and performance of the entire system. The expression of all terms and conditions in a smart contract must be explicitly and accurate (Lauslahti, Mattila, & Seppälä, 2017; O'Shields, 2017). Essentially, this is a critical requirement because transaction errors may emanate from any omission. Therefore, the automation exhibit in the smart contracts avoid most of the issues that are found in the traditional contracts.

Implementation of smart contracts could help reduces issues like breach of contract, delays in signing the contracts and disputes that escalates even in to the courts of law. These challenges, as explained by Lauslahti et al. (2017) would be eliminated by the accuracy levels guaranteed by smart contracts.

5.2 Clear Communication and Transparency

Virtually, the terms and conditions of the contract terms and conditions become explicitly visible to the different network players of the specific blockchain. Therefore, once the contract is established, changes cannot be easily implemented. Each of the transaction by either party to the contract is monitored and controlled by other network nodes in the blockchain. As a result, transparency is promoted, and issues of fraud are eliminated. In the modern era, various cases have been reported whereby the organizational are accused of swindling the customers and not offering them the value of their money. A case in point is the court case report in where the complainant is reporting to have been swindled by the plaintiff (Inc., 2016).

As aforementioned earlier, each sale of good or service by an organization results to a contract that may or may not be legally enforceable (O'Shields, 2017). However, in various cases, one or more parties to the

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contract, may breach the contract terms and conditions (Inc., 2016). In the case of sales, an organization may overcharge the customer, or may shorten the service package timespan agreed, without notifying the customer. A case in point is where NCTC was accusing AMC Networks of increasing its fees, a situation that caused their 2010 agreement extension negotiation lag beyond the expected deadline. Indeed, even some quarters have claimed that not everyone, especially the small video producer managed to get a fair deal from the said contract which was eventually signed in 2016 (Engebretson, 2016; Frankel, 2016). The implementation of the smart contracts puts every detail of the contract into light. Unlike in the traditional contract where the organization would have to use legal frame work as the intermediary, in the virtual world, all that is needed is other nodes in the network, who will be tasked with the responsibility of ensuring that each of the transaction pertaining to the contract is accurate and valid. These problems are warranted by its traditions of maintaining information in manual forms. Such risks would be reduced if smart contracts were fully implemented since detail would be secured digitally and virtually.

5.3 Speed AND Efficiency

Essentially, smart contracts do not rely on human intervention, and their implementation is guided and overseen by other nodes in the blockchain network. Therefore, once the contract is triggered, the scripted contract self-executes (Mik, 2017). This is often achieved using trigger events when scripting the contact. For instance, a trigger event may be a date, time, or even an activity initiated by a party to the contract, such as the transfer of a certain units of cryptocurrency from the customer's wallet to that of the company. Once a trigger event happens, the contract now starts executing itself. The verification of whether the correct amount has been paid, and there if the correct subsection, service and associated aspects has been given to the number is determined by the nodes in the blockchain network(Pilkington, 2016). As such, there is no longer reliance on the organization's developed system to determine such contracts with the customers (Networks, 2018). The organization also has no sovereign authority over the transactions as well as over the contractual agreement with the partners. Each contract is targeted as a separate entity and each transaction, irrespective of its origin is fist validated. Overly, this results in

to fast, resilient and robust way of contract execution (Gareth W. Peters, Panayi, & Chapelley, 2015).

5.4 Security

A study by Apostalaki et al. (2017) found the smart contracts to have one of the highest security measures. Smart contracts implemented through blockchain technologies entails the use of decentralized network made of non-trusting parties. The fact that the parties in the network are non-trusting makes them keep check of one another to ensure each transaction is carried out effectively, and that there is a uniform world view of the status of all the transactions. Again, the blockchain technology is implemented through cryptography techniques (Romano & Schmid, 2017). As identified by Romano and Schmid (2017), this technology entails high encryption of data and the use of both private and public keys for reading the transactions in each blockchain, as well as executing any transaction. The fact that before any node commits a transaction, the transaction must first be validated by all the odes across the blockchain network enhances the security of the smart technology.

Buying from explanations given by Chuen (2015), in his book, data encryption and specifically, the use of cryptography techniques can greatly enhance the security of communication and data exchange. As such, any contract that is implemented in an encrypted manner enhances the security of the transaction and thwarts any malicious activities that may be propagated to alter the execution sequence or execute invalid transactions.

5.5 Cost Reduction

Essentially, top business managers are credited with the responsibility of coming up with strategies and ways of reducing costs in an organization (Jehanzeb & Bashir, 2013). These authors explain that the main aim of setting up a business enterprise is to make profits; therefore, all the activities in an organization must be construed in manner that promotes the achievement of corporate objectives, as well as maximizing the wealth of the shareholders (Savelyev, 2017). In the recent world that has seen vast technological revolution, the success of the business enterprises is vested on their ability to keep tabs with the prevailing technologies and adopt ensures and techniques that otherwise increase the employees' productivity and performance.

The implementation of the smart contracts through blockchain technology cuts the need for a middle man, such as the legal personnel as explained by Bö hme et al. (2015). This in turn aids in reducing the overall organizational costs and maximizing the profit margins by an organization.

The contracts can further bolster the efficiency of the organization, which is a critical ingredient for organizational success and increased performance. It is however critical to note that despite the security, cost reduction and efficiency aspects associated with the smart contracts, the latter is not by any chance magical, and hence may be subject to flaws. For instance, the quality and execution of the contract highly depends on the input, which is basically the coded version of the contract. Therefore, if there are flaws in setting up the smart contracts, such flaws may trigger adverse effects as well as poor quality of the output generated.

6. THE LIMITATIONS OF SMART CONTRACTS

Despite the various advantages noted and which emanate from the implementation of smart contracts, it is also crucial to note that smart contracts are associated with various limitations. The disadvantages of the smart contacts limit their application in various real-life scenarios. As attested by O'Shields (2017) often, technology often outpaces the law and the regulatory framework.

6.1 Immutability

Essentially, since smart contracts are scripted as piece of codes, once set up, the contacts cannot be modified easily. In the traditional contracts, amendment of terms and conditions is often useful especially in long term contracts whose execution is depending on real life dynamics and the conditions keep changing. Owing to the rigidity exhibited in the smart contracts after being established, the latter results in a wide array of practical problems more so with respect to the ease of modifying the contract terms in depending on various situation (Mik, 2017).

This is underpinned by Idelberger, Governatori, Riveret, and Sartor (2016), who explains that the conventional contracts have provisions that allow for the annulment, embedment and modification of contracts. The implementation of the smart contracts. To a greater extent it literally impossible to achieve analogous goals. Nevertheless, various actions can be taken to instil aspects of modification and contract annulment. For instance,

an escape hatch can be included in the coded contract. The escape hatch can be sued to allow for the modification of the contract terms, to cater for the real-life contracts which are characterised by vast dynamics. Nevertheless, implementing such in the smart contracts may compromise the security apparatus, and hence may require further tightening of the transaction controls in order to ensure that the escape hatch is not used to initiate invalid transaction or transactions that are aimed at unauthorised manipulation of records This is as well noted by Governatori et al. (2018), who explained that, owing to the complexity of the smart contract and blockchain technology in general, ensuring that the right permission is granted to the right node, and that all the nodes are able to monitor the amendment of the contract may be quite tricky but necessary.

6.2 Contractual Secrecy

Essentially, the blockchain technology entails the sharing of smart contract across all the nodes in the blockchain network, since all the transaction are recorded on general ledger using encoded permissions in each of the nodes (Ferguson & Schneier, 2003). Essentially, the blockchain technology entails the use of anonymity, whereby all the participants in a blockchain network are anonymous and secured. However, there is no security of the contract execution. This is because though the nodes are anonymous in their operations, the ledger is maintained public, and hence the transactions are visible and there is no security of such. Jehanzeb and Bashir (2013), explain that this is an area that needs to be focused, because despite the nodes being anonymous, the maintenance of a public ledger in distributed environment results in a privacy lapse.

While the essence of the smart contracts is to maintain a public ledger that is visible to all parties in the network, and to monitor the validity and accuracy of the taxations (Swan, 2015; Tapscott & Tapscott, 2015), there is the need to also develop a protocol that can aid in the verification of the transactions without necessarily reading the contents of the transaction. This is because though the participants and the origin of the transaction may be anonymous the contents are not, and each node can read and access the transaction contents. It is as well critical to develop measures to curb this privacy issues, since security is not all about anonymity and encryption, it also entails ensuring the content of the transaction is protected against

access by other parties. As such, this aspect of smart contracts is yet to be full addressed.

6.3 Legal Adjudications and Enforceability

Traditionally, the establishment of a valid contract covers various constructs, which make it legally enforceable. O'Shields (2017) explains that the key characteristics of a legally enforceable contract are; offer by one party or parties, acceptance by the other party or parties, a promise, consideration and legal capacity mutuality and in some contracts, a written instrument. While these elements of a contract are very critical, some of them are not applicable in smart contracts (Stim, 2016).

For instance, the financial sector exhibits immense regulations by the government and specific permissions and licensures are required for a form to engage in transactions execute don general ledgers. However, despite the licensure and associated approvals, the legal enforceability of the smart contracts is yet to be established and synced with the contract law as well as other laws that giver financial transactions. This fact is well affirmed even in this research where 66.7% of the respondent were not so conversant with how smart contracts work. All elements of aspect contracts are expressed as segments of code, and elements of a valid contract may not necessarily be identifiable. This therefore necessitates the need for the translation of the legal framework governing the contracts into the software logic to ensure that besides the smart contract being self-executing, they also adhere to the legal regulations of formal contracts (Meng, Wolfgang, Wang, Wang, & Han, 2018). Further, such tantalisation should take in to account the blockchain developer's point of view, the lower's point of view and the transacting parties' points of view. Such an aspect would aid in enforcing legality and validity of the contracts. However as at present, the organizational that have implemented the smart contracts though blockchain technology must continuously struggle with the aspect of the contract validity and enforceability. Nevertheless, Farhana et al. (2016), denotes that the upside of the smart contracts is that breaches of contracts are rare to occur, as the execution of the contract is dependent on the pre-defined conditions which are also triggered by an event that neither of the nodes in the network have control over.

7. Conclusion

The field of blockchain; especially regarding smart contracts, though with innumerable benefits, has not been given enough attention. From this research, it has been established that there are limited studies done covering application of smart contracts in organisations. However, it is understandable that the newness of the concept and lack of benchmarks could be one of the reason that has hindered many organisations to deep their feet in unchartered grounds. The study has established that there are no legal framework backing or supporting smart contracts, thus, making it difficult for companies to embrace it fully.

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