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OIL PRICE AND VIETNAM STOCK MARKET IN THE ERA OF THE COVID-19 OUTBREAK

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Abstract

The interactive association between oil prices and stock market has increasingly captured the attention of researchers. Especially, how does the relationship between oil prices and stock market varies during COVID-19 pandemic? The study's aim is to investigate the time-varying causal effect of the COVID-19 pandemic on the link between the oil prices and Vietnam stock market using the wavelet approach. Daily data about oil prices Vietnam stock prices and returns covers the period of ten years from January 2011 to December 2021 will be gathered, processed and analyzed to examine the influence of pre, first and second waves of COVID-19 pandemic on the relationship between oil prices and stock market.

Key words: COVID-19, Oil Price, Stock Market, Stock Price, Stock Return.

Introduction

Background Context

According to Rafiq et. al. (2016), the two oil crises of the 1970s caused economic inflation that has tormented many countries for a decade. In particular, the study by Hamilton in 1983 and 1996 concluded that unforeseen increases in international oil prices adversely affected the global economy. International oil prices have skyrocketed and have fluctuated widely since the first half of 2021. Such significant price changes have hurt the stock markets of many countries. Petroleum is considered "the lifeblood of the industry". It is both a core energy source and the key raw material for the industry. Therefore, oil is crucial for the sustainable growth of the world economy and market. Consequently, the sustainability of national economies depends partly on world oil prices (Gisser & Goodwin, 1986; Mork & Olsen, 1994; and Lardic & Mignon, 2006).

Vietnam is more of an oil importer than an exporter, and this trend has continued for many years. The Ministry of Investment and Planning reported that crude oil exports are on the decline, while imports of oil have been increasing rapidly in order to meet domestic production. Oil plays a key role in ensuring the long-term and robust development of the Vietnamese economy. Therefore, it is vital to investigate the impact of international oil prices on the Vietnamese economy and market.

Oil price fluctuations have a great influence on economic activities in general, including the stock market. Huang et al (1996) suggested that changes in oil prices have an impact on stock prices due to the effect of oil price fluctuations on the firm's future cash flow and discount rate. Accordingly, for a net oil consumer, an increase in oil prices on the one hand increases input costs and reduces future cash flows; on the other hand increases inflation, the expected real interest rate as well as the discount rate, which ultimately reduces the

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value of firms.

From an empirical perspective, the studies of Creti et al (2014), and Park and Ratti (2008) have shown that the impact of oil price fluctuations on the stock market between oil-importing and exporting countries is different. Studies by Bjornland (2009), and Kilian and Park (2009) have shown that when oil prices increase, the stock market of net oil exporting countries will benefit; and vice versa, the stock market of net oil importing countries will deteriorate as the results of Nandha and Faff (2008), O'Neil et al. (2008), Papapetrou (2001). Recently, stemming from the discoveries of the asymmetric influence of oil price fluctuations on the economy, the studies of Badeeb and Lean (2016), Hu et al (2018), and Salisu and Oloko (2015) demonstrated the existence of this asymmetry in the stock market. This asymmetry is reflected in the different volatility of the stock market when oil prices increase/decrease as a result of Chou and Tseng (2016).

Meanwhile, in Vietnam, studies on the influence of oil prices on the stock market have also been explored and shown inconsistent results, such as Huynh et al (2017), Narayan and Narayan (2010), Phan and Pham (2013). On the other hand, the above studies have only considered this impact by different linear and non-linear approaches. The new concept to be studied in the research is to clarify the dynamic relation between oil prices and the stock market in Vietnam by the Wavelet approach.

While the researches in Vietnam on this topic only focus on studying the asymmetry relationship through linear and non-linear approaches but have not considered the simultaneous and persistent co-movement between these variables. This study uses the wavelet approach to consider the existence of a dynamic relationship between oil price volatility and the stock market in Vietnam.

Research Objectives

Based on wavelet approach, the present study concentrates on exploring the effect of oil prices and their implied volatility on the stock market at different horizons of the COVID-19 outbreak, specifically during its pre, first, and second waves.

Literature Review

Oil Prices and Stock Returns.

Many previous studies on the correlation between oil prices and stock returns over the past two decades remained inconclusive, and the debate over the nature of this relationship attracted interest from policymakers as well as investors. In a study on the relationship between oil prices and the stock market in Greece published by Papapetrou (2001), using the VAR model, the author found the impact of oil prices on economic and labor market conditions. The results show the negative impact of oil prices on macro variables such as growth, inflation, and unemployment rate.

The connection between oil prices and the stock market can be illustrated through different channels. From a production cost perspective, higher oil prices will increase input costs and production costs, decrease corporate profits and negatively impact the market (Sadorsky, 1999; Narayan and Sharma, 2011; Xu, 2015).

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Additionally, rising oil prices will affect companies' cash flows as consumers will reconsider their savings spending trade-offs and expect unemployment.

H1: Oil prices have a negative effect on stock returns.

Oil Price Volatility and Stock Returns.

Oil prices and their volatility can affect the stock market, both directly and indirectly. The direct effect can be explained by the volatility of oil prices creating uncertainty in financial markets, which in turn leads to a decline in the prices of securities. The indirect effect is described by a decrease in production output and an increase in the rate of inflation when oil prices rise. Both of them affect the macro variables of the economy and thereby affect the stock market.

Research by Jones and Kaul (1996) shows evidence of the negative impact of oil prices on the stock market. In particular, the fluctuation of oil prices reduces the company's real cash flow due to high input costs and difficulties in selling output products. In addition, using the arbitrage model, the study concluded that oil price sensitivity is a risk factor for the stock market. Jones et al. (2004) found evidence that high oil prices will increase production costs in the economy, leading to a decrease in production output and a decrease in expected returns on the stock market.

Furthermore, a number of studies by Saettem (1999), Ciner (2001), Nandha and Faff (2008) have shown a negative relationship between the volatility of oil prices and stock returns. Sadorsky (1999) also came to the same conclusion in his study, according to which part of the oil price fluctuations had a negative impact on the profitability of the stock market.

One of the other empirical studies on the relationship between oil prices and stock returns is the study of Miller and Ratti (2009). Using the VECM method and the data set collected from the period 1971–2008, the authors have shown that the stock market is negatively affected by changes in oil prices in the long run. This negative relationship continues to be found and supported in the study of Park and Ratti (2008) when analyzing the impact of oil price shocks on the stock markets of 12 countries in the European Union, which are huge oil-importing nations.

H2: Oil price volatility has a negative effect on stock returns.

COVID-19, Oil Prices and Stock Prices

Recently, regarding the consequences of the COVID-19 pandemic on the financial market and energy industry, some studies have revisited and investigated the nexus between oil prices and the stock market. The dynamic correlation between oil prices and the S&P500 index at the end of the first quarter of 2020, for instance, is examined by Yousfi et al. (2021). According to Sharif et al. (2020), there is a strong connection between oil prices and the stock market, with oil prices being the leading factor. Sakurai and Kurosaki (2020) looked into how the association between oil and the US stock market has altered since the COVID-19 crisis.

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They found that both the upside and downside linkages had intensified at that time. According to Salisu et al. (2020), during the COVID-19 pandemic era, oil prices and financial markets may face more severe early effects and long-lasting repercussions. The impact of the pandemic on the relationship between oil and stock prices is confirmed by Zhang and Hamori (2021).

H3: COVID-19 negatively affects the relationship between oil and the stock market

Methodology

Data Collection

The study focuses on studying the relationship between the oil market and the stock market during the COVID-19 epidemic. Daily data about oil prices (OIL), the implied volatility of the oil market (OVX), and the stock market (VNI) will be gathered. The daily data covers the period from January 2011 until December 2021. By including both the first and second waves of the COVID-19 pandemic spread as well as the pre-COVID-19 era, the data acquires an intriguing aspect. As a result, when the COVID-19 era began, any changes in the behavior of the oil-stock co-movement will be identified.

In particular, the benchmark crude oil, WTI, is used to measure oil prices (in dollars per barrel), which are collected from the Energy Information Administration's website (https://www.eia.gov/). The OVX measures the implied volatility index of oil, whose data is derived from Yahoo Finance. Higher OVX numbers denote greater dread or uncertainty in the oil market, whereas lower OVX values suggest less dread or uncertainty in the oil market. For the stock market, VNIndex, which measures the stock performance of all stocks listed and traded on the Ho Chi Minh City Stock Exchange (HOSE), is taken into consideration.

Data Process and Analysis

Descriptive Statistics

To conduct a descriptive analysis of the collected data, the time series graphs of the daily returns and prices of each variable will be presented. The overall trends of each variable during the rapid spread of the COVID-19 pandemic will then be captured. After that, the statistical properties of the daily data such as completeness, consistency, sufficiency, unbiasedness, minimum mean square error, etc. are also analyzed.

Unit Root Tests (Augmented Dickey-Fuller ADF)

A null hypothesis implies that a unit root is present in a time series sample, while alternative hypothesis indicates that a time series is stationary (or trend-stationary). Unit Root Test, which is ADF, is applied to test if a given time series is stationary or not. For instance, if it is concluded that the variables have a unit root, the empirical results are practical and can be applied for the whole period in reality.

Wavelet Approach

In the current study, an innovative wavelet approach is utilized to examine and compare the interdependence between oil prices, implied oil volatility, stock returns, and economic conditions during the

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time of the COVID-19 outbreaks. The wavelet approach was developed by Grinsted et al. (2004). The objective of this method is to identify co-movements in the stock market, oil market, and oil implied volatility index. In comparison to standard econometric time series modeling techniques, wavelet analysis's key advantage is its capacity to capture slow and persistent co-movements, which enables a more subtle understanding of the association between two pairs of variables at different measurement time intervals.

Conclusion

The complex and time-varying association between oil prices and stock market has increasingly attracted investors, researchers and policy makers. The study aims to discover the linkages among oil prices and Vietnam stock market before, during and after the COVID 19 pandemic outbreak using wavelet multi-resolution analysis. Daily data about oil prices (OIL), the implied volatility of the oil market (OVX), and the Vietnam stock market (VNI) covers from January 2011 until December 2021will be collected, processed and analyzed to discover if there are significant correlations among oil prices, stock prices, and stock returns in the period of COVID 19.

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ILLEGAL GOLD MINING GRANDIL: EMPIRICAL TRAIL IN SOUTH CITOREK LEBAK REGENCY, INDONESIA

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Abstract

The goal of the study is to do the following: 1) identify the variables that contribute to the emergence of unlicensed gold miners (Gurandil), 2) analyze the level of environmental damage caused by unlawful gold mining (UGoM), and 3) assess the socioeconomic impact of unlicensed gold mining. In this study, ethnomethodology's qualitative methods and research approaches are used. The investigation was done in June 2021 at a mining site in South Citorek, which is in the Cibeber Subdistrict of the Lebak Regency. The village chief, five village devices, 25 illegal miners, and numerous parties related to or relating to the researchers' problem are among the research informants.The village chief, five village devices, 25 illegal miners, and a slew of other parties associated with and related to the A few examples of methods that can be used to collect data are observations, interviews, and documentation. In the analysis phase of qualitative research, there are four different things that are done: collecting data, coming up with a problem, filtering the data, and coming to a conclusion. According to the findings, illegal gold mining has a significant impact on ecosystems, causing issues such as air pollution, a decline in the quality of rivers in the Cimari region, the conversion of forests, river siltation, the formation of large holes, soil abrasion, and the loss of Rasamala and Resin cropland.

Keywords: Illegal gold mining grandil, Galamsey operations, Soildegradation, South Citorek
JEL Classification Codes: M12, M21, M54

1. INTRODUCTION

Illegal gold mining is considered one of the phenomena of unlicensed mining (PETI). Illegal gold mining is carried out by small-scale workers without permission from the local government (Dutu, 2016). Such mining processes have attracted the attention of the scientific community, which is conducting studies on the adverse effects they could potentially have on the environment. Illegal gold miners have a negative impact on the environment, resulting in a disruption of ecosystem balance. Not only the environment is affected by these activities, but workers who carry out illegal gold mining activities will also suffer direct and indirect impacts. Negative impacts of illegal gold mining activities include the production of mercury heavy metal waste (Hg) (Nakazawa et al., 2016), the emergence of various diseases (Zolnikov, 2012), arsenic waste

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emissions (USA) (Shepherd et al., 2018), and river siltation (Veiga et al., 2014).

Natural and human resources are both abundant in Lebak Regency, especially in Cibeber Subdistrict. The land is operated by the old Aneka Tambang Tbk mining company, which is no longer operated by the corporation. It is utilized by locals to explore the countryside. As a result, there are some people who handle traditional and modern management. This becomes a problem due to excessive community mining processing. They do not have permission to process it, either individually or in groups, and are therefore found to be unlawful.

Illegal or unmitigated mining has become a major problem for the community and the government. This practice also has a negative impact on the environment, both in terms of soil ecstasy and the use of highly dangerous chemicals. When toxic compounds such as mercury, cyanide, and carbon are used, they are not handled appropriately. As a result of illegal mining activities, various problems arise. Relevant parties, particularly the government, should pay special or serious attention to the matter.

Illegal mining, sometimes known as "gold mining," eventually became the foundation of life for the community. When compared to the agricultural industry, gold mining is expected to provide more revenue. Illegal miners exist as a result of increased income, and their presence in a region can have a major impact on the socio-economic fabric of the local community. This is due to a number of driving factors, including social, economic, legal, and other problems.

According to Asiedu (2013), the activities of wild miners pose a major threat to the environment, and there is almost no transfer of expertise that can be capitalized (Suseno & Dwiatmadja (2016). Although it has become a job for the Amponsah-Tawiah and Dartey-Baah (2011) communities and also contributes to overall gold production each year, the environmental consequences are numerous and very critical. It involves the exposure of mineral deposits using rudimentary tools and primitive mining and processing techniques (Owusu-Boateng and Kumi-Aboagye, 2013) and often employs unskilled and illiterate people for a variety of reasons, having little or no sensitivity to the consequences of their actions on the environment (Kessey and Arko, 2013; Mudyazhezha and Kanhukamwe, 2014). They are seen in activities that cause similar levels of environmental damage, including large and dangerous excavations, destruction of vegetation, soil pollution, and air and water pollution with the remains of hazardous chemicals and heavy metals.

Miners in the South Citorek mayority are locals or local residents, working in the category of small gurandils and regular gurandils. While the majority of capital owners are immigrants who are dissatisfied with their situation in the mining industry, This activity is triggered by the annual increase in gold prices. As a result, residents or communities are forced to engage in illegal mining. Gold prices, particularly in Indonesia, have always risen, reaching their highest point in the last 10 years at 802,611.88 rupiah every gram in early 2020.

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Illegal gold mining operations are clearly against the law,but paradoxically promise a lot of money. The idea of making individuals lead prosperous lives is not ruled out by these various benefits. This is based on data from poor or pre-prosperous households that continue to dominate in South Citorek, despite the fact that some of its residents have switched professions to gurandil. Changes in people's economic conditions that can be exacerbated by education levels, living conditions, and the ability to meet needs are referred to as "living standards" or "levels of community well-being."

2.LITERATURE REVIEW

Mining is an excavation activity, as well as the processing and sale of excavation materials (metal, coal, minerals, oil, gas, and others).In the mining industry, to get satisfactory results, usually the mineral rocks of the undisturbed followers must be separated (Noor, 2011).

According to Manann and Saleg (2014), mining activities play an important role in regional development and generate large amounts of revenue. Evidence from Yusuf and Suseno (2020) indicates that mining plays an important role in regional development and provides a large amount of revenue. A new community will be developed when mining activities occur in a region or regions. The new city will serve as a new economic growth center for the region. The local economy will benefit from community efforts. People looking for work will be absorbed as a result of mining, reducing unemployment. New economic growth will emerge, resulting in the expansion of other services. mining-related activities, either directly or indirectly (Suseno, 2018).

Unlicensed Gold Mining

Unlicensed gold mining (UGM) is a mining activity carried out by excavation by the community or companies that do not have permission from the relevant authorities (good mining practice). This activity is illegal because the resources that are underground belong to the state. According to Dyahwanti (2007), natural resources that can be mined by companies or miners are those that, according to the law, already have licenses according to laws and regulations made by the government.

According to Supramini (2012), the ampak produced by unlicensed or illegal mining is less of a natural balance source and more damaging to the environment around mining. Fertile soil will be lost as a result of this mining activity, which will result in a lot of pollution. From the beginning of production until the end of mining activities, only profits are seen without regard to the impact that occurs on the environment (Suseno et al. 2019).

Impact of Mining Activities

According to Soemarwoto (2005), the effects of changes caused by certain activities—natural, chemical, physical, and biological—are examples of such activities. When comparing environmental variations after

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and before mining, it shows the effect of mining on ecosystems. Mining has a positive impact on the environment if the changes that occur during mining are profitable, and mining has a negative impact on the environment if the results of mining activities are declared harmful, polluting, and damaging to the environment. If there is a fundamental environmental change, the impact of miners becomes very important.

According to Salim (2007), kegiatan mining will have a beneficial or negative effect on the environment. The positive impact of mining development activities includes: 1) adding real value to national economic growth; 2) increasing local native income (PAD) to accommodate labor, particularly in mining communities, 3) increasing the economic economy around mining. As added by Suseno et al. (2019), it can improve microbusinesses and services around mining, improve living standards and human resources around mining, and improve public health around mining.

There are negative influences in addition to beneficial impacts. Mining activities have the following negative consequences: 1) environmental damage, 2) the suffering of indigenous peoples near mines; 3) decreased quality of life for local or nearby residents, and 4) increased violence against women.
Unlicensed mining activities are intended to generate benefits either directly or indirectly, based on economic considerations. It is also beneficial for the local community in terms of mining development. The benefits are both large and small. Unlicensed gold mining is considered a severe threat to mining investment in Indonesia on a macroscale, while a small group of people participates in unlicensed gold mining (UGM) as part of the "creative economy" movement. To reform and improve the family economy, communities are digging for gold grains. (Willyrdus and Chang, 2012)

Impact of Mining Activities on the Environment

Although conventional gold mining activities have provided jobs for the community, this activity has a much greater impact because the risks faced are even greater. Damage caused by illegal mining is relatively high. The risk faced by miners is the uncertainty of finding gold reserves both during excavation and processing. This resulted in the uncertain income earned by miners.

Unlicensed mining occurs due to land degradation, with negative consequences for the environment. Many of the holes are dug between 400 and 4000 feet in depth over a distance of 6 to 30 feet (Kessey and Arko, 2013). Unfortunately, this remains undisclosed even long after mining is completed (Kpan et al., 2014). The holes fill with rainwater and become a breeding ground for mosquitoes, causing a pungent stench in the surrounding environment (Awaomim, 2013). Furthermore, this activity resulted in damage to the top layer of valuable soil (Asiedu, 2013), so that the land does not allow for living plants. These consequences are least observed by mining actors.

Socio-Economic Impact

Unlicensed gold mining (UGM) can provide a foundation for life for some people, as it can generate better profits than the agricultural sector. Furthermore, UGM activities can be carried out by all communities

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with various levels of education because UGM activities do not require sufficient educational background because miners only need to observe and imitate the activities carried out by their colleagues in the field to carry out their activities.

The arrival of industry in a region has an impact on population movement, resulting in migration. A person migrates if he or she travels a certain minimum distance or moves from one geographic location to another permanently or somewhat permanently. Getting a job is the driving force behind migration. This is done by the community, despite the fact that mining operations are prohibited.

3. MATERIALS AND METHODS

The research was done in South Citorek, Cibeber Subdistrict, Lebak Regency, Banten Province, Indonesia, in the areas of Cirotan, Cimari, Copal, and the sand slope. This study was conducted in June – December 2021. The purpose of this study is to investigate the illegal impact of gold mining on the environment and socio-economics of the local community located in the village of South Citorek. Data is collected from various sources and informants who are at the site of illegal gold mining. Based on initial interviews and observations conducted by researchers, there was a decrease in environmental quality, including ecosystems in forests and rivers.

To find out how this mining activity is carried out, researchers visited several villages that are near illegal mining sites. Interviews were conducted with 15 illegal miners who were in the surrounding area using convenience sampling. The selection of this type of sampling is based on the willingness of the wild miners to talk to the researchers. Secondary data was also collected from Jaro Jalu, the village head of South Citorek, apart from the village head data taken from the village device. The data were analyzed, and together with observations and interviews conducted, conclusions were drawn on the impact of illegal mining on the environment and socio-economic community in South Citorek.

4. RESULTS

The goal of this research is to determine: 1) what is driving the emergence of unlicensed gold miners, 2) the extent of the damage caused by illegal gold mining on land and bodies of water; and 3) the socioeconomic impact of illegal gold mining.

Characteristics of Respondents

Participants in the study were 25 illegal miners (gurandil) and other related respondents. Illegal miners (gurandil) in South Citorek Village have three distinct gurandil characteristics namely, shallow gurandil, moderate gurandil and depth gurandil. Respondents ranged in age from 19 to 50, according to the study. The majority of respondents were classified as poorly educated, that is, they did not complete junior high school or equivalent, and others did not finish elementary school or did not attend school. The respondents' poor education levels were due to their family's financial problems, which prevented them from continuing their education. Working in agriculture does not allow people to meet the demands of their families. Many communities and farmers become gurandil miners as a result of the potential of natural resources,

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particularly the potential of gold mining in South Citorek . They chose this career because it would allow them to make money faster than farming.

Social Factors Context

The level of relations between parties, both within the community and between the community and the local government, is one of the driving elements of gurandil's arrival in one area. According to the findings of the study, the relationships that occur between fellow citizens in the course of daily activities are relatively good. The existence of gotong royong is often used to achieve a common goal. Studies are conducted on a regular basis to establish silatuhrahmi, or indigenous peoples.According to Citorek Kidul, the village chief, community interactions between immigrants and natives are strained due to cultural differences. Conflicts between indigenous peoples and migrants arise as a result of an influx of miners from outside the area. In the mining industry, there is a lot of competition, which leads to a lot of conflict (Suseno et al., 2020).

Immigrants become locals by marrying or bringing their families to Citorek Kidul, and this inequality begins to fade into equality of purpose. It is possible to argue that indigenous people cannot accept outsiders into their villages. As a result of this situation, the more friendly indigenous peoples are to immigrants, the more individuals seek employment as illegal miners. The worse the government's public relations are, the greater the number of people who become illegal miners.

Legal Factors Context

Indonesia is a legal state. Every activity carried out in Indonesia must comply with the law. The mining industry is one of the few regulated by mining laws and has a legal basis for its development. The laws in force in Indonesia, particularly in the field of mining, are found in Article 33, Paragraph 3 of the 1945 Constitution, which states that "the land, water, and natural wealth contained therein are owned by the state and exploited for the benefit of the people." Mining proceeds obtained from the depths of the earth are used for the benefit of the people, as can be observed from this statement. It does not, however, happen or occur in small communities living near mines.

The findings revealed that all respondents had different views on the law in the mining industry. This is due to the respondents' inability to dig up information due to their poor level of education, which limits their ability to understand the law (Suseno, 2019).

Economic Factors Contex

Economic causes, in addition to social and legal factors, are one of the elements that contribute to the existence of unlicensed or gurandil mining activities. South Citorek village is an agricultural and plantation village with a lot of land. Working in agriculture is insufficient to meet basic needs. To supplement people's income, they look for jobs that pay well and pay quickly. One such job is that of a miner. According to the study findings, respondents preferred to work as gurandil for a variety of reasons, including the fact that it did not require a large amount of wealth or a high level of education. High-level ability and work experience

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are required (Suseno et al., 2020). This is in accordance with the fact that the residents of South Citorekl Village still have a poor level of education. Few people have received an education up to the college level. Many people have left the agricultural sector in favor of the mining sector because the time it takes to make money in the mining sector is shorter. Working as a gurandil miner increases your chances of dying in a mine accident. However, due to financial difficulties, the community has no alternative but to support its family. The people in South Citorek village is strongly linked to their financial status. A previous income of 100,000 rupiah (US $ 6,41) is insufficient to cover the rising cost of living. The findings revealed that before working as miners or gurandil, the villagers of Citorek Kiduls were students, not workers, farmers, or hawkers.

5. DISCUSSION

Most of the residents of South Citorek Village work as gurandil miners or rats, and the village is controlled by middle-aged productive men. However, others continued to work as farmers, farm laborers, or in other jobs such as vegetable swords. People who choose jobs other than mining are old people and are physically unable to do so. The duration of work, the frequency of work, the working capital level, the level of work safety and migration level, as well as gurandil features, such as small gurandil, regular gurandil, and gurandil barrel, can all be used to determine the level of gurandil mining activity.

The most common gurandil in Citorek Kidul Village is a small gurandil miner. The majority of people who do this work only do it for one day (in the morning at home in the afternoon or evening). Gurandil's small group consists mainly of dropouts and residents who want to pursue a career as miners. According to research, the more small gurandi involved in gold mining, the more difficult the economic situation will be. Based on his current wages, he didn't have enough money to cover his basic needs. The level of gurandil activity in mining is low, as evidenced by the long working period. Mining of small gurandil is done using only basic tools such as hammers, chisels, flashlights, and sacks to store mining products. Gurandil uses a tool called "gulundung" to process gold into pieces, but not all gurandils have these instruments. Small gurandils without gulundung will turn stones into gold replacing those with rental status. Gurandil who has his own processing tools, on the other hand, has little money to invest in the process. Gurandils can sell pieces of gold when they have been converted into them. Transaction income is used to cover basic living expenses.

The frequency of gold mining in the previous month revealed the characteristics of a small gurandil. The day that a small gurandil used to do gold mining in the previous month is the frequency of work. According to recent research, small gurandil mining has increased 6-10-fold. When mining gurandil, you can also choose negative weather conditions that endanger your safety.

Working capital only requires and uses basic equipment. Small gurandils do not need to remove large biyaya to meet the equipment because the tools are cheap. How to sell the results of excavation can be considered in addition to the typical capital of small gurandil. One option is to sell the excavation as raw excavation

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material, such as stones collected in sacks and sold to steamers or gurandi l barrelsas a share of resources (Suseno et al., 2020). Furthermore, a little gurandil offers the results of the excavation in the form of pieces of gold. Pieces of gold, on the other hand, have low value due to the low level of gold contained within them.

In one week, Gurandil miners who do mining to achieve mining results take 4 to 6 days. These findings reveal that mining in groups is a viable option. One group usually consists of 6 to 8 workers who will mine in a deep enough hole. It is usually a group of people or gurandil with a close relationship. It's not just that it could come from somewhere else. Depending on the hardness of the material obtained, the processing of dakam from raw materials to gold gurandil is used to take less time sati day. As a result, the processed elements obtained from these excavations are more numerous than those produced by small gurandils. The processing procedure into pieces of gold begins with the initial session using the method of crushing rocks dug from the mountain with a hammer, which is followed by a processing loop that lasts 4 to 6 hours. About 4 hours, depending on the hardness of the stone (Suseno et al. 2021). The gold granules are then removed from the dirt, which can then be converted into silver again. After that, try melting it for 30 minutes until it turns into coral vein material (a type of sand), then processing again for 3 hours with mercury and water. The gold is then pounded, filtered, and separated by mercury. After that, I tried to burn, put in the water, on the clock (scratched) to get the piece, burned again for 10 minutes to get a piece of gold, on the clock (scratched) until it was completely slippery so that it could be a good part, and then weighed for sale."

The use of harmful chemicals such as mercury and cyanide in the processing of these excavation products will disrupt or endanger the safety of miners. Because the authorities prohibit it, materials used in gold processing can be obtained clandestinely, according to the findings. Despite the difficulty in obtaining this mineral, the public is not discouraged from continuing to mine.

Small gurandil is the same as regular gurandil in terms of capital needed. Chisels, hammers, crowbars, flashlights, and sacks are all used by both. Ordinary gurandil has a larger capital than ordinary gurandil. While in the mining area, this capital will be used to meet basic needs such as food and other needs. Gurandil supplies logistics supplies for its gegiata, including rice, noodles, salted fish, salt, sugar, and coffee. They take logistics materials with them to the mine to meet their needs. Ordinary gurandil relationships are rather broad and strong among fellow gurandils or gurandil groups, based on relationships shared by regular gurandils. In general, one group has a network of security forces.

Gurandil barrels are gurandils that do not do mountain mining but have facilities where excavation products can be processed into pieces of gold. Small gurandils and standard gurandils have slightly safer positions than gurandil barrels, which are more similar to bosses. This is due to the fact that gurandil barrels are not exposed to hazards such as underground landslides. Men or laborers are usually present in Gurandil barrels, either for mining mountains or to fix gold into individual pieces. Gurandil is a standard gurandil that eventually has more capital to provide a processing area or better known as a barrel before it becomes a

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gurandil barrel.

Gurandil barrels are distinguished by higher incomes than conventional gurandils. These gurandils seem to have one or two staff employed daily or weekly. These findings provide gurandiltong with a better quality of life, such as the state of residential buildings. The way gurandil casg processes mining resources into pieces of gold is superior to regular gurandil (Yusuf and Suseno, 20200). Gurandil Case contains large processing facilities as well as large storage areas known as barrels. Gurandil case obtains pieces of gold with good weight as a consequence of processing. Toxic chemicals including carbon, cyanide, and mercury are used to prepare these materials. However, it uses hardness and a long enough time to produce a good piece of gold so that the piece of gold is of high quality and sold at a premium price. As a result of these advantages, gurandil barrels produce more than regular gurandil. According to the study findings, most respondents were aware of the seriousness of the crisis. Working as a gurandil miner, on the other hand, offers the opportunity to make enough money to meet daily needs while having limited skills and education.

The environment is severely harmed as a result of illegal gold mining activities in the area. So that there are environmental problems as a result of illegal gold mining, the academic community is concerned and wants to look into it more thoroughly to prevent and reduce more serious damage. This is not only the responsibility of the Ministry of Energy and Mineral Resources (ESDM), but also the responsibility of all levels of society. Gold mining operations are carried out in the village of Citorek Kidul by individuals, organizations, or small companies that do not have authorization from government agencies (Spiegel, 2012). According to information gathered from the village head, Citorek Kidulber's situation was different from the community before mining.

The river environment has been damaged by illegal gold mining activities, according to research conducted in the community. In addition, people tend to dump domestic waste into rivers, potentially increasing river pollution. River pollution is a major problem that has life-threatening consequences for humans, animals, and ecosystems.

The unavoidable environmental impact is probably the most obvious post-mining impact (Siswanto et al., 2012). Mineral extraction almost always causes some kind of environmental damage (Tom-Dery et al., 2012). Illegal surface mining has a greater environmental impact because illegal miners do not reclaim and have no environmental education (Ontoyin and Agyeman, 2014: Essumang, 2015), causing environmental damage in the surrounding area. Soil erosion, compaction, soil layer removal, shallow and deep digging holes, river siltation, forest encroachment, soil chemical pollution, and destruction of soil organisms are just a few of them (Ako et al., 2014: Rajaee et al., 2015). Which is a working mining location.

The investigation found significant environmental damage, particularly in the Cirotan and Cimari districts, where large holes were dug to depths of more than 500 meters into the earth's guts. They don't fill the holes they dig after they've finished mining. This has turned the location into a deadly trap for humans and

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animals. Surface mining is the process of taking the top layer of soil from the site and piling it up elsewhere.

Layers of soil fenced off at various locations or places have been relocated and stacked on un mined land, according to observations from several mining sites. The loss of this uppersod layer makes the soil unfit for plant growth around construction or mining sites. The buildup of the above soil layers has a negative impact on soil microorganism culture, disrupts biological functions and nutrient cycles, as well as affects the chemical and physical properties of the soil, resulting in soil systems that cannot function. This situation can be seen in a number of abandoned mining sites.

One of the effects found at mining sites is river contamination. The use of chemicals such as mercury, cyanide, carbon, etc. causes pollution. In each mining settlement, the data reveal substantial turbidity in surface water bodies. This can occur as a result of waste being dumped directly into rivers and previous layers of mining soil. At mining sites, high levels of condutivity indicate the presence of dissolved minerals. The operations of wild miners should be closely and limitedly monitored, even if they are below the permissible limit, to ensure that ec concentrations do not rise to unacceptable levels. Because low oxygen levels are caused by high numbers of particles, this can affect the dissolution of oxygen in water.

Mercury is idealized as the main chemical used by miners, and is recognized as the main chemical in laterite gold mining (Soelistijo and Mili, 2014). Water and soil are also contaminated by these substances. When mercury vapor and methyl mercury enter rivers and food systems, they are recorded as bioaculated in the essential organs of fish and humans (Idowu, et al., 2013, suseno, et al., 2022). Even if illegal miners are unaware of the dangers of mercury, they expose themselves and the public to the toxic effects of mercury through inhalation, skin adsorption, and eating.

Unlicensed gold mining is gold mining done without government approval by individuals, organizations, or companies. According to the results of the author's survey, about 40% of the population in Cibeber Subdistrict practices traditional patchwork. Unlicensed mining activities, in general, do not follow the correct mining standards, resulting in environmental damage, mineral resource waste, and mining accidents.

Automatic gold mining without permission is not subject to duties to pay taxes or other levies to the state because it is not licensed. With illegal mining activities virtually ignored, environmental factors remain an important issue that should be thoroughly examined. Moreover, the actors involved in unauthorized gold mining have little understanding of the importance of environmental processing. In fact, almost all gold mining areas operate without a license, resulting in communal riots. This type of social unrest often occurs, both between local communities and gold mining actors who operate without immigration permits (Suseno, et al., 2022). Lower societies, often victims of financiers and apparatus, have become particularly vulnerable to the creation of social unrest as a result of these battles. Residents currently suffer from skin disorders such as hives and koren.

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Not only that, the river water is also very clear. However, once the mine starts operating, the water quality has deteriorated to the point where it cannot be used for recreational purposes by locals. Chemicals such as mercury and sanide can even be found in water. In hilly places, there is a loss of water catchment areas, resulting in degradation of the landscape. Soil conditions can shift or move, causing human property and life to be lost.

Mining activities have a beneficial impact that is able to overcome the household economy. Some people in Cikotok Lebak Regency can improve their family economy with gold mining, but not all gold miners sacrifice their family life. Even if a person makes a lot of money, it seems that his life does not change much if his way of life is not good. However, some people get rich overnight. The income levels of respondents operating in illegal gold mining are shown in the table 1 below.

Table 1 **The number of respondents' incomes**

No.	Income	Sum	%
1	Below Rp. 2,000,000 / month	25	50
2	2.000.000 - 3.000.000	19	38
3	Above Rp. 3,000,000/ month	6	12
	SUM	50	100

Source: Field Primer Data in 2021

Based on the table 1 above the number of income respondents before changes in livelihood is below 2,000,000 25 people, while the income of 2,000,000-3,000,000 19 people, and above 3,000,000 as many as 6 people. Mining activities also open jobs for the local community. Due to the increasing income for the community, resulting in the growth of supporting businesses in mining activities such as food stall businesses, factorying of replacement mining tools. Every mining activity will almost certainly have an impact on society, the economy, education and the environment. Both positive and negative.

Household behavior that utilizes river water for fulfillment and normal activities. Bathing, cleaning clothes, washing cooking utensils, and even defecating to eat are examples. As a result, locals in mining areas are at significant risk of contracting diseases caused by mining influences. Not only that, but mining activities are very dangerous to one's health, resulting in injury and even death. Not only that, but many diseases can be contracted by inhaling mercury vapor that is accidentally inhaled by us, or by coming into direct contact with mercury, which can result in blistered skin.

Here is a table 2 with data on the number of respondents based on their care location, as shown in the

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table below:

Tabel 2 **Number of Respondents by Place**

No.	Coping when sick	Before gold mining	After gold mining
1	No treatment	30	3
2	Phc	4	30
3	Doctor's Practice		5
4	Alternative Medicine	16	12
	SUM	50	50

Source: Primer Data in 2021

Based on the table above the number of naiveding when seeking treatment of respondents before the change in livelihood that is not treatment before PETI is 30 people while after PETI was drastically reduced to 3 people, this is because the livelihood of the population increased.

6. Conclusions

There are several main elements that drive the formation of unlicensed gold miners, including economic factors, a lack of income to meet basic needs, and the village's decision to hire people as gold miners without permission. In addition, it is driven by a lack of law enforcement resources to deal with illegal mining. Working as a miner doesn't require a college diploma. Gurandil miner activities are divided into three categories: small gurandil, standard gurandil, and gurandil barrels. Small gurandils have the highest activation rate because they are mined more often than regular gurandil and gurandil barrels. The findings of this study revealed that illegal gold mining activities in Citorek Kidul Village, Cibeber Subdistrict, Lebak Banten Regency, have had various adverse environmental consequences. This behavior has been carried out by locals for a long time, and the resulting damage is significant. River siltation, the appearance of holes, abrasions, and overburdening are some of the environmental effects that occur. Tong gurandil showed the highest levels of gurandil household happiness. Based on the results of high-income and comfortable living situations. However, from a health point of view, both small, regular gurandils, and gurandil tongs are in poor condition. This is related to the actions taken to fit the demands of the family.

Patents

The study requires a comparison of two different places in terms of miners' activities and the welfare of miners' households, which are classed as homogeneous and heterogeneous, to get decent enough results. Gurandil communities and miners are expected to be considered in deciding which type of work is appropriate for the home, taking risks and benefits into account. The apparatus and government are expected to be able to develop a policy of gurandil mining (based on social, economic, and legal problems), so as to produce social and economic benefits, especially for the community.

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Informed Consent Statement: All data was obtained based on structured interviews and cross-tested through triangulation with informants who represent the object and context of each data point and fact. Additional information to support the interpretation of data processing was obtained from all subjects involved in the research..

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to restrictions.

Conflicts of Interest: The authors declare no conflict of interest.

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DI-TOPOLOGICAL APPROXIMATIONS IN INFORMATION SYSTEMS

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Abstract.

In this paper, Authors introduced a new method for generating di-topological spaces based on information systems and binary relations by using right neighbourhoods and left neighbourhoods without neglecting others, and provide examples, counterexamples and some properties of these spaces. Authors established a new concept on di-topological spaces that are analogue to known concepts in rough set theory such as di-rough sets, di-dependency, di-rough dependency and totally di-dependency. Finally, Authors used the generated di-topological spaces to reduct the knowledge in decision information systems.

Mathematics Subject Classification: 04A05, 54A05, 54C55, 54E05.

Keywords: Binary relations; topological spaces; di-topology; di-rough sets; neighbourhood system

I. INTRODUCTION

Topological structure and its generalizations are significant methods for measuring similarity and dissimilarity between objects in information systems as well as uncertain concepts, and the relations between objects are a simple mathematical model that fills the gap between real-life data and computer science. Topologies and relations played a manifest role in many fields such as approximation space and rough set theory [1, 6], dynamics [7], biology [8], biochemistry [9], and digital topology [10, 11].

Rough set theory has been introduced in 1982 [1] as an extension of set theory. Rough sets and topologies are related through neighbourhood systems and used in applications as in [2, 3]. E. Lashin, et al. [4] used the topological spaces to find approximations space, rough set and applied these concepts in the information system field.

A di-topological space has been introduced by L. M. Brown and M. Diker [12]. Many authors [13, 14, 15, 16] introduced new notions and properties based on di-topological spaces. Literature relies on using the right neighbourhoods without the left neighbourhoods, or vice versa, to find the upper, lower approximations and the rough sets.

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In this paper, Authors used right neighbourhoods and left neighbourhoods without neglecting others to study some methods for generating di-topological spaces using binary relations, and give several examples, counterexamples, and study some properties and structures of these methods. Moreover, Authors investigated di-rough sets and di-approximation space on a di-topological space generated by relations. Finally, Authors defined di- dependency, di-rough dependency, and totally di- dependency of information, and use these notions to reduct the knowledge in decision information systems.

Definition 1.1. For a relation R on X, Authors have

1. The right neighbourhood of $x \in X$ (briefly $RN(x)$) is $RN(x) = \{y \in X : xRy\}$,
2. The left neighbourhood of $x \in X$ (briefly $LN(x)$) is $LN(x) = \{y \in X : yRx\}$.

Definition 1.2. For a relation R, the class of all $RN(x)$ (briefly $RN(X)$) (resp. the class of all $LN(x)$ (briefly $LN(X)$) is a sub-base for the topology τ_R(resp. κ_R) on X.

II. Di-topology generated by relation

Definition 2.1. For a relation R, the di-topology generated by R is $(X, PO(X), \tau_R, \kappa_R)$, where τ_R(resp. κ_R) is the topology on X generated by the class of all $RN(x)$ (resp. the class of all $LN(x)$).

Example 2.1. Let $X = \{a, b, c, d\}$ and $R = \{(a, a), (a, c), (b, d), (c, d), (d, a)\}$ be a relation on X, then $RN(X) = \{\{a\}, \{d\}, \{a, c\}\}$, $LN(X) = \{\{a\}, \{b, c\}, \{a, d\}\}$,

$\tau_R = \{X, \phi, \{a\}, \{d\}, \{a, c\}, \{a, d\}, \{a, c, d\}\}$ and $\kappa_R = \{X, \phi, \{a\}, \{a, d\}, \{b, c\}, \{a, b, c\}\}$.

Definition 2.2. The di-topology $(X, PO(X), \tau_R, \kappa_R)$ is called complemented if $(\tau_R)^c = \kappa_R$, where $(\tau_R)^c$ is the complement of τ_R.

Example 2.2. Let $X = \{a, b, c, d\}$ and $R = \{(a, a), (b, b), (c, c), (d, d), (a, b), (b, d), (a, d)$. Then,

$\tau_R = \{X, \phi, \{c\}, \{d\}, \{c, d\}, \{b, d\}, \{a, b, d\}, \{b, c, d\}\}$ and

$\kappa_R = \{X, \phi, \{a\}, \{c\}, \{a, b\}, \{a, c\}\{a, b, c\}, \{a, b, d\}\}$. So, $(X, PO(X), \tau_R, \kappa_R)$ is complemented.

Remark 2.1. In general, the di-topology $(X, PO(X), \tau_R, \kappa_R)$ is not complemented for any binary relation R as in Example 2.3.

Example 2.3. From Example 2.1, the di-topology $(X, PO(X), \tau_R, \kappa_R)$ is not complemented.

Lemma 2.1. For a symmetric relation R, authors have $\tau_R = \kappa_R$.

Proof. For a symmetric relation R, we have $RN(X) = LN(X)$. Therefore $\tau_R = \kappa_R$.

Definition 2.3. The $(X, PO(X), \tau_R, \kappa_R)$ is called di-quasi-discrete spaces if $(\tau_R)^c = \tau_R$

Lemma 2.2. For an equivalence relation R, the $(X, PO(X), \tau_R, \kappa_R)$ is a di-quasi-discrete space and complemented.

Proof. For an equivalence relation R, authors have $RN(x)$ (resp. $LN(x)$) is apparition on X and so τ_R (resp. κ_R) is a quasi-discrete space. Therefore, the space $(X, PO(X), \tau_R, \kappa_R)$ is a di-quasi-discrete space and complemented.

Remark 2.2. The converse of Lemma 2.1 and Lemma 2.2 is not true as in Example 2.4.

Example 2.4. Let $X = \{a, b, c\}$ and $R = \{(a, a), (a, b), (b, b), (b, c), (c, c), (c, a)\}$. Then, $\tau_R = \{X, \phi, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}\}$, $\kappa_R = \{X, \phi, \{a\}, \{b\}, \{c\}, \{a, b\}, \{a, c\}, \{b, c\}\}$ and $X, PO(X), \tau_R, \kappa_R)$ is a di-quasi-discrete spaces, where R is not symmetric relation and not equivalence

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relation.

Lemma 2.3. For a preorder relation R, authors have

1- $A = \bigcup_{x\in A} RN(x)$ if and only if $A \in \tau_R$.
2- $A = \bigcup_{x\in A} LN(x)$ if and only if $A \in \kappa_R$.

Proof.

1- Let $A \in \tau_R$ and $y \in A$. By reflexivity of R, authors have $y \in RN(y)$ and $y \in \bigcup_{x\in A} RN(x)$, then $A \subseteq \bigcup_{x\in A} RN(x)$. Now, if $y \in \bigcup_{x\in A} RN(x)$, then, there exist $x \in A$ such that $y \in RN(x)$. In addition, by transitivity if $z \in RN(y)$, authors get $z \in RN(x)$. Then $y \in RN(y) \subseteq A \in \tau_R$, $\bigcup_{x\in A} RN(x) \subseteq A$, and $A = \bigcup_{x\in A} RN(x)$.
Conversely, let R is preorder and $A = \bigcup_{x\in A} RN(x)$, then for every $y \in A$ there is $RN(y) \in \tau_R$ such that $y \in RN(y) \subseteq A = \bigcup_{x\in A} RN(x)$, hence, $A \in \tau_R$.
2- Similar to the proof of 1.

Proposition 2.1. If R is a preorder relation on a set X, then

1- $RN(X)$ is a base for the topology τ_R.
2- $LN(X)$ is a base for the topology κ_R.

Proof.

1- Let $\mathrm{RN(X)} = \{RN(x) : x \in X\}$. If R is reflexive and $x \in RN(x)$ for all $x \in X$, then $X = \cup_{x\in X} RN(x)$. Also, $RN(x), RN(y) \in \mathrm{RN(X)}$, $RN(x) \cap RN(y) \neq \emptyset$ for all $x, y \in X$. Then, by the transitivity of R, there exists $z \in X$ such that $z \in RN(x)$ and $z \in RN(y)$. Therefore, $RN(z) \subseteq RN(x) \cap RN(y)$ and $\cup_{RN(z)\in \mathrm{RN(X)}} RN(z) = RN(x) \cap RN(y)$. Then, $RN(X)$ is a base for the topology τ_R on X.
2- Similar to the proof of 1.

Proposition 2.2. If R is a preorder relation, then $(X, PO(X), \tau_R, \kappa_R)$ is complemented.

Proof. Let $A \in \tau_R$, R be a preorder relation and $A^c \notin \kappa_R$. Then, $A^c = \bigcup_{x\in A^c} LN(x)$, and there exists $y \in \bigcup_{x\in A^c} LN(x)$ and $y \notin A^c$. Hence, there is $z \in A^c$ such that $y \in LN(z)$ and $y \in A$. Thus, $z \in RN(y) \subseteq \bigcup_{x\in A} RN(x) = A$, leads to contradiction. Therefore, $A^c = \bigcup_{x\in A^c} LN(x)$ and so $A^c \in \kappa_R$, then $(X, PO(X), \tau_R, \kappa_R)$ is complemented.

Remark 2.3. In example 2.5, authors show that the converse of Proposition 2.1 is not true.

Example 2.5. Let $X = \{a, b, c\}$ and $R = \{(a, a), (c, c), (a, b), (c, b)\}$. Then
$\tau_R = \{X, \phi, \{b\}, \{a, b\}, \{b, c\}\}$, $\kappa_R = \{X, \phi, \{a\}, \{c\}, \{a, c\}\}$.
So $(X, PO(X), \tau_R, \kappa_R)$ is complemented space, where R is not preorder relation.

III. Di-Rough sets in di-topological space.

Definition 3.1. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topology generated by relation R on X and $A \subseteq X$.

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Then:

1- Di- lower approximation of A in short $diL(A)$ is

$$diL(A) = \cup \{u: u \in \tau_R,\ u \subseteq A\},$$

2- Di- upper approximation of A in short $diU(A)$ is

$$diU(A) = \cap \{v: v \in \kappa_R,\ A \subseteq v\}.$$

Proposition 3.1. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topological space generated by R and $A \subseteq X$. Then, $x \in diU(A)$ if and only if $u \cap A \neq \emptyset$ and $x \in u$ for every τ_R- open set u.

Proof. Follows from Definition 3.1.

Proposition 3.2. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topological space generated by a relation R on X, and $A \subseteq X$. Then, the following properties hold:

1- $diL(A) \in \tau_R$ and $diU(A) \in \kappa_R$.
2- $A \in \tau_R$ if and only if $diL(A) = A$,
3- $A \in \kappa_R$ if and only if $diU(A) = A$,

Proof. Follows from definition 3.1.

Definition 3.2. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topological space generated by a relation R on X, and $A \subseteq X$. Then,

1- Di- boundary of A $(dib(A))$ is $dib(\mathrm{A}) = diU(A) - diL(A)$,
2- Di- internal edge of A $(diL - edg(A)$ is $diL - edg(A) = A - diL(A)$,
3- Di- external edge of A $\left(diU - edg(A)\right)$ is $diU - edg(A) = diU(A) - A$.

Definition 3.3. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topological space generated by a relation R. Then, a set $A \subseteq X$ is called di-Rough if $dib(A) \neq \emptyset$, otherwise A is called di- exact (di- definable).

Definition 3. 4. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topological space generated by a relation R and $A \subseteq X$. Then, A is called

1- Di-internally definable, iff $diL(A) = A$,
2- Di-externally definable, iff $diU(A) = A$.

Example 3.1. From Example 2.1, let $A = \{a, c\}$, $B = \{a.d\}$ and $C = \{b, c\}$.
For a set A, authors have $diL(A) = \{a, c\}$, $diU(A) = \{a, b, c\}$, $dib(\mathrm{A}) = \{\mathrm{b}\}$, $diL - edg(A) = \emptyset$ and $diU - edg(A) = \{b\}$. Then, A is di-Rough set and di-internal definable.
For a set B, authors have $diL(B) = \{a, d\}$, $diU(B) = \{a, d\}$, $di - b(\mathrm{B}) = \emptyset$, $diL - edg(B) = \emptyset$ and $diU - edg(B) = \emptyset$. Then, A is di-exact (di-defibable) set, di-internal definable and di-external definable.
Finally, for a set C, authors have $diL(C) = \emptyset$, $diU(C) = \{b, c\}$, $di - b(\mathrm{C}) = \{b.c\}$,
$diL - edg(C) = C$ and $diU - edg(C) = \emptyset$. Then, A is di-Rough set and di-external definable.

Proposition 3.3. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topological space generated by a relation R on X and $A \subseteq X$. Then, $dib(\mathrm{A}) = diU - edg(A) \cup diL - edg(A)$.

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Proof. From Ddefinition 3.2, authors have $diU - edg(A) \cup diL - edg(A)$
$= (diU(A) - A) \cup \big(A - diL(A)\big) = diU(A) \cup -diL(A) = dib(A)$.

Proposition 3.4. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topological space generated by a relation R on X and $A \subseteq X$. Then A is di- definable if it is di-internally definable and di-externally definable.

Proof. Follows directly from Definition 3.4 and Proposition 3.3.

Proposition 3.5. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topological space generated by a relation R on X and $A \subseteq X$. Then,

1- $diL(A) \subseteq A$,
2- $A \subseteq diU(A)$,
3- $diL(\emptyset) = diU(\emptyset) = \emptyset$,
4- $diL(X) = diU(X) = X$,
5- If $A \subseteq B$, then $diL(A) \subseteq diL(B)$ and $diU(A) \subseteq diU(B)$.

Proof.

1- Let $x \in diL(A)$, hence there exists u $\in \tau_R : x \in$ u $\subseteq$ A. Then, $x \in$ A.
2- Let $x \in$ A and $v \in \kappa_R$ with $A \subseteq v$. Then, $x \in V$ and $x \in diU(A)$.

The proof of 3 and 4 follow directly from Definition 3.1 and Proposition 3.2.

5- Let $x \in diL(A)$. Then, there exists u $\in \tau_R : x \in$ u $\subseteq$ A. If $A \subseteq B$, then $x \in$ u $\subseteq$ B and x $\in diL(B)$, therefore $diL(A) \subseteq diL(B)$. To prove $diU(A) \subseteq diU(B)$. Let $x \notin diU(B)$, then there exists v $\in \kappa_R$ such that B $\subseteq v$ and $x \notin B$. If A $\subseteq$ B, then $x \notin diU(X)$ and authors have $diU(A) \subseteq diU(B)$.

Remark 3.1. In general for the di-topological space $(X, PO(X), \tau_R, \kappa_R)$ generated by a relation R on X and $A \subseteq X$, authors have $diU(A^c) \neq \big(diL(A)\big)^c$ and $diL(A^c) \neq \big(diU(A)\big)^c$ as in Example 3.2.

Example 3.2. In Example 2.1, let $A = \{a, c\}$ and $B = \{b\}$.
For the set A, authors have $diL(A) = A$, $diU(A^c) = diU\{b, d\} = X$ and
$\big(diL(A)\big)^c = X - A = \{b, d\}$. Then, $diU(A^c) \neq \big(diL(A)\big)^c$.
For the set B, authors have $diU(B) = \{b, c\}$, $diL(B^c) = diL\{a, c, d\} = \{a, c, d\}$ and
$\big(diU(B)\big)^c = X - B = \{a, d\}$. Then, $diL(B^c) \neq \big(diU(B)\big)^c$.

Proposition 3.6. Let $(X, PO(X), \tau_R, \kappa_R)$ be a completed di-topological space generated by a relation R on X and $A \subseteq X$. Then,

1- $diU(A^c) = \big(diL(A)\big)^c$
2- $diL(A^c) = \big(diU(A)\big)^c$

Proof.

1- Let $(X, PO(X), \tau_R, \kappa_R)$ be a completed di-topological space generated by a relation R on X and $A \subseteq X$. Then, $\big(diL(A)\big)^c = X - \cup\{u : u \in \tau_R,\ u \subseteq A\} = \cap\{X - u : u \in \tau_R,\ X - A \subseteq X - u\}$. Since

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$(X, PO(X), \tau_R, \kappa_R)$ is a completed di-topology, if $u \in \tau_R$, then $X - u = v \in \kappa_R$. So, $\big(diL(A)\big)^c = \bigcap\{v: v \in \kappa_R,\ A^c \subseteq v\} = diU(A^c)$.

2- Similar to the proof of 1.

Corollary 3.1. Let $(X, PO(X), \tau_R, \kappa_R)$ be a di-topological space generated by a preorder relation R on X and $A \subseteq X$. Then,

1- $diU(A^c) = \big(diL(A)\big)^c$
2- $diL(A^c) = \big(diU(A)\big)^c$

Proof. Follows directly from Proposition 2.1 and Proposition 3.6.

Proposition 3.7. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topological space generated by a relation R on X and $A, B \subseteq X$. Then,

1- $diL(A \cup B) \supseteq diL(A) \cup diL(B)$,
2- $diL(A \cap B) = diL(A) \cap diL(B)$,
3- $diU(A \cup B) = diU(A) \cup diU(B)$,
4- $diU(A \cap B) \subseteq diU(A) \cap diU(B)$,
5- $diL(A) \cap diL(A^c) = \emptyset$.
6- $diU(A) \cup diU(A^c) = X$,

Proof.

1- Since $A \subseteq (A \cup B)$, $B \subseteq (A \cup B)$, $diL(A) \subseteq diL(A \cup B)$ and $diL(B) \subseteq diL(A \cup B)$, then, $diL(A) \cup diL(B) \subseteq diL(A \cup B)$.
2- Since$(A \cap B) \subseteq A$,$(A \cap B) \subseteq B$, $diL(A \cap B) \subseteq diL(A) \cap diL(B)$,$diL(A) \subseteq A$ and $diL(B) \subseteq B$, then, $diL(A) \cap diL(B) \subseteq A \cap B$. However, $diL(A \cap B)$ is the largest τ_R-open set contained in $A \cap B$. Therefore, $diL(A) \cap diL(B) \subseteq diL(A \cap B)$, and thus $diL(A \cap B) = diL(A) \cap diL(B)$.
3- Since $diU(A \cup B) = \bigcap\{v: v \in \kappa_R,\ A \cup B \subseteq v\}$, then
$$diU(A \cup B) = \{\bigcap\{v: v \in \kappa_R, \quad A \subseteq v\} \cup \big\{\bigcap\{v: v \in \kappa_R, \quad B \subseteq v\}\big\} = diU(A) \cup diU(B)$$
4- Since $(A \cap B) \subseteq A$, $(A \cap B) \subseteq B$, $diU(A \cap B) \subseteq diU(A)$ and $diU(A \cap B) \subseteq diU(B)$, then $diU(A \cap B) \subseteq diU(A) \cap diU(B)$.
5- From 2, authors have $diL(A) \cap diL(A^c) = diL(A \cap A^c) = diL(\emptyset) = \emptyset$.
6- From 3, authors have $diU(A) \cup diU(A^c) = diU(A \cup A^c) = diU(X) = X$.

Remark 3.2. Generally, for the di-topological space $(X, PO(X), \tau_R, \kappa_R)$, the equality of 1 and 4 of Proposition 3.6 are not satisfied as in Example 3.3.

Example 3.3. From Example 2.1,
If $A = \{a\}$ and $B = \{c\}$, then $diL(A \cup B) = \{a, c\}$ and $diL(A) \cup diL(B) = \{a\}$. So,
$diL(A \cup B) \neq diL(A) \cup diL(B)$.
Also, if $A = \{a\}$ and $B = \{d\}$, then $diU(A \cap B) = \emptyset$ and $diU(A) \cap diU(A) = \{a\}$. So,
$diU(A \cap B) \neq diU(A) \cap diU(B)$.

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Proposition 3.8. Let $(X, PO(X), \tau_R, \kappa_R)$ be the completed di-topological space generated by a relation R on X and $A \subseteq X$. Then,

1- $diU(A) \cup diL(A^c) = X$,
2- $diL(A) \cup diU(A^c) = X$,
3- $diU(A) \cap diU(A^c) = dib(\mathrm{A})$,
4- $diU(A) \cap diL(A^c) = \emptyset$,
5- $diL(A) \cap diU(A^c) = \emptyset$,
6- $diL(A) \cup diL(A^c) = \big(dib(\mathrm{A})\big)^c$.

Proof.

1- Since $diL(A^c) = \big(diU(A)\big)^c$ by Proposition 3.6. Then,
$diU(A) \cup diL(A^c) = diU(A) \cup \big(diU(A)\big)^c = X$
2- Since $diU(A^c) = \big(diL(A)\big)^c$ and by proposition 3.6. Then,
$diL(A) \cup diU(A^c) = diL(A) \cup \big(diU(A)\big)^c = X$.
3- $diU(A) \cap diU(A^c) = diU(A) \cap \big(diL(A)\big)^c = diU(A) - diL(A) = dib(A)$.
4- $diU(A) \cap diL(A^c) = diU(A) \cap \big(diU(A)\big)^c = \emptyset$.
5- $diL(A) \cap diU(A^c) = diL(A) \cap \big(diL(A)\big)^c = \emptyset$.
6- Since $diL(A^c) = \big(diU(A)\big)^c$. Then $diL(A) \cup diL(A^c) =$
$diL(A) \cup \big(diU(A)\big)^c = \big(diU(A)\big)^c \cap diL(A^c) = \big(dib(A)\big)^c$.

Remark 3.3. Generally, for the di-topological space $(X, PO(X), \tau_R, \kappa_R)$, the equality of items of Proposition 3.8. is not satisfied as in example 3.4.

Example 3.4. In Example 2.1,

1- If $A = \{a\}$ and $A^c = \{b, c, d\}$, then $diL(A^c) = \{d\}$, $diU(A) = \{a\}$ and
$diU(A) \cup diL(A^c) = \{a, d\} \neq X$.
2- If $A = \{b, c, d\}$ and $A^c = \{a\}$, then $diL(A) = \{d\}$, $diU(A^c) = \{a\}$ and
$diL(A) \cup diU(A^c) = \{a, d\} \neq X$.
3- If $A = \{a\}$, then $diU(A) \cap diU(A^c) \neq \mathrm{di} - \mathrm{b(A)}$.
4- If $A = \{b, c, d\}$, then $diU(A) \cap diL(A^c) = \emptyset$.
5- If $A = \{a\}$, then $diL(A) \cap diU(A^c) = \emptyset$.
6- If $A = \{b, c, d\}$, then $diL(A) \cup diL(A^c) = \big(dib(A)\big)^c$.

Proposition3.9. Let $(X, PO(X), \tau_R, \kappa_R)$ be the di-topological space generated by a symmetric relation R on X and $A \subseteq X$. Then,

1- $diL\big(diL(A)\big) = diU\big(diL(A)\big)$,
2- $diU\big(diU(A)\big) = diL\big(diU(A)\big)$.

Proof.

1- From Proposition 2.1, authors have $\tau_R = \kappa_R$. If $diL(A) = u \in \tau_R = \kappa_R$, then
$diL\big(diL(A)\big) = u = diU\big(diL(A)\big)$.
2- Similar to the proof of 1.

An information system, denoted by $IS = (U, A)$, where U is a nonempty finite set of objects

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$\{x_1, x_2, \ldots . x_n\}$ called a universe set, and A is a set of attributes $\{a_1, a_2, \ldots . a_n\}$. (U, A) is also called a decision table if $A = C \cup D$, where C is the set of condition attributes, and D is the set of decision attributes.

Example 3.5. Let $IS = (U, A)$ be an information system, where $U = \{1,2,3, \ldots, 10\}$ and A = {height, weight}, as in Table 1. Authors defined the relation of objects by

$$RN(x) = LN(x) = \{x \in U : V_{ax} \bigcap U_{ay} \neq \phi \quad \forall x, y \in U\}.$$

Then, $\beta_{\tau_{\mathrm{R_H}}} = \beta_{\kappa_{\mathrm{R_H}}} = \{U, \emptyset, \{2\}, \{4\}, \{10\}, \{3,4\}, \{2,5\}, \{8,9\}, \{1,2,6,7\}, \{1,2,5,6,7\}\}$. and
$\beta_{\tau_{\mathrm{R_W}}} = \beta_{\kappa_{\mathrm{R_W}}} = \{\{U, \emptyset, \{1\}, \{3\}, \{4\}, \{1,3\}, \{1,6\}, \{1,3\}, \{8,9\}, \{9,10\}, \{1,2,6\}, \{1,3,5\}, \{1,6,7\},$
$\{8,9,10\}, \{1,2,3,6,7\}\}$.

TABLE 1(TABLE OF DATA)

	Height(cm)	Weight(kg)	R_H	R_W
1	150,….,170	60,….,70	{1,2,6,7}	{1,2,3,6,7}
2	160,….,180	65,….,69	{1,2,5,6,7}	{1,2,6}
3	190,….,195	70,….,75	{3,4}	{1,3,5}
4	185,….,190	85,….,95	{3,4}	{4}
5	180,….,189	75,….,80	{2,4,5}	{3,5}
6	160,….,170	60,….,64	{1,2,6}	{1,6,7}
7	155,….,165	55,….,64	{1,2,6,7}	{1,6,7}
8	205,….,210	90,….,95	{8,9}	{8,9}
9	205,….,215	90,….100	{8,9}	{8,9,10}
10	200,….,204	100,….,105	{10}	{9,10}

IV. Reduction of knowledge by using di-dependency degree in di- information system

Definition 4.1. For a universe set U and a set of attributes A, the di-information system is the di-topology generated by attribute $a_i \in A$ on U and denoted by $di - IS = \left(U, A, \tau_{a_i}, \kappa_{a_i}\right)$. To be more specific, a di-information system is also called a di-information decision system if
$A = C \cup D$ and denoted by $di - DT = \left(U, C \cup D, \tau_{a_i}, a_i\right)$.

Definition 4.2. For a di-information decision system $di - DT = \left(U, C \cup D, \tau_{a_i}, \kappa_{a_i}\right)$, $u_1, u_2, \ldots, u_M$ object subset of τ_D and the set of attributes $B \subseteq C$, the lower approximation and the upper approximation of decision D with respect to attributes B are defined as:
$diL_B\, D = \bigcup_{i=1}^{M} diL_B\,(u_i)$, $diU_B D = \bigcup_{i=1}^{M} diU_B(u_i)$
The di-decision boundary region of D with respect to attributes B is defined as
$dib(D) = diU_B D - diL_B D$.
The di-positive region of the decision, denoted by $diPOS_B(D)$, is the di-lower approximation of the decision.

Definition 4.3. For a di-information decision system $di - DT = \left(U, C \cup D, \tau_{a_i}, \kappa_{a_i}\right)$, the di-dependency

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degree of D to B is defined as:

$$\gamma_B(D) = \frac{|diPOS_B(D)|}{|U|}, \qquad 0 \le \gamma \le 1$$

Authors said that.

D is totally di-dependency on B if $\gamma = 1$,

D is di-rough dependency on B if $0 < \gamma < 1$,

D is totally di-independency on B if $\gamma = 0$.

Definition 4.4. For a di-information decision system $di - DT = \left(U, C \cup D, \tau_{a_i}, \kappa_{a_i}\right)$ and $B \subseteq C$, then B is a relative reduct if $\gamma_B(D) = \gamma_A(D)$ and for all $a \in B, \gamma_B(D) > \gamma_{B-a}(D)$.

Therefore, a reduct is a minimal subset of attributes which has the same approximation power as the whole set of attributes.

Theorem 4.1. For a di-information decision system $di - DT = \left(U, C \cup D, \tau_{a_i}, \kappa_{a_i}\right)$, and $B_1, B_2 \subseteq C, B_1 \subseteq B_2$ with the same neighbourhood of $n(x)$, we have

1- $\tau_{B_1} \supseteq \tau_{B_2}$;
2- For all $u \subseteq U, diL_{B_1}(u) \subseteq diL_{B_2}(u)$;
3- If $diPOS_{B_1}(D) \subseteq diPOS_{B_2}(D)$, then $\gamma_{B_1}(D) \le \gamma_{B_2}(D)$.

Proof.

1- Let $B_1 \subseteq B_2$, $x_i \in U$, $x_i \in n_{B_1}(x)$. Therefore, $x_i \in n_{B_2}(x)$ (because $n_{B_1}(x) \le n_{B_2}(x)$) and we have $RN_{B_1} \supseteq RN_{B_2}$. Then $\tau_{B_1} \supseteq \tau_{B_2}$.
2- If $B_1 \subseteq B_2$,then $RN_{B_1} \supseteq RN_{B_2}$. Assuming $n_{B_1}(x) \subseteq RN_{B_1}(X)$, then we have $n_{B_2}(x) \subseteq RN_{B_2}(X)$. in the same time, there may be $n_{B_1}(x_i) \nsubseteq diL_{B_1}(X)$ and $n_{B_2}(x_i) \nsubseteq diL_{B_2}(X)$. Therefore, $diL_{B_1}X \subseteq diL_{B_2}(X)$.
3- Given $B_1 \subseteq B_2, diL_{B_1}(X) \subseteq diL_{B_2}(X)$. Assuming $D = \{X_1, X_2, \dots\dots, X_m\}$,we have $diL_{B_1}(X_1) \subseteq diL_{B_2}(X_1), \dots\dots, diL_{B_1}(X_m) \subseteq diL_{B_2}(X_m)$, $diPOS_{B_1}(D) = \bigcup_{i=1}^{m} diL_{B_1}(X_i)$ and $diPOS_{B_2}(D) = \bigcup_{i=1}^{m} diL_{B_2}(X_i)$,so $diPOS_{B_1}(D) \subseteq diPOS_{B_2}(D)$. Then we have $\gamma_{B_1}(D) \le \gamma_{B_2}(D)$.

Example 4. 1. In this example, Authors considered a data set, as in table 2, containing the result of five symptoms for five patients in cardiology department (i.e. $U = \{a, b, c, d\}$) with different presenting symptoms, resting ECG, detailed history, full labs, physical examination, conventional echo assessment wrier done and finally heart failure diagnosis that is confirmed or excluded (i.e C the set of condition attributes is $\{a_1, a, a_3, a_4, a_5\}$ and D).

TABLE 2: MEDICAL INFORMATION SYSTEM PATIENTS

	a_1	a_2	a_3	a_4	a_5	D
A	1	1	1	1	0	1
B	1	0	0	1	1	1
C	0	0	0	1	1	0
D	1	1	1	1	1	1
E	1	0	0	1	0	0

Then, $\tau_D = \{U, \emptyset, \{a, b, d\}, \{c, e\}\}$, $\tau_{a_1} = \{U, \emptyset, \{a, b, d, e\}, \{c\}\}$. If $= \{a_1, a_2\}$, then

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$\tau_B = \{U, \emptyset, \{a, d\}, \{b, e\}, \{c\}\}$. By similar way, we can find τ_u, where $u \in PO(A)$.
For a_1, we find $\gamma_{a_1}(D)$ as $diL_{a_1} D = \bigcup_{i=1}^{M} diL_{a_1}(u_i)$, where $u_i \in \tau_D$. Then

$diL_{a_1} D = \bigcup_{i=1}^{M} diL_{a_1}(u_i) = \{c\} = di - POS_{a_1}(D)$ and $\gamma_{a_1}(D) = \frac{1}{5}$.

By a similar way, we can find $\gamma_B(D)$ as in table 3.

Then

1- D is totally di-depends on $\{a_1, a_2, a_5\}$ or $\{a_1, a_3, a_5\}$ or $\{a_1, a_2, a_3, a_5\}$ or $\{a_1, a_2, a_4, a_5\}$ or $\{a_1, a_3, a, a_5\}$
2- D is totally di-independent on $\{a_4\}$or $\{a_5\}$ or $\{a_4, a_5\}$
3- D is di-rough depends on $B \subseteq PO(C)$, except sets in 1 and 2 .
4- Therefore, $\{a_1, a_2, a_5\}$or $\{a_1, a_3, a_5\}$ or $\{a_1, a_2, a_3, a_5\}$ or $\{a_1, a_2, a_4, a_5\}$ or $\{a_1, a_3, a_4, a_5\}$ is a reduct data and $\{a_1, a_5\}$ is a core of data. TABLE 3 (TABLE OF THE DI-DEPENDENCY DEGREE)

$B \subseteq C$	$\gamma_B(D)$	$B \subseteq C$	$\gamma_B(D)$	$B \subseteq C$	$\gamma_B(D)$
$\{a_1\}$	$^1/_5$	$\{a_2, a_4\}$	$^2/_5$	$\{a_1, a_4, a\}$	$^3/_5$
$\{a_2\}$	$^2/_5$	$\{a_2, a_5\}$	$^3/_5$	$\{a_2, a_3, a_4\}$	$^2/_5$
$\{a_3\}$	$^2/_5$	$\{a_3, a_4\}$	$^2/_5$	$\{a_2, a_3, a_5\}$	$^3/_5$
$\{a_4\}$	0	$\{a_3, a_5\}$	$^3/_5$	$\{a_2, a, a_5\}$	$^3/_5$
$\{a_5\}$	0	$\{a_4, a_5\}$	0	$\{a_3, a_4, a\}$	$^3/_5$
$\{a_1, a\}$	$^3/_5$	$\{a_1, a_2, a_3\}$	$^3/_5$	$\{a_1, a_2, a_3, a_4\}$	$^3/_5$
$\{a_1, a_3\}$	$^3/_5$	$\{a_1, a_2, a_4\}$	$^3/_5$	$\{a_1, a_2, a_3, a_5\}$	1
$a, a\}$	$^1/_5$	$\{a_1, a_2, a_5\}$	1	$\{a_1, a_2, a_4, a_5\}$	1
$\{a_1, a_5\}$	$^3/_5$	$\{a_1, a_3, a_4\}$	$^3/_5$	$\{a_1, a_3, a_4, a_5\}$	1
$\{a_2, a_3\}$	$^2/_5$	$\{a_1, a_3, a\}$	1	$\{a_2, a_3, a_4, a_5\}$	$^3/_5$

Example 4.2 Considering the following information system as in Table 4.

TABLE 4 (TABLE OF DEGREES)

	A	E	M	C	Decision
x_1	90	85	71	95	Vg
x_2	85	64	65	83	G
x_3	74	69	83	92	Vg
x_4	86	88	92	64	Vg
x_5	72	95	81	70	Vg

where the objects $U = \{x_1, x_2, x_3, x_4, x_5\}$ represent the ID of 5 students, and the set of attributes $C = \{A, E, M, C\}$ are the degrees scored by students in an examination, and the relation R on the set objects is defined by : $x_i R x_j \Leftrightarrow |a(x_i) - a(x_j)| < 5$.
By using Table 4, we have $\tau_D = \{U, \emptyset, \{x_2\}, \{x_1, x_3, x_4, x_5\}\}$

For $B = A$, $\tau_A = \{\{x_1, x_4\}, \{x_2, x_4\}, \{x_3, x_5\}, \{x_1, x_2, x_4\}, \{x_3, x_5\}\}$ and $\gamma_B(X) = \frac{4}{5} \neq \gamma_D(X)$.

For $B = \{A, C, E, M\}$, we have$\tau_B = \{U, \emptyset, \{x_2\}, \{x_4\}, \{x_1, x_4\}, \{x_3, x_4, x_5\}, \{x_1, x_3, x_4, x_5\}\}$ and $\gamma_B(X) = 1$. Then, the attribute $\{E, M, C\}$ is dispensable and reduct, and the attributes $\{A, E, C\}, \{A, M, C\}, \{A, E, M\}$

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are indispensable. $\{C\},\{E\},\{M\},\{E,M\},\{E,M,C\}$ totally depends on and $\{A,C\},\{A,E\},\{A,M\},\{E,M\},\{E,C\},\{A,E,C\},\{A,M,C\},\{A,E,M\}\}$ rough depends.

Remark 4.1. We note that, the use of the concept of di-topology in information systems, especially to find the reduct and core of information system is better than the concepts based on the previous methods, especially Pawlak methods.

1- In Example 4.1 by using Pawlak methods [11], there is no reduct and core of data. However, using the concepts of di-topology and di-rough sets in information systems, Authors find the reduct and core of data.
2- In Example 4.2, Authors study the information system based on a general relation instead of equivalence relation as in Pawlak methods [11].

TABLE 5: ABBREVIATION TABLE

No	Words	Abbreviations
1	The right neighborhood	RN
2	The left neighborhood	LN
3	di-topology	$(X, PO(X), \tau_R, \kappa_R)$
4	Di- lower approximation	diL
5	Di- upper approximation	diU
6	Di- boundry approximation	dib
7	Di- internal edge	$diL - edg$
8	Di- external edge	$diU - edg$

V. CONCLUSION AND FUTURE WORK

In this paper, Authors suggested approach based on di-topological space generated by binary relation on a nonempty set by using neighbourhood system. The method in this work uses right neighbourhoods and left neighbourhoods without neglecting others to generate the di-topological space to define new concepts in rough set theory. Moreover, the new approximation helps to get a new classification of the data in an information system field to find the reduct and core of knowledge. In the future work, Authors will use di-topological space to find the messing value in information systems.

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ANALYZING TICKETING PERFORMANCE OF THE KANDY RAILWAY STATION USING ARENA SIMULATION

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ABSTRACT

Waiting lines at ticketing counters in transport networks are a common sight in Sri Lanka. The main goal of this research is to analyze the Kandy railway station's queuing system. ARENA software was used to model the systems. For the survey, 200 data were collected between the hours of 6 a.m. and 7 a.m. on two consecutive weekdays from two ticketing counters. The input analyzer is used to identify inter-arrival patterns. The arrival rate analysis in both counters revealed a Weibull distribution, while the service rate analysis in counters 01 and 02 revealed a Triangular distribution and a Poisson distribution. The findings indicate that the railway counters' performance was inefficient, as there was a long customer wait time and a large number of customers waiting. When the resources in both counters are doubled, the waiting time and number of people in the queue are significantly reduced.

KEYWORDS: Railway, Rockwell ARENA, Simulation, Multi-server, Queuing system

INTRODUCTION

A queue is created where the service rate of a particular server is less than the arrival rate of the system (Rambandara et al., 2019). Customers are inconvenienced by waiting in a line or queue, and businesses incur economic losses as a result (Bonga, 2013). Queues are a more common sight nowadays, and it can be seen in retail shops, banks, hospitals, supermarkets, transportation services, and many other places in day-to-day life.

Railway transportation is regarded as one of the most important modes of transportation in Sri Lanka (Lanel, 2015). It transports over 86 million passengers and 1 million tons of goods per year (Halpita & Thelijjagoda, 2011), and there are over 165 main railway stations in Sri Lanka (Sri Lanka Railways, 2018).

The Kandy railway station was chosen for the study because it is one of the main railway stations. Because Kandy is a tourist destination as well as the secret city of Buddhists due to the temple of the tooth relic, the railway service provides excellent service to passengers traveling to Kandy, and Kandy railway station serves as a hub for conducting operational activities to Kandy Colombo, Kandy Mathale, and Kandy Badulla routes. Perera and Bandara (2016) Long lines can be seen at Kandy railway station during weekday morning hours when most local and foreign travelers start their journeys and laborers leave for work. The ticketing system has two counters in Kandy railway station to issue tickets for all railway stations. The population and waiting room sizes were both infinite. First in, first out is the queue discipline. In this study, the arrivals are concerned

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as random. The identified model of the system is Multiple Servers with Unlimited Capacity, and Kendall's notation for the model is (M/M/2): (FIFO/∞/∞). The study aimed to analyze the current system with ARENA software and create an improved model to reduce passenger queues and optimize the ticketing counter system at the Kandy railway station.

LITERATURE REVIEW

Simulation is a good strategy for analyzing client-server systems and assisting in better implementing feasible solutions (Deshpande et al., 1996). Most queue optimization simulation studies are carried out using the ARENA software, which is based on the SIMAN simulation language. It can be identified as the most widely-used and comprehensive discrete event simulation software in the world. This allows for the simulation of a model using predefined modules and entities representing a flow or logic.

The ARENA has been used by many other authors in modeling events in several different industries. Sanjay et al. conducted a research study in 2014 using ARENA to improve the performance of student canteens. Adding an extra counter for the canteen has been considered a possible improvement for the canteen's performance. A similar study was carried out in 2014 by Hatami et al. to improve productivity in a bank system. Analysis of the service performance of an ATM using Arena has been carried out in Ethiopia (Worku, 2018).

Further, Arena simulation has been widely used for research studies to optimize ticketing performance. Madhushan et al., 2019 carried out a research study to enhance the ticketing performances at the counters of a hospital using arena simulation software. That study suggested doubling the resources to reduce customer waiting time at hospital counters. Atuahene et al., in 2011, conducted a simulation study to optimize the entry model and optimize ticketing and seating performance of a stadium. The study presented suggestions and recommendations to expedite the stadium processes. Above mentioned research studies have used Arena simulation methods to address the issues of excess waiting time and suggested improvements.

In a research study to analyze the factors affecting passenger satisfaction in Sri Lankan public transport services, Sooriyabandara et al. (2018) have identified rail service quality attributes as waiting time and ticketing time. Findings have identified that customers are dissatisfied with the quality of rail service. Therefore, the service quality attributes must be improved. A similar study has been carried out by Jayawickrama et al. (2017) to analyze customer satisfaction factors on Colombo to Kandy Luxury railway services. In the study, he has identified quality and ticketing as significant factors which influence customer satisfaction. Research findings of the above studies raise the need to improve the ticketing performance in rail service to improve customer satisfaction. Arena simulation can be used to optimize the ticketing performance of railway stations.

In 2017, Shanmugasundaram and Banumathi conducted research in Southern Railways in India on multi-channel queuing systems using Monte Carlo Simulation on the future behavior of the railway. The paper explored ways to reduce waiting time and ways to provide better services to customers. Another research has been conducted by Patel et al. (2011) on ticketing windows which review the model efficiency in terms of

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utilization of the queue length. A research study has been carried out to analyze the service performance of ticketing counters in the Sri Lankan context (Wanniarachchi et al., 2021). That study was carried out in Gampaha railway station and recommended adding counters to improve the service performance and reduce customer waiting times since one existing counter was closed in the station.

So, the current study will use Arena simulation to analyze the Ticketing Performance of the Railway Station – Kandy and to suggest and recommend methods to improve the service performances in the ticketing counters.

METHODOLOGY

The primary data for the study were collected through direct observation on Monday and Tuesday from 6 a.m. to 7 a.m. As primary data, the customer arrival time, service start time, and service end time were recorded. The data were collected in seconds at all railway counters 01 and 02.

The population for the study is considered as the total number of travelers in the Kandy railway station. The participants for the study were travelers who bought tickets from all railway counters 01 and 02 at Kandy railway station from 6 a.m. to 7 a.m, and the sample consists of 200 observations.

The difference between two consecutive arrivals was used to compute inter-arrival times. In addition, service time was computed by subtracting the arrival time to the counter from the departure time from the counter. Then the data were fed into the ARENA Input Analyzer, which identified the probability distributions specified in each case.

Model Development

Figure 01 depicts the conceptual model for the railway queuing system. When a customer randomly arrives at the system and the two counters are busy, the customer makes a decision about which counter to enter. When all customers depart, two counters become idle until a new customer arrives.

The basic simulation model was developed based on the following assumptions:

- Traveler arrival is random and independent
- Traveler arrival is single
- Travelers were served on FIFO (First-In First-Out) basis
- No traveler leaves the queue until the service is completed

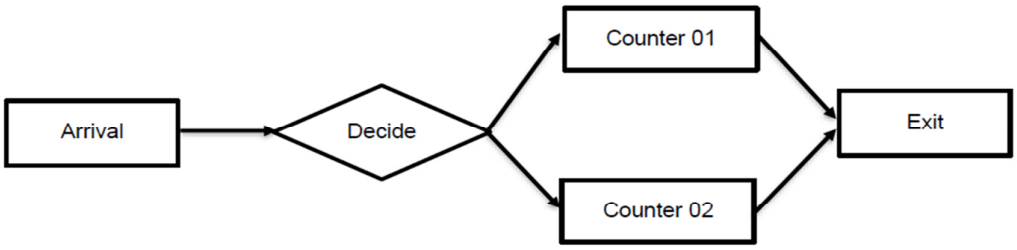

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Fig 01: Conceptual Model for Railway Queuing System

Figure 02 shows the traveler inter-arrival time distribution histogram for all railway counters 1. It revealed a Weibull distribution with the expression -0.001 + WEIB (5.7,0.434).

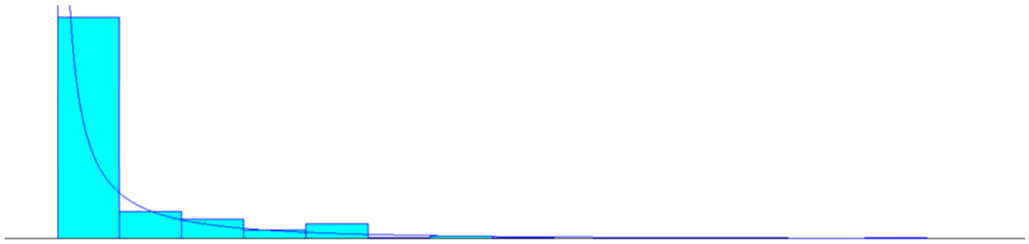

Fig 02: Input Analysis of Arrival Data

Figure 03 and 04 show the traveler service time distribution histogram for all railway counters 01 and 02. It revealed a Triangular distribution with the expression TRIA (11, 13.7, 112) and Poisson distribution with the expression POIS (34.7), respectively.

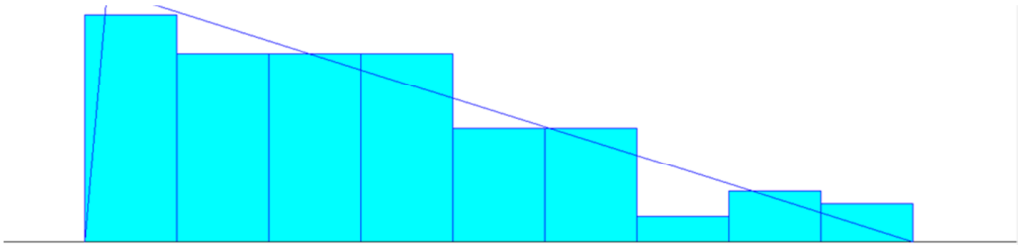

Fig 03: Input Analysis of Service Time Data for all Railways Counter 01

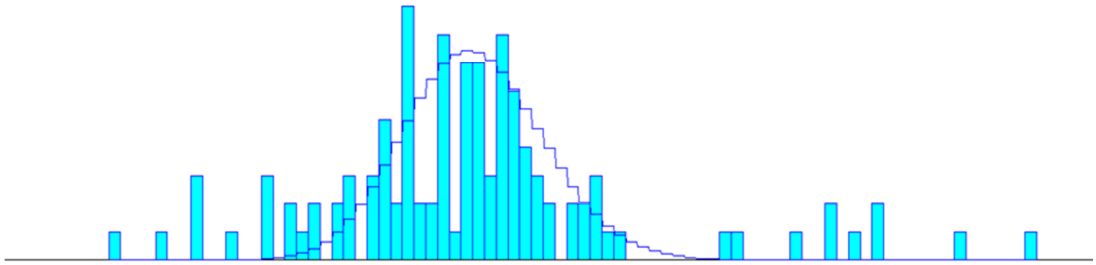

Fig 04: Input analysis of service time data for all railways counter 02

The basic process panels and advance transfers in ARENA software were used to model the existing system as in Figure 05. Two process modules were utilized to represent the travelers' decision to purchase tickets at one of the two counters.

The basic model for the existing system was animated using ARENA, as in Figure 06, and Figure 07 illustrates the animated view of the existing system.

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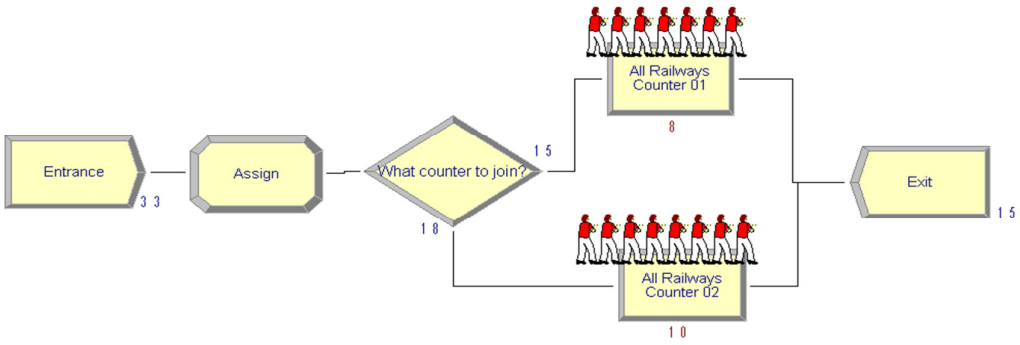

Fig 05: Basic Simulation Model for Existing System

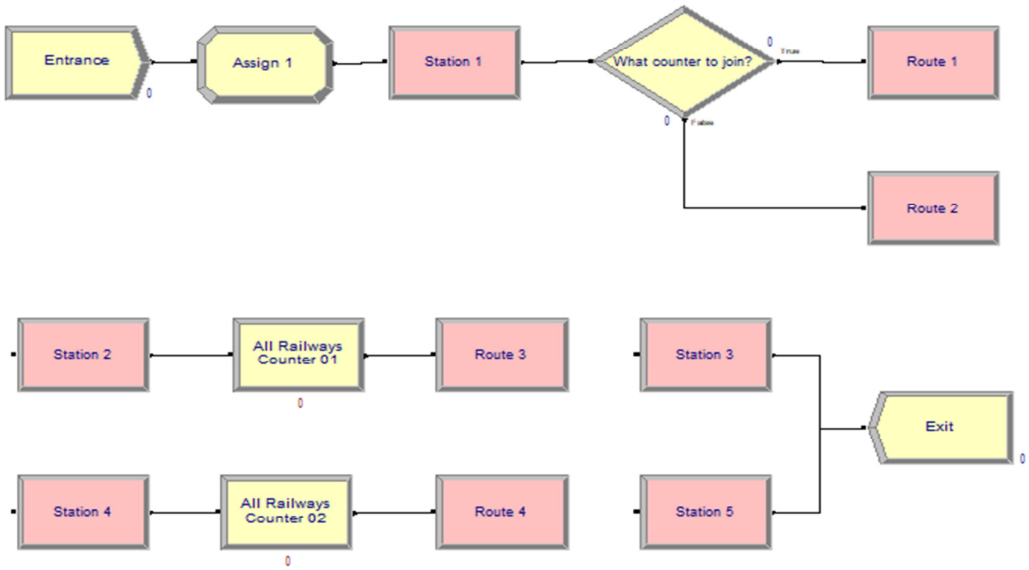

Fig 06: Animated Simulation Model for Existing System

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Fig 07: Animated View of the Existing System

Modified Simulation Model

The existing railway system did not record optimal results; therefore, it was further modified by changing the resources used in the counters. The proposed models are as follows.

- Model 01: Resources were doubled in all railway counter 01.
- Model 02: Resources were doubled in all railway counter 02.
- Model 03: Resources were doubled in both all railway counters.

Table I : Results of Existing and Proposed Systems

	Existing Model		**Proposed Models**					
			Model 01		**Model 02**		**Model 03**	
All Railway Counter No:	**01**	**02**	**01**	**02**	**01**	**02**	**01**	**02**
Waiting Time (minutes)	4.98	3.98	1.03	4.41	4.35	0.49	2.54	1.18
Number Waiting	9	6	2	9	7	1	5	3
Number In	185		232		179		235	
Number Out	145		201		160		221	
Percentage of Customers Served (%)	78.38		86.64		85.39		94.04	

The proposed model was animated using ARENA, as in Figure 08, and Figure 09 illustrates the animated view

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of the proposed system.

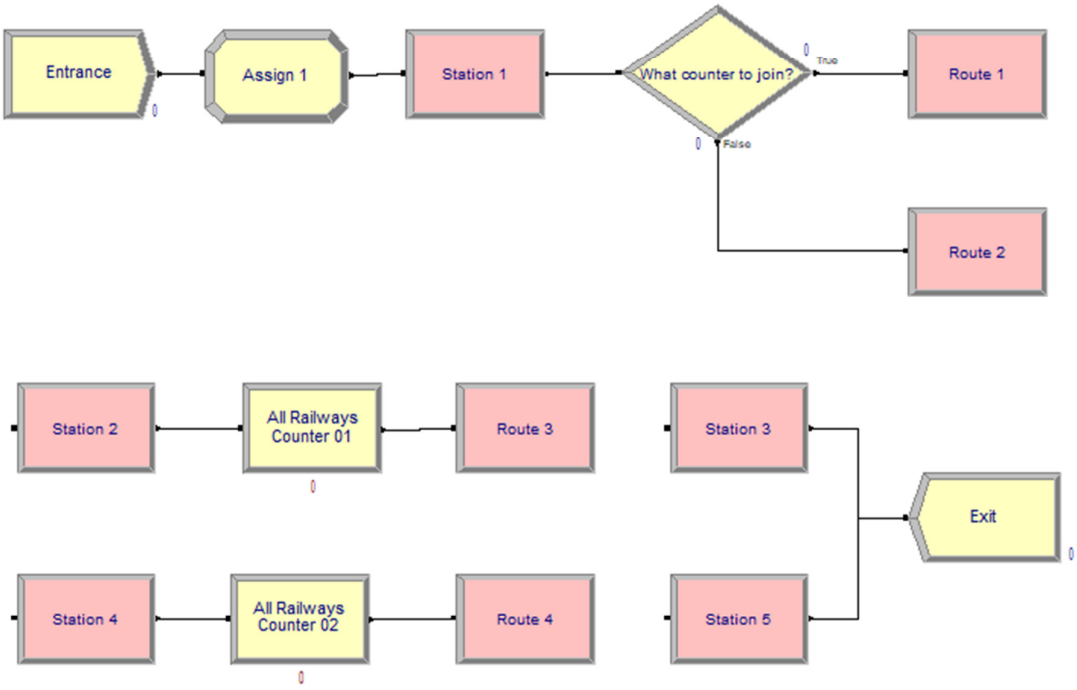

Fig 08: Animated Simulation Model for Proposed System

Fig 09: Animated View of the Proposed System

RESULTS AND DISCUSSION

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Table 01 summarizes the results obtained from the four models, which are existing models and proposed models. To optimize the queues, the resources in each counter are doubled. Because the resources are doubled, the waiting time for counter 01 in models 01, 02, and 03 is reduced by 3.95 minutes, 0.63 minutes, and 2.44 minutes, respectively, when compared to counter 01 in the existing system.

Waiting time for counter 02 in models 02 and 03 is reduced by 3.49 minutes and 2.8 minutes, respectively, compared to counter 02 in the existing system, but it is increased by 0.43 minutes in model 01 compared to counter 02 in the existing model.

When comparing the number of people entering the station of the proposed systems and the existing system, model 03 has the highest number of entrances to the system. And the number of people who leave the system after the service is done is also highest in model 03. Therefore, the Percentage of Customers Served (%) is highest in model 03 compared to the existing model, model 01, and model 02.

CONCLUSION AND RECOMMENDATION

The main purpose of this study is to analyze the performance measures of the railway station – Kandy. The results revealed that the railway counters' performance was inefficient, as there was a long customer wait time and a large number of customers waiting. As a result, the current model must be improved further.

Increasing the number of resource people at a railway counter is the most practical way to improve its performance. As a result of the study results, Model 03 is the best-fitted model among the other proposed models, as other models have long waiting times and a high number of people waiting at least at one counter compared to Model 03. The proposed model 03 shows the lower waiting time and the number of waiting in both counters. The optimal results are given by the proposed model 03.

Due to the country's current poor economic situation and the limited budget allocated to the Sri Lanka Railway Department, it is challenging to double the resources in railway counters. However, to make further improvements, railway stations could implement smart ticketing, which would allow passengers who travel by train on a daily basis to use a train pass with a QR code and pay monthly via an online payment method. The number of passengers who visit railway counters regularly for ticketing purposes may be reduced as a result of this process, as may the waiting time and number of passengers waiting. As a result, both time and resources can be saved.

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UNDERSTANDING THE MEANING AND SIGNIFICANCE OF PERSONAL HYGIENE

Dr. Radhika Kapur

Abstract

It is comprehensively understood that throughout the lives of the individuals, they have the main objective of promoting well-being and leading to up-gradation of their overall quality of lives. For achieving these objectives, one needs to acquire an efficient understanding of the meaning and significance of personal hygiene. In the lives of the individuals, they need to be well-aware in terms of ways of maintaining personal hygiene. This will prove to be beneficial to the individuals to a major extent. When the individuals are well-versed in terms of ways of maintaining personal hygiene, they will contribute significantly in promoting good health and well-being, physically as well as psychologically; alleviating health problems and illnesses and leading to up-gradation of one's overall personality traits and living conditions. Within homes as well as in schools, parents and teachers make provision of information to the individuals in terms of ways of maintenance of personal hygiene. After acquiring information, one needs to put it into operation in an adequate manner. Therefore, it is of utmost significance for the individuals to understand the meaning and significance of personal hygiene. The main concepts that are taken into account in this research paper are, types of personal hygiene, factors to be implemented in maintenance of personal hygiene, promoting personal hygiene among children and promoting personal hygiene among elderly individuals.

Keywords: Appropriately, Cleanliness, Health Problems, Illnesses, Individuals, Maintenance, Personal Hygiene

Good personal hygiene is regarded as one of the best ways of protecting oneself from getting illnesses such as, gastroenteritis and the common cold. Washing your hands with water and soap removes the germs that can cause various types of health problems and illnesses (Hygiene, 2021). Maintaining personal hygiene in an appropriate manner can render an important contribution in preventing the individuals from spreading diseases to other individuals. Good personal hygiene involves keeping the parts of the body clean and healthy. It is important for maintaining both physical and mental health. In India, in rural as well as in urban communities, the individuals are residing in the conditions of poverty and backwardness. They are overwhelmed by the problem of illiteracy. They are not aware in terms of ways to maintain a good personal hygiene. When one is not aware in terms of ways of maintaining a good personal hygiene, one is likely to experience health problems and illnesses. Hence, it is of utmost significance for the individuals to be well-versed in terms of measures and approaches to maintain good personal hygiene. These need to be put into operation throughout the lives of the individuals. Therefore, it can be stated, maintenance of personal hygiene is indispensable for leading to enrichment of one's overall quality of lives.

From the stage of early childhood, the parents need to make provision of information to their children

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in terms of measures and approaches to maintain good personal hygiene. The information in terms of these measures is imparted to them in schools as well. When the children are young, they are helped by their parents and caregivers in the maintenance of personal hygiene. On the other hand, as they grow up, they are usually aware in terms of ways of maintenance of personal hygiene. When they are provided with information, they need to put it into operation in an effectual manner. When the individuals attain the age of 60 and above, they usually experience health problems and illnesses. Vocabulary and usage of words begin to decline at the age of 70. In other words, when the individuals attain old age, they experience health problems and illnesses. In some cases, they are not ambulatory and need help and support from the other individuals as well. These include, family members and caregivers. In maintenance of personal hygiene, they need support and assistance from others. Hence, it can be stated, good personal hygiene is a concept, which needs to be recognized throughout the lives of the individuals. When the individuals are maintaining personal hygiene, they are rendering an important contribution in achieving desired goals and objectives and leading to up-gradation of one's overall standards of living.

It is comprehensively understood, all individuals, irrespective of their communities, categories and backgrounds put into operation the measures and approaches, necessary in promoting good health and well-being. One of the indispensable aspects that need to be taken into account is cleanliness. One needs to pay attention on the concept of cleanliness on a regular basis (Importance of Cleanliness Essay, n.d.). In promoting cleanliness, one needs to ensure, they carry out the job duties of cleaning and sweeping on a regular basis. This is not only important within households, but also in educational institutions of all levels, various types of organizations and public places. In some cases, primarily in rural communities, the individuals carry out the task of cleaning on their own, whereas, in urban communities, usually helpers and cleaners are hired. The individuals are required to be well-equipped in terms of ways to alleviate various forms of pollution. The different types of pollution are, air, water, land and noise. When these are experienced in a major form, they cause health problems and illnesses. Hence, one needs to ensure, they are able to alleviate different types of pollution and prevent them from assuming a major form. Therefore, promoting cleanliness and alleviating various types of pollution are necessary in maintenance of personal hygiene.

Types of Personal Hygiene

The types of personal hygiene are recognized in terms of four areas, i.e. body, nails, dental and activities of daily living. These are stated as follows:

Body

In keeping the body clean, bathing is considered to be of utmost significance. In the morning, after bathing, the individuals wear clean clothes. In the evening as well, when they change, they normally bathe and wear clean night clothes. When the individuals are engaged in full time jobs, they usually go to work in the morning. When they return home in the evening, they bathe and change their clothes. In winter season, normally the individuals feel cold. Hence, they usually bathe once a day or do not bathe. One needs to be well-versed in terms of methods and approaches, necessary in taking care of the hair. Once or twice a week, the individuals shampoo and oil their hair. In one day, it is vital for the individuals to comb their hair at least twice. Making use of proper combs or brushes are regarded as essential. Furthermore, one needs to be

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well-versed in terms of measures of maintaining good physical health. When the individuals are engaged in hazardous jobs or are to make use of tools and machines, they need to take precautions. Therefore, body is regarded as the crucial type of personal hygiene.

Nails

Keeping nails clean is regarded to be of utmost significance. There are number of tasks and activities, which the individuals carry out with their hands. The numerous job duties are in the personal as well as professional lives of the individuals. When the individuals are vested with the responsibility of preparation of meals within households, or when they are employed in a restaurant or hotel, they are required to work with food items, they need to pay attention towards keeping nails clean. This is regarded as one of the efficacious aspects that is necessary to put into operation job duties in a well-organized manner and in generating the desired outcomes. When women have small children, infants or toddlers, then they are focusing upon the job duty of child development. In such cases, they need to ensure, they keep nails clean as well as put into operation other factors to maintain personal hygiene. Keeping nails clean is a factor to be implemented in maintenance of personal hygiene. Therefore, nails is regarded as the vital type of personal hygiene.

Dental

Dental is considered with maintaining teeth in an appropriate manner. From the stage of early childhood, throughout the lives of the individuals, one needs to be well-equipped in terms of ways of maintaining teeth. One needs to ensure, when they consume any types of food items, they brush their teeth. As toothache or any types of dental problems are usually unfavourable to the individuals to a major extent. In case of these problems, one usually makes visit to dental surgeons. When the individuals have healthy teeth, they are rendering an important contribution in not only maintaining good health, but also personal hygiene. Hence, the individuals are augmenting their knowledge and understanding in terms of ways that are necessary in not only promoting healthy teeth, but also in maintaining personal hygiene. Therefore, dental is regarded as the indispensable type of personal hygiene.

Activities of Daily Living

The activities of daily living are, eating, bathing, dressing, toileting and transferring. These need to be put into operation in an appropriate manner in maintaining personal hygiene. The children, below five years of age as well as the elderly individuals, particularly the ones who are not ambulatory need help and support from the other individuals in carrying out these activities in an adequate manner. When the individuals are eating on their own or they are being fed by others, they need to make sure, the tasks are carried out in an appropriate manner. Apart from eating, in the implementation of other activities as well, one needs to ensure, one carries them out in a satisfactory manner. One should dress neatly, take into account all the factors that are necessary in maintaining personal hygiene and focus upon having a pleasant personal appearance. Therefore, activities of daily living are regarded as the indispensable type of personal hygiene.

Factors to be implemented in Maintenance of Personal Hygiene

Maintaining personal hygiene in an appropriate manner can render an important contribution in preventing the individuals from maintaining good health (Personal Hygiene, 2020). It is apparently understood that all individuals aspire to be healthy from the physical and psychological perspective. When

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they will be healthy, only then they will render an important contribution in doing well in one's job duties, achieving personal and professional goals and bringing about improvements in one's overall quality of lives. Some of the diseases are contagious. They can easily be transferred to other individuals. Good personal hygiene involves keeping the parts of the body clean and healthy. Furthermore, they will not spread diseases to other individuals. The individuals are required to be well-equipped in terms of factors to be implemented in maintenance of personal hygiene. Throughout the lives of the individuals, when they are maintaining personal hygiene, they are rendering an important contribution in promoting good health and well-being from the physical as well as psychological perspective. Furthermore, the individuals will be able to bring about development of their overall personality traits. Factors to be implemented in maintenance of personal hygiene are stated as follows:

Bathing on Daily Basis

Throughout the lives of the individuals, they need to ensure, they bathe on daily basis. When the individuals feel hot in the summer season, they may usually bathe twice a day. In the morning, after bathing, the individuals wear clean clothes. In the evening as well, when they change, they normally bathe and wear clean night clothes. When the individuals are engaged in full time jobs, they usually go to work in the morning. When they return home in the evening, they bathe and change their clothes. In winter season, normally the individuals feel cold. Hence, they usually bathe once a day or do not bathe. When the individuals do not feel well and experience various types of health problems and illnesses, they usually do not bathe. The individuals, belonging to all age groups may get their clothes stained. The various materials that effect clothes are, mud, dust, food items, paints, colours and so forth. In such cases, it is necessary for the individuals to bathe and get their stained clothes wash on an immediate basis. This is regarded as one of the crucial factors in maintenance of personal hygiene. Therefore, bathing on daily basis is a factor to be implemented in maintenance of personal hygiene. This has been put into operation by the individuals throughout their lives, irrespective of their occupations.

Keeping Hair Tidy

One needs to keep hair tidy. Some individuals have short hair, whereas, some have long hair. Men have short hair, whereas, women in some cases have long or short hair. Both men and women need to take care of their hair. It is indispensable for the individuals to keep their hair tidy. One needs to be well-versed in terms of methods and approaches, necessary in taking care of the hair. Once or twice a week, the individuals shampoo and oil their hair. Within homes as well as outside the homes, when the individuals are to meet other individuals or are to get engaged in various tasks and activities, they need to ensure, they keep their hair tidy. When the hair gets effected by dust, heat or smoke, these are regarded as unhealthy. Hence, individuals need to augment their knowledge in terms of various factors that are necessary in taking care of the health conditions of the hair. In one day, it is vital for the individuals to comb their hair at least twice. Making use of proper combs or brushes are essential. Furthermore, these should be kept clean on a regular basis. Therefore, keeping hair tidy is a factor to be implemented in maintenance of personal hygiene. This has been put into practice by the individuals, particularly when they are determined towards leading to enrichment of their overall personality traits.

Keeping Nails Clean

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Keeping nails clean is regarded to be of utmost significance. There are number of tasks and activities, which the individuals carry out with their hands. The numerous job duties are in the personal as well as professional lives of the individuals. When the individuals are vested with the responsibility of preparation of meals within households, or when they are employed in a restaurant or hotel, they are required to work with food items, then also they need to pay attention towards keeping nails clean. When women have small children, infants or toddlers, then they are focusing upon the job duty of child development. In such cases, they need to ensure, they keep nails clean as well as put into operation other factors to maintain personal hygiene. In the implementation of all types of household responsibilities and various types of job duties within employment settings, one needs to pay adequate attention towards keeping nails clean and maintaining personal hygiene. Therefore, keeping nails clean is a factor to be implemented in maintenance of personal hygiene. This has been put into practice by the individuals, particularly when they are putting into practice various types of job duties and responsibilities in personal and professional lives.

Alleviating Body Odour

Alleviating body odour is regarded as indispensable for the individuals. When one puts into operation the measures and approaches to alleviate body odour, they are not only rendering an important contribution in maintaining personal hygiene, but they are able to benefit in terms of other areas as well. These are, forming an effective social circle; developing mutual understanding with other individuals; carrying out one's job duties in a well-ordered manner, particularly that involves individuals and leading to up-gradation of one's overall quality of lives. From the stage of early childhood, throughout the lives of the individuals, one needs to be well-equipped in terms of ways of alleviating body odour. When the individuals are pursuing education or they are engaged in employment opportunities, particularly in reputed organizations, they need to make sure, they dress neatly, keep hair tidy, nails clean and alleviate body odour. One cannot carry out their job duties in seclusion. Hence, one needs to work in collaboration and integration with each other. Hence, this factor will enable the individuals to create a good impression. Therefore, alleviating body odour is a factor to be implemented in maintenance of personal hygiene. This has been put into practice by the individuals within as well as outside the homes.

Carrying out the Activities of Daily Living in an Appropriate Manner

The activities of daily living are, eating, bathing, dressing, toileting and transferring. The children, below five years of age as well as the elderly individuals, particularly the ones who are not ambulatory need help and support from the other individuals in carrying out these activities in an appropriate manner. When the individuals are eating on their own or they are being fed by others, they need to make sure, the tasks are carried out in an adequate manner. Apart from eating, in the implementation of other activities as well, one needs to ensure, one carries them out in an appropriate manner. One should dress neatly and focus upon having a pleasant personal appearance. When the children are assisted by their parents or caregivers, they need to ensure, they listen to them. On the other hand, when elderly individuals are supported by others, they need to deal with them in a polite and decent manner. Therefore, carrying out the activities of daily living in an appropriate manner is a factor to be implemented in maintenance of personal hygiene. This has been taken into consideration not only by children and elderly individuals, but by the individuals, belonging to other age groups as well.

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Implementing Ways to Curb Health Problems and Illnesses

One of the indispensable aspects that need to be taken into account by all the individuals, irrespective of their age groups, gender, communities, categories and backgrounds is to be informative and implement ways to curb health problems and illnesses. The various ways are, obtaining adequate diet and nutrition; managing weight in an appropriate manner; yoga and meditation; obtaining medical check-ups on regular basis, particularly in case of health problems and illnesses; promoting cleanliness; coping with various types of psychological problems; managing anger and stress in an appropriate manner; possessing the abilities to work under stress; being well-equipped in terms of job duties and responsibilities; forming cordial and amiable terms and relationships with others and creating a pleasant environment within as well as outside the homes. When the individuals are putting into operation these ways in a satisfactory manner, they are able to render a significant contribution in not only curbing health problems and illnesses, but also in maintaining personal hygiene. Therefore, implementing ways to curb health problems and illnesses is a factor to be implemented in maintenance of personal hygiene. This has been taken into consideration by the individuals, particularly when they are determined towards leading to up-gradation of their overall living conditions.

Promoting a Normal Mind-set

In order to achieve ones desired goals and objectives in both personal and professional lives, leading to up-gradation of their overall living conditions and in maintaining personal hygiene, it is of utmost significance to promote a normal mind-set. The various factors that need to be taken into account in this case are, coping with various types of psychological problems; managing anger and stress appropriately; possessing the abilities to work under stress; being well-equipped regarding job duties and responsibilities; forming cordial and amiable terms and relationships with others; creating a pleasant environment within and outside the homes; implementing time management skills satisfactorily; making wise and productive decisions; implementing the traits of morality and ethics in an effective manner; inculcating the traits of diligence, resourcefulness and conscientiousness; and being aware in terms of approaches of coping with problems satisfactorily. When the individuals are putting into operation these ways in a satisfactory manner, they are able to render a significant contribution in promoting a normal mind-set. Therefore, promoting a normal mind-set is a factor to be implemented in maintenance of personal hygiene. This has been taken into consideration by the individuals, when they are focusing upon achievement of goals in personal and professional lives.

Promoting Cleanliness

One of the indispensable aspects that need to be taken into account is cleanliness. One needs to pay attention on the concept of cleanliness on a regular basis. In promoting cleanliness, one needs to ensure, they carry out the job duties of cleaning and sweeping on a regular basis. This is not only important within households, but also in educational institutions of all levels, various types of organizations and public places (Cleanliness, n.d.). In some cases, primarily in rural communities, the individuals carry out the task of cleaning on their own, whereas, in urban communities, usually helpers and cleaners are hired. When the individuals form the viewpoint, they cannot put into practice various types of cleaning jobs on their own, they take help of cleaners and service providers. For example, in cleaning of the ceiling fans, one needs to hire cleaners or service providers. The individuals, belonging to all age groups may get their clothes stained.

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The various materials that effect clothes are, mud, dust, food items, paints, colours and so forth. In such cases, it is necessary for the individuals to change immediately and wash the stained clothes. Therefore, promoting cleanliness is a factor to be implemented in maintenance of personal hygiene. This has been acknowledged by the individuals, belonging to all communities, categories and occupations.

Alleviating various Types of Pollution

The individuals are required to be well-equipped in terms of ways to alleviate various types of pollution. The different types of pollution are, air, water, land and noise. When these are experienced in a major form, they cause health problems and illnesses. These are also likely to have unfavourable effects on the personal hygiene of the individuals. In rural communities, the individuals are dependent upon the water bodies, i.e. lakes, rivers, wells and so forth for obtaining water. Water is used for cleaning, washing, preparation of meals, drinking and other purposes as well. When waste materials will be thrown in water bodies, it will cause water pollution. Contaminated water will cause unfavourable effects upon the health and well-being of the individuals (Water, Sanitation & Environmentally-related Hygiene, n.d.). Furthermore, all individuals need to be well-equipped in terms of ways of keeping the environment clean and alleviating all types of pollution. Hence, one needs to ensure, they are able to alleviate different types of pollution and prevent them from assuming a major form. Therefore, alleviating various types of pollution is a factor to be implemented in maintenance of personal hygiene. This has been recognized by the individuals, belonging to rural as well as urban communities.

Implementing all the Methods to promote Development of Personality

Throughout the lives of the individuals, they need to make sure, they are well-versed in terms of the methods to promote development of personality. When the individuals are putting into operation these methods, they are not only contributing significantly in leading to personality development, but also in maintaining good personal hygiene. Some of these factors are, bathing on daily basis; keeping hair tidy; keeping nails clean; alleviating body odour; carrying out the activities of daily living in an appropriate manner; implementing ways to curb health problems and illnesses; promoting a normal mind-set; promoting cleanliness; implementing time management skills in an effective manner; making wise and productive decisions; implementing the traits of morality and ethics in an effective manner; inculcating the traits of diligence, resourcefulness and conscientiousness; being aware in terms of ways of coping with various types of psychological problems in an appropriate manner; implementing communication processes in an effective manner and forming cordial and amiable terms and relationships with others. All these methods are required to be put into operation to promote development of personality. Therefore, implementing all the methods to promote development of personality is a factor to be put into operation in maintenance of personal hygiene. This has been acknowledged by the individuals, irrespective of their age groups and gender.

Promoting Personal Hygiene among Children

From the stage of early childhood, the parents need to make provision of information to their children in terms of measures and approaches to maintain good personal hygiene. The information in terms of these measures is imparted to them in schools as well. When the children are young, they are helped by their parents and caregivers in the maintenance of personal hygiene. When the children are young, when they are below 10 years of age, they are usually not aware in terms of meaning and significance of cleanliness and

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personal hygiene. When they are playing with different types of playthings or are making use of crayons and paints, they usually tend to scribble around and are likely to spill the paints. The parents at home and teachers in school need to ensure, they do not put them in their mouth and it does not have an effect upon their health and well-being. The parents ensure, the children are bathed on daily basis, hair is kept tidy and nails are clean. These are regarded as vital factors in maintaining personal hygiene. These need to be taken into consideration throughout the lives of the individuals.

When the children grow up, they are usually aware in terms of ways of maintenance of personal hygiene. When they are provided with information, they need to put them into operation in an effectual manner. When children are teenagers, they usually put into operation the factors to maintain personal hygiene in an appropriate manner. When they experience any types of health problems and illnesses, they communicate with their parents. When the children are experiencing problems in the maintenance of personal hygiene, they obtain support and assistance from their parents at home and teachers in school. Individuals such as, medical practitioners, health care specialists and professional counsellors are the ones that are making provision of information to the individuals in terms of ways of maintaining personal hygiene. After acquiring information in terms of these measures, these need to be put into operation in an appropriate manner. Therefore, one is able to understand that putting into operation the factors to maintain personal hygiene has proven to be significant to the children, belonging to all age groups to a major extent.

When the children, either on their own or through obtaining help from others are putting into operation these methods, they are not only contributing significantly in leading to personality development, but also in maintaining good personal hygiene. Some of these factors are, bathing on daily basis; keeping hair tidy; keeping nails clean; alleviating body odour; carrying out the activities of daily living in an appropriate manner; implementing ways to curb health problems and illnesses; promoting a normal mind-set; promoting cleanliness; implementing time management skills in an effective manner; making wise and productive decisions; implementing the traits of morality and ethics in an effective manner; inculcating the traits of diligence, resourcefulness and conscientiousness; being aware in terms of ways of coping with various types of psychological problems in an appropriate manner; implementing communication processes in an effective manner and forming cordial and amiable terms and relationships with others. All these methods are required to be put into operation on a regular basis to promote development of personality and maintaining personal hygiene among children. These methods need to be acknowledged irrespective of their age groups, gender, communities, categories and backgrounds.

Promoting Personal Hygiene among Elderly Individuals

The research studies have indicated that elderly individuals are normally aware in terms of factors to maintain personal hygiene (Ageing and Health, 2021). When the individuals attain the age of 60 and above, they usually experience health problems and illnesses. When these are overwhelming and prove to be barriers within the course of promoting good health and maintaining personal hygiene, one is required to obtain assistance from others. Vocabulary and usage of words begin to decline at the age of 70. In other words, when the individuals attain old age, they experience health problems and illnesses. In some cases, they are not ambulatory and need help and support from the other individuals as well. These include, family members and caregivers. In maintenance of personal hygiene, they need support and assistance from others.

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Hence, it can be stated, good personal hygiene is a concept, which needs to be recognized throughout the lives of the individuals. Therefore, elderly individuals are also well-aware of the point that when they are maintaining personal hygiene, they are rendering an important contribution in promoting up-gradation of their personality traits and leading to up-gradation of one's overall standards of living.

In some cases, when the individuals are above 80 or even 90 years of age, they are active. They in some cases do not have family members around and are living alone. They normally make use of walking sticks and wheel chairs. As they are not ambulatory as compared to young and middle aged individuals. When they experience any types of health problems and illnesses, they communicate with their helpers, service providers and family members. When they are experiencing problems in the maintenance of personal hygiene, they obtain support and assistance from the other individuals. Individuals such as, medical practitioners, health care specialists and professional counsellors are the ones that are making provision of information among individuals in terms of ways of maintaining personal hygiene. After acquiring information in terms of these measures, these need to be put into operation in an efficient manner. When the elderly individuals consult them, they inform them regarding ways of maintaining personal hygiene. Therefore, one is able to understand that putting into operation the factors to maintain personal hygiene has proven to be significant to the elderly individuals in leading to enrichment of their overall health and well-being.

The elderly individuals, particularly the ones, belonging to deprived, marginalized and socio-economically backward sections of the society need to be well-versed in terms of the ways that would facilitate in maintaining personal hygiene. Some of these ways are, bathing on daily basis; keeping hair tidy; keeping nails clean; alleviating body odour; carrying out the activities of daily living in an appropriate manner; implementing ways to curb health problems and illnesses; promoting a normal mind-set; promoting cleanliness; implementing time management skills in an effective manner; making wise and productive decisions; implementing the traits of morality and ethics satisfactorily; inculcating the traits of diligence, resourcefulness and conscientiousness; being aware in terms of ways of coping with various types of psychological problems appropriately; implementing communication processes in an effective manner and forming cordial and amiable terms and relationships with others. All these ways are required to be put into operation to maintain personal hygiene. Therefore, one is able to understand that when the elderly individuals are informative and put them into practice on a comprehensive basis, they are able to benefit to a major extent.

Conclusion

Maintaining personal hygiene in an appropriate manner can render an important contribution in preventing the individuals from spreading diseases to other individuals, and bringing about improvements in their overall quality of lives. The types of personal hygiene are recognized in terms of four areas, i.e. body, nails, dental and activities of daily living. Factors to be implemented in maintenance of personal hygiene are, bathing on daily basis, keeping hair tidy, keeping nails clean, alleviating body odour, carrying out the activities of daily living in an appropriate manner, implementing ways to curb health problems and illnesses, promoting a normal mind-set, promoting cleanliness, alleviating various types of pollution and implementing all the methods to promote development of personality. Children and elderly individuals are

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required to be imparted adequate information in terms of ways of promoting personal hygiene. Finally, it can be stated, when the individuals are well-versed in terms of ways to maintain personal hygiene, they will render a significant contribution in promoting good health and well-being, leading to development of one's personality traits and promoting up-gradation of one's overall standards of living.

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DIASPORA REMITTANCES-STOCK MARKET DEVELOPMENT: AN INCLUSIVE FRAMEWORK FOR ZIMBABWE

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Abstract

This study sought to determine an inclusive framework for diaspora remittances growth and stock market capitalisation. Stock market plays an important role in economic development and growth by creating liquidity and allocation of resources to deficit sectors of the economy. The study used the ARDL-ECM in the determination of the relationship between the two variables, using data for the period 1990 to 2020. Eviews Version 9.0 Statistical Package was used to run the regressions. This study found that in the short-run, the diaspora remittances have a significant negative relationship with stock market capitalisation, whilst in the long-run, there is a significant positive relationship. The study recommend an inclusive framework that allows the government to take measures to boost investor confidence, to encourage the diaspora population to invest more in Zimbabwe through elimination of corruption, having stable political environment, formulation of policies that ensures stability in the macroeconomic environment, and having the right governance systems. Encouraging campaigns which must be run by the government and nongovernmental organizations educating Zimbabweans in the diaspora of the benefits of investing home. Allowing the government to set up formal diaspora remitting channels which have minimal charges to encourage more remittances to flow through the channels. Government must also offer favourable interest rates on bond holders so as to lure those in the diaspora to invest in the stock market.

Key Terms: Stock Market Capitalisation; Diaspora Remittances; ARDL

1.0 Introduction

This paper seeks to determine how stock market development responds to diaspora remittances in Zimbabwe. The Zimbabwean economic plan of vision 2030 targets the transformation of the economy into an upper middle-income economy that delivers high quality standards of living the country's residents. The stock market is one of the key drivers that the Vision 2030 economic plan is based upon. The economic plan outlines that the accomplishment of Vision 2030 can be made feasible through increasing the bond and equities markets. Theory has it that financial markets' depth in the bond and equity market can be leveraged through diaspora remittances (Adenuga, 2010). This study, therefore seeks to determine an inclusive framework that promotes contribution of diaspora remittances to the stock market.

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1.1 Background of the Study

Up to 1989, there were five stock exchanges in SSA, the three largest African stock exchange markets that held 3-digit numbers of listings at that time included the Johannesburg Stock Exchange (JSE) having four hundred and ten counters, NSE with two hundred and seventeen counters, and the ESE having two hundred and three counters, whereas Zimbabwe Stock Exchange was still struggling with only 65 counters by the year 2006 (World bank, 2006). Through privatization procedures, financial service diversification, lasting wealth organisation, the providing of different savings opportunities, aid for the isolated sector, and by luring imported investment, the growth of stock markets in Africa has facilitated economic development. Since their formation, most African stock markets are stagnant fronting more than a few constrictions, these may include, macroeconomic uncertainty, small number of indigenous listed companies, low level of listings, market dominance by a few large firms, low market capitalization low liquidity levels, limited domestic investor base, under-developed trading systems and leisurely reimbursement and disbursement arrangements (World bank,2012). Table 1.1 below shows a snapshot of the trends in the four market performance indicators at the Zimbabwe Stock Exchange from the year 2015 to 2020.

1.1.1 Stock Market Improvement in Zimbabwe

Table 1.1: Key Stock Market Improvement Pointers (2015-2021)

Market Indicator	2015	2016	2017	2018	2019	2020
Market Capitalization (billions USD)	3.073	2.779	9.58	19.42	29.77	317
SE All Share Index (points)	114.85	145	333.02	146.24	230.08	236.34
Equity Turnover (million USD)	228.63	193.91	694.87	926.31	190	620
Listed Firms	60	58	63	65	63	60

Source: Zimbabwe Stock Exchange Reports (2020)

According to the ZSE Annual Report (2016), the ZSE's Industrial Index had a strong performance in the year 2016 gaining 30.15 points more than that of 2015. The ZSE believes growth was largely attributable to the introduction of the Bond notes when investors reacted to uncertainty arising in money markets and took refuge in equities. However, market capitalization fell from $3.073 billion United States dollars (USD) to $2.779 billion (USD) in the same period and market turnover fell sharply from $228.63 million dollars to $193 million dollars, the fell in performance might have been due to the market trying to adjust to the introduction of bond notes according to the minister RBZ annual report (2020).

In the course of the first half of 2017, the Zimbabwe Stock Exchange (ZSE) experienced steady growth with the industrial and mining indices rising from 144.53 points and 58.51 points at the end of December 2016 to 195.97 points and 69.79 points on the 30th of June 2017, respectively. The second half of 2017, however, recorded exponential growth in both industrial and mining indices, leading to new respective ZSE highs of

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534.13 points and 138.12 points on 14th November 2017. The growth was largely attributed to speculative behaviour by investors who flocked to the stock market seeking a haven given the limited investment options in the country ((RBZ Annual report, 2017). In the second half of 2018, an online and mobile platform, Capital Trade (C-Trade) was launched and operationalized. This modernised and improved trading activity on the ZSE markets using the C-Trade platform and its attendant online and mobile application, which is utilised by portable linkages, regardless of geographical location of investors (RBZ, 2017).

Furthermore, the lowest equity turnover was recorded in the year 2019 at $190 million USD compared to the previous year which recorded the highest equity turnover at $926.31, according to the ZSE Annual report of 2019. However, the equities market closed the 2019 trading year on a high note as the benchmark index, the All-Share Index gained 57.33% to close at 230.08 points, however it failed to surpass the 2017 all share index of 333.02. The increase was primarily attributed to inflationary pressures which caused high demand for shares as investors fled to safety (ZSE Annual Report, 2019). When compared to other emerging stock marketplaces, the size stock fair is still minimal, with the largest number of listed businesses being only 65 in 2018 and the lowest number being 57. Despite a recent increase, market capitalization remains much below the internationally advised benchmark of US$500 billion annually in market capitalization to attract major foreign involvement from global emerging market funds.

1.1.2 Diaspora Remittances in Zimbabwe

Table 1.2: Diaspora Remittances to Zimbabwe 2015-2020

Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Remittance Inflows(USD) Millions	935	779	699	619.25	921.7	1209.7

Source: Reserve Bank of Zimbabwe's Annual Statements (2020)

According to the above Table 1.2, there has been a significant increase in remittance inflows to Zimbabwe from US$921.7 million in the year 2019 to USD$1209.7 million in the year 2020 despite the effects of the Covid-19 pandemic according to the Reserve Bank of Zimbabwe Annual Report of 2020. Major source countries being South Africa (33%), United Kingdom (23%), United States (10%), Australia (7%) and Botswana (4%). This increasing trend shows that diaspora remittances are resilient to external shocks and can be leveraged on to develop the country's capital markets whose development have been showing a stochastic trend as indicated by the statistics on Table 1.1.

2.0 Review of Related Literature

This section reviews existing theoretical and empirical literature relating to Diaspora Remittance and Stock Market Development. The section also reviews the determinants of stock market development augmented by the past studies related to the phenomenon under study.

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2.1 Theoretical Framework

This section outlines various theories with implication on the relationship between diaspora remittances and stock market development. Four main theories have been identified namely Base-Broadening theory, Pure Self-interest theory, Random Walk Model, and the theory of Altruism. These theories are critical in providing a framework for the understanding of the relationship between diaspora remittances and development of the stock exchange market, in this case being the Zimbabwe Stock Exchange.

2.1.1 Base Broadening Theory

Base Broadening theory was proposed by Merton (1987). The theory postulates that the number of investors can be increased by liberalization of financial markets and through the inclusion of investors from foreign countries would lead to increased diversification. Diversification will lead to lower investment risk and consequently lowering the required risk premium according to Osoro et al. (2020). This will lead to the increase in the availability of capital in the stock market, liquidity and stability of prices hence leading to development of the stock market (Galindo et al., 2007). If financial markets are relaxed, it leads to increased market efficiency and better allocation of resources to the most ideal users in the domestic capital markets according to Yartey and Adjasi (2008). According to the theory, the assumed factors impeding investments from foreigners include informational barriers; investors will fail to invest in stocks if they are not fully informed about the returns available in the capital markets.

Therefore, according to this theory, if both the domestic and foreign investors from the diaspora share the same information sets, they will invest equivalently (Merton, 1987). The implication of the theory is that investment of diaspora remittance at the stock market will push stock prices up due to increased demand. The theory concludes that if there is no information asymmetry, citizens living in foreign countries and even foreigners will increase their remittances towards investments and therefore lead to increased stock market development.

2.1.2 The Pure Self Theory

Furthermore, another theory explains diaspora remittances and stock market development. The theory was proposed by Lukas and Stark (1985). According to this theory, citizens working in the diaspora usually send remittances with an ambition to inherit and to make investments for the future with the intention to return home in future and enjoy benefits from their investments. Emigrants send remittances to their country of origin with an expectation to return home and can expect to receive family gratitude for having sent remittance as explained by Vargas and Huang (2006). The main aim of remitting income from the foreign country to the domestic country is for investments that are expected to earn returns in future when the remitter eventually returns to their country of origin. Therefore, remittances act as a strategy of investment for future returns postulated Docquier and Rappoport (2005). According to the theory remittances one way or another have a positive association with the development of the stock market in the home country, however poor economic conditions may result in low volumes of remittances. The migrants' remittance can be purely due to their self-interests (Lucas and Stalk, 1985). Therefore, they remit to invest in their home country. The theory, like the Base broadening theory, also supports the notion that diaspora remittances have a positive influence on stock market development and those countries can leverage on them to develop their stock markets.

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2.1.3 The Theory of Altruism

This theory was proposed by Chami et al. (2003) and holds that the diaspora remittances increase during declining economic situations in the home country. The emigrant worker's decision to remit is mainly because of the increased income needs of the relatives back home and not necessarily to improve the economy. This theory implies that motivation of the migrant worker to remit increases when the family faces income hardships and if it weren't for this reason, no remittance would have been made. Remittances are, therefore, a form of compensatory transfers which reimburse households faced by economic disruptions thus enabling them to smoothen their consumption as stated by Chami et al, (2003). As a result, the remittances have a compensatory nature and under the Pure Altruism model this means that remittances are countercyclical, that is, they increase during times when there is deterioration in economic conditions in the business cycle (Vargas-Silva, 2002; Chami et al, 2003).

Altruistic remittances can be countercyclical to gross domestic product patterns possibly because migrants tend to remit more during periods of economic disturbances for their families in the home country to satisfy their consumption needs. This indicates that remittances have no influence on stock market development and are mainly for consumption. Relating to the theory, diaspora remittances may affect stock market development indirectly as some remittances may be saved for investment. According to the reviewed theoretical literature, one can conclude that there are contradicting views from different researchers concerning the stock market development response to diaspora remittances.

2.2 The Empirical Framework

Raza and Jawaid (2014) studied the effect of remittances on stock market development in 18 Asian countries. Market capitalization was used as a proxy for stock market development for the different countries. The study covered the period 2000-2010 and time series data was analysed using ARDL cointegration and Toda and Yamamoto causality tests. The findings indicated remittances had a significant effect on stock market development. The Toda Yamamoto causality test indicated a bi-directional causal relationship. Notably, this study is conducted beyond the context of the African stock markets. Therefore, the market's regulations and the other factors influencing foreign financial inflows in these markets are obviously different from the Zimbabwean stock market context. This creates the need to test the relationship in the context of the African stock markets such as the Zimbabwe Stock Exchange.

Zivengwa et al. (2011) explored the causal link between stock market development and economic growth in Zimbabwe using annual time series data for the period 1980 to 2008. The study evaluated the nature of the relationship between stock market development and economic growth in Zimbabwe. Stock market development was measured using two variables namely stock market size as measured by stock market capitalization as a ratio of GDP and stock market turnover as measured by the value of stocks traded as a ratio of stock market capitalisation. Turnover ratio was used as an index of comparison for market liquidity rating and level of transaction costs. It is also a measure of the value of securities transactions relative to the size of the securities market as explained by Zivengwa et al (2011). This study however considered market capitalization only as a proxy for stock market development due to unavailability of data for the stock market

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turnover.

Furthermore, Osoro (2020) conducted research to determine the impact of diaspora remittances on stock market development at Nairobi stock exchange, in the study stock market development was measured using three indicators namely market capitalization, market turnover and the Nairobi All Share Price Index. This study has adopted these variables as well; however, adjustments have been made to suit the Zimbabwean situation by excluding the all-share price index and equity turnover due to unavailability of data for the variable.

Njoroge (2014) studied the effect of Diaspora remittances on stock market performance using evidence from the Nairobi Securities Exchange. Stock market performance was measured by The Nairobi Securities Exchange All Share Price Index (NASI). Inflation, interest rates and exchange rates were used as control variables; time series monthly data for seven years from February 2008-May 2015 was used. The study findings indicated that Diaspora remittance had a strong and significant positive effect on stock market performance.

Shoko and Dube (2018) studied the impact of macroeconomic variables on stock market development at the Zimbabwe Stock Exchange and the study applied the Autoregressive Distributed lag model to determine the long-run impact of macroeconomic variables on stock market development. Mukoka (2020) and Makore (2020) studied the impact of diaspora remittances on economic growth in Zimbabwe; both studies found a significant effect of diaspora remittances on economic growth. Zhou et al (2012) also studied the consumption response to diaspora remittances, the three stage least square model was adopted and the results indicated that diaspora remittances had a significant contribution in explaining consumption in the country. None of the studies conducted determined the impact of diaspora remittances on stock market development in Zimbabwe.

To continue, there are other empirical studies such as that by Ngoroje (2014), Raza and Jawaid (2014) conducted on the relationship between diaspora remittances and stock market development have either focused on either long term or short-term effects of remittances on stock market development in isolation. This study adopted a lagged model such as the Autoregressive Distributed Lag model (ARDL) which is suitable to test both the long-run and short-run dynamics simultaneously which was implemented by Osoro et al (2020) in the study of the impact of diaspora remittances on the stock market development of the Nairobi Stock Exchange that was conducted in Kenya .These studies have equally taken a restricted view that stock market development is measured using a single indicator with more emphasis on market capitalization .However according to Osoro et al (2020) stock market development is a multi-faceted complex process that is measured using various indicators rather than a single indicator. The current study however considered only one indicator for stock market development due to unavailability of sufficient data for the other variables suggested by Osoro et al. (2020).

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3.0 Research Methodology

To determine stock market development response to diaspora remittances, the study adopted a model from a research which was conducted by Osoro (2020). Stock Market Capitalization was used as the proxy for Stock Market Development. Annual time series data for the period 1990-2020 relating to stock market capitalization and stock market turnover were collected from ZSE Annual Reports and from the World Bank database. Annual time series data for diaspora remittances was collected from the Zimbabwe Statistical Agents website. For the study, stock market development was measured using two indicators namely stock market capitalization and stock market turnover. Since stock market development is a multi- faceted process that is measured using various indicators rather than a single indicator according to Osoro (2020). However, in this study the All-Share Price index was not considered as a proxy for stock market development since the index was introduced in the year 2018 by the ZSE so data for the index that suits this study is not available. The general empirical relationship between Diaspora Remittances and Stock Market Development is presented by the General Time Series Linear Model below.

Stock Market Capitalization = f (Diaspora Remittances, Inflation, Foreign Direct Investment). This can be explained mathematically as below:

$$SMCP_t = \beta_0 + \beta_1 REM_t + \beta_2 INFL_t + \beta_3 FDI_t + \mu_t$$

Where:
$SMCP_t =$ Stock Market Capitalization at Time *t*
$REM_t =$ Diaspora Remittances at Time *t*
$INFL_t =$ Inflation Rate at Time *t*
$FDI_t =$ Foreign Direct Investment at Time *t*
β_0= Intercept
$\beta_1 - \beta_3$= Coefficients of the Explanatory Variables

The variables in equation (1) are then transformed into their natural logarithmic form to lessen variability. The log-linear form gives more efficient results and reduces sharpness of data as compared to the original functional specification according to Cameron (1994). Also, such sort of conversion in variables provides elasticity estimates in the form of coefficients which a researcher can directly and easily interpret for policy purposes (Khalid & Khan, 2017). Accordingly, the structural model in the log-linear form of all variables under examination can be stated as follows:

$$ln\ SMCP_{\ t} = \beta_0 + \beta_1 ln\ REM_{\ t} + \beta_2 ln\ INFL_{\ t} + \beta_3 ln\ FDI_{\ t} + \mu_t$$

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Where:
$ln\ SMCP_t$= Natural Log Stock Market Capitalization at Time *t*
$ln\ REM_t$= Natural Log of Diaspora Remittances at Time *t*
$ln\ INFL_t$= Natural Log of Inflation at Time *t*
$ln\ FDI_t$= Natural Log of Foreign Direct Investment at Time *t*

To establish the relationship between Diaspora Remittances and Stock Market Development at Zimbabwe Stock Exchange, the study adopted the Autoregressive Distributed Lag Model. The Autoregressive Distributed Lag Model was suitable since it can be applied irrespective of the core variables being integrated of order I(0) and I(1) but not mutually integrated as explained by Pesaran et al. (2001). The model is more robust and performs better in small samples than other cointegration techniques as explained by Kalim and Shahabaz (2008). Furthermore, to determine the short-run and long term relationship between diaspora remittances and stock market development in Zimbabwe, Autoregressive Distributed Lag model was used to estimate the Error Correction Model (ECM) and, thus test for both long term relationship and short term relationship simultaneously as suggested by Dube and Shoko (2020). According to Ocharo et al. (2014), it is vital to estimate the effect of one time shocks to each of the independent variable and the dependent variable in this case stock market capitalization. It follows, therefore that, in addition to the use of the Autoregressive Distributed Lag Model estimation for long-run relationship, the study used the Error Correction Model estimated from the Autoregressive Distributed Lag model to analyse short-run dynamic relationship between Diaspora Remittances and Stock Market Development. The model is specified as below:

$$\Delta lnsmcp_t = \alpha_1 + \alpha_{rem} lnREM_{t-1} + \alpha_{exr} lnINFL_{t-1} + \alpha_{fdi} lnFDI_{t-1} + \sum_{j=1}^{p} \alpha_1 \Delta ln\ REM_{t-1} + \sum_{j=0}^{q} \Delta\alpha_j lnINFL_{t-j} + \sum_{k=0}^{h} \Delta\delta_k lnFDI_{t-k} + \varepsilon_t$$

Where Stock Market Capitalization is the dependent variable, whereas Diaspora Remittances, Inflation and Foreign Direct Investment are the explanatory variables and ε_t is an error correction term used to capture deviations of variables from the long-run equilibrium.

Justification of Variables

- **Stock Market Capitalization (SMCP)**

The dependent variable is one that is explained or determined by the explanatory variables in a study, in this case stock market capitalization as a proxy for stock market development is the dependent variable. The study considered stock market capitalization as a measurement for stock market development based on the reviewed literature. Stock market capitalization is preferred due to its direct relationship with the firms' ability to mobilize capital and its future growth prospects as argued by Rajan and Zangles (2003). Moreover, market capitalization can capture the high frequency changes in the stock market development. The current study will consider market capitalization as the proxy for stock market development at Zimbabwe Stock Exchange based

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on the empirical literature. Also due to unavailability of sufficient data for other stock market development indicators stock market capitalization is therefore preferred.

- **Diaspora Remittances (REM)**

The variable of concern in this study is diaspora remittances (REM), which represents the level of remittance inflows to Zimbabwe expressed as a percentage of GDP. Empirical studies have reported ambiguous relationships between diaspora remittance inflows and stock market development. This study sought to determine the impact of diaspora remittances on stock market development using Zimbabwe as the case study since there is still limited literature in the country concerning how diaspora remittances can be leveraged for development.

- **Inflation Rate (INFL)**

According to a study carried out by Shoko and Dube (2020), inflation was found to have a positive significant relationship with stock market development. Considering that outcome, inflation have been considered as one of the control variables in the study. Various studies such as that conducted by Njoroge (2015) found that inflation in short-run has positive relationship with stock market development. This is explained by the fact that foreign investors will tend invest more during inflationary periods to protect the value of their money. However, Barsky (2009) explains that in the long term, this is due to the investors' risk prevalence. The foreign investors will demand a risk premium for expected poor economic performance while local investors maintain more precautionary savings and avoid risky assets. This will result in the stock returns to reduce significantly.

- **Foreign Direct Investment (FDI)**

Foreign direct investment refers is an important determinant of stock market development according to Tsaurai (2018). The study considered foreign direct investment as a control variable based on existing literature that explains that if a country receives more foreign direct investment, it is more likely to develop its stock market through increased investment capital and number of participants at the stock exchange market.

According to Gujarati (2011), any violation of the assumptions of Classical Linear Regression Model (CLRM) will not only produce parameter estimates that are not Best Linear and Unbiased Estimates (BLUE) but also inefficient and inconsistent parameter estimates. The study conducted the following tests to ensure non-violation of the assumption of the Classical Linear Regression Model: Normality test, Correlation tests, Stationarity test, and Cointegration test. The research further conducted the Heteroskedasticity test, Multicollinearity test and group Normality test to determine if the model used in the study is well specified.

4.0 Results of the Study

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4.1 Normality Test

Table 4.1: Normality Test Results

Variables	LNSMCP	LNREM	LNFDI	LNINFL
Mean	8.378121	19.32038	-0.281544	3.891995
Median	8.213300	18.60666	0.082782	3.148453
Maximum	12.669443	21.47165	1.937309	19.25793
Minimum	6.866933	17.11135	-3.432943	-1.609438
Standard dev.	1.154398	1.519480	1.255869	3.784004
Skewness	1.845506	0.347005	-0.904107	2.293878
Kurtosis	7.450576	1.501792	3.234991	10.13727
Jarque Bera	43.18196	3.521444	4.294612	92.98473
Probability	0.000000	0.171921	0.116798	0.000000
Sum	259.7217	598.9319	-8.727864	120.6519
Sum square dev.	39.97901	69.26461	47.31617	429.5607
Observations	**31**	**31**	**31**	**31**

Source: E-Views Statistical Packages Version 9.0

Table 4.1 displays the raw data for the four variables used in the study namely Stock Market Capitalization (SMCP), Diaspora Remittances (REM), Foreign Direct Investment (FDI) and Inflation (INFL). All four variables coefficients are positively skewed, with the skewness coefficients all above zero. The Jarque-Bera test assumes that if a variable is normally distributed the probability values should be greater than 0.05. Therefore, from the test's results REM and FDI are normally distributed with a probability value of 0.1719 and 0.1168 respectively. The other two variables SMCP and INFL are not normally distributed as indicated by a probability value of zeros.

4.2 Correlation Test

Table 4.2: Karl Pearson Correlation Matrix Test Results

	LNSMCP	LNREM	LNFDI	LNINFL
LNSMCP	1.000000	0.526477	0.063251	0.107380
LNREM	0.526477	1.000000	0.451180	-0.247701
LNFDI	0.063251	0.451180	1.000000	-0.142425
LNINFL	0.107380	-0.247701	-0.142425	1.000000

Source: E-Views Statistical Packages Version 9.0

The results also indicate that there exists a weak positive and negative association between the variables of the study. The results generally suggests that there exists a linear association between the study variables running from positive to negative. The following section presents the unit root tests results which are a prerequisite when handling time series data. Regressions carried out on non-stationary data result in spurious results as explained by Gujarati (2011).

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4.3 Unit Root Test

Table 4.3: Philips- Perron Unit Root Test Results

Variable	PP t-statistic	P-value	Critical 1%	Critical 5%	Critical 10%	Decision
LNSMCP	-6.722519	0.0000	-3.679322	-2.967767	-2.622989	I (1)
LNREM	-5.489725	0.0001	-3.679322	-2.967767	-2.622989	I (1)
LNINFL	-8.305718	0.0000	-3.679322	-2.967767	-2.622989	I (1)
LNFDI	-7.432704	0.0000	-3.679322	-2.967767	-2.622989	I (1)

Source: E-Views Statistical Packages Version 9.0

The results shows that all variables were not stationary at levels. However, the variables' data became stationary after first difference. This has serious implications on the regression model that the study must adopt. If the variables' data are all stationary at levels, ordinary least squares (OLS) is used, and when variables data are stationary at a level which is not of order zero, as is the case for this study, Autoregressive Distributed Lag Model (ARDL) becomes plausible for the study.

4.4 Cointegration Test

Table 4.4: Cointegration Test Results

Significance level	I0	I1
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

F-Statistic 8.415509

Source: E-Views Statistical Packages Version 9.0

The results for the study confirm the existence of cointegration amongst variables, as supported by an F-statistic value of 8.415509, which is above the upper bound critical value at 5% levels. These results are enough to motivate study to adopt the ARDL for the long-run results, and an unrestricted Error Correction Model (ECM) to determine the short-run relationships.

4.5 ARDL-ECModel

Table 4.5: ARDL-ECM Model Test Results

Dependent Variable: Stock Market Capitalization (LNSMCP)

Variable	Short-Run Co-efficient	Probability	Decision
Ln REM	-0.0828	0.016	Significant
Ln INFL	0.2974	0.011	Significant
Ln FDI	0.0165	0.723	Insignificant
ECT	-0.7203	0.000	Significant
Variable	**Long-Run Co-efficient**	**Probability**	**Decision**
Ln REM	0.0281	0.043	Significant

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Ln INFL	0.1214	0.017	Significant
Ln FDI	0.0143	0.010	Significant

Source: E-Views Statistical Packages Version 9.0

Pesaran et al. (2001) explained that the coefficient of the error correction term (ECT) indicates the speed at which the model adjusts to long-run equilibrium while the sign of the ECT indicates the direction of adjustment to equilibrium. According to Shahbaz et al. (2013) the coefficient of the error correction term should be negative and significant. According to Bannerjee et al. (1998) a highly significant negative coefficient of the error correction term is an indication of a stable long-run equilibrium of the model. The results presented on the table 4.5 above shows a speed of adjustment being 72% which is plausible for policy responsiveness. For the ECM, the diaspora remittances have a significant negative coefficient of -0.0828 with a p-value of 0.016. This suggest that a 1% increase in diaspora remittances result in a decrease in stock market capitalisation growth by 8%. Again, for the ARDL, the diaspora remittances recorded a significant and positive coefficient of 0.0281 with a p-value of 0.043. This suggest that a 1% increase in diaspora remittances result in 3% increase in stock market capitalisation. All things being equal, the coefficient could have been higher than 3% given the theoretical underpinnings regarding the significance of diaspora remittances in economic growth. The results could have been due to that most diaspora remittances are flowing through informal and illegal channels to Zimbabwe resulting in the government failing to tap the benefits that comes with the flows. The high coefficient of the ECT motivates policy makers to come up with policies that promote growth of diaspora remittances so as to enhance stock market capitalisation for Zimbabwe.

4.6 STABILITY TESTS

Table 4.6: Group Normality Tests Results

Jarque- Bera	**Skewness**	**Kurtosis**
3.3411	0.542850	4.259654
0.188095		

Source: E-Views Statistical Packages Version 9.0

According to the Jarque-Bera Group Normality test, there exists a normal distribution of the error terms as indicated by the P-Value of 0.188095 which is above the 0.05 significance level.

Table 4.7: Heteroskedasticity Test Results

F-statistic	0.529213	Prob. E (20,8)	0.8813
Obs*R-squared	16.51632	Prob. Chi-Square (20)	0.6841
Scaled explained SS	16.93224	Prob. Chi-square (20)	0.6574

Source: E-Views Statistical Packages Version 9.0

The results show the Prob. Chi-Square values greater than the significance level of 0.05. The results suggest that the error terms are homoscedastic.

Table 4.8: Multicollinearity Test Results

Variables	**Co-efficient**	**Uncentered VIF**	**Centred VIF**

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	Variance		
LNSMCP1(-1)	0.049539	1.377938	1.365109
LNREM1	0.185217	1.243721	1.189314
LNFDI1	0.027657	1.148214	1.136280
LNFDI1(-1)	0.033251	1.456401	1.449583
LNINFL1	0.002104	1.029883	1.029017
C	0.031796	1.092289	NA

Source: E-Views Statistical Packages Version 9.0

According to Field (2009), VIF values more than 10 or a tolerance statistic less than 0.1 are indicators of the presence of Multicollinearity. The table above shows the variance inflation factors test for Multicollinearity and it shows that there is no Multicollinearity since all the Variance inflation factors are all below 10 and the tolerance statistic is less than 0.1. Therefore, the model used in the study did not suffer from the effects of Multicollinearity and produced reliable results. It follows, therefore, that the model used for this study is well specified.

5.0 Conclusion and Policy Recommendations

Stock market plays an important role in economic development and growth by creating liquidity and allocation of resources to deficit sectors of the economy. This study found that Diaspora Remittances have a negative and insignificant relationship with Stock Market Development in the short-run and positive and significant relationship in the long-run. This study, therefore, make recommendations based on the following proposed Diaspora Remittances-Stock Market Development Inclusive Framework;

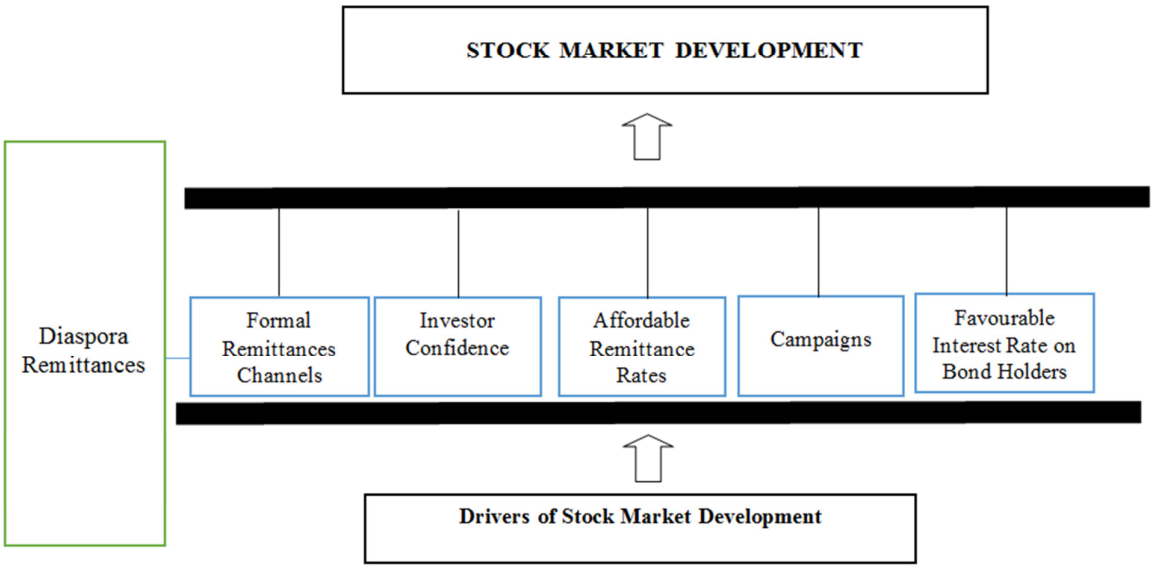

Figure 5.1: Diaspora Remittances-Stock Market Development Inclusive Framework (Self, 2022)

Explanation of the Framework

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- The government must take measures to boost investor confidence by encouraging the diaspora population to invest more in Zimbabwe. This can be done by mitigating cases of corruption, having stable political environment, formulation of policies that ensures macroeconomic environment stability, and having the right governance systems.

- The government and nongovernmental organizations must educate Zimbabweans in diaspora the importance of investing home.

- The government must set up affordable formal diaspora remitting channels to encourage more remittances to flow through formal channels to leverage on the resource for stock market development.

- The government must set up a board charged with the responsibility of encouraging migrants to invest back home, and ensuring that citizens are encouraged to remit their funds back home at affordable rates.

- The government must offer favourable interest on bond holders so as to lure those in the diaspora to invest their money either in the equity and or bond markets.

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REINFORCEMENT OF POSITIVITY IN ONE'S OUTLOOK IS THE KEY IN PROMOTING WELL-BEING

Dr. Radhika Kapur

Abstract

In the lives of the individuals in both personal and professional spheres, they are engaged in number of job duties, tasks and activities. In some cases, they are manageable, whereas, in other cases, they are complicated. But in order to carry out the job duties successfully, it is necessary to reinforce positivity in one's outlook. In some cases, one is required to deal with difficult and demanding individuals. In such cases as well, reinforcement of positivity in one's outlook is regarded to be of utmost significance to do well in one's job duties and to generate the desired outcomes. When the individuals recognise the meaning and significance of reinforcement of positivity in one's outlook, they will be able to benefit to a major extent. The important benefits, which are identified are, doing well in one's job duties, achieve personal and professional goals, form an effective social circle and sustain their living conditions in an efficient manner. These benefits are acknowledged by all individuals, irrespective of their age groups, gender, communities, categories and backgrounds. Therefore, throughout the lives of the individuals, they need to be well-aware in terms of methods and approaches to reinforce positivity in their outlook. The main concepts, which are taken into account in this research paper are, factors requiring reinforcement of positivity in one's outlook, measures to be implemented in leading to reinforcement of positivity in one's outlook and reinforcement of positivity in one's outlook leads to development of personality.

Keywords: Education, Employment Opportunities, Outlook, Positivity, Personality, Reinforcement, Well-being

An aimless life is the meaningless life. All individuals, irrespective of their age groups, gender, communities, categories and backgrounds have goals and objectives to achieve. The main goals of the individuals are, to acquire good-quality education, getting engaged in well-paid and reputed employment opportunities, forming an effective social circle, sustaining one's living conditions in an adequate manner and bringing about improvements in one's overall quality of lives. Within the course of achievement of these goals and objectives, there are number of problems and challenges that are experienced by the individuals (Sasson, 2021). But it is necessary for the individuals to reinforce positivity in one's outlook. When positivity will be reinforced, one will be able to cope with various types of problems and difficulties in an efficacious manner. Within the course of pursuance of educational programs, there are number of problems that are experienced by the individuals. But one needs to inculcate the traits of diligence, resourcefulness and conscientiousness to provide solutions to problems and prevent them from assuming a major form. The individuals need to form the viewpoint that when they will acquire good-quality education, they will render an important contribution in leading to up-gradation of their career prospects. Therefore, it is necessary for

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the individuals to form positive viewpoints in terms of educational institutions of all levels.

Within the course of pursuance of employment opportunities or when the individuals are having their own businesses, they experience various types of problems. In order to be successful in one's job duties, it is necessary for the individuals to be well-equipped in terms of measures, strategies and approaches. Furthermore, one needs to make use of modern, scientific and innovative methods in the implementation of various tasks and activities. When one is determined towards implementation of job duties and responsibilities in a well-ordered manner, one needs to form positive viewpoints in terms of various aspects. The implementation of household responsibilities is regarded as one of the crucial tasks, which all individuals need to pay attention towards on a regular basis. In some cases, they are difficult. But individuals need to be well-equipped in terms of various methods and procedures. When there are occurrence of any problems, one needs to form positive viewpoints. When the individuals are determined to carry them out in a well-ordered manner, they need to focus upon reinforcement of positive viewpoints. Therefore, one is able to understand that pursuance of employment opportunities and implementation of household responsibilities are the areas, which require reinforcement of positivity in one's outlook.

It is apparently understood, one cannot carry out their job duties within homes, educational institutions and employment settings in seclusion (Hoque, 2014). They need to obtain help and support from others. In some cases, the individuals are understanding, kind and wise. Whereas, in other cases, one is demanding and difficult to deal with. Hence, one needs to form positive viewpoints. When the individuals are determined to carry out various types of job duties, particularly through working with others in a well-ordered manner, they need to focus upon reinforcement of positive viewpoints. In order to lead to enrichment of one's overall quality of lives, one needs to pay attention towards forming cordial and amiable terms and relationships with others. This is important within as well as outside the homes. In this case, if parents, other family members, instructors, supervisors and employers have stated something, which does not sound pleasing, one needs to form positive viewpoints. One needs to feel that if older and experienced individuals have identified the inconsistencies, they are focusing upon reinforcement of betterment. Therefore, it can be stated, reinforcement of positivity in one's outlook will contribute in a significant manner in forming cordial and amiable terms and relationships with others and obtaining help from them in the implementation of job duties.

Factors requiring Reinforcement of Positivity in one's Outlook

In order to achieve personal and professional goals and lead to enrichment of one's overall quality of lives, one needs to pay wholehearted attention towards reinforcement of positivity in one's outlook. In the implementation of this aspect in an effective manner, it is of utmost significance for the individuals to be well-equipped in terms of various methods and procedures. Furthermore, one needs to be determined towards not only implementation of job duties, tasks and activities in a well-organized manner, but also towards forming cordial and amiable terms and relationships with others. One of the important aspects that needs to be taken into account is, one should not possess any negative feelings in terms of any factors or individuals. When one experiences various types of barriers within the course of putting into operation various tasks and activities, one needs to form positive viewpoints. One needs to pay attention towards implementation of critical thinking and problem-solving skills. These skills need to be put into operation in a

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satisfactory manner in doing well in one's jobs and in generating the desired outcomes. Factors requiring reinforcement of positivity in one's outlook are stated as follows:

Pursuance of Educational Programs

Within the course of pursuance of educational programs, there are number of problems that are experienced by the individuals. These problems are related to academic subjects, lesson plans, class assignments, homework assignments, exams, competitions, events and other functions. It is indispensable for the individuals to implement the traits of morality and ethics and inculcate the traits of diligence, resourcefulness and conscientiousness to provide solutions to problems. When the meaning and significance of these aspects are acknowledged, problems can be prevented from assuming a major form. It is necessary for the individuals to reinforce positivity in one's outlook. When positivity will be reinforced, one will be able to cope with various types of problems and difficulties in an efficacious manner. The individuals need to form the viewpoint that when they will acquire good-quality education, they will render an important contribution in leading to up-gradation of their career prospects. Hence, it is of utmost significance for the individuals to form positive viewpoints in terms of education of all levels. Therefore, pursuance of educational programs is a factor requiring reinforcement of positivity in one's outlook, which needs to be taken into consideration by the individuals within the course of pursuance of education at all levels.

Getting Engaged in Employment Opportunities

Within the course of putting into operation various types of employment opportunities or when the individuals are having their own businesses, they experience various types of problems. In order to be successful in one's job duties, it is necessary for the individuals to be well-equipped in terms of measures, strategies and approaches. Furthermore, one needs to make use of modern, scientific and innovative methods in the implementation of various tasks and activities. It is indispensable for the individuals to implement the traits of morality and ethics and inculcate the traits of diligence, resourcefulness and conscientiousness to do well in one's job duties and generate the desired outcomes. Reinforcement of positivity in one's outlook is regarded as the key to do well in one's jobs and achieve the desired goals and objectives in professional lives. When one is determined towards implementation of job duties and responsibilities in a well-ordered manner, one needs to form positive viewpoints in terms of various aspects. The individuals are required to work and interact with others. For this purpose, one needs to form positive viewpoints in terms of various aspects. Therefore, getting engaged in employment opportunities is a factor requiring reinforcement of positivity in one's outlook, which needs to be taken into consideration by the individuals within the course of implementation of various types of employment opportunities and in having their own businesses.

Implementation of Household Responsibilities

The implementation of household responsibilities is regarded as one of the crucial tasks, which all individuals need to pay attention towards on a regular basis. The various types of household responsibilities are, cleaning, sweeping, washing, preparation of meals, child development, taking care of the needs and requirements of elderly family members and so forth. In rural areas, one needs to focus upon rearing of the livestock. In some cases, they are manageable, whereas, in other cases, they are difficult. But individuals need to be well-equipped in terms of various types of methods, strategies and procedures. When there are occurrence of any problems and challenges, one needs to form positive viewpoints. When the individuals are

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determined to carry them out in a well-ordered manner, they need to focus upon reinforcement of positive viewpoints. Hence, one is able to understand that implementation of household responsibilities is the area, which require reinforcement of positivity in one's outlook. Therefore, implementation of household responsibilities is a factor requiring reinforcement of positivity in one's outlook, which needs to be taken into consideration by the individuals when they are putting into operation various types of household responsibilities either on their own or through obtaining assistance from others.

Dealing with Demanding Individuals

It is apparently understood, one cannot carry out their job duties within homes, educational institutions and employment settings in seclusion. In other words, one is required to deal with others. One needs to work in collaboration and integration with others. In cases, particularly when the job duties are complicated, one needs to obtain help and support from others. In some cases, the individuals are understanding, kind and wise. Whereas, in other cases, one is demanding and difficult to deal with. Hence, one needs to form positive viewpoints in terms of difficult situations as well as demanding individuals. When the individuals are determined to carry out various types of job duties, particularly through working with others in a well-ordered manner, they need to focus upon reinforcement of positive viewpoints. In order to lead to enrichment of one's overall quality of lives, one needs to pay attention towards reinforcement of positivity in one's outlook. A constructive outlook will contribute in a significant manner in promoting well-being and goodwill. Therefore, dealing with demanding individuals is a factor requiring reinforcement of positivity in one's outlook, acknowledged by the individuals within homes, educational institutions at all levels and in various types of employment settings.

Forming Cordial and Amiable Terms and Relationships with Others

From the stage of early childhood, throughout the lives of the individuals, one needs to pay attention towards forming cordial and amiable terms and relationships with others. In order to implement job duties in a well-ordered and satisfactory manner and lead to enrichment of one's overall quality of lives, one needs to pay attention towards forming cordial and amiable terms and relationships with others. When the individuals recognise the meaning and significance of these traits, they will incur the feelings of pleasure and contentment. This is important to be recognized by the individuals, irrespective of their communities, categories and backgrounds within as well as outside the homes. One of the important aspects that needs to be taken into account are, if parents, other family members, instructors, supervisors and employers have stated something, which does not sound favourable and pleasing, one needs to form positive viewpoints. One needs to feel that if older and experienced individuals have identified the inconsistencies, they are focusing upon reinforcement of betterment. Therefore, forming cordial and amiable terms and relationships with others is a factor requiring reinforcement of positivity in one's outlook, which is recognized by the individuals, particularly when they are focused upon implementation of job duties appropriately and in generating the desired outcomes.

Managing the Psychological Problems of Anger and Stress

In the lives of the individuals in both personal and professional spheres, the individuals do experience situations, which enable them to experience anger and stress. The psychological problems of anger and stress are normal. The individuals do experience them, irrespective of their communities,

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categories and backgrounds. These problems may be experienced in a major as well as in a minor form. Hence, it is of utmost significance for the individuals to conduct an analysis of the aspects, which need to be improved. After the analysis is conducted, one needs to be well-versed in terms of ways to bring about improvements. Individuals need to be well-equipped in terms of various types of methods, strategies and procedures to manage these problems (Stress Management, 2021). Furthermore, they need to be prevented from assuming a major form. When there are occurrence of any problems and challenges, one needs to form positive viewpoints. When the individuals are determined to carry them out in a well-ordered manner, they need to focus upon reinforcement of positive viewpoints. Therefore, managing the psychological problems of anger and stress is a factor requiring reinforcement of positivity in one's outlook, which is identified by the individuals, when they experience the situations and instances causing these problems.

Coping with Emotions

In the personal and professional lives of the individuals, they do experience situations, which enable them to experience positive as well as negative emotions. Individuals need to be well-equipped in terms of ways of coping with emotions in an appropriate manner (Coping with Emotions, 2021). Within homes, in educational institutions at all levels and in various types of employment settings, the individuals do undergo situations and instances, which enable them to feel stress, anxiety and anger. But they need to ensure, when they are dealing with others, they need to exercise control on these psychological problems. One is required to deal with instructors, supervisors, classmates, colleagues, employers and so forth. When the individuals are putting into operation job duties and responsibilities or are working with others, one needs to be informative and form positive viewpoints in terms of various aspects as well as individuals. When the individuals are wholeheartedly determined towards putting into operation various types of job duties and responsibilities in a well-ordered manner, they need to focus upon reinforcement of positive viewpoints. Positive viewpoints are regarded as the key in promoting a normal mind-set. Therefore, coping with emotions is a factor requiring reinforcement of positivity in one's outlook, which is identified by the individuals, when they experience stressful and difficult situations and instances.

Promoting Health and Well-being

Health is wealth. When the individuals will be healthy physically as well as psychologically, they will contribute significantly in achieving desired goals and leading to enrichment of their overall quality of lives. In promoting health and well-being, various aspects, which need to be taken into account by the individuals are, diet and nutrition; exercise and physical activities; yoga and meditation; being well-equipped in terms of various types of job duties and responsibilities in personal and professional lives; implement the traits of morality and ethics; inculcate the traits of diligence, resourcefulness and conscientiousness; form positive viewpoints in terms of various factors; form cordial and sociable terms and relationships with others; promote cleanliness; obtain medical check-ups on regular basis; making wise decisions and taking out time for all tasks and activities. In the case of putting into practice all the aspects, there are occurrence of problems and impediments. When positivity will be reinforced, one will be able to cope with various types of problems and impediments in an efficacious manner. Therefore, promoting health and well-being is a factor requiring reinforcement of positivity in one's outlook, which is identified by the individuals, when they determined to promote good health from the physical as well as psychological perspective.

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Enhancement of Career Prospects

In leading to enhancement of one's career prospects, the various aspects, which need to be taken into account by the individuals are, making selection of the right field; forming positive viewpoints in terms of various factors; depicting the traits of efficiency, honesty and truthfulness; augmenting professionalism; being well-equipped in terms of modern, scientific and innovative methods; being well-versed in terms of various types of job duties and responsibilities; implementing the traits of morality and ethics; inculcating the traits of diligence, resourcefulness and conscientiousness; forming positive viewpoints in terms of various factors; forming cordial and sociable terms and relationships with others; implementing the ways to cope with various problems in a satisfactory manner; promoting a normal mind-set; making wise decisions and taking out time for all tasks and activities. In the case of putting into practice all the aspects, there are occurrence of problems and impediments. When positivity will be reinforced, one will be able to cope with various types of problems and impediments in an efficient manner. Therefore, enhancement of career prospects is a factor requiring reinforcement of positivity in one's outlook, which is taken into account by the individuals, irrespective of their educational qualifications, occupations, cultures, communities, categories and backgrounds.

Leading to Enrichment of one's overall Quality of Lives

Leading to enrichment of one's overall quality of lives is regarded as one of the primary goals of all individuals. In the implementation of this task, the various aspects, which need to be taken into account by the individuals are, making selection of the right field; forming positive viewpoints in terms of various factors; depicting the traits of efficiency, honesty and truthfulness; augmenting professionalism; being well-equipped in terms of modern, scientific and innovative methods; being well-versed in terms of various types of job duties and responsibilities; implementing the traits of morality and ethics; inculcating the traits of diligence, resourcefulness and conscientiousness; forming positive viewpoints in terms of various factors; forming cordial and sociable terms and relationships with others; implementing ways to cope with various problems in a satisfactory manner; promoting a normal mind-set; making wise decisions and taking out time for all tasks and activities. In the case of putting into practice all the aspects, there are occurrence of problems and impediments. When positivity will be reinforced, one will be able to cope with various types of problems and obstacles in an efficient manner (Stress: Coping with Life's Stressors, 2021). Therefore, leading to enrichment of one's overall quality of lives is a factor requiring reinforcement of positivity in one's outlook, which is recognized by the individuals to a major extent.

Measures to be implemented in Leading to Reinforcement of Positivity in one's Outlook

Throughout the lives of the individuals, one needs to be well-versed in terms of measures that are considered vital in leading to reinforcement of positivity in one's outlook. The information in terms of these measures can be acquired either on one's own through conducting research or through communicating with others. When the individuals are putting into operation these measures, one needs to ensure, they do not cause any unfavourable effects upon anybody. It is comprehensively understood, one is focused upon promoting well-being and goodwill of themselves. But one needs to put emphasis upon promoting well-being of community members as well. Measures to be implemented in leading to reinforcement of positivity in one's outlook are, being determined towards promoting well-being; being well-equipped in

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terms of modern, scientific and innovative methods; being well-versed in terms of various types of job duties and responsibilities; implementing the traits of morality and ethics; inculcating the traits of diligence, resourcefulness and conscientiousness and coping with various types of problems in an effective manner. These are stated as follows:

Being determined towards promoting Well-being

It is apparently understood, one is focused upon promoting well-being and goodwill of themselves and their families. Furthermore, one needs to put emphasis upon promoting well-being of community members as well. One needs to be determined towards promoting well-being. When one is determined, one needs to work diligently and conscientiously in doing well in one's job duties and generating the desired outcomes. In the case of putting into practice all the aspects that are focused towards promoting well-being, there are occurrence of problems and impediments. When positivity will be reinforced, one will be able to cope with various types of problems and obstacles in an efficient manner. Therefore, being determined towards promoting well-being is a measure to be implemented in leading to reinforcement of positivity in one's outlook, which is put into practice by the individuals on a comprehensive basis.

Being well-equipped in terms of Modern, Scientific and Innovative Methods

The individuals put into operation different tasks and job duties. They make selection of different types of occupations in accordance to their competencies, abilities and aptitude. In the present existence, with advancements taking place and with the advent of technologies, one needs to utilize modern, scientific and innovative methods within the course of implementation of various job duties. These methods are, maps, charts, pictures, images, designs, models, technologies and so forth. These are utilized within the course of pursuance of education as well as implementation of job duties within employment settings. When positivity will be reinforced, one will be able to implement these methods in a successful manner. Therefore, being well-equipped in terms of modern, scientific and innovative methods is a measure to be implemented in leading to reinforcement of positivity in one's outlook. This is implemented by the individuals within the course of pursuance of education and in carrying out job duties within employment settings.

Being well-versed in terms of various types of Job Duties and Responsibilities

When the individuals are putting into operation various types of job duties and responsibilities within households, pursuing education and implementing job duties within employment settings, they need to be well-versed in terms of various types of job duties and responsibilities. One needs to be well-versed in terms of them in personal as well as professional lives. Within the course of putting into operation various types of job duties and responsibilities, individuals need to be well-equipped in terms of modern and pioneering methods, strategies and procedures. When there are occurrence of any problems and challenges, one needs to form positive viewpoints. When the individuals are determined to carry them out in a well-ordered manner, they need to focus upon reinforcement of positive viewpoints. Therefore, being well-versed in terms of various types of job duties and responsibilities is a measure to be implemented in leading to reinforcement of positivity in one's outlook, which is recognized by the individuals in personal and professional lives.

Implementing the Traits of Morality and Ethics

From the stage of early childhood, throughout the lives of the individuals one needs to implement the

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traits of morality and ethics. In the implementation of these traits in an efficacious manner, one needs to form positive viewpoints in terms of various factors; depict the traits of efficiency, honesty and truthfulness; augment professionalism and differentiate between appropriate and inappropriate. The implementation of these traits in an effectual manner will render a significant contribution in leading to enrichment. When there are occurrence of any problems and challenges within the course of implementation of various types of job duties and responsibilities, one needs to form positive viewpoints. When the individuals are determined to carry them out in a well-ordered manner, they need to focus upon reinforcement of positive viewpoints. Therefore, implementing the traits of morality and ethics is a measure to be implemented in leading to reinforcement of positivity in one's outlook, which needs to be put into operation by the individuals in all spheres.

Inculcating the Traits of Diligence, Resourcefulness and Conscientiousness

The individuals, belonging to all communities, categories and backgrounds are engaged in different types of job duties. In order to do well in one's jobs, promoting well-being and goodwill and leading to enrichment of their overall quality of lives, one needs to inculcate the traits of diligence, resourcefulness and conscientiousness. When the individuals recognize the meaning and significance of these traits, they will contribute in a significant manner in promoting well-being and goodwill. Throughout the lives of the individuals, one needs to recognize the meaning and significance of these traits. When the individuals are overwhelmed by any types of problems and challenges, these traits contribute in a significant manner in providing solutions to various types of problems. Therefore, inculcating the traits of diligence, resourcefulness and conscientiousness is a measure to be implemented in leading to reinforcement of positivity in one's outlook, which needs to be put into operation by the individuals in all job duties and tasks that one is engaged in.

Coping with various types of Problems in an Effective Manner

Within the course of putting into operation various types of job duties and responsibilities in personal as well as professional lives, the individuals are overwhelmed by any types of problems. But one needs to be well-versed in terms of various methods, strategies and approaches. The information in terms of them can be acquired on one's own through conducting research through making use of various sources as well as through communicating with others. It is necessary for the individuals to reinforce positivity in one's outlook. When positivity will be reinforced, one will be able to cope with various types of problems and difficulties in an efficacious manner. Therefore, coping with various types of problems in an effective manner is a measure to be implemented in leading to reinforcement of positivity in one's outlook, which needs to be put into operation by the individuals, particularly when they are overwhelmed by problems within the course of implementation of various types of job duties within as well as outside the homes.

Reinforcement of Positivity in one's Outlook leads to Development of Personality

Leading to development of personality is one of the primary goals of all individuals. The individuals focus upon development of their personality on their own or through obtaining support and assistance from others. The parents make provision of information to their children in terms of ways to lead to development of the personality of their children. On the other hand, in educational institutions and in various types of employment settings as well, instructors, supervisors and employers make provision of information in terms

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of methods to lead to development of one's personality. In the implementation of this task, the various aspects, which need to be taken into account by the individuals are, promoting good health and well-being; forming positive viewpoints in terms of various factors; depicting the traits of efficiency, honesty and truthfulness; augmenting professionalism; forming cordial and sociable terms and relationships with others; implementing ways to cope with various problems in a satisfactory manner; promoting a normal mind-set; making wise decisions; augmenting skills and abilities and forming positive viewpoints in terms of various factors. When positivity will be reinforced, one will be able to cope with various types of problems satisfactorily. Therefore, it is well-understood, reinforcement of positivity in one's outlook leads to development of personality.

When the individuals are determined towards leading to development of personality, there are number of problems and challenges that are experienced by the individuals. One of the important factors that needs to be taken into account by the individuals is to reinforce positivity in one's outlook. When positivity will be reinforced, one will be able to cope with various types of problems and difficulties in an appropriate manner. Within the course of leading to development of personality, there are number of problems that are experienced by the individuals. These may be experienced in a major as well as in a minor form. One needs to inculcate the traits of diligence, resourcefulness and conscientiousness to provide solutions to problems and prevent them from assuming a major form. Reinforcement of positivity in one's outlook is regarded as fundamental in promoting well-being and goodwill. The individuals need to form the viewpoint that when they will lead to development of personality, they will be able to render a significant contribution in forming an effective social circle, promoting well-being and goodwill and leading to enrichment of their overall quality of lives. Therefore, one is able to understand in a well-ordered manner that, reinforcement of positivity in one's outlook leads to development of personality.

Conclusion

Within the course of implementation of job duties and achievement of goals and objectives, there are number of problems and challenges experienced by the individuals. But it is necessary for the individuals to reinforce positivity in one's outlook. When positivity will be reinforced, one will be able to cope with various types of problems in an appropriate manner. Factors requiring reinforcement of positivity in one's outlook are, pursuance of educational programs, getting engaged in employment opportunities, implementation of household responsibilities, dealing with demanding individuals, forming cordial and amiable terms and relationships with others, managing the psychological problems of anger and stress, coping with emotions, promoting health and well-being, enhancement of career prospects and leading to enrichment of one's overall quality of lives.

Measures to be implemented in leading to reinforcement of positivity in one's outlook are, being determined towards promoting well-being; being well-equipped in terms of modern, scientific and innovative methods; being well-versed in terms of various types of job duties and responsibilities; implementing the traits of morality and ethics; inculcating the traits of diligence, resourcefulness and conscientiousness and coping with various types of problems in an effective manner. Reinforcement of positivity in one's outlook leads to development of personality. Finally, it can be stated, when individuals reinforce positivity in their outlook, they will be able to contribute in a significant manner in doing well in

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their job duties, promoting well-being and goodwill and leading to enrichment of their overall quality of lives.

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EDUCATION OF TRIBAL WOMEN

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Abstract

The women belonging to tribal communities have recognized the meaning and significance of education. They aspire to acquire good-quality education, get engaged in employment opportunities, sustain their living conditions in an adequate manner and bring about improvements in their overall quality of lives. In tribal communities, the system of education is not in a well-developed state. In the system of education, there are number of areas, which are deficient. Measures and programs need to be formulated to bring about improvements in them. The tribal women experience number of problems within the course of acquisition of education. One of the major problems is, in some cases, they do not obtain support and assistance from their family members. Furthermore, the tribal individuals are residing in the conditions of poverty and backwardness. Hence, tribal women are required to experience number of problems within the course of acquisition of education and leading to enrichment of their overall living conditions. But in the present existence, there are transformations taking place in the viewpoints of tribal individuals and they are encouraging their girls towards acquisition of education. Therefore, in order to promote education among tribal women, it is necessary to encourage them and improvements need to be brought about in the overall system of education. The main concepts that are taken into account in this research paper are, problems experienced by tribal women in acquisition of education and measures to be implemented in promoting education among tribal women.

Keywords: Education, Efforts, Problems, Responsibilities, Resources, Tribal Communities, Tribal Women

In tribal communities, the individuals are overwhelmed by the conditions of poverty and backwardness. They experience scarcity of resources. Due to scarcity of resources, they experience number of problems and challenges within the course of achievement of goals and objectives, sustaining their living conditions in an adequate manner and bringing about improvements in their overall quality of lives. The tribal women have recognized the meaning and significance of education. They aspire to acquire good-quality education (Discover a Limitless World of Learning, 2021), promote better livelihoods opportunities and enhance their overall personality traits. The rate of education among tribal women is low. They experience number of problems and challenges, which lead to occurrence of impediments within the course of acquisition of education and sustaining their living conditions in a suitable manner. In tribal communities, the system of education is not in a well-developed state. There are number of areas, in terms of which there are occurrence of inconsistencies and limitations. Hence, there is a need to formulate measures, which would contribute in a significant manner in bringing about improvements in the overall system of education. When there will be improvements, one will be able to recognize the meaning and significance of education. Furthermore, they will put in efforts to acquire education.

In tribal households, there are occurrence of various types of problems and challenges, which hinder

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the acquisition of education among tribal women (To Help Expand Learning for Everyone, n.d.). The birth of the girls is not appreciated in tribal households. The tribal individuals form the viewpoint that from the stage of early childhood, the girls should be trained in terms of implementation of household responsibilities and taking care of the needs and requirements of family members. They form the viewpoint that they need to eventually get married and in their marital homes, they will not be able to make use of their educational qualifications and competencies in any manner. Hence, they should focus upon getting trained in terms of various types of household chores. The family members are vested with the authority and responsibility of imparting information among girls in terms of various types of household responsibilities and listening and obeying their family members. When the girls are focusing upon learning all types of household chores and responsibilities, they are not able to express their desires before their family members. Therefore, in this manner, they are not only giving up their hopes and aspirations but are getting compelled to live their lives in accordance to the wishes of their family members.

An aimless life is a meaningless life. All individuals have aims and objectives to achieve. The girls and women belonging to tribal communities also have aims and objectives to achieve. One of the indispensable aims is to acquire good-quality education (Education, n.d.). As when they will be well-educated, they will be able to achieve their goals and objectives and bring about improvements in their overall quality of lives. In the present existence, with advancements taking place and with the advent of modernization and globalization, the tribal women are progressing. They are bringing about transformations in their overall quality of lives. The tribal women are getting enrolled in educational institutions to acquire education. They are migrating to urban communities to get enrolled in higher educational institutions. After the completion of education, they are acquiring employment opportunities. Hence, they are rendering a significant contribution in leading to up-gradation of their career prospects. The individuals are able to understand on a comprehensive basis that when the girls and women acquire education, they will be able to do well in their lives, both in personal and professional spheres. In this manner, one is able to acknowledge the meaning and significance of education. Education is the key to lead to reinforcement of women empowerment.

Problems Experienced by Tribal Women in Acquisition of Education

The tribal women possess either less education or no education at all (Challenge, 2021). In their lives, they are engaged in various types of tasks and activities that give rise to barriers within the course of acquisition of education. When they are participating in these tasks and activities, they experience number of problems and challenges, which lead to occurrence of impediments within the course of learning, generating information and sustaining their living conditions in a suitable manner. In tribal communities, the system of education is not in a well-developed state. There are number of areas, in terms of which there are occurrence of limitations. When the system of education will not be in a well-developed state, it is apparently understood, the girls and women will not be able to acquire an efficient understanding of academic subjects and lesson plans. Furthermore, they will not be able to put into practice the academic activities in an appropriate and satisfactory manner. There are number of problems experienced by tribal women in acquisition of education. These are stated as follows:

Implementation of Household Responsibilities

The tribal individuals form the viewpoint that from the stage of early childhood, the girls should be

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trained in terms of implementation of household responsibilities. The various types of household responsibilities, which they are required to carry out are, cleaning, washing, preparation of meals, fetching water, taking care of the needs and requirements of family members and so forth. The tribal individuals form the viewpoint that girls need to eventually get married and in their marital homes, they will not be able to make use of their educational qualifications in any manner. Hence, they should focus upon getting trained in terms of various types of household responsibilities. The family members provide information among girls in terms of various types of household responsibilities and taking care of elderly family members. When the girls are focusing upon learning all types of household chores and responsibilities, they experience problems within the course of acquisition of education. Therefore, implementation of household responsibilities is one of the problems experienced by tribal women in acquisition of education on a comprehensive basis.

Early Marriage

Early marriage is the marriage of the girls, when they are below 18 years of age. (What is the Difference between Goals and Objectives? 2021). In tribal households, the individuals possess limited financial resources. When there are girls in the family, their parents make savings for them, so they can organize their marriage. The individuals, belonging to tribal communities form the viewpoint, when marriage will take place at an early age, the financial resources spend will be less. The parents are not willing to spend financial resources on their education. They are saved to be spent on marriage. After marriage, if their husbands and in-laws give them permission and make provision of support to them, then they can acquire education. On the other hand, when they are not given permission, they are required to put into practice the household responsibilities and take care of the needs and requirements of family members. Therefore, one is able to understand that due to early marriage, the tribal women experience problems within the course of acquisition of education.

Discriminatory Treatment

In tribal communities, the individuals give more preference to the male members. The birth of the girls is not appreciated. The girls are regarded as liabilities, who will not yield any returns on investment. Rather it is believed that they will make demands of various things. On the other hand, male children are regarded as assets. It is believed when they will be provided with good-quality education, they will contribute in an effective manner in promoting well-being of their families and communities. Due to prevalence of discriminatory treatment, the girls are deprived of acquisition of education and participation in various types of tasks and activities. In some cases, they are not even given the food items that are given to the male children. This is apparently understood, when the girls will be discriminated against, they will not be able to get enrolled in educational institutions to acquire good-quality education. Therefore, it is comprehensively understood that due to discriminatory treatment, the tribal women experience problems within the course of acquisition of education.

Conditions of Poverty

The tribal individuals are residing in the conditions of poverty. The conditions of poverty are characterised by scarcity of resources. When the tribal individuals are to acquire good-quality education, they need financial resources. The financial resources need to be spend on stationary, technology, bags, transportation and so forth. Hence, when the individuals will be overwhelmed by the conditions of poverty,

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this is apparently understood, they will experience problems in fulfilling their needs and requirements. When the tribal individuals are residing in the conditions of poverty, they undergo problems in fulfilling their nutritional requirements. It is necessary to be healthy physically as well as psychologically in participating in various tasks and activities and in acquiring education. Due to the prevalence of the conditions of poverty, the physical and psychological health and well-being of the individuals get effected. When one will be unhealthy physically as well as psychologically, they will not be able to concentrate on their studies in a well-organized and satisfactory manner. Therefore, conditions of poverty are regarded as one of the major problems within the course of acquisition of education.

Inadequate Instructional Strategies

In order to facilitate education, the instructional strategies are regarded to be of utmost significance. The teachers need to focus upon up-gradation of instructional strategies to promote education among individuals. Through instructional strategies, the teachers are able to impart adequate knowledge among students in terms of academic subjects and lesson plans. When the instructional strategies are put into practice, the teachers need to ensure the students understand well. On the other hand, when the instructional strategies are inadequate, the teachers experience problems within the course of imparting education. The students also experience problems in learning. Hence, in schools as well as in other educational institutions, it is of utmost significance to focus upon up-gradation of instructional strategies. The up-gradation of instructional strategies takes place in accordance to the needs and requirements of the students. Therefore, it can be stated, when the instructional strategies within educational institutions at all levels are not in a well-developed state, the teachers and students experience problems within the course of acquiring an efficient understanding of lesson plans and academic concepts. Furthermore, the girls as well as other students will experience problems in acquisition of education.

Inadequate Teaching-Learning Materials

Teaching-learning materials are regarded as fundamental within the course achievement of educational goals and leading to up-gradation of the overall system of education. The teachers need to focus upon enrichment of teaching-learning materials. These are regarded as the key in providing as well as acquiring education. When the students get enrolled in educational institutions, inadequate teaching-learning materials are regarded to be of utmost significance. The various types of teaching-learning materials are dependent upon various aspects, i.e. grade levels of students, academic subjects and lesson plans, needs and requirements of the students, academic goals and overall system of education. In tribal schools, the teaching-learning materials are not in a well-developed state. Hence, this will give rise to barriers in promoting student learning, achieving academic goals and bringing about improvements in the overall system of education. Furthermore, the girls as well as male students will experience problems within the course of acquisition of education. Therefore, inadequate teaching-learning materials are regarded as one of the essential problems within the course of acquisition of education.

Shortage of Teachers

Teachers have an indispensable role to perform in promoting student learning, achieving academic goals and bringing about improvements in the overall system of education. They render a significant contribution in leading to effective growth and development of the students. In tribal schools, there is

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shortage of teachers. The individuals do not develop motivation and interest in acquiring teaching jobs in tribal schools. In educational institutions, there are number of factors that need to be taken into account in acquiring teaching jobs. These are, academic goals, salary and reimbursements, infrastructure, amenities and facilities, and the overall environmental conditions. When the teachers do not feel satisfied in terms of these factors, they do not make an attempt to acquire teaching jobs in educational institutions. Hence, when there will be shortage of teachers in educational institutions, the girls as well as boys will not get enrolled in them. Therefore, one is able to understand on a wide scale, shortage of teachers is regarded as one of the vital problems within the course of acquisition of education.

Lack of Infrastructure, Amenities and Facilities

In promoting student learning, achieving academic goals, bringing about improvements in the overall system of education, doing well in one' job duties, incurring the feelings of pleasure and contentment and retaining one's jobs, it is of utmost significance to focus upon development of infrastructure, amenities and facilities. When these are in a well-developed state, the members of the educational institutions will develop motivation and concentrate on their job duties in a well-organized and regimented manner. In tribal schools, these are not in a well-developed state. Hence, when there are formulation of programs and measures, they need to focus upon development of infrastructure, amenities and facilities. In educational institutions of all levels, it is necessary to have furniture, equipment, clean drinking water, restrooms, and other facilities. When these will not be in a well-developed state in educational institutions, the girls as well as boys will not get enrolled in them. Therefore, one is able to understand on a comprehensive basis that lack of infrastructure, amenities and facilities are regarded as one of the crucial problems within the course of acquisition of education.

Inappropriate Assessment Strategies

Assessment strategies are the strategies that are put into practice by the teachers. The main aims of implementing these strategies are to assess the performance of the students, to find out whether instructional strategies and teaching-learning materials are meaningful or there is a need to bring about improvements in them and learning of the students is taking place in a satisfactory manner. The various types of assessment strategies are, class assignments, homework assignments, tests, exams, competitions, quizzes and other academic activities. In tribal schools, these are not in a well-developed state. Hence, the teachers as well as the students are unable to generate awareness in terms of various aspects. When these are inappropriate and are not organized in a well-ordered and satisfactory manner, the members of the educational institutions, irrespective of their job positions in the hierarchy experience problems in promoting student learning, achieving academic goals, bringing about improvements in the overall system of education, doing well in one' job duties and in generating the desired outcomes. Furthermore, the girls as well as other students will experience problems within the course of acquisition of education. Therefore, inappropriate assessment strategies are regarded as one of the problems within the course of acquisition of education that does not enable the teachers and students to find out whether teaching and learning is taking place in an adequate manner.

Lack of Academic Activities

In tribal communities, girls usually develop motivation and enthusiasm in participating in various

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types of creative, extra-curricular and academic activities. These are, production of artworks, handicrafts, jewellery, dancing, singing, playing of musical instruments, role playing, sports, physical activities, and so forth. In tribal schools, there is lack of academic activities. The girls as well as boys are not provided with the opportunities to participate in various types of creative, extra-curricular and academic activities. When the students participate in these activities, their mind-sets get stimulated and they are able to develop motivation towards learning. When the tribal individuals are competent in terms of one or more of these activities, they may even take them up as careers. In other words, they may be reinforced as sources of livelihoods. Hence, when there will be lack of academic activities, it is likely to prove to be disadvantageous towards promoting student learning, achieving academic goals, and bringing about improvements in the overall system of education. Therefore, it can be stated, lack of academic activities is regarded as one of the problems within the course of acquisition of education and leading to up-gradation of the overall system of education.

Measures to be implemented in Promoting Education among Tribal Women

In order to acquire good-quality education, the tribal women need to obtain support and assistance from their family members in natal as well as marital homes. Girls need support of their parents and when they are married, they need support of their husbands and in-laws. When education is provided free of cost, then too expenses need to be met in terms of uniforms, bags, stationary, transportation, and so forth. Hence, financial resources are regarded to be of utmost significance in meeting all the educational needs and requirements and goals and objectives. Apart from financial resources, there are other measures as well, which need to be put into practice within the course of acquisition of education, these are honing communication skills; alleviating conditions of poverty and backwardness; generating information among girls regarding significance of education; providing equal rights and opportunities to girls; inculcating the traits of diligence, resourcefulness and conscientiousness and managing stress and anger. These are stated as follows:

Honing Communication Skills

The tribal women need to focus upon honing of communication skills. The communication skills are regarded as the key in acquiring education, achieving personal and professional goals and bringing about improvements in one's overall quality of lives. When the tribal women are focusing upon honing communication skills, there are various aspects that need to be taken into account, i.e. making use of polite language and decent words, treating others with respect and courtesy, providing accurate information and implementing the traits of morality and ethics. When the individuals possess good communication skills, they are able to do well in their lives. These skills render a significant contribution in enriching the overall quality of lives of the tribal individuals. Hence, the tribal individuals need to learn to integrate with the mainstream society. Therefore, one is able to acknowledge on a wide scale that honing communication skills is regarded as one of the fundamental measures to be implemented in promoting education among tribal women.

Alleviating conditions of Poverty and Backwardness

The tribal individuals are residing in the conditions of poverty and backwardness. The conditions of poverty are characterised by scarcity of financial as well as material resources. Whereas, the conditions of

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backwardness are characterised by seclusion and unawareness in terms of various aspects. When the tribal individuals are to acquire good-quality education, they need financial resources. The financial resources need to be spend on stationary, technology, bags, transportation and so forth. Hence, when the individuals will be overwhelmed by the conditions of poverty, this is apparently understood, they will experience problems in fulfilling their needs and requirements. When the tribal individuals are residing in the conditions of poverty, they undergo problems in achieving their goals and objectives and doing well in their lives. Hence, they need to move on and learn to integrate with the mainstream society. Therefore, one is able to acknowledge on a comprehensive basis that alleviating conditions of poverty and backwardness is regarded as one of the key measures to be implemented in promoting education among tribal women.

Generating information among Girls regarding Significance of Education

In tribal communities, it is of utmost significance for the individuals to generate information among girls regarding significance of education. In this case, emphasis is put upon making provision of information among girls, regarding how education will prove to be efficacious and worthwhile to them. When the tribal women will recognize the meaning and significance of education, they aspire to acquire good-quality education, promote better livelihoods opportunities and enhance their overall personality traits. Furthermore, they will be able to differentiate between appropriate and inappropriate. Through acquisition of education, the women will be able to provide solutions to the problems and challenges within the course of achievement of goals and objectives, sustaining their living conditions in an adequate manner and bringing about improvements in their overall quality of lives. Therefore, one is able to identify well that generating information among girls regarding significance of education is regarded as one of the essential measures to be implemented in promoting education among tribal women.

Providing Equal Rights and Opportunities to Girls

The girls need to be provided with equal rights and opportunities. They should be encouraged towards acquisition of education and participation in other tasks and activities. The tribal individuals need to bring about changes in their viewpoints in terms of girls and women. They need to understand that girls can also render a significant contribution in promoting well-being of their families and communities. When the girls are enrolled in educational institutions to hone their educational skills, in such cases, they need to be provided with the opportunities to make use of their educational qualifications, skills and abilities. The girls should not be discriminated against and should be provided with equal rights and opportunities as compared to their male counterparts. This needs to be applied within households as well as educational institutions. Therefore, one is able to acknowledge well that providing equal rights and opportunities to girls is regarded as one of the essential measures to be implemented in promoting education among tribal women.

Inculcating the traits of Diligence, Resourcefulness and Conscientiousness

Acquisition of education is not a manageable task. The individuals need to put into operation and abide by certain norms, values, rules and laws that are necessary to acquire education. The individuals are required to experience number of problems and challenges within the course of acquisition of education. Through inculcating the traits of diligence, resourcefulness and conscientiousness, they are able to provide solutions to their problems and achieve academic goals. In educational institutions at all levels, within the course of learning and understanding academic subjects and lesson plans, there are number of tasks and

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activities, which they need to put into operation. These are, class assignments, homework assignments, tests, exams, competitions, quizzes and other academic activities. Through inculcating the traits of diligence, resourcefulness and conscientiousness, the students will be able to do well and generate the desired outcomes. Hence, within households, the parents need to inculcate these traits among their children. In this manner, they will not only be able to do well in their studies, but will be able to achieve personal and professional goals and bring about improvements in their overall quality of lives. Therefore, one is able to identify well that inculcating the traits of diligence, resourcefulness and conscientiousness is regarded as one of the significant measures to be implemented in promoting education among tribal women.

Managing Stress and Anger

In personal as well as professional lives of the individuals, they need to be encouraged to participate in various tasks and activities, which are complicated. In this manner, they will possess the abilities to work under stress and manage it in an appropriate manner. On the other hand, they should learn to manage anger and prevent it from assuming a major form. Within the course of pursuance of education and achievement of academic goals, the individuals are required to experience number of problems and challenges. When these are severe, in such cases, the individuals are likely to experience the psychological problems of stress and anger. These need to be managed in an appropriate manner. Furthermore, they need to be prevented from having unfavourable effects upon the overall quality of lives of the individuals. Hence, within homes, the parents need to train their girls in terms of managing stress and anger. Therefore, it is well-understood that managing stress and anger is a vital measure to be implemented in promoting education among tribal women. Through this measure, the students will be able to promote a normal mind-set. As to acquire education and to participate in various types of tasks and activities, it is indispensable for the individuals to promote normal mind-set. For this purpose, they need to be healthy physically as well as psychologically.

Conclusion

In the present existence, the tribal women have recognized the meaning and significance of education. They aspire to acquire good-quality education, promote better livelihoods opportunities and enhance their overall personality traits. The rate of education among tribal women is low. They experience number of problems and challenges. In tribal communities, there is a need to formulate measures and programs that are necessary in bringing about improvements in the system of education. Furthermore, girls should be encouraged towards acquisition of education. Problems experienced by tribal women in acquisition of education are, implementation of household responsibilities, early marriage, discriminatory treatment, conditions of poverty, inadequate instructional strategies, inadequate teaching-learning materials, shortage of teachers, lack of infrastructure, amenities and facilities, inappropriate assessment strategies and lack of academic activities. Measures to be implemented in promoting education among tribal women are, honing communication skills; alleviating conditions of poverty and backwardness; generating information among girls regarding significance of education; providing equal rights and opportunities to girls; inculcating the traits of diligence, resourcefulness and conscientiousness and managing stress and anger. Finally, it can be stated, when tribal women are encouraged towards acquisition of education, they are able to achieve personal and professional goals and bring about improvements in their overall quality of lives.

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MODELING BARRIERS IN THE ADOPTION OF BLOCKCHAIN TECHNOLOGY IN THE INDIAN HEALTHCARE SECTOR: A QUALITATIVE APPROACH

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Abstract
Blockchain is a revolution on par with the Internet. The Internet solved the problem of information and communication, but it could not address the concerns of Trust and Intermediaries. Blockchain Technology is the answer to these problems. It is a revolutionary technology poised to have a tremendous economic impact equal to that of the Internet in recent decades. Experts hail it as internet 2.0. Finance, charity, retail, government, insurance, agriculture, and other industries actively use blockchain development services, and healthcare is no exception. This paper attempts to identify and model the barriers to adopting Blockchain technology in India's healthcare sector using a qualitative technique called Interpretive Structural Modelling (ISM). MICMAC Analysis is further used to illustrate the driving and dependence power of the variables under study.
9 Barriers were finalized by extensive literature review and two brainstorming sessions with field experts. After partitioning these barriers into six levels, Cyber-attacks and Privacy threats(C2) were found as the primary barriers to Blockchain adoption. Cyber-attacks and privacy threats have excellent driving power, leading to Scalability issues(C1), which drive legal and Regulatory challenges(C8). Legal and Regulatory challenges further drive the high cost of sustainability(C7), which drives interoperability issues(C6). High energy consumption(C3), Slow Processing Speed(C4), Human Resource Limitation(C5), and lack of public awareness came at the top of the hierarchy, meaning they are the most dependent variables, driven by the variables at lower hierarchies.
Further, on doing MICMAC analysis, these 9 Barriers to Blockchain Technology in India were separated into three groups, i.e., dependent, linkage, and independent variables, and there are no autonomous variables in the system. Dependent variables are C5, C8, and C9, while variables C1, C3, C4, C6, and C7 are entering the third quadrant concerning their linking nature, hence placed as a linkage variable. C2 lies in the fourth quadrant and is thus an independent variable.

1. Introduction:

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We live in an era of rapid shift, and the world around us is changing incredibly. Novel technologies in the 21st century significantly impact how people live, socialize, and work. These advances and innovations challenge traditional methods of delivering goods and services, conducting business, and making payments. If our previous history is any indication, our immediate future will change at a rate unprecedented in human history. It is a shift toward development anticipated by the human being.

New technologies are causing significant changes. Blockchain technology is said to be a revolution on par with the Internet. The Internet alleviated information and communication difficulties, but there were particular challenges it couldn't address, such as trust and intermediaries. Blockchain technology can help with these issues.

The decentralization of the web and the disintermediation of many online services will be enabled by blockchain technology. People's interactions with automated data processing and the IoTs (Internet of Things) have transformed how we store information, remember events, and recall them. Likewise, decision-making has also evolved into an art form.

According to Don Tapscott (2016), the scope of blockchain extends beyond financial services.

There are many other potential areas, including voting, real estate, supply chain management, and healthcare. Healthcare is open to change since it faces issues that blockchain can address with its immutability, fraud prevention, and ability to transfer data between firms without requiring trust. (Bell *et al.*, 2018)

The Healthcare sector, in terms of revenue generation and employability, is one of the biggest sectors in India. It includes medical services, infrastructures like hospitals and clinics, medical equipment and its manufacturing units, medical tourism, medical insurance, the manufacture of drugs, and several other provisions that facilitate patient healthcare. It contains several industries of different natures, ranging from research and manufacturing to facilitating management. It is the sector that touches every person in and across the country in one way or the other. Researchers worldwide are indulging in studies investigating the scope of blockchain technology in the healthcare sector and tackling the challenges and problems to make it more efficient and easy to use. (McGhin *et al.*, 2019)

Blockchain Technology may be a front-runner for advancing the Healthcare Sector of India. However, presently there are certain hurdles in tapping the potential of this technology. This paper thus explores the barriers to adopting blockchain technology in India's Healthcare Sector.

2. Background Literature

Mark Van Rijmenam and Philippa Ryan, in their book transforming your business and our world (2019), demonstrate how blockchain technology gives a way to address major challenges concerned with the economy, environment, and society.

Blockchain technology is defined by Sara Saberi et al. (2018) as "a distributed digital ledger technology that offers transparency, traceability, and security."

Although this technology is still in its nascent stage in India, it is rapidly gaining traction. As a result, it's critical to look into India's adoption concerns. Technology adoption by users has been described as a complex process (Newell et al., 2000; Wang and Qualls, 2007). Moreover, the success of technology is determined by

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the actions of implementers such as the government, clients, and others. (Hota 2017). Moreover, a country's socio-economic and political situations profoundly impact the performance and accomplishment of the technology. (Hota 2017) (Altenburg and Lundvall,2009; Chinyanyu and Watkins-Mathys,2011).

Blockchain is a revolutionary technology altering the digital world by providing a new viewpoint on system security, robustness, and efficiency. While Bitcoin made it famous, Blockchain is more than a cryptocurrency basis. It provides a safe environment for exchanging any good service or transaction. Trusted alliances are becoming more critical in industrial growth, but increased rule, cybercrime, and scam impede expansion. Blockchain will enable additional flexible value chains, rapid product inventions, closer customer relationships, and quicker integration with IoT and cloud technology to address these difficulties. Furthermore, blockchain technology substantially cuts trade costs by providing a reliable contract monitoring system that eliminates the need for third-party intervention that may not provide direct benefit. (Amaba, 2017)

While blockchain research has grown considerably in the last few years, there is still much to be discussed about blockchain's acceptability and role in the existing technology acceptance literature. Blockchain technology's capabilities and claimed advancements will not transfer to applicability if users do not accept the technology. The acceptability, or lack thereof, of new information systems, is a persistent hindrance to their adoption and dissemination. By moving the attention and authority to the users, blockchain systems strive to decentralize information and transactions. This raises the issue because, by design, the system cannot rely exclusively on the adoption of trusted third parties but must also depend upon the customers it is intended to serve. (Jaoude&Saade, 2019).

According to Boschi, Alexandre et al. (2018), blockchain technology helps customer operations gain visibility into the working of blockchain works. That ends up in learning comprehensively about the traceability of the product. (Zheng, Xie, Dai, Chen, & Wang, 2017).

Blockchain will profoundly impact future generations, shaping future developments in education, governance, healthcare, financial system, agriculture, and more. (Don Tapscott, 2016). Don Tapscott (2016) further suggested that the scope of blockchain technology is way more than the financial system.

Public, Permissioned, and Private are the types in which a Blockchain can be categorized. A public Blockchain is one in which anyone with proof of work can read or publish on the platform. A permissioned Blockchain allows only specified blocks to access and ascertain consent on specific transactions, allowing for limited transparency. On the other hand, a private Blockchain only allows selected members to join the network. (Deloitte, 2017)

Blockchain technology can provide significant value to its users. (Prathyusha, Kavya, &Akshita, 2018)

Table 1: Background Literature

S.NO.	AUTHOR/YEAR	NAME OF JOURNAL/BOOK	THEME
1	(Van Rijmenam and Ryan, 2018)	Transforming Your Business and Our World	Blockchain technology is the development after the Internet that the world has seen in decades. It has the potential to solve the pressing challenges that the world is facing today.

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2	(Don Tapscott, 2016)	Harvard Business Review	Blockchain technology is intended to sketch out the next generation of affluence in governance, finance, healthcare, agriculture, etc.
3	(Amaba, 2017)	Blockchain technology innovations	Blockchain will enable additional flexible value chains, rapid product inventions, closer customer relationships, and quicker integration with IoT and cloud technology to address these difficulties
4	(Deloitte, 2017).	Deloitte	Blockchain technology is divided into three categories: Public Blockchain Technology, Permissioned Blockchain technology, and Private Blockchain Technology.
5	(Prathyusha, Kavya and Akshita, 2018)	International Journal of Computer & Mathematical Sciences	The blockchain revolution can be crucial in turning India into a digital society.
6	(Altenburg and Lundvall,2009; Chinyanyu and Watkins-Mathys,2011)	Handbook of Innovation Systems and Developing Countries	A country's socio-political and economic conditions have an enormous influence on the success of the technology.
7	(Newell et al., 2000; Wang and Qualls, 2007)	Journal of Industrial Management & Data Systems	Technology adoption has been elaborated as a complex process by the respective users.
8	(Cachin, 2016)	IBM Institute for Business Value	Blockchain technology has been continuously researched and explored by enterprises across industries.
9	(Lakhani & Iansiti, 2017)	Harvard Business Review	The authors explained how used cases for novel foundational technologies evolve by proposing a two-dimensional four-by-four matrix.
10	(Tveita and Borander, 2018)	The Adoption of Blockchain Technology in Norwegian Corporations	Blockchain technology has been considered a transformational phase of technological evolution.
11	(Bhattacharyya, 2019)	White paper of Institute for Development and Research in Banking Technology	Telangana, Andhra Pradesh, Maharashtra, and Kerala are some of the states in India which have begun driving the blockchain agenda aggressively.

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12	(Summary, 2019)	NASSCOM Avasant India Blockchain Report 2019	Think tanks across different industries are researching more about blockchain technology. In addition, the stakeholders are developing solutions and services for the same.

2.1 The Healthcare Sector of India and Blockchain Technology

The Healthcare sector of India remains in abysmal and appalling condition. It is lying behind the requirement that the World Health Organization has set up to serve the masses, such as the number of doctors, nurses, and medical technicians. The healthcare market is expected to be around 8.6 trillion by 2022. (Prema, Kathiravan and Shaikh, 2021)

According to the Economic Survey 2022, India's public expenditure on healthcare stands at 2.1 percent of the total Gross Domestic Product. Hence, the sectors need attention and go hand in hand with the latest technological advancement. Due to budget constraints, India's health system can be termed inadequate, appalling, and inconsistent. (Finance Ministry, 2022)

Arvind Kasthuri's Challenge to Healthcare in India- The Five A's" has highlighted five significant challenges in the healthcare sector in India. They are lack of awareness, access to healthcare, absence or the crisis of human power, affordability or the cost of healthcare, and the lack of accountability in healthcare. (Kasthuri, 2018)

The author of "Scaling of Health Information Systems in India: Challenges and Approaches" has observed that pragmatically, scaling up healthcare information systems in Primary Health care is an intricate ambition for three reasons. Firstly, the inimitable difficulty of "all or nothing." It means data of the whole state is needed in a single format using the same logic to compute indicators. Secondly, the political issue arises from a clash of interests among contributors, vendors, politicians, and bureaucrats. Thirdly, the permanent volatility and change in this domain are also a significant concern due to inconsistent political change, uneven reforms in technological demands, and significant variations in public health needs. (Sahay and Walsham, 2006)

Poor health quality is a global issue that is not only confined to India. Medical personnel who make little effort to ensure that patients receive high-quality care, geographic differences in healthcare quality, and high incidence of medical errors have been identified in research findings from several industrialized and developing countries. (Manoj Mohanan, Katherine Hay, 2016)

The COVID-19 pandemic's extensive death and disruption exposed existing institutions' shortcomings in safeguarding human health and well-being. The shortage of adequate and timely data and widespread misperception create significant harm and increase tension between data privacy and public health. (Khurshid, 2020)

Cloud technology and mobile health apparatus have become more common. In the internet era, the potentiality of malicious intrusions and the compromise of private information have also increased. The sharing of health information and privacy issues associated with such sharing has been increased. It has

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become more difficult to access such health information through smartphones, making patients travel to many doctors. Hence, the healthcare industry faces several challenges, particularly authentication of the information provided, interoperability of data, privacy concerned with data sharing, the exchange of medical information, and concerns for mobile health. (McGhin *et al.*, 2019)

In 2015, the "Digital India" campaign was announced by the Indian government. It intended to bring digital transformation to India through a digitally empowered society and knowledge economy. With the announcement of the Ayushman Bharat Digital Mission, National Tele Mental Health Program, in the budget of 2022, the government has made clear intentions toward digitization and technological advancement in the healthcare sector. With digitization in the sector, several concerns and challenges come forth, too, like privacy and cyber threat, high cost, infrastructure, etc. The aims and objectives of digitizing health data are to achieve "health for all." However, it has not yet met its expectations, as data digitization is a colossal and complex task. At the same time, it is inevitable as it forms the foundation of healthcare delivery based on accessibility, affordability, and quality. (Ranganathan, 2020)

Furthermore, the government initiated the National Digital Health Blueprint Policy to pursue the digitization of India's healthcare sector. It offered a comprehensive architectural framework of a "Federated National Health Information System." It was intended to connect primary, secondary, and tertiary healthcare systems within private and public healthcare provider organizations.

The policy is an extended version aligned with the National Health Policy of 2017 that aims to formulate and incorporate information systems concerning all healthcare system stakeholders to improve transparency, efficiency, and the citizens' experience. (Gudi *et al.*, 2021)

Blockchain technology appears to be a feasible solution. Its qualities of decentralization, immutability, transparency and traceability can improve the exchange and storage of healthcare information. However, many organizations associated with healthcare are apprehensive of embracing such novel blockchain technology due to several challenges like privacy and security of the data, authorization, interoperability issues, and human resources having technical skills required for the same. (Abu-elezz et al., 2020)

Numerous obstacles to implementing blockchain technology in industries and services demand immediate consideration. (Biswas & Gupta, 2019)

Healthcare applications on blockchain technology require a more robust authentication system, interoperability, and information-sharing system due to strict guidelines and rules enumerated in government laws such as the Health Insurance Portability and Accountability Act of 1996. Some advancements in the field include fraud detection, identity verifications, and smart contracts. Even after all such advances and development in the area, there are challenges, vulnerabilities, and issues that blockchain technology comes with, like mining threats, crucial management systems, and mining incentives. (McGhin *et al.*, 2019)

Blockchain is an innovative technology that provides greater accuracy and traceability for the artifacts it is used to create and the domains it supports. Blockchain technology is believed to comprehensively support the healthcare sector, including medications, medical equipment, health records, and the transfer of medical records to patients using unified registers. A large-scale registry of a country's complete health system could help with accountability and detect crucial supply chain improvement spots. It may allow for the fast and exact detection of new human dangers in the form of new viruses and illnesses, such as Covid 19, which

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necessitated swift government response to reduce human losses. (Kassab *et al.*, 2021)

Patients' private information, such as their names, addresses, and diseases, is often breached in today's smart cities and houses, raising the privacy and security of electronic health records. The current state-of-the-art security measures for Electronic Health Records have rendered data not accessible to patients in most cases. The system has a hard time striking a good balance between data privacy and accessibility of Electronic Health Records. Hence, patients and providers need to interact with data regularly. These schemes exchanges decentralized and transactional data. Blockchain Technology solves such problems, which can be leveraged in the healthcare sector to maintain the balance between privacy and accessibility of EHRs. (Vora *et al.*, 2019)

There is a worldwide shortage of efficient EHR (Electronic Health Record) infrastructure. The global healthcare industry currently spends 2.3 trillion dollars, and the cost is rising at around 5.6 percent per year. However, the results of these most expensive charges are not revolutionary. Within 30 days of discharge, a person (one in five) risks returning to the hospital. When you look at the cost structure of spending, you'll notice that around a quarter of it is deemed waste. When you examine this waste, it has been found that there are two major factors behind it:

(a) The administrative expenditures associated with such large amounts of data.
(b) Failure to deliver the correct facts to the right person at the right time so they can make well-informed judgments. Blockchain technology can transform how we handle our health information systems on a network. (Shah *et al.*, 2018)

Most national health systems are now attempting to compile all personal medical information about a single patient into a single electronic medical record, known as Electronic Health Record (EHR). This type of record provides valuable information gathered throughout a person's life. However, it is frequently controlled by medical institutions and practitioners who are not technically knowledgeable or equipped to provide adequate security measures. Furthermore, most medical institutions save and create patient medical records in various formats incompatible with other countries and multiple labs within the same hospital. Many suggestions to employ a blockchain have arisen due to the need for a system to securely handle and retain medical records.(Di Francesco Maesa and Mori, 2020)

Counterfeit medications are a global problem, and every government is now dealing with it. According to the National Drug Survey 2014-2016, undertaken by the National Institute of Biologics, Ministry of Health & Family Welfare, fraudulent medications are a big problem in India, with around 3% of pharmaceuticals being substandard or counterfeit. In the highly regulated pharmaceutical business, blockchain technology offers the potential to increase transaction transparency, efficiency, and dependability. Manufacturers and other supply chain actors may use blockchain to access real-time data and increase visibility throughout the supply chain, from manufacturing to the point of sale. (Ayog, 2020)

The blockchain-based model considers data integrity concerns and the development of regulated and codified contracts for data access, offering the healthcare industry a new dimension. When working with Electronic Health Records, which save data in different ways, it's tough to figure out who, what they're doing, and when they're done. Each process has a timestamp and an identity in the blockchain-based paradigm, and copies are distributed to each network point. As a result, any change or update to a node is

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spread uniformly throughout all nodes and visible to anyone visiting it from anywhere on the earth. (Onik *et al.*, 2019)

As an emerging technology, blockchain is gaining traction, with more applications likely to emerge shortly. Blockchains are being used to overcome challenges in systems vulnerable to assaults because they provide a decentralized and distributed ledger system without the help of any intermediaries or a third trusted party. Researchers have focused on healthcare as one prospective industry that could be benefited from blockchain technology. There are several challenges, like fragmented patient data, a unitary system seen as a single point of attaching by the aggressors, and the lack of patient-oriented services. (Shuaib *et al.*, 2019)

Electronic healthcare data must be accessible to provide an efficient treatment system, policy choices, and healthcare data/information exchange. Healthcare data is vulnerable to privacy and security breaches due to the non-physical nature of digital data. When a nationwide healthcare and wellness program is envisaged, the significance of immutability and healthcare data security and privacy has become even more critical. Providing high-quality healthcare to a large population is complex and necessitates adequate technological infrastructure. Society's collaboration is also vital in laying such a vast infrastructure for healthcare services to work smoothly. (Pandey and Litoriya, 2020)

Blockchain technology has made significant development in industries like healthcare in recent years. Personal and sensitive information in medical records must be kept safe and secure. In the initial stages of the design and development, several firms have established unique technologies with the potential to maximize medical data, such as heterogeneous transparency and operational capabilities. Blockchain provides a novel and potentially distributed platform for enhancing and supporting healthcare data integration for various uses and stakeholders. (Alonso *et al.*, 2019)

There are several obstacles to knowledge exchange and dissemination in healthcare. Service providers and patients must use a combination of secure data-sharing technologies to make educated clinical decisions. The digitization of medical records opens new possibilities for researching medical trends and assessing treatment quality. Relevant technologies are still in their infancy, but blockchain has the potential to help the support service in a variety of ways. Simultaneously, electronic documents are isolated in locally centralized data storage, obstructing future progress. The use of blockchain enhances connectivity while simultaneously ensuring security, privacy, and cost savings for all parties involved. (Prokofieva and Miah, 2019)

The benefits of blockchain adoption, like any other emerging technology in healthcare, come with several drawbacks. Difficulties occur due to the need to preserve thoroughly dispersed patient data, the massive volume of clinical data created, and the forking of blockchains due to consensus changes. Many blockchain applications store patient data and information using a hybrid approach, storing rules and references to data in either a secure, centrally owned system or a private blockchain. This may seem completely negate the purpose of distribution, as it is only one step away from centralized ownership, yet, its implementation is crucial. (Kamel Boulos, Wilson and Clauson, 2018).

Table 2: Blockchain Technology and Healthcare Sector of India

S.NO.	AUTHOR/YEAR	NAME OF JOURNAL/BOOK	THEME
1	(Abu-elezz et al., 2020)	International Journal of Medical Informatics	This article examines and categorizes the rewards and drawbacks of using blockchain technology in healthcare.

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2	(McGhin et al., 2019)	Journal of Network and Computer Applications	This paper discusses several potential research opportunities.
3	(Kassab et al., 2021)	IEEE Transactions on Emerging Topics in Computing	This article outlines and categorizes existing blockchain benefits and challenges in healthcare.
4	(Vora et al., 2019)	2018 IEEE Globecom Workshops-Proceedings	This research looks at how our projected outline fits the requirements of patients, providers, and third parties in healthcare 4.0 while addressing privacy and security concerns.
5	(Shah et al., 2018)	International Conference on Circuits and Systems in Digital Enterprise Technology, ICCSDET 2018	Medical research institutes and health insurance businesses can both benefit from blockchain technology.
6	(Onik et al., 2019)	Big Data Analytics for Intelligent Healthcare Management	Explores numerous blockchain technology solutions for healthcare
7	(Di Francesco Maesa& Mori, 2020)	Journal of Parallel and Distributed Computing	In this paper, many exciting applications of blockchain technology have been surveyed.
8	(Shuaib et al., 2019)	Journal of Personalized Medicine	This study has researched and analyzed the recent literature on blockchains to address difficulties in modern healthcare information systems.
9	(Pandey &Litoriya, 2020)	Health Policy and Technology	The social and technical challenges of establishing large-scale comprehensive healthcare services are assessed in this study, and a technology-intervening solution to serve society is proposed.
10	(Alonso et al., 2019)	Journal of Medical Systems	This paper's major purpose is to review prevailing research on blockchain technology used in e-health.
11	(Prokofieva& Miah, 2019)	Australasian Journal of Information Systems	Potential uses of blockchain technologies in healthcare have been found in this study after undertaking the most recent systematic literature review to produce a new source of proof.

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12	(Kamel Boulos et al., 2018)	International Journal of Health Geographics	Blockchain technologies are being investigated for use in public health and healthcare in various disruptive ways.

Based on the literature review, the barriers to user acceptance of Blockchain Technology have been determined from India's healthcare perspective. A list containing these variables and their description is presented in Table 3.

Table 3: List of identified Variables for barriers to user acceptance of Blockchain Technology

S.No.	Variable	Description
1	C1	Scalability Issues- The transaction processing rate is minimal, which eventually triggers scalability issues with blockchain technology. (McGhin *et al.*, 2019)
2	C2	Cyber-attack & Privacy Threats- Domain name systems (DNS) and mem-pool assaults, in which blocks are filled with transactions, make blockchain technology vulnerable to cyber-attacks. In addition, the aggressor takes charge of the more significant part of blockchain networks. (Angraal, Krumholz and Schulz, 2017)
3	C3	High energy consumption-High energy consumption due to many users joining the network is a significant barrier for acquirers of public blockchains. (Chamola *et al.*, 2020)
4	C4	Slow Processing Speed-Because all network members must validate a Blockchain-based transaction, it takes longer to complete than a traditional transaction. As a result, increasing processing speed is a challenging task. (Kogure *et al.*, 2017)
5	C5	Human Resource Limitation-One study found that the human resource working in the field of maintenance of pharmaceutical supply chain having expertise in blockchain technology and those who lack the required technical ability was an issue. (Di Francesco Maesa and Mori, 2020)
6	C6	Interoperability Issues- The minimal trust between parties and restricted open standards have been blamed for the interoperability problem that complicates health information between healthcare institutions' overall giving and taking of health information. (Kassab *et al.*, 2021)
7	C7	High Cost of Sustainability-Although blockchain has the potential to save money in the long term, the initial setup expenses are substantial. According to one analysis, each Bitcoin transaction requires a processing cost of more than USD 0.30.(Kamel Boulos, Wilson and Clauson, 2018)
8	C8	Legal and regulatory challenges: The disengagement of an arbitrator/mediator and the decentralization of medical information results in difficulty for the legal system to allow access to incorporate blockchain technology. Blockchain use in healthcare may be constrained by a lack of government rules, guidelines, and norms. (Tanwar, Parekh and Evans, 2020)
9	C9	Lack of general awareness-The lack of awareness among stakeholders is the most significant impediment to Blockchain implementation. (Deloitte, 2017)

The stepwise methodology applied for modeling the variables by employing the ISM technique is discussed in the following sections. Table 4 summarizes the ISM analysis elements, contextual relation, and interpretation.

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Table 4: Elements, Contextual Relationship, and Interpretation for barriers to user acceptance of Blockchain Technology

Element code	Elements	Contextual Relation
C1	Scalability Issues	Factor C1 will influence/enhance Factor C2
C2	Cyber-attack & Privacy Threats	
C3	High energy consumption	
C4	Slow Processing Speed	
C5	Human Resource Limitation	
C6	Interoperability Issues	
C7	High cost of sustainability	
C8	Legal and regulatory challenges	
C9	Lack of public awareness	

3. Research Methodology

The basic methodology of the research paper is to create a conceptual research model based on a literature review and interpret the model. A detailed literature review was conducted to aid in selecting research variables in general and the healthcare industry.

The next step was to undertake Qualitative Modeling of Research Constructs. Domain experts' input was gathered to determine the inter-relationship between the factors. The hierarchical relationship between the variables was identified using a qualitative technique called Interpretive Structural Modeling (ISM). MICMAC Analysis is used to illustrate the driving and dependence power of the variables.

4. ISM for Barriers to the adoption of Blockchain Technology in the Healthcare Sector in India

4.1 List of Variables obtained by a thorough literature review:

I. Scalability Issues
II. Cyber-attack & Privacy Threats
III. High energy consumption
IV. Slow Processing Speed
V. Human Resource Limitation
VI. Interoperability Issues
VII. High cost of sustainability
VIII. Legal and regulatory challenges
IX. Lack of public awareness

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4.2 SSIM matrix:

Table 5: SSIM matrix

	C1	C2	C3	C4	C5	C6	C7	C8	C9
C1	-	A	X	X	V	X	X	V	X
C2		-	O	X	V	X	O	X	V
C3			-	X	O	X	X	A	O
C4				-	O	X	X	O	O
C5					-	A	A	O	X
C6						-	A	X	O
C7							-	A	O
C8								-	X
C9									-

4.3 Reachability Matrix:

Table 6: Reachability Matrix

	C1	C2	C3	C4	C5	C6	C7	C8	C9
C1	1	0	1	1	1	1	1	1	1
C2	1	1	0	1	1	1	0	1	1
C3	1	0	1	1	0	1	1	0	0
C4	1	1	1	1	0	1	1	0	0
C5	0	0	0	0	1	0	0	0	1
C6	1	1	1	1	1	1	0	1	0
C7	1	0	1	1	1	1	1	0	0
C8	0	1	1	0	0	1	1	1	1
C9	1	0	0	0	1	0	0	1	1

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4.4 Level Partitioning

The Reachability Matrix is partitioned into six levels .

Table 7: Iteration 1

Variable	Reachability Set	Antecedent Set	Intersection Set	Level
C1	C1, C3, C4, C5, C6, C7, C8, C9	C1, C2, C3, C4, C6, C7, C9	C1, C3, C4, C6, C7, C9	
C2	C1, C2, C4, C5, C6, C8, C9	C2, C4, C6, C8	C2, C4, C6, C8	
C3	C1, C3, C4, C6, C7	C1, C3, C4, C6, C7, C8	C1, C3, C4, C6, C7	I
C4	C1, C2, C3, C4, C6, C7	C1, C2, C3, C4, C6, C7	C1, C2, C3, C4, C6, C7	I
C5	C6, C9	C1, C2, C5, C6, C7, C9	C6, C9	I
C6	C1, C2, C3, C4, C5, C6, C8	C1, C2, C3, C4, C6, C7, C8	C1, C2, C3, C4, C6, C8	
C7	C1, C3, C4, C5, C6, C7	C1, C3, C4, C7, C8	C1, C3, C4	
C8	C2, C3, C6, C7, C8, C9	C1, C2, C6, C8, C9	C2, C6, C8, C9	
C9	C1, C5, C8, C9	C1, C2, C5, C8, C9	C1, C5, C8, C9	

Table 8: Iteration 2

Variable	Reachability Set	Antecedent Set	Intersection Set	Level
C1	C1, C6, C7, C8	C1, C2, C6, C7	C1, C6, C7	
C2	C1, C2, C6, C8	C2, C6, C8	C2, C6, C8	
C6	C1, C2, C6, C8	C1, C2, C6, C7, C8	C1, C2, C6, C8	II

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C7	C1, C6, C8	C1, C7, C8	C1, C8	
C8	C2, C6, C7, C8	C1, C2, C6, C8	C2, C6, C8	

Table 9: Iteration 3

Variable	Reachability Set	Antecedent Set	Intersection Set	Level
C1	C1, C7, C8	C1, C7	C1, C7	
C2	C1, C2, C8	C2, C8	C2, C8	
C7	C1, C7	C1, C7, C8	C1, C7	III
C8	C2, C7, C8	C1, C2, C8	C2, C8	

Table 10: Iteration 4

Variable	Reachability Set	Antecedent Set	Intersection Set	Level
C1	C1, C8	C1, C2	C1	
C2	C1, C2, C8	C2, C8	C2, C8	
C8	C2, C8	C1, C2, C8	C2, C8	IV

Table 11: Iteration 5

Variable	Reachability Set	Antecedent Set	Intersection Set	Level
C1	C1	C1, C2	C1	V
C2	C1, C2	C2	C2	

Table 12: Iteration 6

Variable	Reachability Set	Antecedent Set	Intersection Set	Level
C2	C2	C2	C2	VI

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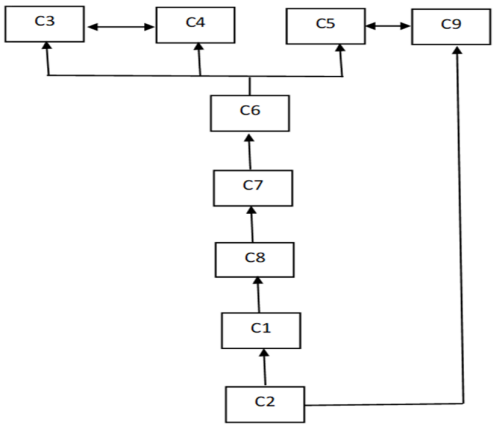
4.5 Diagraph:

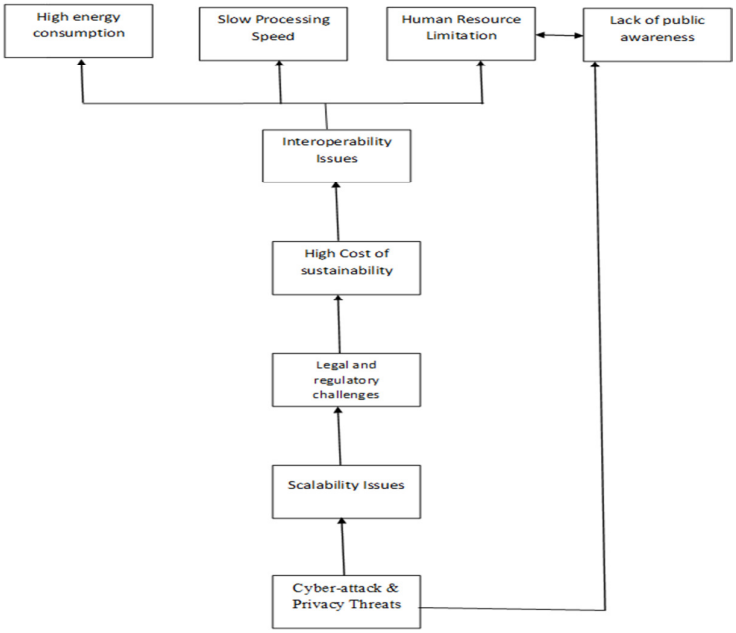
Based on the partitions, a digraph is drawn (Figure 1)

Figure 1- Diagraph:



4.6 ISM Model:

Figure 2- ISM Model:



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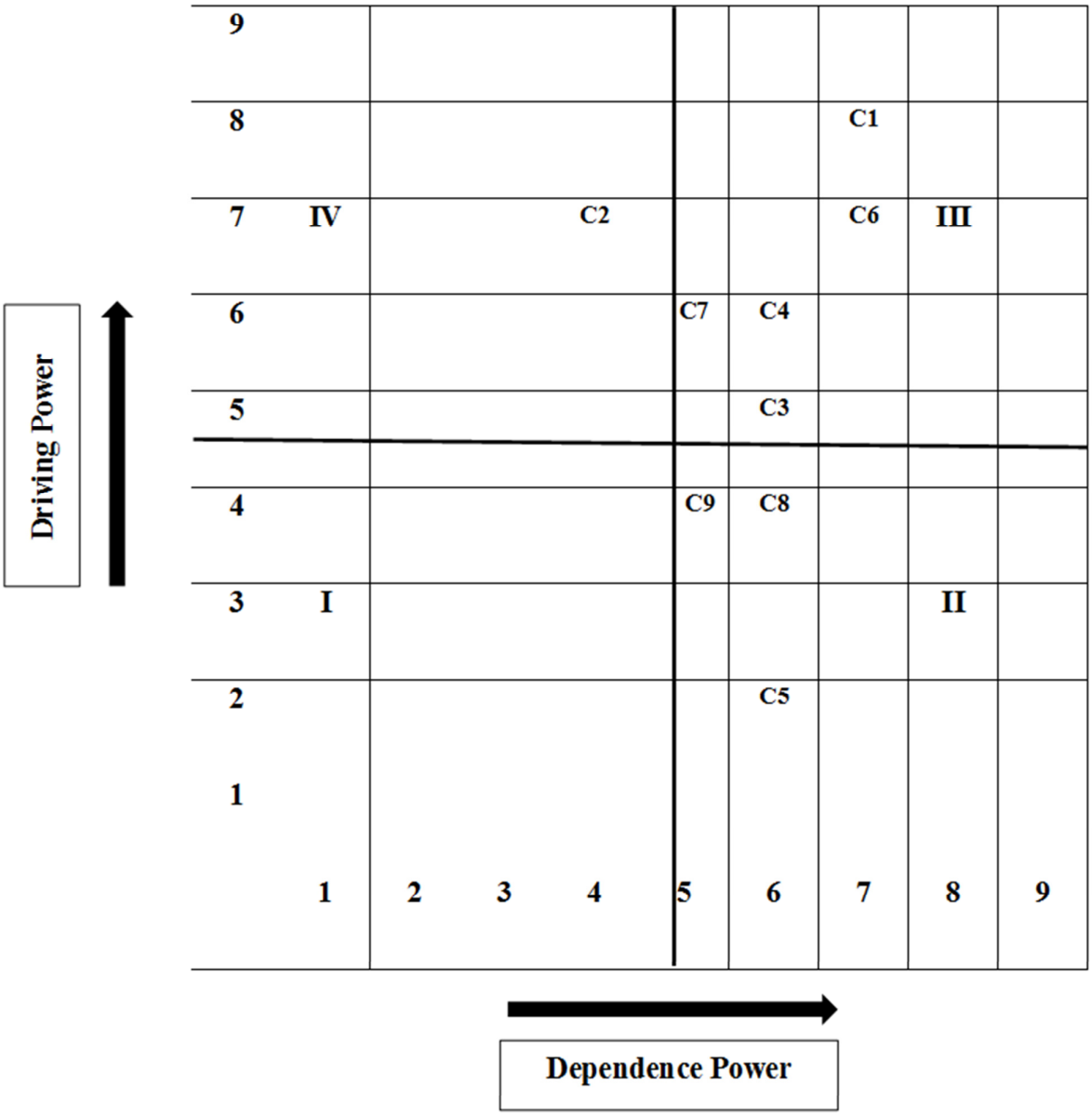
5. MICMAC Analysis

Figure 3



Variables could be differentiated into four clusters based on their driving and dependence power, namely:

Quadrant I-Autonomous Factors (These variables have a weak drive and dependence power.)

Quadrant II-Dependent Factors (These variables have strong dependence power but weak drive power)

Quadrant III- Linkage Factors (These variables have a strong drive and dependence power.)

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Quadrant IV- Independent Factor (These variables have a strong drive but weak dependence power.)

Barriers to Blockchain Technology in India are, thus, separated into three groups, i.e., dependent, linkage, and independent variables, and there are no autonomous variables in the system. Dependent variables are C5, C8, and C9, while variables C1, C3, C4, C6, and C7 are entering the third quadrant concerning their linking nature, hence placed as a linkage variable. C2 lies in the fourth quadrant and is thus an independent variable.

6. Conclusion

- The nine barriers to adopting blockchain technology were partitioned into six levels.
- The hierarchical structure of the model shows Cyber-attacks and Privacy threats as the primary barriers to Blockchain adoption.
- Cyber-attacks and privacy threats have excellent driving power, leading to Scalability issues, which drive legal and Regulatory challenges.
- Legal and Regulatory challenges further drive the high cost of sustainability, which drives interoperability issues.
- High energy consumption, Slow Processing Speed, Human Resource Limitations, and lack of public awareness came at the top of the hierarchy, meaning they are the most dependent variables, driven by the variables at lower hierarchies.

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Prof Saboohi planned and supervised the overall paper.

Anam Fatima Conducted the lit Review, Expert Survey and Reported the Results after conducting the ISM and MICMAC analysis.

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DEVELOPMENT OF CONVERSATION SKILLS IS CRUCIAL FOR LEADING TO ENRICHMENT OF LIVING CONDITIONS AND PERSONALITY TRAITS

Dr. Radhika Kapur

Abstract

From the stage of early childhood, throughout the lives of the individuals, they need to put emphasis upon development of conversation skills. The individuals, belonging to all communities, categories and backgrounds have aims and objectives to achieve in their personal and professional lives. In order to achieve the goals and objectives and lead to up-gradation of one's overall quality of lives, one needs to focus upon development of conversation skills. The parents and teachers have an important role to play in leading to development of conversation skills. But it is up to the individuals to pay attention towards these skills throughout their lives. The important aspects that need to be taken into account by the individuals are, possessing positive viewpoints in terms of other individuals, making use of decent words, treating others with respect and courtesy and possessing a pleasant personality. These aspects are regarded as the key in making conversation successful. Hence, one needs to pay attention towards reinforcement of these aspects on a regular basis. Therefore, the individuals understand that development of conversation skills is crucial for leading to enrichment of living conditions and personality traits. The main concepts that are taken into account in this research paper are, the aspects highlighting the significance of conversation skills, factors to be implemented in leading to development of conversation skills and development of conversation skills lead to enhancement of personality traits.

Keywords: Conversation Skills, Individuals, Information, Living Conditions, Personality Traits, Social Circle, Viewpoints

It is comprehensively understood that all individuals, irrespective of their communities, categories and backgrounds aspire to achieve their goals and objectives in personal and professional spheres, sustain their living conditions in an adequate manner and bring about improvements in their overall quality of lives. Hence, they need to focus upon development of conversation skills (Conversation Skills for Children, 2021). Conversation is referred to having a dialogue or a discussion with other individuals. From the stage of early childhood, throughout the lives of the individuals, they need to focus upon development of conversation skills. When the individuals are having a conversation with others within as well as outside the homes, they need to form positive viewpoints in terms of various aspects. One needs to treat others with respect and courtesy and not discriminate against anybody. One should not take into account the differences, particularly when they are working with each other. When one forms positive viewpoints, one will be successful in the implementation of various tasks and activities. In some cases, the conversation among individuals is focused

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upon putting into operation various job duties in an effective manner. Therefore, it is of utmost significance for the individuals to focus upon implementation of factors that lead to development of conversation skills.

When the individuals are putting into operation conversation skills, one needs to maintain eye contact. Conversation can be carried out with two or more individuals. Hence, one needs to ensure, eye contact is maintained with all. Maintaining eye contact signifies that one is paying attention to what the others are saying. When one observes that others are looking at them, they will be able to express their ideas and viewpoints without any stress. On the other hand, when the individuals are not maintaining eye contact and are paying attention to something else, one will experience problems in the implementation of conversation skills. Within households, educational institutions at all levels, in various types of employment settings and in public places, when the individuals are conversing with each other, they need to provide factual information. Factual and accurate information will enable the individuals to not only do well in their tasks and activities, but also form cordial and sociable terms and relationships with each other. One of the major aims of development of conversation skills is, one should form pleasant terms and relationships with others within as well as outside the homes. Therefore, implementation of appropriate factors will render a significant contribution in leading to development of conversation skills.

Within the course of implementation of conversation skills, one needs to make use of polite language and decent words. Among family members, relatives and friends, there is a joking relationship among individuals. When one is joking with others, then also, they need to make use of polite language and decent words (Audrey, 2020). One needs to ensure that they laugh with others and not at others. When one is engaged in a conversation with parents, grandparents, older family members, instructors, supervisors or employers, they need to converse with them in a polite and decent manner. When the individuals are conversing with each other, they are required to put forward questions. In asking questions, one needs to make use of civil and gracious tone of voice. One of the important aspects that needs to be taken into account is, one should not put forward questions to which answers are already known. As when the individuals possess the abilities to analyse, they will make an attempt to find answers to questions on their own. But when certain areas are complicated and one is not able to find answers on their own, they put them forward before others. Therefore, polite language, decent words and meaningful questions are regarded as key aspects in leading to development of conversation skills.

The Aspects highlighting the Significance of Conversation Skills

All individuals throughout their lives recognize the significance of conversation skills. They are aware that to achieve desired goals and objectives, form an effective social circle, sustain one's living conditions in an adequate manner and bring about improvements in one's overall quality of lives, one needs to get engaged into conversation with others. It is apparently understood by them that they cannot put into operation the job duties, particularly the ones that are complicated in seclusion. In other words, one needs to converse with others to acquire knowledge. Furthermore, in order to lead to enrichment of one's overall living conditions, it is necessary to form an effective social circle. Implementation of conversation skills in an adequate manner facilitates in formation of an effective social circle. Therefore, it is indispensable to implement conversation skills in an effective manner. The aspects highlighting the significance of conversation skills are, generating information regarding viewpoints and perspectives; obtaining help in case

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of complicated problems; forming an effective social circle; achieving desired goals and objectives in personal and professional lives and leading to enrichment of one's overall living conditions. These are stated as follows:

Generating Information regarding Viewpoints and Perspectives

When the individuals are putting into operation various job duties and responsibilities within homes, educational institutions at all levels and in various types of employment settings, they need to be well-aware and informative. In other words, one needs to be aware in terms of approaches and strategies. After the individuals have acquired an efficient understanding in terms of all these factors, they are required to be put into operation in a meaningful and efficient manner. One is able to augment their knowledge, skills and abilities through conducting research via various sources or they get engaged into conversation with others. The other individuals are, family members, instructors, classmates, supervisors, employers and colleagues. The research studies have indicated that in some cases, one is able to acquire adequate information by getting engaged into conversation with others, rather than by reading books, articles and other information on the internet. Therefore, when the individuals are able to generate information regarding viewpoints and perspectives through putting into operation conversation skills, they will be able to recognize their significance.

Obtaining help in case of Complicated Problems

Problems are regarded as an integral part of the lives of the individuals. In order to provide solutions to them, one needs to put into operation conversation skills. One needs to get engaged into conversation with others, particularly when they are to provide solutions to complicated problems. These may take place in the personal as well as professional lives of the individuals. It is apparently understood by them that they cannot put into operation the job duties, particularly the ones that are difficult in seclusion. In other words, one needs to converse with others to acquire support and assistance. When one is engaged in a conversation with parents, grandparents, older family members, relatives, instructors, community members, supervisors or employers, they are able to provide solutions to various types of complicated problems. Therefore, when the individuals are able to obtain help in case of complicated problems through putting into operation conversation skills, they will be able to recognize their significance.

Forming an effective Social Circle

In order to achieve the desired goals and objectives in both personal and professional lives, i.e. acquire good-quality education, get engaged in well-paid and reputed employment opportunities, generate a source of income, augment skills and abilities, sustain one's living conditions in an adequate manner and bring about improvements in one's overall quality of lives, it is of utmost significance to form an effective social circle. The formation of an effective social circle is facilitated in the personal and professional lives of the individuals, when one is paying attention towards reinforcing of conversation skills. When one is engaged in a conversation with individuals within as well as outside the homes, one will not only be able to form an effective social circle, but also contribute significantly in incurring the feelings of pleasure and contentment and also in leading to up-gradation of one's overall personality traits. Therefore, when the individuals form an effective social circle through putting into operation conversation skills in a well-organized and satisfactory manner, they will be able to recognize their significance.

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Achieving desired Goals and Objectives in Personal and Professional Lives

In the personal and professional lives of the individuals, the desired goals and objectives are, acquisition of good-quality education, getting engaged in well-paid and reputed employment opportunities, generating a source of income, augmenting skills and abilities, promoting better livelihoods opportunities, promoting health and well-being, forming an effective social circle, providing solutions to various types of problems in a satisfactory manner, sustaining one's living conditions in an adequate manner and bringing about improvements in one's overall quality of lives. In order to achieve these goals and objectives, one needs to recognize the meaning and significance of conversation skills. When one is engaged in a conversation with individuals within as well as outside the homes, one will be able to generate information in terms of viewpoints and perspectives and obtain help in providing solutions to complicated problems. Therefore, when the individuals are able to achieve desired goals and objectives in personal and professional lives, through putting into operation conversation skills in a well-ordered and suitable manner, they will be able to recognize their significance.

Leading to Enrichment of one's overall Living Conditions

In leading to enrichment of one's overall living conditions, the important factors that need to be taken into account are, acquisition of good-quality education; getting engaged in well-paid and reputed employment opportunities; augmenting skills and abilities; promoting better livelihoods opportunities; promoting health and well-being; forming an effective social circle; providing solutions to various types of problems in an adequate manner; reinforcing professionalism; forming cordial and pleasant terms and relationships with others; making wise and productive decisions; taking out time for all tasks and activities; inculcating the traits of morality and ethics and implementing the traits of diligence, resourcefulness and conscientiousness. The information in terms of these factors need to be acquired by all individuals, irrespective of their communities, categories and backgrounds. One is able to generate information in terms of these factors by putting into operation conversation skills in an adequate manner. Therefore, when the individuals are able to implement all the factors that are necessary in leading to enrichment of one's overall living conditions through implementing conversation skills, they will be able to recognize their significance.

Factors to be implemented in Leading to Development of Conversation Skills

From the stage of early childhood, throughout the lives of the individuals, one needs to generate information in terms of factors that lead to development of conversation skills. The information in terms of these factors is imparted to them within homes from their family members and from teachers in school. These factors are not difficult to understand (Koay, 2016). After the individuals have acquired an efficient understanding in terms of all these factors, they are required to be put into operation in a worthwhile and effectual manner. The important goals of all individuals are, acquisition of good-quality education, getting engaged in well-paid and reputed employment opportunities, forming an effective social circle, sustaining their living conditions in an adequate manner and bringing about improvements in their overall quality of lives. When the individuals are wholeheartedly determined towards achievement of all goals and objectives in both personal and professional spheres, they need to pay attention towards development of conversation skills. Therefore, one needs to put emphasis upon augmenting information in terms of these factors throughout their lives. Factors to be implemented in leading to development of conversation skills are stated

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as follows:

Forming Positive Viewpoints in terms of various Aspects

When the individuals are having a conversation with others, within as well as outside the homes, they need to form positive viewpoints in terms of various aspects. Apart from various aspects, they need to form constructive viewpoints in terms of other individuals as well. One needs to treat others with respect and courtesy and not possess any negative feelings nor discriminate against anybody. One should not take into account the differences, particularly when they are working with each other. When one forms positive viewpoints, one will be successful in the implementation of various tasks and activities. In some cases, the conversation among individuals is focused upon putting into operation various job duties in an effective manner. Hence, it is of utmost significance for the individuals to focus upon implementation of factors throughout their lives that lead to development of conversation skills. Therefore, forming positive viewpoints in terms of various aspects is a factor to be implemented in leading to development of conversation skills. This has been taken into account by the individuals, particularly when they are focused upon putting into operation various types of job duties within as well as outside the homes.

Speaking Clearly and Fluently

The individuals need to speak clearly and fluently, when they are conversing with others. The traits of clarity and fluency are regarded as fundamental in putting into operation conversation skills in a meaningful and appropriate manner. When the individuals take into account these traits within the course of implementation of conversation, they will be able to understand each other's ideas and viewpoints. Furthermore, one needs to make use of common language. The common language will be understandable to the individuals in a manageable manner. Clarity and fluency in the tone of voice are regarded as the key in putting into operation the conversation skills in a successful manner. The individuals will be able to depict clarity and fluency, when they will develop interest and enthusiasm in having a conversation with others. In other words, one should develop motivation within the course of putting into practice conversation skills. Therefore, speaking clearly and fluently is a factor to be implemented in leading to development of conversation skills. This has been taken into account by the individuals, when they are to carry out conversation in a successful manner in both personal and professional lives.

Maintaining Eye Contact

When the individuals are putting into operation conversation skills, one needs to maintain eye contact. When eye contact is maintained, one needs to possess pleasant facial expressions. Having a smile on the face leads to enrichment of conversation skills to a major extent. Conversation can be carried out with two or more individuals. Hence, one needs to ensure, eye contact is maintained with all. Maintaining eye contact signifies that one is paying attention to what the others are saying. When one observes that others are looking at them, they will be able to express their ideas and viewpoints without any stress. On the other hand, when the individuals are not maintaining eye contact and are paying attention to something else, one will experience problems in the implementation of conversation skills. In other words, one will experience stress within the course of putting into operation conversation skills in a satisfactory manner. Therefore, maintaining eye contact is a factor to be implemented in leading to development of conversation skills. This has been taken into account by the individuals, when they are conversing with others in a formal as well as

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in an informal manner.

Providing Factual Information

Within households, educational institutions at all levels, in various types of employment settings and in public places, when the individuals are conversing with each other, they need to provide factual information. There are numerous subjects and topics in terms of which they communicate with each other, hence, one needs to ensure, information is factual. Factual and accurate information will enable the individuals to not only do well in their tasks and activities, but also form cordial and sociable terms and relationships with each other. Furthermore, one will be able to work in collaboration and integration with each other. One of the major aims of development of conversation skills is, one should form pleasant terms and relationships with others within as well as outside the homes. Hence, factual information will encourage the implementation of appropriate factors that will render a significant contribution in leading to development of conversation skills. Therefore, providing factual information is a factor to be implemented in leading to development of conversation skills. This has been acknowledged by the individuals, when they are determined towards implementation of various types of job duties in personal and in professional lives.

Making use of Polite Language and Decent Words

Within the course of implementation of conversation skills, one needs to make use of polite language and decent words. These are regarded as fundamental within the course of putting into operation conversation skills in an effectual manner. Furthermore, these render an important contribution in reinforcing of professionalism among individuals. Among family members, relatives and friends, there is a joking relationship among individuals. When one is joking with others, then also, they need to make use of polite language and decent words. One needs to ensure that they laugh with others and not at others. One needs to avoid teasing and making fun of others. Communication needs to take place in a respectful manner. When one is engaged in a conversation with parents, grandparents, older family members, instructors, supervisors or employers, they need to converse with them in a polite and decent manner. In addition, with the younger individuals, helpers and service providers as well, these traits need to be implemented. Therefore, making use of polite language and decent words is a factor to be implemented in leading to development of conversation skills. This needs to be recognized by the individuals on a comprehensive basis.

Putting forward Meaningful Questions

When the individuals are conversing with each other, they are required to put forward questions. One needs to ensure, the questions are meaningful. In asking questions, one needs to make use of polite language, decent words and gracious tone of voice. One of the important aspects that needs to be taken into account is, one should not put forward questions to which answers are already known. As when the individuals possess the abilities to conduct an analysis of the areas, they will make an attempt to find answers to questions on their own. But when certain areas are complicated and one is not able to find answers on their own, they put them forward before others. Hence, putting forward meaningful questions are regarded as key aspects in leading to development of conversation skills. These questions can be open-ended as well as close-ended. Open-ended questions require elaborate answers, whereas, close-ended questions require one word answers. Therefore, putting forward meaningful questions is a factor to be implemented in leading to development of

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conversation skills. This needs to be documented by the individuals within homes, educational institutions at all levels and in various types of employment settings.

Inculcating the traits of Morality and Ethics

Within the course of implementation of conversation skills, one needs to inculcate the traits of morality and ethics. These are regarded as fundamental within the course of putting into operation conversation skills in an effectual manner. When the individuals recognize the meaning and significance of morality and ethics, they are able to benefit to a major extent. These are, they will be able to differentiate between appropriate and inappropriate; make use of polite language and decent words; treat others with respect and courtesy; make provision of factual information; carry out job duties with diligence and conscientiousness; depict efficiency; not discriminate against others on the basis of any factors; reinforce professionalism; form cordial and pleasant terms and relationships with others; make wise and productive decisions and take out time for all tasks and activities. When the individuals are taking into consideration these factors within the course of implementation of conversational skills, they will contribute in leading to their up-gradation (Conversational Skills, 2021). Therefore, inculcating the traits of morality and ethics is a factor to be implemented in leading to development of conversation skills. This needs to be documented by the individuals throughout their lives.

Possessing an Approachable Nature and an Amiable Attitude

When the individuals possess an approachable nature and an amiable attitude, they are not only able to put into operation the conversation skills in a well-ordered manner, but they are able to lead to up-gradation of their overall quality of lives. Within educational institutions at all levels and in various types of employment settings, there are individuals in leadership positions. These individuals organize discussion meetings and are engaged in conversations with their subordinates. When the students and employees are overwhelmed by any types of problems and challenges, they usually approach their instructors, supervisors and employers to obtain solutions to them. Hence, one needs to be well-versed in terms of measures that are necessary in leading to reinforcement of an approachable nature and an amiable attitude. On the other hand, within homes as well, one needs to put into operation these traits. Therefore, possessing an approachable nature and an amiable attitude is a factor to be implemented in leading to development of conversation skills. This needs to be put into practice by the individuals, when they are determined towards achievement of goals and leading to enrichment of one's overall quality of lives.

Possessing the Determination towards implementation of Job Duties Satisfactorily

Within homes, educational institutions at all levels and in various types of employment settings, one is required to possess the determination towards implementation of job duties satisfactorily. One cannot work in isolation. In other words, one cannot implement various types of job duties nor enhance one's career prospects by residing in seclusion. One needs to get engaged in conversation with others (8 Ways to Improve Conversational Skills in the Workplace, 2021). In some cases, the job duties are hard and cannot be carried out on one's own. Hence, it is indispensable for the individuals to obtain help from others. The conversation skills are honed, when the individuals are to obtain help from others in providing solutions to various types of problems, doing well in one's job duties, in generating the desired outcomes and in leading to up-gradation of the overall structure of the educational institutions and organizations. Therefore, possessing

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the determination towards implementation of job duties satisfactorily is a factor to be implemented in leading to development of conversation skills. This needs to be put into practice by the individuals, when they are determined towards doing well in their jobs and in generating the desired outcomes.

Implementing Time Management Skills

When conversations are to take place in professional spheres, between instructors and students or between supervisors and employees, one usually implements time management skills. The individuals in leadership positions have busy schedules. When they get engaged in conversations, they normally put them into operation in accordance to the time. When the individuals recognize the meaning and significance of time management skills, they usually set up appointments. When appointments are made, the time management skills are implemented. Within educational institutions at all levels and in various types of employment settings, the individuals in leadership positions organize discussion meetings and are engaged in conversations with their subordinates. Hence, they are required to implement time management skills. When the time is limited, the individuals ensure, they discuss only work-related matters. Furthermore, it needs to be ensured, they complete the conversation and come to a conclusion within the required time. Therefore, implementing time management skills is a factor to be implemented in leading to development of conversation skills. This needs to be put into practice by the individuals, when they are to take out time for not only conversations, but also for other job duties.

Development of Conversation Skills Lead to Enhancement of Personality Traits

In leading to enhancement of personality traits, the various factors that need to be taken into account are, acquisition of good-quality education; getting engaged in well-paid and reputed employment opportunities; augmenting skills and abilities; promoting better livelihoods opportunities; promoting health and well-being; coping with psychological problems in an adequate manner; forming an effective social circle; providing solutions to various types of problems in a satisfactory manner; reinforcing professionalism; forming cordial and pleasant terms and relationships with others; making wise and productive decisions; taking out time for all tasks and activities; inculcating the traits of morality and ethics and implementing the traits of diligence, resourcefulness and conscientiousness. The information in terms of these factors need to be acquired by all individuals, irrespective of their communities, categories and backgrounds. One is able to generate information in terms of these factors by putting into operation conversation skills in a satisfactory manner. Therefore, it can be stated, when the individuals acknowledge and implement all the factors that are necessary in leading to enrichment of one's overall personality traits through putting into practice conversation skills in a well-ordered manner, they will understand that development of these skills lead to enhancement of personality traits.

Within the course of putting into operation the factors that are necessary in leading to enhancement of personality traits, there are occurrence of various types of problems and difficulties. These take place in a major as well as in a minor form. It is of utmost significance for the individuals to pay attention towards leading to up-gradation of conversation skills. One needs to get engaged into conversation with others, particularly when they are to provide solutions to complicated and unmanageable problems. These may take place in the personal as well as professional lives of the individuals. It is apparently understood by them that they cannot provide solutions to them on their own. Hence, they need to get engaged into conversations with

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others. Furthermore, the individuals are required to form positive viewpoints and listen in an adequate manner to the ideas and suggestions given by others. Within the course of honing personality traits also, there are occurrence of problems, which can be solved through conversing with others. Therefore, when the individuals put into operation all the factors, necessary in leading to enrichment of one's overall personality traits through implementing conversation skills, they will understand that development of these skills lead to enhancement of personality traits.

Conclusion

It is apparently understood that all individuals, irrespective of their age groups, genders, communities, categories and backgrounds aspire to achieve their goals and objectives in personal and professional lives, sustain their living conditions in an adequate manner and lead to enrichment of their overall living conditions. Hence, they need to focus upon development of conversation skills. The aspects highlighting the significance of conversation skills are, generating information regarding viewpoints and perspectives; obtaining help in case of complicated problems; forming an effective social circle; achieving desired goals and objectives in personal and professional lives and leading to enrichment of one's overall living conditions. Factors to be implemented in leading to development of conversation skills are, forming positive viewpoints in terms of various aspects, speaking clearly and fluently, maintaining eye contact, providing factual information, making use of polite language and decent words, putting forward meaningful questions, inculcating the traits of morality and ethics, possessing an approachable nature and an amiable attitude, possessing the determination towards implementation of job duties satisfactorily and implementing time management skills. Development of conversation skills lead to enhancement of personality traits. Finally, it can be stated, development of conversation skills will prove to be beneficial to the individuals in bringing about improvements in their overall quality of lives.

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