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COMPARING DIFFERENT METHODS TO DETERMINE THE RELATIONSHIP BETWEEN ENVIRONMENTAL PERFORMANCE AND ECONOMIC PERFORMANCE. AN EMPIRICAL STUDY OF THE SOUTH AFRICAN MINING INDUSTRY

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Abstract. The study investigated the South African mining industry and estimated the linear association between environmental performance and economic performance and developed a data envelopment analysis (DEA) model to estimate the relative technical efficiency of environmental performance to generate economic gains. The linear association method indicated to the mining-sectors whether it does / does not pay to be green. The point is that it does not really matter whether it does or does not pay to be green! Any mining activity puts pressure on the environment and using the environment must be done in the most efficient manner. The DEA method helped in this regard, i.e. the performance of the individual mining companies was estimated and the best practices in the sector were identified that can be used by inefficient companies in that sector as a benchmark. The practical implication is that the linear association method, which was used in all the previous related studies, should not be used on its own, but should be used complimentary to the DEA method.

JEL Classification: C61

Keywords: energy usage, environmental performance, economic performance, greenhouse gas emissions, return on assets, return on equity, water usage

1. Introduction

The World Commission on Environment and Development's report in 1987 initiated the debate about sustainability and identifies three dimensions of sustainable development, namely environmental, economic and social sustainability (WCED, 1987). The growing importance of environmental and social

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issues has put pressure on companies to implement environmental and social systems (Laurinkevičiūtė et al., 2008). As a result of this, a growing number of companies are publishing triple bottom line and sustainability reports (Brown and Fraser, 2006). Many companies are reporting according to the Sustainable Reporting Guidelines (GRI, 2002), which are voluntary guidelines that companies use to report on the three above-mentioned sustainability dimensions. The focus of this study is limited to the link between the environmental and economic dimensions of sustainability. The importance of this topic is that it supports, and provides new perspectives on the view of Ciegis and Kareivaiti (2009) that sustainability is about “striving for economic and social development that would be compatible with environmental protection.”

In the past, many authors studied the relationship between environmental performance and economic performance and concluded that it “does pay to be green” (Bragdon and Marlin, 1972; Porter and Van der Linde, 1995; Hart and Ahuja, 1996; Bhat, 1999; King and Lenox, 2001; Rivera, 2001; Orlitzky et al., 2003; Ambec and Lanoie, 2008). On the opposite side, Jaggi and Freedman, 1992 found mainly negative relationships between environmental and economic performance and Hertin et al. (2008) found in a related study that there is no evidence that companies with environmental management systems outperform companies without such a system. These studies estimated environmental performance differently; for example, Hart and Ahuja (1996) and King and Lenox (2001) estimated environmental change by measuring the percentage change in an environmental performance indicator. Jaggi and Freedman (1992) created an index of the emissions of various pollutants to estimate environmental performance. The relative efficiency of companies to convert emissions into minerals was then estimated. This approach was also used *inter alia* by Hertin et al. (2008). Bhat (1999) measured environmental performance by the log of the quantitative emission value, and Rivera (2001) merely classified companies that voluntarily participated in a sustainability initiative and those that did not. *The common ground of all these studies is that they measured the strength of a linear association between environmental performance with economic performance, such as financial ratios or values by using correlation analysis.* A positive relationship, for example, implies that an improvement in environmental performance leads to an improvement in economic performance, and the conclusion is that it pays to be green for the sample of companies. The gap is that there is no evidence in the literature that a different measurement of the association between environmental performance and economic performance will lead to a similar conclusion than the above-mentioned approach. Therefore, the research question is: Is there a difference in the results when a linear association is used and when a different method is used to determine the association between environmental performance and economic performance? The alternative method used is data envelopment analysis (DEA) that estimated the technical efficiency of mining companies to convert environmental impact into economic gains. DEA was used since it can overcome the problem of weighting when a number of environmental performance indicators are used (Munksgaard et al., 2005) and it lends itself to aggregate the performance into a single measure where multiple inputs and outputs are used (Coelli et al., 2005). Related studies, which applied DEA to estimate relative efficiency of environmental issues, are Lee et al. (2008), Munksgaard et al. (2005), Wier et al. (2005), Yu and Wen (2010) and Kuo et al. (2010), but no empirical link

could be found where DEA was used to link the environmental performance with economic performance.

In order to answer the research question, the study has set three purposes; firstly, to estimate the linear association between environmental performance and economic performance; secondly, to develop a DEA model to estimate the relative technical efficiency of environmental performance indicators to generate economic gains; and thirdly, to compare the results of these two methods. (To simplify references, these two approaches will be indicated as the linear association method and the DEA method.) This study focuses on the South African mining industry, since they disclose environmental information as a result of their immense environmental impact (De Villiers and Barnard, 2000) and there are specific accounting policies that apply to the mining sector that they have to adhere to (Antonites and de Villiers, 2003). Note that the real issue is not about the sample of mining companies in the different mining sectors that is included in the study, but rather the methodology used to assist the mining sector to see their economic gains in perspective with environmental impact.

The contribution of the study is that it concluded that the results of the popular linear association method between economic performance and environmental performance, although it identifies to a sector (or number of mining companies) whether it does / or does not pay to be green, is only of academic interest. *This is because managers may argue whether it does pay / does not pay to be green is due to a mining-sector's nature.* The DEA method could pin-point to each individual mining company the efficiency of converting environmental impact into economic gains.

The organisation of the paper is as follows: Section 2 provides a background of environmental and economic performance indicators. The method of the study is explained in Section 3, i.e. sample and data, the linear association method and the DEA method. Section 4 presents the empirical results and the study is summarised and concluded in Section 5.

2. Environmental and economic performance indicators

2.1. Environmental performance indicators

GRI reports for the mining sector require eight environmental performance indicators, i.e. materials, energy, water, biodiversity, emissions/effluents/waste, products/services, compliance and transport (GRI 2010). This study included three of the indicators as input variables, namely greenhouse gas (GHG) emissions (measured in tons), water usage (measured in m³) and energy usage (measured in GJ), because these indicators are quantifiable and they are used for benchmarking by all the mining companies in this study (Angloplat, 2008). Documentary data from internal company sources, such as annual reports and sustainability reports, were used to acquire the information needed for this study.

2.2. Economic performance indicators

The selection of economic performance indicators is based on a combination of different approaches previously used. Examples of economic performance indicators previously used are revenue, net income, return on sales, return on equity, return on assets, cashflow to equity and cash flow to assets (Ambec and Lanoie, 2008; Rivera, 2001; Hart and Ahuja, 1996; Jaggi and

Friedman, 1992). Since no single financial ratio provides on its own an adequate indication of a mining company's performance (Halkos and Salamouris, 2004), two components of the Du Pont analysis were used, i.e. return on equity (ROE), which is affected by return on assets (ROA) and financial leverage, and return on assets, which is affected by the net profit margin and asset/turnover ratio (Brigham and Ehrhardt, 2006). Considering the return on equity and return on assets, two broad categories of a firm are explained, namely those associated with investment and those associated with capital structure (Correia et al., 2007). Note that return on equity and return on assets are relative (normalised) values, since they indicate profit relative to equity and relative to assets. The McGregor BFA (2010) database supplied the economic performance information used in this study.

3. Method

3.1. Sample and data

The population for this study was selected from the following companies:

- South African mining companies that are listed on the JSE Limited stock exchange in Johannesburg, South Africa;
- South African mining companies that subscribe to the South African Business Council for Sustainable Development hosted by the National Business Initiative; and
- South African mining companies that report on environmental performance based on the GRI guidelines and that are listed on the GRI database.

Only ten South African mining companies provided sufficient data for this study from 2005 to 2009. The ten companies operate in the following sectors of the mining industry: Four in the platinum-mining sector; three in the gold-mining sector and three in the coal-mining sector. This small sample size is a result that limited data was available due to limited mining companies that reported on environmental-related issues, especially for the period prior to 2005. Only the market leaders in the mining industry are included because they reported on their environmental performance while the smaller players did not. Since environmental performance estimates are industry and mineral specific and economic performance estimates are also industry specific, gold-, platinum- and coal-mining companies were separately investigated. As highlighted previously, the issue is not about the companies selected in the sample, or the sample size; their data are merely used to demonstrate the difference in the results of the two measuring methods.

3.2. The linear association method

The first part of the linear association method is where greenhouse gas emissions, water usage and energy usage were included as input variables relative to the output variable, namely the production of minerals. That is an indication of how efficient a company relatively (normalised) converts these input variables into minerals. As mentioned, the literature indicated several different approaches to estimate environmental performance. In this study, the approach of Jaggi and Freedman (1992) was used. They created an index (JFI) that is helpful to estimate the relative efficiency of companies using the environmental performance indicators to produce ounces of gold, ounces of platinum or tons of coal, respectively. In other words, greenhouse gas emissions, water usage and energy

usage are seen as input variables relative to the production of minerals as the output variable. Therefore, the first step is to calculate the normalised score of the environmental performance indicators for each mining company in a sector for each of the five years.

Normalised score = greenhouse gas emissions / production of minerals (oz or tons)

Normalised score = water usage / production of minerals (oz or tons)

Normalised score = energy usage / production of minerals (oz or tons)

The second step is to identify for each year the lowest normalised score for each of the three environmental performance indicators. These are the baseline scores. The third step is to calculate the JFI-score that is dividing each year's normalised scores into the baseline score. Noticeably, the company that provides the baseline score in a specific year will end up with a final score of 1. This company is the most efficient to convert the environmental indicator into the production of minerals. Therefore, the JFI-scores indicate environmental performance and the closer it is to 1, the greener the company is. The formula is as follows:

$$JFI_{it} = \frac{1}{P} \sum_{p=1}^P E_{pit}$$

$epit$ = Emissions pit /Production it

Where:

$epit$ = Normalised emissions

p = Pollutant

i = Company

t = Time period

The second part of the linear association method is to determine the relationship between the economic performance indicators and the performance of the different environmental indicators. Regression and correlation analysis is widely used to define the structural relationship between variables and the strength of this identified association (Wegner, 2007). In a time series analysis, the simple linear regression model needs at least 10 data points (10 time periods) to be scientific (Kvanli et al., 2006). Since there are only data of three gold-, four platinum and three coal mining companies available, it was decided to combine the data from 2005 to 2009. It is important to note that this limits the scientific value of the linear association method, because a previous year's data may have a direct impact on the next year's data, and the effect of autocorrelation could not be determined as too little time-series data were available. Spearman's rank-order correlation was used to determine the relationship between environmental performance and economic performance. The significance of the relationship were tested at a level of one, five percent and ten percent, where $p < \alpha = 0.01, 0.05$ and 0.10 , respectively (two-tailed).

3.3. The DEA method

DEA is a non-parametric linear programming technique that measures the relative efficiency of a comparative ratio of outputs to inputs for each decision-making unit, such as a firm (Dramani, 2011 et al., 2004; Van der Westhuizen,

2010). Unless managers are concerned that variables should be restricted because they are over-represented or under-represented, common practice allows the optimisation model to determine the weight for each variable (Avkiran, 1999). DEA is a relative efficiency measure that accommodates multiple inputs, multiple outputs and other factors in a single model (Halkos and Salamouris, 2004). A single estimate of productive efficiency, which lies between zero (meaning the firm is totally inefficient) and one (which signals that the firm is fully efficient), is calculated. The main usefulness is its ability to identify inefficient firms, to generate potential improvement for them and indicate efficient firms that should be used as a benchmark by the inefficient ones (Avkiran, 1999).

The fundamental assumption of DEA is that if firm A (also known as a decision-making unit (DMU)) is capable to produce $y(A)$ units of output with $x(A)$ inputs, then other producers should also be able to do the same if they were operated efficiently. The core of the exercise is to find the “best” virtual producer for each real producer and then compare the producer to its best virtual producer in order to determine its efficiency. The best virtual producer is found by means of linear programming (Anderson, 1996). DEA effectively estimates the frontier by finding a set of linear segments that envelop the observed data. DEA can determine efficiencies from an input-orientated (input minimisation) or output-orientated (output maximisation) point of view (Avkiran, 1999; Coelli et al., 2005). Furthermore, analysts choose between using constant return to scale (CRS) or variable return to scale (VRS). The first implies a proportionate rise in outputs when inputs are increased, in other words, a firm’s efficiency is not influenced by the scale of operations (Avkiran, 1999). This is a significant assumption, since CRS may only be valid over a limited range and its use should be justified (Anderson 1996). “VRS implies a disproportionate rise or fall in outputs when inputs are increased” (Avkiran, 1999), in other words, if a firm grows in size, its efficiency will not stay constant, but it will either rise or fall.

The successful application of the assessment of comparative efficiency of DMUs depends on the selection of appropriate input variables and outputs variables (Min et al., 2009). Input variables or output variables can be related to each other. Therefore, one variable may be a function of another variable, for example, both labour costs and the number of employees may be used as inputs, and both production units and sales revenue may be used as outputs (Ray, 2004). It is also important to note that input variables and output variables are not opposed to each other, but rather complementary (Li and Liang, 2010). Input variables should be the resources that lead to the key business drivers and output variables should be the key business drivers that are critical to the success of the business (Avkiran, 1999).

As in the case of the model for the linear association method, greenhouse gas emissions, water usage and energy usage were taken as the input variables and production volume of minerals is taken as an output variable. The main difference between the model for the DEA method and the model for the linear association method is that the two economic performance indicators are in the latter also used as output variables, instead of a linear association with the environmental performance. Return on equity and return on assets were also used as output variables by Chen (2002), Mercan et al., (2003) and Halkos and Salamouris (2004) in their DEA models.

The following summarises the DEA model that was specified:

Inputs:	x_1 = Greenhouse gas emissions (tons)
	x_2 = Water usage (m^3)
	x_3 = Energy usage (GJ)
Outputs:	y_1 = Return on equity
	y_2 = Return on assets
	y_3 = Production of minerals (in oz or tons)

The software package of Zhu (2004) is purpose-built to solve the DEA problem and was used in this paper to generate estimates of the annual input-orientated technical efficiency for each company over a five-year period. Technical efficiency estimates how well inputs are converted into outputs (Avkiran, 1999). The reason for using an input-orientated model is that we rather seek an approach to reduce environmental impact (input) than increase outputs. This is where the inputs are minimised, while the outputs are kept at their current levels. Furthermore, the less restricted VRC approach was used. The DEA formula is as follows (Zhu, 2004):

$$\min \theta - \varepsilon \left(\sum_{i=1}^m s_i^- + \sum_{r=1}^s s_r^+ \right)$$

subject to

$$\sum_{j=1}^n \lambda_j x_{ij} + s_i^- = \theta x_{io} \quad i = 1, 2, \dots, m;$$

$$\sum_{j=1}^n \lambda_j y_{rj} - s_r^+ = y_{ro} \quad r = 1, 2, \dots, s;$$

$$CRS \quad \lambda_j \geq 0 \quad j = 1, 2, \dots, n.$$

$$VRS : \text{Add } \sum_{j=1}^n \lambda_j = 1$$

Efficient Target :

$$\hat{x}_{io} \dots \theta^* x_{io} - s_i^{-*} \quad i = 1, 2, \dots, m$$

$$\hat{y}_{ro} \dots y_{ro} + s_i^{+*} \quad r = 1, 2, \dots, s$$

The input-orientated formula calculates input minimisation (where θ indicates the efficiency score). Each observation, DMU_j ($j = 1, \dots, n$), uses m inputs X_{ij} ($i = 1, 2, \dots, m$) to produce s outputs Y_{rj} ($r = 1, 2, \dots, s$), and where DMU_o represents one of the n $DMUs$ under evaluation, and X_{io} and Y_{ro} are the i th input and r th output for DMU_o , respectively. In order to consider any slacks, the presence of the non-Archimedean ε effectively allows the minimisation over θ to pre-empt the optimisation involving the slacks, s_i^- and s_r^+ . [For a more detailed discussion on the DEA methodology, see Avkiran (1999), Ray (2004) and Zhu (2004).]

4. Results

4.1. Results of the linear association method

Table 1 exhibits the results that are based on Spearman's correlation coefficient between economic performance and environmental performance.

Table 1: Spearman's correlation coefficient: Trends and significance

	ROE				ROA			
	r	p	Direction	Significance	r	p	Direction	Significance
Environmental performance								
Gold mining								
Water	-0.574	0.032	Neg	**	-0.415	0.121	Neg	
Energy	0.096	0.719	Pos		0.343	0.211	Pos	
GHG	-0.083	0.674	Neg		0.126	0.638	Pos	
Platinum mining								
Water	-0.332	0.147	Neg		-0.500	0.029	Neg	**
Energy	-0.548	0.017	Neg	**	-0.592	<0.001	Neg	***
GHG	-0.585	0.011	Neg	**	-0.651	<0.001	Neg	***
Coal mining								
Water	-0.061	0.819	Neg		0.115	0.667	Pos	
Energy	0.577	0.031	Pos	**	0.340	0.211	Pos	
GHG	0.577	0.031	Pos	**	0.354	0.222	Pos	

Source: Own calculations. ** Significant at 5% (two-tailed) *** Significant at 1% (two-tailed)

Table 1 shows for gold-mining companies a significant relationship (negative) between water usage and return on equity. Except for water usage and return on equity, all the other relationships are significant (negative) for platinum-mining companies. There is a significant relationship (positive) between the energy usage (and GHG emissions) and return on equity. The conclusions that will be made from these findings are that there is little evidence that it does not pay to be green for gold-mining companies. There is overwhelming evidence that it does not pay to be green for platinum-mining companies. Finally, there is little evidence that it pays to be green for coal-mining companies.

4.2. Results of the DEA method

As a result of space restriction, Table 2 exhibits the technical efficiency of only the platinum-mining companies. Platinum-mining company 1 (P1) is the most efficient to convert the input variables into the output variables during the five years with an estimate of 98.8 percent, implying that this company should reduce its input by 1.2 percent without reducing its outputs. The average technical efficiency

for all four companies for the five years is 89,8 percent. Furthermore, Table 2 also indicates the percentage that the input and output variables should change to meet the benchmark standards, which is the easiest way to begin operating on the efficiency frontier. For example, Platinum-mining company 1, in year 2007, should have reduced its water usage, energy usage and greenhouse gas emissions by 12 percent, eight percent and six percent, respectively, and increased its return on assets by nine percent to reach the efficiency frontier. Platinum-mining company 2 is the most inefficient and has the highest targets to reach the efficiency frontier.

Table 2: Technical efficiency (TE) of platinum-mining companies with targets to reach the efficiency frontier

Platinum company	Year	TE	Input variables			Output variables		
			Δ Water	Δ Energy	Δ GHG	Δ Production	Δ ROE	Δ ROA
P1	05	1.000	0%	0%	0%	0%	0%	0%
	06	1.000	0%	0%	0%	0%	0%	0%
	07	0.938	-12%	-8%	-6%	0%	0%	9%
	08	1.000	0%	0%	0%	0%	0%	0%
	09	1.000	0%	0%	0%	0%	0%	0%
	Avg.	0.988						
P2	05	0.752	-49%	-35%	-25%	0%	0%	30%
	06	0.677	-48%	-42%	-32%	0%	0%	9%
	07	0.687	-56%	-40%	-31%	0%	2%	0%
	08	0.707	-54%	-37%	-29%	0%	0%	16%
	09	0.497	-66%	-58%	-50%	0%	12%	0%
	Avg.	0.664						
P3	05	1.000	0%	0%	0%	0%	0%	0%
	06	0.966	-3%	-9%	-7%	0%	34%	0%
	07	0.836	-16%	-27%	-16%	0%	17%	0%
	08	1.000	0%	0%	0%	0%	0%	0%
	09	1.000	0%	0%	0%	0%	0%	0%
	Avg.	0.960						
P4	05	1.000	0%	0%	0%	0%	0%	0%
	06	1.000	0%	0%	0%	0%	0%	0%
	07	1.000	0%	0%	0%	0%	0%	0%
	08	1.000	0%	0%	0%	0%	0%	0%
	09	0.892	-11%	-11%	-21%	14%	263%	200%
	Avg.	0.978	-2%	-2%	-4%	3%	53%	40%
Avg.		0.898						

Source: Own calculations.

5. Conclusion

The purpose of the study was firstly to use the Jaggi-Freedman Index to estimate the environmental performance of mining companies, then to determine the linear association between environmental performance and economic performance (the linear association method). Secondly, to use the same data as above to develop a DEA model to estimate the relative technical efficiency of environmental performance indicators to generate economic gains (the DEA method). The third purpose, to compare the results of these two methods, will be done in this section.

It should be noted that there are limitations to the study. Firstly, limited data was available due to limited mining companies that reported on environmental-related issues prior to 2005. Furthermore, only the market leaders in the mining industry reported on their environmental performance and the smaller players did not report on their environmental performance. If more mining companies reported on their environmental performance, the sample size would have been bigger and the JFI and DEA model could discriminate to a greater extent between companies. Secondly, environmental performance estimates are industry and mineral specific and economic performance estimates are also industry specific. Therefore, gold, platinum and coal companies were separately investigated. This has led to the third limitation, namely that the data of the different years were grouped together to get sufficient data points. The problem is that five year's data is not sufficient to test for auto-correlation in the data. Note that these limitations could influence, for example, the strength of the linear associations, DEA efficiency estimates and targets, but it could not influence the results of the comparison between the two methods, since the data was only used to demonstrate the difference between the two methods.

The study found that when the linear association method is used, the conclusion would have been made that there is little evidence that it does not pay to be green for gold-mining companies. There is overwhelming evidence that it does not pay to be green for platinum-mining companies. Finally, there is little evidence that it pays to be green for coal-mining companies. This finding correspond with other studies, for example Bhat (2001) and Rivera (2001), found a positive relationship between environmental and economic performance and concluded that it pays to be green with regard to the group of companies investigated. Jaggi and Freedman (1992) found mainly negative relationships between environmental performance and economic performance, which implies it does not pay to be green.

Regarding to the DEA method, the study found that Platinum-mining company 1 is the most efficient to convert the input variables into the output variables during the five years with an estimate of 98.8 percent, implying that this company should reduce its input by 1.2 percent without reducing its outputs. Furthermore, Platinum-mining company 2 is the most inefficient and therefore has the highest targets to reach the efficiency frontier.

The research question asked whether there is a difference between the results of the two methods used. The finding may be supportive, but it is not possible to directly link the results of the one method to the results of the other one. This is because, although the same data is used, the two methods measure different aspects. The advantage of the linear association method is that it can

indicate to a mining-sector whether it does / does not pay to be green; however, whether it “does or does not” is only of academic interest. The problem is that the performance of an individual company is not revealed. Another problem is that since it is evident that it pays or does not pay to be green in specific sectors, managers may argue that these results are due to their sector’s nature, and whether it does or does not pay to be green, individual companies have no pressure to improve. The DEA method can help to overcome the problems of the linear association method. The performance of an individual company can be estimated, the best practices in the sector can be identified that can be used by inefficient companies in that sector as a benchmark. Furthermore, targets of input variables and output variables are also revealed to indicate to the inefficient companies to reach the efficiency frontier the easiest way.

The practical implication is that the linear association method, which was used in all the previous related studies, should not be used on its own. The point is that it does not really matter whether it does or does not pay to be green! The point is that any mining activity puts pressure on the environment, and using the environment must be done in the most efficient manner. Therefore, the linear association method should be used complimentary to the DEA method, or any other efficiency estimation method that focuses on individual companies.

The value of the study is this is the first to compare the results of the linear association with the results of the technical efficiency to convert environmental performance indicators into economic gains. Further research should be done to determine the reason why some of the mining sectors have a positive relationship between economic performance and environmental performance and others not. The reason behind the success and these controls should be adopted by other companies to also improve their environmental performances.

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AN ANALYSIS OF BUSINESS INTERNATIONALIZATION MODELS

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Abstract. Due to the deepening globalization and hard competitive fight on the domestic market are business entities forced to look for markets, which bring the possibility of a better assessment of corporate resources and the new dimension of their business. The present article responds to this need and on the theoretical aspect brings insight into the three most significant, world's recognized models of internationalization, which concept business entities may use when entering foreign markets. The aim of the scientific article is a detailed analyzes several models of the internationalization of business activity, their mutual comparison, the specification of the key elements, knowledge of which is necessary for the management of the foreign business.

JEL Classification: F23, L26

Keywords: models of internationalization, entrepreneurship, foreign market, enterprise

1. Introduction

The world economy is characterized by the interconnecting of national economies and by internationalization of economic processes. In turbulent changing business environment can be successful only those businesses that can adapt on-going trends. The internationalization process brings new business opportunities, allowing enterprises to increase their competitiveness (Malá, 2009).

The Slovak Republic runs through the different levels of economic integration. So the enterprises are formed by internationalization too. The most noticeable term was the entry of Slovakia into the European Union in May 2004 and its full membership in this integration group it confirmed on the 1st January 2009 with entry into the single monetary union by adopting the common European

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currency Euro. Membership of our country has brought many benefits and market opportunities to Slovak enterprises, but also the competition has accelerated.

Conditions for conducting business in Slovakia, as well as in the European Union, are still changing and improving. Entrepreneurs acquire the necessary knowledge, skills, the level of professionalism and business ethics grow. The integration into the European single market has offered to Slovaks' enterprises the opportunity to expand to date business. The space for close cooperation with foreign partners was opened up outside of our territory. Adapting to new conditions and creating a new business environment is comprehensive and lengthy process. Therefore, the present position of the Slovak enterprises still changes and forms turbulently in that international business environment (author, 2010).

The deepening international interdependency and the world globalization and integration processes cause that individual businesses more and more participate in international business and have to face increasing competitive pressure.

In turbulent changing business environment may actually survive, develop and prosper only those companies that understand the current trends in the global economy. Business practice shows that without business internationalization enterprises get increasingly more difficult competitive position. Consequently of integration processes and trade liberalization the boundaries of individual states, regions are wiping, the enterprises have a chance to more easily filter into foreign markets and increase the efficiency of recovery of the capital.

2. Material and methods

The main objective of the scientific article is to analyze the different internationalization models with an aspect of the business activity internationalization. The partial objectives of article are:

- explanation of the process of internationalization,
- comparison of models with specified key elements,
- identification of the recommended business internationalization model for Slovak enterprises.

In order to fill the goal set was collected and processed factual material. The sources of information were professional articles, reports made to scientific conferences, research results of foreign authors, opinions, views and research results of domestic experts, as well as professional publications. Actually the results of research projects and grants, in which the authors have actively participated in years 2004–2010 are used. Secondary data were supplemented by information from their own primary research carried out by controlled interview techniques with management companies from Nitra Region of Slovakia which filter on foreign markets. During the article process were used the methods of analysis and synthesis, comparison and interview.

3. Results and discussion

Rapid internationalization of economic life brings to entrepreneurs new business opportunities, promising sales markets and foreign investment. The management is forced to revalue the implementation of its business activities and marketing management to adapt to market conditions. Theoretical elaboration of

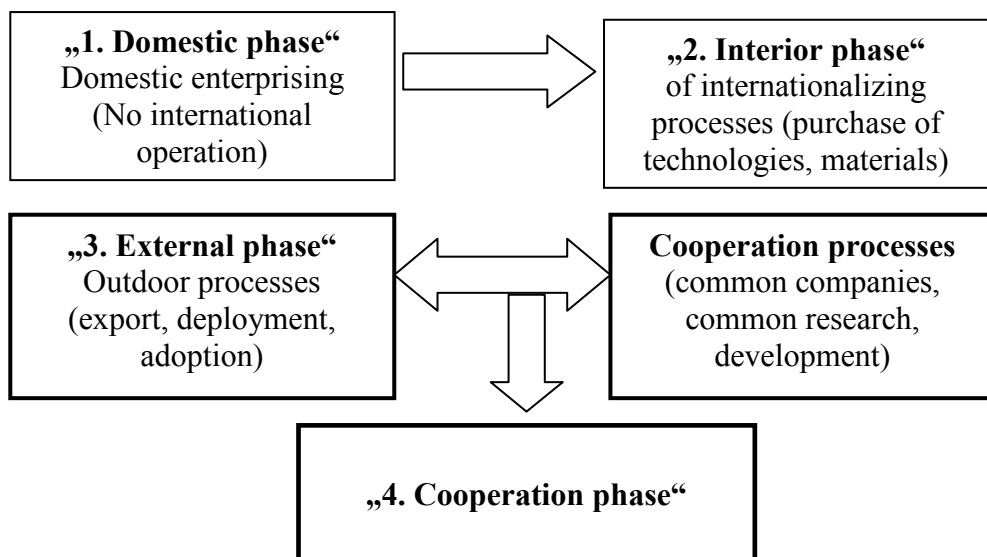
the issue distinguishes two basic forms of corporate activity internationalization: the active form and the passive form. In the practice this means that the internationalization of the company runs directly (active), transcends national boundaries or indirectly (passively), mostly through foreign trading partners.

In theory we can find several approaches which explain the internationalization process differently. In relation to small and medium enterprises the internationalization of their business wasn't paid attention to itself, then in large multinationals companies. In the present work we offer several views and approaches on research issue. Internationalization can be achieved gradually (Horská, 2007). When entering foreign markets the common business activities is influenced by such factors as language, differences in habits and consumption, higher competition, transport and insurance, taxes, tariff, various regulations of actual country.

The experts engaged in research into the issue of internationalization participate on opinion that the internationalization process has several phases. Growing out Luostarinen and Hellman work was defined "the path of internationalization", which was known as several degree involvement into internationalization process (Kjellman, 2004).

Enterprise starts to undertake on the domestic market and gradually involves in foreign - market operations with simply forms (export, import, deployment, adoption) and continues through higher forms of involvement in the internationalization of business activities through the sale of licenses, management know-how and direct foreign investment (author, 2010). Figure 1 shows the internationalization path.

Figure 1: The internationalization path

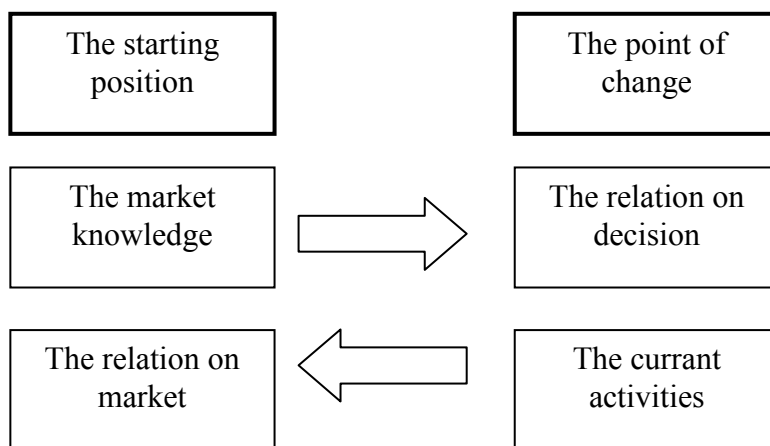


Source: Kjellman (2004), modified by authors

Uppsala's model of internationalization (The classic model of internationalization)

The internationalization process of business activities of particular enterprises is in permanent development. Therefore one of the basic internationalization models – Uppsala's model - shows the process of internationalization through two components: one is the starting position and the second deals with changes within the meaning further internationalization. It indicates the fact that the internationalization process is accompanied by a set of follow-up steps and methods with increasing relation and participating on foreign markets. The internationalization of business is therefore the result of interactions of knowledge development, experience and foreign markets relation. Mentioned facts about process of internationalization by Uppsala's model are presented in Figure 2.

Figure 2. Uppsala's model of internationalized processes



Source: Kjellman (2004)

In the structure of the model force two groups of key factors: factors influencing the current position of business and the factors affecting the change in the business. The first group of factors is presented in a number of resources available and current links to market as well as knowledge of a specific target market of company. The second group of factors is created by decision to join resources to the existing opportunities and threats in the market and current activities and thereby obtain further knowledge of the market.

Larimo and Vissak (2009) find that the internationalization process of company is obvious from Uppsala's model. The process is accelerated by the interaction between the knowledge of the operations in international business and international market relations.

Uppsala internationalization model is based on the fact that the domestic companies are becoming multinational (transnational) companies. A procedure whereby an operator to a higher degree of entering into foreign markets, we see the development of the company itself, which passes from one subcategory to a higher sub-categories (microbusiness - small business – medium business - large enterprise) in the classification and typology of enterprises in the European Union.

It occurs adaption to market conditions of target market and to modification enterprise management, enterprise policies and marketing strategies. This observation we consider as key for the management of business entities in relation to the future direction of business process management and business.

The model of internationalization, which author is Uppsala, belongs among basic models describing and explaining the business internationalization. In our point of view, this model can be called as classic. Among the authors who find out longtime to this model and its applications in the enterprise sector belong Johanson and Vahl (1990). They already reported their empirical research of Swedish companies and their results they presented at the Department of International Trade of Uppsala University in the 1977. The theory of internationalization degrees describes activities of internationalized company, its entering into unknown markets, entrepreneurship in uncertainty and its gradual development from lower to higher stages. Companies are moving from one stage to another, depending on how their performance and foreign experiences are rising. The analysis of Uppsala's internationalization model we can conclude that enterprises develop their business in foreign markets gradually, on base of key factors:

- *knowledge of the target market*: increasing company knowledge about foreign market in relation with the time scale of its influence on given market, the opportunity to apply selected equity forms of foreign market entry increases,
- *effort to gain market*: the more a company interested in the target market and aims to get as much information about foreign markets, the more it will prefer a way to entry on the market, which makes the capital. It says about its long-term strategy to operate in a particular foreign market.

To strengthen the internationalization process is necessary to have both general and specific information and knowledge about the target foreign market. It is assumed that specific market information can be obtained through experiences, whereas general knowledge can be transferred from one country to another (Horská, 2007). This theory predicts that better and more detailed information and knowledge of the market are also valuable resources and a stronger link to the foreign market.

The lack of Uppsala's model is the fact that some businesses in its development exclude some phases or after its origin they advance to the ultimate stage. This and some other shortcomings of the model attempted to modify in their scientific works other authors: Hansson, Sundell and Ökman (2004), employees of Department of Trade from Kristianstand University in Sweden. Their effort led to the modification of the original Uppsala's model because it cannot fully explain the internationalization of companies. In their work, they concluded that it is hard to change and draw up a unified model applicable to all businesses, because in different situations, firms decide differently, and also some conditions are unique.

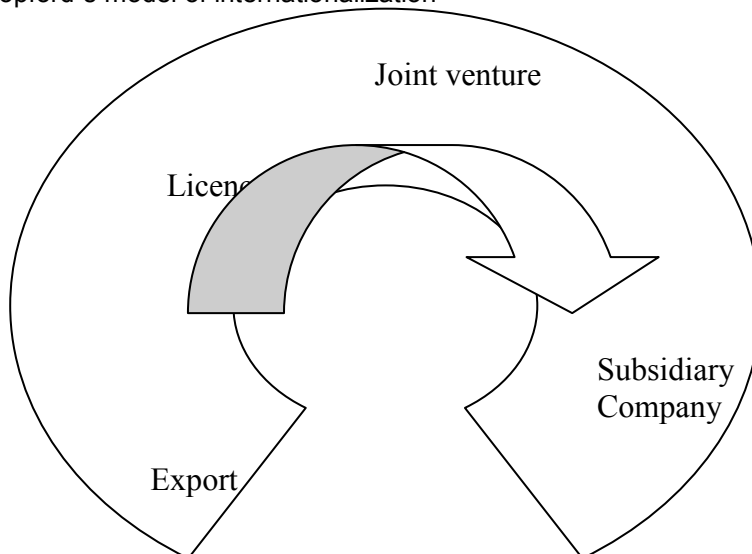
Stopford's model of internationalization

The deepening process of economic internationalization and globalization of the world were already 40 years ago the subject of research (in addition to other experts) also of John M. Stopford. His internationalization business model he derived from searching of 187 companies in the status of multinationals companies in the U.S.A. Based on empirical research he finds that internationalization cannot

be accomplished in one step, but it is a longer process with several phases. He confirmed the results of Uppsala; at that point the two models are identical. Stopford's model, however, explains the process of internationalization of the company business activities undertaking by detecting the partial steps, from simple forms to be establish on a foreign market to the highest stage of business internationalization in the form of wholly owned subsidiaries.

This model is based on the assumption that companies entry on foreign markets gradually: at first they find the potential advantage of action in the host country through export activities, which manage external. An example would be selling the output to foreign trade partner, who provides marketing activities in the target market. According to the particular market situation and existing experience it opens a possibility of local production and trade partner asks for a license for its market. With business development and increasing size of production for foreign markets another stage in the business internationalization comes. Then the management company is faced to situation when loses direct control of the promising developing foreign market and has to change its strategy of the entry to this market. With agreement with its foreign partners the company can create, for example a joint venture, which provide the producing local business undertaking a reduction of risk and allow him to get partial control on production for the target market and also over marketing management to customers. Stopford's supreme degree of internationalization model is the establishment of fully owned property trader on the foreign market. In business practice it means the subsidiary company. Situation can be observed in Figure 3.

Figure 3. Stopford's model of internationalization



Source: Chetty, Campbell-Hunt (2004)

In comparison of Uppsala's internationalization model with Stopford's, the second one explains and opens in more details partial level of internationalization, as well as management decisions about the future orientation of business in foreign markets. That is key moment for successful business. For business experience it provides practical solutions without distinction on the size category of business. The model is therefore universal, with the possibility to apply it to a specific sector of small and medium enterprises.

Deresky (2003) considers the Stopford's internationalization model as an evolutionary, because the firms have a tendency to export first and then they establish branches in the target market.

The degree of business internationalization, according to Porter (2001), is determined the characteristics of the industry in which it operates. The size of the competition, the strength of customers, suppliers, size of entry and exit barriers, industry has a direct influence on business activities from the industry to internationalize. Small and medium enterprises can be successful on foreign markets, if they manage to identify the potential for increasing foreign market and successfully differentiate in the following areas:

- product's quality,
- marketing and customer service,
- focus on product and innovation.

It is clear that the choice of their own strategies to entry on foreign markets is the management decision for each business entity. In business practice rise situations where companies miss one or several steps of internationalization and their first choice is to create of a subsidiary company. Stopford marks it as a peak stage of internationalization. These facts are supported by the results of Chetty and Campbell-Hunt (2004), who speak about the phenomenon of 'born-global' firms. These are so businesses, which since its origin are globally oriented and do not undergo through partial levels of internationalization. They are starting business right through a subsidiary.

We believe that such a enterprise undergoes a higher overall business risk, because it does not adequately examined the market and created long term relation to customers or business partners. The cost per target market entry is considerably higher in compare with the business internationalization costs in the lower hierarchical level (for example, export).

Internationalization model according to Daniels a Radebaugh

Some form of "compromise" between Uppsala's and Stopford's internationalization model presents the model of Daniels and Radebaugh. In this model we can follow the theoretical integration of internationalization into a single synthetic model. The authors divided the field of foreign markets for a total of 5 dimensions (graphically it illustrates the Figure 4):

- *The first dimension - active vs. passive using of the opportunities of internationalization:* At the beginning of business internationalization the companies typically respond with a passive form on competitive, cost and legislative initiatives from the market, which force them to move their business activities on foreign markets. Over time, enterprises become active, themselves interested in the new territories and opportunities that would bring them benefits on specific target market.

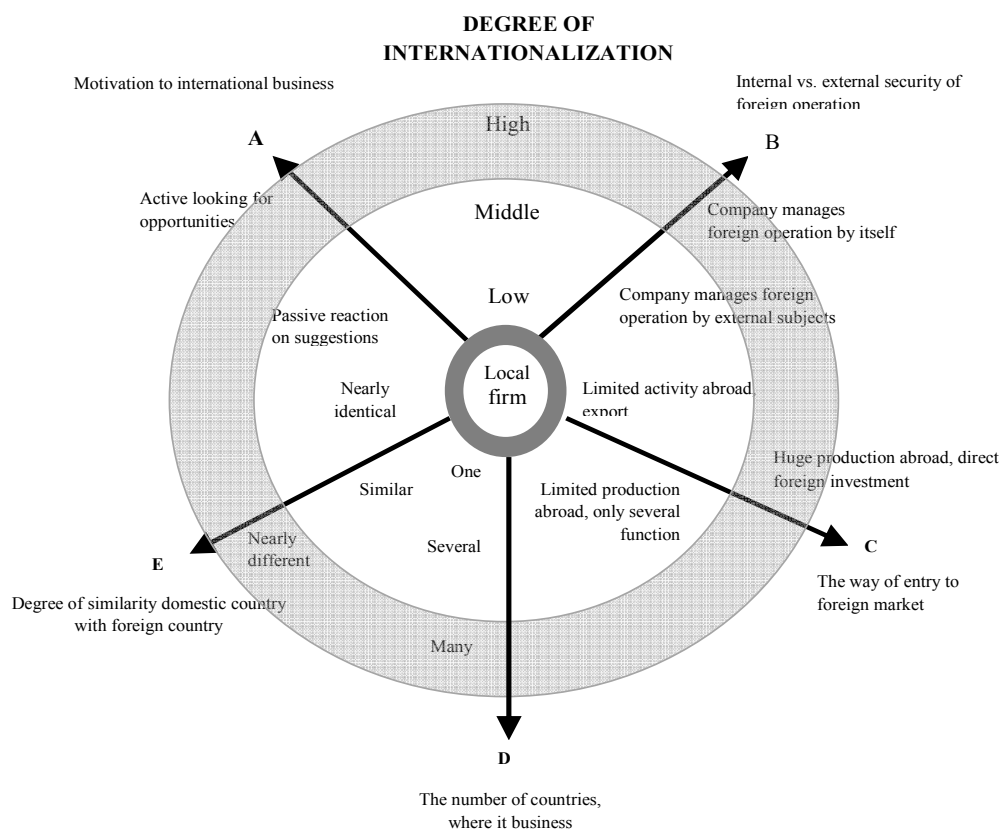
- *The second dimension - internal vs. external management of foreign trade operations:* on the beginning of the path of internationalization the enterprises are careful; they are unwilling to be exposed to increased entrepreneurial risk. Whereupon they leave decision and then management of foreign trade operations on external foreign bodies, which have proper information and knowledge about the market. Later, in connection with the development of international business, respectively with procedure to a higher form of internationalization is the company management faced to need to solve the security control of operations in foreign markets. To this end, management approaches to manage its foreign business directly, thus ensuring the control and feedback while.
- *The third dimension - the level of similarity between domestic and foreign markets:* In the early stage of business internationalization the company prefers those foreign markets, which are by their nature similar to the domestic market. The company management is looking for similarity in customer buying behavior, cultural habits or the size and segments of target market. In the later stage of business internationalization or after reaching of experiences with international business the enterprise starts to retire higher risk with entering into unknown and risky territories.
- *The fourth dimension - the number of target markets:* The enterprise enters the beginning of the internationalization of their business activities in one target market, later entries already on several foreign markets.
- *Fifth dimension - the way of realization:* In this dimension, we can observe the practical implementation of Stopford's model. The companies gradually undergo through internationalization steps, from simple form of entry into foreign markets (export) through externally - managing production abroad to the highest level of internationalization - own business abroad (through a subsidiary).

In compare of Uppsala's model with model of Daniels and Radebaugh we found out several intersections. We can specify and regard key intersections in two areas: in levels of similarity of domestic and foreign market and in the number of territories. Effort about target market abroad then corresponds to what Daniels and Radebaugh (2009) named as "active possibilities utilization of opportunities abroad".

The various theories explain the internationalization process differently. A common feature of these theories is the fact that the internationalization of business they understand as the highest level in the lifecycle of business and it is characterized by a certain level of performance. This claim is in our point of view, partly in contrast with the business of small and medium-sized enterprises, as we have seen that the enterprises of small and medium businesses sector internationalize their business nevertheless they don't fill the criterion of high volume performance.

For better understanding the process of business internationalization and its various phases is important to know the motives and the reasons of companies to do so. Internationalization motives are presented in Table 1.

Figure 4. Model of internationalization according to Daniels a Radebaugh



Source: Chetty, Campbell-Hunt (2004)

Table 1. The Motives of business internationalization

The form of internationalization	The practical activity	The degree of internationalization
Business	Export	commerce
Agreement	License	contracting
Investment	Founding of consortium	participating
Integration	Direct production investment	integrating
Autonomy	Founding of others companies in all phases of business activities	autonomous

Source: author, 2010

On the base of empirical knowledge we can include the following factors among the most common motives of business internationalization:

- domestic market is relatively saturated, respectively grows slowly, activities abroad may be profitable,
- company wants to ensure no crisis development, is thus a possibility of diversification of business risk in new markets,
- better using of existing production capacities,
- foreign branches may increase turnover due to closeness of market,
- changes in purchasing power and exchange rate changes cause pressure on the business internationalization,
- with entry into the foreign market company has the ability to access business know-how.

The internationalization of business in the Small and Medium Enterprises

In the literature we can find the issue of business internationalization developed primarily in conditions of large enterprises. The Slovak literature does not pay due attention to small and medium enterprises, although it would be desirable. A common feature in the literary sources is the fact that the further development and prosperity of small and medium enterprises, the individual authors recommend to small and medium enterprises to internationalize their business. We think that the gradual steps and applying strategic management and an appropriate model of internationalization they have a real opportunity to overcome obstacles in the path of internationalization.

The internationalization process of small businesses was explored by Kjellman - Sundmäs - Ramström - Elo (2004). Small businesses are seen as vital components of a market economy. Their involvement in internationalization processes is considered relevant to the use of market opportunities, growth and innovation opportunities.

Šúbertová (2010) in connection with the business internationalization of micro and small enterprises points to the fact that limited size of micro and small enterprises created (apart from some positive effects) also potential problem in the internationalization of business activities that are essential in the dynamics of enterprise development. Small businesses are more frequent due to the absence of strategic marketing management and adequate marketing research become unable to innovate of products and processes and so to look more forward to capture new market opportunities. One way to reduce the disadvantages brought by the limited size of the firms in the business internationalization is their jointing. Thus they are able better to compete and also to extend their lifetime in the market. The cooperation strategy and creating of micro and small enterprises cluster make the conditions not only better possibility to access the financial resources to finance its own expansion, but also bigger possibility for the effective use of space on the foreign market.

To research of small and medium enterprises internationalization pay attention also Lesáková - Múhlback - Trnková (2007). In their research work they concluded that the process of small and medium enterprises internationalization in the Slovak Republic is not in most cases a part of a targeted marketing strategy, but only using the opportunities brought by external and internal environment of the enterprise. The main initiative of the internationalization of small and medium enterprises comes partly from growing competition in domestic markets and also from opportunities to gain new customers in foreign markets.

In diapason of 2006-2009 they studied the process of business internationalization in a specific sector of small and medium enterprises in Slovakia, among other professionals also author Mura and Gašparíková (2010). On a statistically representative sample of the Nitra region they found that their business internationalized 36.96 % of business entities. The most companies entered the markets of European Union Member States. This is particularly true of markets in neighboring countries, especially in a series of Visegrad. In surveyed companies the most used way of business internationalization is direct export. This form is used by 88.24 % of business entities. The representatives of partial companies specified that it is the most acceptable form of their entry into foreign markets from several angles. The subcontractor of another business entity is in entering into foreign markets around one quarter of enterprises (23.53 %). 17.65 % of business entities operating outside the territory of Slovakia had created a subsidiary company abroad. With indirect export only 11.76 % of enterprises proceeded. Neither of surveyed companies did not specify as the way of the business internationalization establishment of a branch abroad, license or franchising.

Presented findings confirm:

- the current level of business internationalization process development in small and medium-sized enterprises also at the macro level in Slovakia
- the gradual shift from partial degrees to a higher level in the hierarchy of internationalization according to Stopford's model.

A lot of small and medium-sized enterprises in Slovakia are in the first and second stages of development, not only in their basic features, but also in terms of economic and social processes within which they work their business activities. With gradually establishing Euroregions and involving of small and medium enterprises in their development have moved to the next stage of development - to regiocentric stage. Under the influence of entry of Slovakia into the European Union, some of them move up to the global stage. In our opinion, by the internationalized small and medium-sized enterprises is important also tendency of owners and managers themselves to suffer risks connected with entry into foreign markets.

Manager skills and international orientation have predominant influence to company internationalizing. The level of skills and experiences of business and marketing managers, acknowledge of foreign languages, willingness, respectively unwillingness to take risks are the factors that are determinant in the internationalized business activities in the specific conditions of small and medium enterprises.

As key factors in the internationalization of small and medium enterprises we consider the according to findings from the business practice of the following:

- increasing managerial and communication skills, language competence and skills in information and communication technologies,
- improving managerial features obtained with an accent on skills and economic knowledge,
- application of systematic and purposeful planning,
- sophisticated marketing strategy,
- strategic use of appropriate foreign intermediaries and foreign partners,
- increasing of the company's ability to quick identify changes and then respond flexibly.

For the domestic business environment, well-established small and medium-sized businesses we recommend in the business activities internationalization to come out Stopford's model, especially if the enterprise does not yet have experience with international business. Within the procedure referred in Stopford's model enterprise can manage its foreign trade activities step by step, thereby increasing their chances not only to survive but also sustainable development on foreign markets. Currently it minimizes the business risk resulting from entry into new target markets.

Due to greater vulnerability we recommend to micro enterprises, resp. enterprises in the beginning stage of its lifecycle, to rise in entry into foreign markets from Daniels and Radebaugh's model for his comprehensive and detailed approach and a synthetic character.

4. Conclusion

The internationalization of business activities directly or indirectly relates to any enterprise. This process supports enforced competitive struggle on domestic market and efforts to better assess the company's resources into foreign markets. The enterprises are interested in consolidating and developing their business for which internationalization opens new opportunities. Universal, in all market conditions applicable internationalization model of business is extremely difficult to construct. On the base of theoretical knowledge and the results of actual researches among enterprises aimed to the business internationalization is possible to recommend managers approaches, gradual steps according to internationalization models, which can actively contribute to successful entry into foreign markets and ensure the subsequent development of international business.

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CAPITAL STRUCTURE THEORIES: A CRITICAL APPROACH

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Abstract. This paper reviews the most important theories of capital structure, specifying the practical implications, as well as the strengths and weaknesses of these theories. Each theory is briefly described and some critical comments on the empirical implications are made. Both classical and modern theories of capital structures are discussed in terms of contributions they make to the field of corporate finance, as well as problematical issues such as unsolved explanations and conflicting results. The review highlights the fact that there was a transition from Modigliani and Miller's (1958) irrelevance proposition to the modern theories (i.e., trade-off theory, pecking order theory, agency theory, market timing theory) which postulate that the market value of the firm is dependent of the firm's debt ratio, because of the existence of taxes, financial distress costs, agency costs, information asymmetry and market imperfections on the financial market (Baker & Wurgler, 2002; Jensen & Meckling, 1976; Modigliani & Miller, 1963; Myers, 1984).

JEL Classification: G32

Keywords: capital structure, trade-off theory, pecking order theory, agency theory, market timing theory

1. Introduction

Capital structure is referred to as the types of long-term financing used by firms (i.e., the reinvested profit, equity and long-term debt) and explains how firms are financed through a mix of equity and debt. In an attempt to explain how firms finance their assets and to identify the factors that influence these funding decisions, a number of theories of capital structure have been proposed over the years. More specifically, in general these theories try to explain the percentage of debt and equity observed that one can find in the firms' balance sheets.

Among the theories of capital structure that were imposed over time, the theorem of Modigliani and Miller (1958) can be considered the starting point for explaining the capital structure, although it was later proved to be a theoretical

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model without a solid empirical foundation (Ross, Westerfield & Jaffe, 1993). The main assumption of this classical theory is that under conditions of a perfect capital market, and in the absence of taxation, the value of the firm is not influenced by how it is financed. In other words, according to this theory, the overall cost of capital remains the same regardless of the firms' debt policy.

The capital structure theories developed later (i.e., trade-off theory, pecking order theory, agency theory, market timing theory) demonstrated that a firm can change its market value and growth rate by changing the optimal ratio between equity and debt. For determining the optimal capital structure, these modern theories take into account taxes, financial distress costs, agency costs, information asymmetry, effects of market imperfections and institutional constraints (Baker & Wurgler, 2002; Jensen & Meckling, 1976; Modigliani & Miller, 1963; Myers, 1984). More specifically, the trade-off theory emphasizes taxes, the pecking order theory underlines the information asymmetry, the agency theory emphasizes agency costs, and the market timing theory underlines the practice of equity market timing. In the following, we will elaborate on the main assumptions of these modern theories of capital structure.

The current state-of-the-art of research in corporate finance can be described by Myers's statement (2001): „there is no universal theory of the debt-equity choice and no reason to expect one” (p. 81). A universal theory of optimal capital structure is not possible given the multitude and complexity of factors which explain the firms' financial decisions. In the economic literature, the determinants of capital structure have been grouped into two broad categories (Hermanns, 2006): (1) external factors represented by each country's specific economic conditions in which the economic entities operate and (2) firm-specific factors that include some of their performances. Among the external factors that explain the differences arising between the capital structures of enterprises in different countries, the most important are the macroeconomic conditions (economic growth, inflation and the average interest rate). The internal firm-specific factors are represented by profitability, asset tangibility, firms' size, their growth opportunities, financial distress costs, etc.

2. Modigliani and Miller theorem (1958)

The traditional theory of capital structure, Modigliani and Miller theorem (1958) forms the basis for modern thinking on capital structure, and is also known as the capital structure irrelevance principle. The theorem, which contains two propositions, states that in the absence of taxes, bankruptcy costs, and asymmetric information, firm's value is unaffected by how firms are financed.

The first proposition is called the “irrelevance proposition”, and the second one refers to the influence of capital structure on the cost of equity. According to the first proposition, the market value of a firm is constant regardless of whether the firm's capital consists of equity or debt, or a combination of these two. This proposition is based on the following hypotheses: there are perfect and frictionless markets, individuals and firms borrow at the same rates, no transaction costs, no default risk, and no taxation. The proposition was demonstrated by the method of „reductio ad absurdum” based on the concept of arbitrage. The arbitrage is attempting to profit by exploiting price differences of identical or similar financial instruments, on different markets or in different forms. Therefore, it was assumed

that the market value of a levered firm (a firm financed partly by equity and partly by debt; V_L) is greater than the one of an unlevered firm (a firm financed only by equity; V_U): $V_L > V_U$. More specifically, an investor who obtains a loan and purchases the shares of the unlevered firm gets the same income as if he would invest in shares of the levered firm. However, because $V_L > V_U$, investor's costs of borrowing money would be lower in the case of the unlevered firm and, if levered firms are priced too high, rational investors will simply borrow on their personal accounts to buy shares in unlevered firms. In this case the price for the shares of the levered firm will decrease and the price for the shares of the unlevered firm will increase until $V_L = V_U$.

Second proposition of the Modigliani and Miller theorem states that a firm's capital structure has no effect on its weighted average cost of capital (i.e., the cost of equity is a linear function of the debt-equity ratio). For the demonstration of the second proposition it was used the formula of weighted average cost of capital:

$$WACC = r_D D/V + r_E E/V \quad (1)$$

where $WACC$ is the weighted average cost of capital, r_D is the cost of debt, r_E is the cost of equity, D is debt market value, E is equity market value and V is firm's market value. Solving the equation (1) for the cost of equity, it is obtained:

$$r_E = WACC + (WACC - r_D)D/E \quad (2)$$

The equation (2) indicates that, if the firm increases the debt-equity ratio each equity unit is leveraged with additional debt. This means that the risk for the shareholders increases, and accordingly their expected income from shares. The implication here is that, the weighted average cost of capital is unaffected by the leverage because the reduction of cost of debt is compromised by the increase of the cost of equity.

In reality, there are no perfect markets and therefore Modigliani and Miller's (1958) propositions are exceptionally difficult to test directly Myers (2001). But as Miller (1989) stated "showing what doesn't matter can also show, by implication, what does" (p.7). In other words, Modigliani and Miller theorem shows that capital structure is relevant to the firm's value because some theorem's assumptions are violated. In spite of the fact that the empirical validity of the two propositions of the Modigliani and Miller theorem is still untested, its value is recognized by economists for decades. More specifically, this theorem motivated decades of research devoted to disproving the capital structure irrelevance proposition in terms of both, theoretical and empirical perspectives (Stiglitz, 1969; Ross et al., 1993).

3. Modern theories of capital structure

Given the fact that the Modigliani and Miller theorem assumes that capital markets are perfectly efficient, which is not true, and ignores realities as corporate

taxes, and costs of bankruptcy, most of the research in corporate finance domain in the last 40 years has focused on explaining such imperfections. As result, many different theories have been proposed to explain how these imperfections affects firms financing decisions.

The trade-off theory, pecking order theory, agency theory, and market timing theory are some of the modern theories that have emerged in corporate finance to explain the capital structure decision of firms. They contradict the Modigliani and Miller's propositions (I and II), by postulating that the capital structure of a firm is relevant to its value creation.

3.1. Trade-off theory (Kraus & Litzenberger, 1973)

The Modigliani and Miller propositions of 1958 were based on a number of unrealistic assumptions, and in 1963 Modigliani and Miller introduced taxes into the model. This led to the development of the *trade-off theory* of capital structure, whereby the tax-related benefits of debt were offset by costs of financial distress.

In other words, when corporate income tax was added to the original irrelevance principle this created a benefit for debt in that it served to shield earnings from taxes. Since the firm' objective function is linear (first degree) and there is no compensation cost of debt, corporate finance should be limited to debt financing. One of the disadvantages of debt is the cost of potential distress, especially when the firm relies on too much debt. To avoid this extreme measure, it takes some of the cost of debt and the most suitable in this respect would be the cost of financial distress (Frank & Goyal, 2005).

The trade-off theory changes Modigliani and Miller's propositions as follows (Myers, 2003):

$$V_L = D + E = V_U + VP(\text{tax shields}) - VP(\text{bankruptcy costs})$$

where:

V_L - market value of the levered firm;

V_U - market value of the unlevered firm;

$VP(\text{tax shields})$ – present value of tax shields;

$VP(\text{bankruptcy costs})$ – present value of bankruptcy costs.

The trade-off theory postulates that a firm will borrow up to the point where the marginal value of tax shields on additional debt is balanced by the increase in the present value of possible bankruptcy costs (Myers, 2001).

The first statement of the theory was provided by Kraus and Litzenberger (1973) and states that optimal leverage reflects a trade-off between tax benefits of debt and bankruptcy costs. According to these authors, expansion in leverage increases the probability of bankruptcy and thus increase expected bankruptcy costs. The level that additional leverage causes an increase in expected bankruptcy costs that just offset the tax subsidy to the incremental debt defines the optimal capital structure.

According to Myers (1984), a firm that follows the trade-off theory sets a target debt ratio and then gradually moves towards target. The target debt ratio is determined by balancing debt tax shields against costs of bankruptcy.

Frank and Goyal (2005) subsequently proposed two versions of the trade-off theory: the statistic and dynamic trade-off theory. The *static trade-off theory*

states that firms' optimal capital structure is determined by trading off the interest tax shields of debt and the costs of financial distress. The *dynamic trade-off theory* (adjustment behavior to the target debt ratio) states that a firm exhibits adjustment behavior to the target debt ratio, whether the firm has a target debt ratio and gradually tries to reach this target.

The most important practical implication of the trade-off theory is that the profitable firms use more debt since they are less likely to go to bankruptcy and can benefit from tax advantages of debt (Myers, 2003).

3.2. Pecking-order theory (Myers & Majluf, 1984)

The pecking-order theory of Myers and Majluf (1984) and Myers (1984) is based on the assumption that a firm having assets-in-place and a growth opportunity requires additional equity financing. Myers and Majluf (1984) assumed that a firm is undervalued because managers have inside information concerning new and existing investment opportunities, but cannot reveal that information to investors. Investors are aware of this asymmetric information problem, and they discount the firm's new and existing risky securities when stock issues are revealed. In addition, managers avoid issuing undervalued securities by financing projects with retained earnings and low-risk debt.

Myers (1984) suggested that the costs of issuing risky debt or equity overwhelm the forces that determine optimal leverage in the trade-off theory. More appropriate in this situation is the pecking order theory, which states that firms finance investments first with retained earnings, then with safe debt, then with risky debt, and finally, with equity.

According to Harris and Raviv (1991) the pecking order theory has several empirical implications. The most important is that following the announcement regarding issuance of new shares, the market value of existing shares will decrease. A second implication relates to the firms tendency of financing new projects from retained earnings and low-risk debt. Thirdly, the undervaluation problem is less serious after the disclosure of information such as annual reports and profit. Finally, it is assumed that for firms with a small tangibility, there is a greater probability that these firms deal with the problem of information asymmetry.

There are important conceptual differences between pecking order theory and trade-off theory. As such, while trade-off theory states a positive relationship between profitability and debt ratio, pecking order theory states that more profitable firm use less debt. Trade-off theory implies a target debt ratio in a static approach, while pecking order theory implies a dynamic approach that allows the existence of firms' optimal capital structure. Despite the conceptual differences between trade-off and pecking order theories, the two theories have many common predictions about the determinants of leverage. For example, both theories suggest a positive relationship between growth opportunities and leverage and between assets tangibility and leverage (Fama & French, 2002).

3.3. Agency theory (Jensen & Meckling, 1976)

All aforementioned theories are based on the assumption that the interests of managers are perfectly aligned with those of shareholders and managers will act in the best interests of the firm's existing shareholders. However, the interests of stakeholders are not always aligned. Jensen and Meckling (1976) found that the

interests of managers are not aligned with those of shareholders, and managers tend to waste free cash flow in perquisites and bad investments.

In order to explain the basic concepts upon which the foundations of *agency theory* are built, Jensen and Meckling (1976) defined the relationship between the shareholders (called principal(s)) and managers as an agency relationship, "a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision making authority to the agent" (p. 308). If both parties to the relationship are utility maximizers there is good reason to believe that the agent (the manager) will not always act in the best interests of the principal(s). The principal can limit divergences from his interest by establishing appropriate incentives for the agent and by incurring monitoring costs in order to limit the aberrant activities of the agent. However, it is impossible for the principal or the agent at zero cost to ensure that the agent will make optimal decisions from the principal's viewpoint. In most agency relationships the principal and the agent will support positive monitoring and bonding costs and additional there will be some disparity between the agent's decisions and those decisions which would maximize the welfare of the principal.

According to Jensen and Meckling (1976), agency costs are defined as the sum of the monitoring expenses of the principal (the equity holders), the bonding expenses of the agent (the manager), and the residual loss, and are explained by the *agency theory*. The theory predicts that in order to control the agency costs caused by free cash flow, firms with more profitable assets in place use a larger fraction of their earnings to debt payments. Thus, controlling for investment opportunities, the leverage is positively related to profitability. The underinvestment and asset substitution problems, which arise when debt is risky and the stockholder-debtholder agency problem exists, lead to the prediction that firms with more investments have less leverage (Jensen & Meckling, 1976; Myers, 1977). Jensen and Meckling (1976) have identified two types of conflicts of interests resulting in the following agency problems: conflicts between shareholders and managers (benefits of debt financing) and conflicts between debtholders and shareholders (agency costs of debt financing). The optimal capital structure can be obtained by balancing the benefits of debt financing against agency costs of debt financing. This means that the agency theory can be considered a version of trade-off theory. As a conclusion, it can be said that agency models were some of the most successful models in generating interesting hypotheses (Harris & Raviv, 1991). More specifically, these models show that debt ratio is positive correlated with firm's value (Hirschleifer & Thakor, 1989; Harris & Raviv, 1990; Stulz, 1990), the probability of default (Harris & Raviv, 1990), free cash flow (Stulz, 1990) and the importance of managerial reputation (Hirschleifer & Thakor, 1989).

3.4 Market timing theory (Baker & Wurgler, 2002)

The recent one of capital structure theories, namely *the market timing theory* was first introduced by Baker and Wurgler (2002). This theory suggests that managers are able to identify certain time periods during which equity issuance is less costly due to the high valuation of company's stock. When managers time the equity market and issue equity when market value of equity is high, firm's costs of equity would be relatively lower. In this case, managers would be increasing the value of the firm at the expense of new shareholders and the benefits would be

transferred to current shareholders. In addition, this theory suggests that the managers' ability to time the equity market affects the firm's security issuance decision and ultimately the capital structure of that firm.

Baker and Wurgler (2002) suggested that firms issue securities depending on the relative costs, so, if cost of equity is low relative to the cost of other forms of capital (i.e. debt), the firms are more likely to issue equity. Specifically, according to this theory, firms are more likely to issue equity when their market values are high and to repurchase equity when their market values are low. This implies that, for external financing decisions, firms prefer external equity when the cost of equity is low, and prefer debt under other conditions. Finally, according to Baker and Wurgler (2002), the market timing of equity issuances has long-lasting effects on capital structure. For example, the authors found that low leverage firms are those that raised funds when their market valuations were high, as measured by the market-to-book ratio, while high leverage firms are those that raised funds when their market valuations were low. Contrary to Baker and Wurgler (2002), Hovakimian (2006) and Kayhan and Titman (2007) rejected the hypothesis that fluctuations in market value of equity have long-lasting effects on capital structure.

It should be noted that Frank and Goyal (2004) state that market timing can not be considered a theory of capital structure because there are no sufficient studies to validate the hypotheses of this theory. Later, Huang and Ritter (2005), Alti (2006), Hovakimian (2006), Kayhan and Titman (2007) found empirical support for the existence of market-timing theory and that is why we believe that this theory can be included in the category of modern theories of capital structure.

4. Capital structure theories and their practical implications and characteristics

This section provides a brief review of the prominent theories of capital structure followed by a summary of their practical implications, more specifically how these theories explain the relationship between leverage and determinants of capital structure, as well as their strengths and weaknesses (see Table 1).

Table 1: Theories of capital structure

<i>Theories</i>	<i>Practical implications</i>	<i>Strengths</i>	<i>Weaknesses</i>
Modigliani and Miller theorem (Modigliani & Miller, 1958)	- the choice between equity financing and debt does not affect a firm's market value and a firm's dividend policy does not affect its market value - firm's cost of capital is not affected by its financial structure	- it specifies conditions under which various financing decisions are irrelevant for the firm's value (Ross et al., 1993) - it forms the basis for modern thinking on capital structure (set out the cornerstone for modern thinking on corporate finance)	- it does not take into account taxes, bankruptcy costs, and other agency costs (Stiglitz, 1969) - it is based on the assumption that investors and firms have "equal access" to financial markets

<p>The trade-off theory (Kraus & Litzenberger, 1973)</p>	<ul style="list-style-type: none"> - safe firms with a large proportion of tangible assets tend to borrow more than small, risky firms with mostly intangible assets - firms with high profitability and valuable growth opportunities tend to borrow less and firms with more profitable assets in place, fewer investments, less volatile earnings and net cash-flow have higher leverage (Myers, 2003); 	<ul style="list-style-type: none"> - firm is viewed as setting a target debt ratio and gradually moves towards it, in much the same way that a firm adjusts dividends to move towards a target payout ratio. As a result, a firm's capital structure is formed by gradual movement towards its optimal debt ratio) - the managers of firms should find a debt/equity ratio that balances the risk of bankruptcy (i.e., a high ratio) 	<ul style="list-style-type: none"> - determining the target debt ratio is a very difficult problem in practice - the results that validate the trade-off theory may equally support the assumptions of the other theories of capital structure (i.e., trade-off theory) - there are many profitable firms (which it expected to have more debt) that have a low debt ratio (Myers, 2003)
<p>The pecking-order theory (Myers, 1984. Myers & Majluf, 1984)</p>	<ul style="list-style-type: none"> - while more profitable firms borrow less, because they have more internal financing available, less profitable firms require external financing, and as a consequence accumulate debt (Myers, 2003) 	<ul style="list-style-type: none"> - it predicts that information asymmetry between managers and investors creates a preference ranking over financing sources (Myers, 2001) - it indicates that while more profitable firms borrow less, because they have more internal financing available, less profitable firms require external financing, and as a consequence accumulate debt 	<ul style="list-style-type: none"> - it can not explain why financial decisions are not able to avoid the consequences of the additional information that managers have (Myers, 2003) - it is based on the assumption that the interests of managers are perfectly aligned with those of shareholders
<p>The agency theory (Jensen & Meckling, 1976)</p>	<ul style="list-style-type: none"> - leverage is positively related to firm value, default probability, extend 	<ul style="list-style-type: none"> - it explains the financing behavior of firms when the interests of 	<ul style="list-style-type: none"> - it approaches very different aspects, thereby the contradictory results

	<p>of regulation, free cash flow, extend to which the firm is a takeover target and the importance of managerial reputation (Harris & Raviv, 1990; Stulz, 1990).</p> <p>- leverage is negatively associated with the extent of growth opportunities, interest coverage, the cost of investing firm prospects, and the probability of reorganization following default (Harris & Raviv, 1990)</p>	<p>managers are not perfectly aligned with those of shareholders</p> <p>- it provides explanations for numerous institutional regulations: monitoring rights, reply right, and contractual obligations for credits (Hax, Hartmann-Wandels & von Hinten, 1988)</p>	<p>obtained can not explain firms capital structure</p> <p>- it does not provide practical recommendations</p>
<p>The market timing theory (Baker & Wurgler, 2002)</p>	<p>- debt ratio changes are strongly and positively related to their market timing measure, so, the capital structure of a firm is the cumulative outcome of past attempts to time the equity market;</p> <p>- it argues that firms time their equity issues, in other words they issue new stock when the stock price is perceived to be overvalued, and buy back own shares when there is undervaluation.</p>	<p>- it proves that macroeconomic factors and firm-specific factors influence the capital structures of the listed firms</p>	<p>- it does not define an optimal capital structure</p> <p>- there are no many studies that have been conducted to empirically validate the assumptions of this theory (Frank & Goyal, 2004)</p>

5. Conclusions

Determination of optimal capital structure has been one of the main topics for theoreticians and financial managers since Modigliani and Miller introduced

their capital structure irrelevance propositions in their seminal article in 1958. Since then, the literature on capital structure has been expanded by many theoretical and empirical contributions. More specifically, much of the financial literature over the past four decades has revolved around different theories that try to explain what does matter in determining capital structure.

The modern theories of capital structure explain corporate leverage and its dynamic. According to the *trade-off theory*, firms try to reach that level of debt ratio that balances tax benefits of debt against bankruptcy costs. *Pecking order theory* states that firms prefer debt to equity when these firms do not have sufficient internal funds to finance its assets. According to the *agency theory* firms capital structure is determined by agency costs that arise due to conflicts of interests (between shareholders and managers and between debtholders and shareholders). This theory can be considered a version of trade-off theory, because the optimal capital structure can be obtained by balancing the benefits of debt financing against agency costs of debt financing.

Unifying capital structure theories into a universal theory of capital structure is far from being achieved (Myers, 2001), given the different financial systems and economic traditions of different countries on capital structure choice. Cross-country comparisons are essential for understanding the difference in leverage choices across countries. In addition, cross-country comparisons can be used to suggest linkages between institutional differences and empirical results about capital structure.

The capital structure theories are conditional theories that works in certain circumstances. That means that a firm's financing decisions can be compatible with two of the theories. Therefore, in order to analyze the determinants of capital structure for a sample of firms the researchers have to consider the assumptions of all theories of capital structure.

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THE CASE OF ACCOUNTING TREATMENT OF OPTIONS IN THE SOUTH AFRICAN AGRICULTURAL SECTOR

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Abstract. The main objective of the study is to investigate the accounting treatment of commodity options in the South African agricultural sector. Option contracts fall within the definition of a derivative as defined by IAS 39. The interpretation of IAS 39 by agribusinesses is different and therefore a standard methodology was provided for the accounting treatment of SAFEX option contracts traded by agribusinesses on behalf of producers. The main findings include that option contracts entered into on behalf of the producer by the agribusiness should be fair valued with the fair value movement recorded in the accounting records of the agribusiness. This fair value movement should be transferred to the relevant producer's loan account and not recorded as a profit or loss of the agribusiness.

JEL Classification: M410, Q130

Keywords: Options, IAS 39, SAFEX, agriculture

1. Introduction

1.1. Derivatives

Agribusinesses have to compete both locally and internationally and in order to survive, these entities have to become and remain competitive (Esterhuizen, 2006). It is imperative that agribusinesses become and remain *sustainable* in order to support primary producers responsible for basic food production. Many producers and industries are heavily exposed to the price fluctuations of commodities resulting in exposure to financial risk (Geyser and Cutts, 2007). These price fluctuations may have a significant impact on their competitive position (Ramirez, 2007) and therefore the financial risk should be managed very carefully. Derivative contracts serve a valuable purpose by providing a means to manage financial risk and many commodity derivative contracts are utilised by companies as an integral part of their day-to-day operations (Ramirez, 2007). Producers and agribusinesses reduce commodity

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price risk by forward pricing methods such as hedging with futures and / or options (Jordaan and Grové, 2007).

The global derivatives market has experienced explosive growth over the last few decades and derivatives have been globally accepted by large organisations as the premier vehicles to manage and mitigate financial risk (Gebhardt *et al.*, 2004; Shin, 2004). This was evident in a survey conducted during 2009 by the International Swaps and Derivatives Association (ISDA) that indicated that 94% of the world's largest companies use derivative products as part of their risk management strategies (ISDA, 2009). During 2008 the Futures Industry Association (FIA) ranked the JSE Securities Exchange (currently known as the JSE Limited) in South Africa as the 10th largest derivative exchange in the world by the number of contracts traded. The number of contracts traded during the first six months of 2008 were more than 216 million, a growth of 61% over the corresponding period in 2007 (Anon, 2008). During 2007, the Agricultural Products Division of the JSE Limited in South Africa, commonly known as SAFEX, traded 2.4 million contracts.

During the 1990's large financial losses were incurred by several corporate users of novel derivative products. With the emergence of these new and more complex financial instruments, accounting regulations had to follow these developments. The accounting practices at the time were considered as being insufficient and being applied inconsistently (Abhayawansa and Abeysekera, 2006). According to Ramirez (2007) the resources devoted to the development of these derivative products substantially exceed the resources devoted to the development of accounting standards to interpret these instruments. Globally accounting standard setters undertook to make the use of financial instruments more transparent and to incorporate the effects of these financial instruments on an entity's financial position (PwC, 2005). Investors require financial information to be comparable to ensure sound economic decisions are made (Beke, 2010).

1.2. IAS 39

All publicly quoted companies in the European Union (EU) are required to adopt the International Financial Reporting Standards (IFRSs) as issued by the International Accounting Standards Board (IASB) as from the 1st of January 2005 (Dunne *et al.*, 2003). All *South African* listed companies are required to adhere to the IFRSs as per the IASB (Anon, 2003). IAS 39 became effective on 1 January 2001 (IASB, 2009a) and is perceived as a complex standard, wide in scope that also interacts with a number of other standards (Ramirez, 2007). Traditionally financial derivatives were accounted for using historical cost accounting but since many derivatives attract very little or no initial cost, the presentation was limited to a note to the financial statements not revealing a company's real exposure (Dewing & Russell, 2008). The complexity of financial instruments, including the measurement, recognition and subsequent disclosure is reflected in the length of the IASB's work programme on financial instruments. It commenced during 1988 and final agreement was reached in June 2005 (Dewing and Russell, 2008). The goal of the IASB was to make the use of financial instruments more transparent and to incorporate the effects of these financial instruments on an entity's financial position. It seems that this goal of the IASB has not been achieved if you refer to recent comments made. Sir David Tweedie

of the IASB confessed that the accounting rules of financial instruments were too complex (Temkin, 2009) and in South Africa Mr Trevor Manuel, the previous Minister of Finance has said that more light is needed on the accounting of derivatives (Pickworth, 2009). Comments such as that IAS 39 is “conceptually flawed” and “unworkable in practice” has also been made (Dunne *et al.*, 2003). During March 2006, two of the major standard setters, the IASB, headquartered in London, United Kingdom, and the Financial Accounting Standards Board (FASB), located in Connecticut in the USA, reaffirmed their commitment and further clarified their intentions to converge financial reporting standards. Since then the two Boards worked closely together on a research project to reduce the complexity of the accounting treatment of financial instruments. During July 2009 an exposure draft, ED/2009/7, was issued regarding the classification and measurement of financial instruments which led to the issuance of IFRS 9: Financial instruments during November 2009 (IASB, 2009b). During the same time an exposure draft Amortised cost and impairment (ED/2009/12) was issued by the IASB addressing phase 2. The third phase was dealt with by the issuance of exposure draft Hedge accounting (ED/2010/13) during December 2010 with a comment deadline of 9 March 2011. The IASB aims to replace all the requirements of IAS 39 during the second quarter of 2011 (IASB, 2011).

2. The objective of the research

2.1. Knowledge gap and research motivation

The accounting treatment of options is not specifically covered by IAS 39 with option contracts falling within the broader definition of a derivative contract. Commodity derivative contracts form a major part of the business operations of South African agribusinesses and the interpretation of IAS 39 relating to the accounting treatment of option contracts by these entities varies. A number of appendixes accompany IAS 39, namely i) the basis of conclusions that summarises the IASB’s considerations in reaching the conclusions on the revisions of IAS 39 ii) an illustrative example, and iii) a guidance on implementing IAS 39. With reference to contracts to buy or sell non-financial items these appendixes may not be sufficient due to the inherent complexity of derivative contracts, which includes option contracts. The varying interpretation and application of IAS 39 by auditors and South African agribusinesses results in incomparability of their financial statements by market participants and investment analysts.

The research motivation is therefore to fill the knowledge gap of the accounting treatment of SAFEX options and to provide a standard methodology for South African agribusinesses to account for SAFEX options traded on behalf of producers or to hedge themselves against commodity price risk.

2.2. Problem statement

The incomparability of financial statements of South African agribusinesses may lead to inaccurate decision-making. For purposes of this research project, the primary research problem can therefore be defined as follows:

P1. What is the current state of accounting treatment of options in South African agribusinesses?

2.3. Research objectives

Based on the aforementioned, the main objective of this study is to investigate the accounting treatment of options in the South African agricultural sector.

3. Research design and methodology

In order to achieve the set objectives, both a literature review and an empirical study were conducted. The type of research conducted was applied and descriptive by utilising quantitative and qualitative studies through inductive reasoning. The literature review encompasses a review of literature regarding South African agribusinesses and their use of commodity derivatives and reviewing IAS 39's treatment of option contracts. The empirical study will now be discussed.

3.1. Empirical study

Seven case studies were identified by utilising convenience sampling (unrestricted non-probability sampling). The target population in this study had the following characteristics: South African entities, either companies or cooperatives; operating in the agricultural sector, and trading with commodity derivatives such as option contracts. Six of the respondents were companies while one was a cooperative. The entities agreeing to partake in the study, were elected and included and generously agreed to be named. The respondents, listed in alphabetical order, were: i) AFGRI Limited, ii) Free State Maize (Pty) Ltd, iii) NWK Limited, iv) Ruto Mills, v) Senwes Limited, vi) Tongaat Hullett Starch and Vrystaat Koöperasie Beperk. Interviews were also conducted with relevant representatives of the technical departments of three of the largest four audit firms in South Africa (Deloitte, Ernst & Young, KPMG and PricewaterhouseCoopers). These audit firms were elected for interviews because they are represented both locally and globally. They agreed to partake in the study under the condition of anonymity.

The accounting treatment of option contracts were investigated by identifying typical transaction types agribusinesses utilise in contracts with producers. The accounting treatment was determined by utilising a developed questionnaire and structured interviews with the respondents.

3.1.1. Contracts with producers

Agribusinesses offer producers various options to market and sell their grain. These options differ based on *when* the contract is entered into, *how* the price is determined, *when* the price is determined, if additional protection against price fluctuations is required, etc. The different options, referred to as products, have been developed over time driven by demands from producers. One transaction type offered by agribusinesses to producers is a pre-season minimum price contract which will now be discussed.

Pre-season minimum-price contract

A minimum price contract is entered into before planting season commences. Three variations of the minimum price contract exist, namely minimum-price contract, minimum-maximum price contract and a synthetic put contract. Each one will now be discussed.

Minimum-price contract

This product provides the opportunity to the producer to guarantee a *minimum* price without setting a fixed price for its commodity yet. A put option is purchased with a strike price equal to the minimum price. If the market price of that commodity increases, the put option becomes worthless and is not exercised. When the producer finally decides to sell at a SAFEX-based price, the entity enters into a corresponding short futures position on SAFEX in order to hedge themselves against commodity price fluctuations. If the market price of that commodity decreases, the put option is exercised whereby ensuring the minimum price is paid.

Minimum-maximum price contract

A variation of the minimum price contract, is a minimum-maximum price contract where a producer has the option of purchasing a put option and selling a call option. The producer thereby creates a band width in which the commodity price can fluctuate. This product locks the price in that a producer receives for his commodity within the band width. This type of contract reduces the option premium payable due to the up and down market movements.

Synthetic put contract

Another variation of the minimum price contract is commonly referred to as a synthetic put contract. A futures contract is sold at a price, and a call option is purchased with a strike price at the same price level. If the market price of that commodity decreases, the short futures position is already in place and the call option becomes worthless and is not exercised. If the market price increases, money is lost on the short futures position but the call option increases in value. When the producer decides to price his grain, the entity enters into an off-setting long futures position and exercises the call option.

4. Findings

An option contract adheres to the definition of a *derivative*, in other words it is a financial instrument which's value changes in response to changes in a specified commodity price, requires little or no initial investment and it is settled at a future date (IASB, 2010). According to IAS 39, derivatives fall within the "fair value through profit or loss" financial instrument category. Therefore the option contracts have to be fair valued which means that the mark-to-market valuation must be recorded. There are two relevant aspects related to the accounting treatment of options that should be considered. The first aspect is the methodology behind how these options are marked-to-market and the second aspect is accounting for the options.

4.1. First aspect: Mark-to-market of options

The mark-to-market of these option contracts forms part of the mark-to-market calculations that an entity performs either daily or monthly. SAFEX prescribes a method that they follow in order to perform the daily mark-to-market calculations of options. The findings of the research show that six (85.7%) of the seven respondents trade SAFEX options, and the respondents fair value such option contracts using various methods including the following:

- Four of these six respondents apply the mark-to-market calculation as performed and published by SAFEX.
- One of these six respondents developed a computer software application based on the option valuation method prescribed by SAFEX, which automatically performs the valuations and the adjustments (gain or loss) on the options. This application is used as a management tool to ensure that the SAFEX mark-to-market calculations on options are accurate.
- The final respondent indicated that the options are not valued because the movement on the options is for the account of the producer, not the agribusiness. Therefore, no accounting entry is performed for purposes of the valuation of the options. The option contract however is taken out on behalf of the producer.

When considering options utilised by the producer, the research uncovered the following typical scenario occurring in practice.

Scenario 1: SAFEX options

The agribusiness, with which a producer has a supply contract, has a SAFEX margin account held at SAFEX. The option contract is acquired by the agribusiness on behalf of the producer. In order to acquire an option contract, SAFEX has a certain initial margin requirement. When the agribusiness enters into an option contract on behalf of the producer, the agribusiness will either allocate the mark-to-market movement of the options to i) the producer's loan account on a daily basis; or ii) when the producer physically delivers the contracted maize. The daily mark-to-market movement is performed leading to SAFEX either withdrawing or depositing the movement between the initial margin and the mark-to-market value in the agribusiness's account held at SAFEX. The agribusiness enters a corresponding entry either in the producer's loan account or against the deposit held at the agribusiness.

When considering the initial margin requirement of SAFEX futures, it is a fixed amount, while for SAFEX option contracts the initial margin requirement may vary. SAFEX re-calculates and publishes the initial margin requirement daily.

After the SAFEX option contract has expired, the initial margin requirement is repaid by SAFEX. Agribusinesses again have different business practices of accounting for the initial margin when entering into an option contract on behalf of the producer. SAFEX charges the agribusiness' margin account held at SAFEX but repays the initial margin requirement on the option expiry date. The study found that actual business practices include the following:

- *The agribusiness can either allocate the margin requirement to the producer's loan account; or*
- *the agribusiness will not charge the producer for the initial margin but interest will be raised by the agribusiness for providing the finance for the initial margin to the producer; and / or*

the agribusiness will require a deposit that will include funds to cover the option premium and additional funds for the mark-to-market movement still to occur.
Source: (Authors)

The method used by SAFEX to calculate the mark-to-market for options is based on the Black-Scholes option pricing model. The variables used in this model include *option volatility* and the *underlying commodity price*. A scenario will now

be utilised to explain the accounting of the mark-to-market of options. In this scenario the producer markets its maize by entering into a pre-season minimum price contract leading to the agribusiness entering into a put option contract on behalf of the producer.

Scenario 2: Mark-to-market of options

A SAFEX July white maize put option contract is purchased on 15 April with a strike price of ZAR1 000 per ton with the spot July white maize price at ZAR1 000 per ton. The option premium is ZAR150 per ton. The producer has a loan account with the agribusiness and the option premium is immediately charged to the producer's loan account. SAFEX requires an initial margin of ZAR120 per ton. The agribusiness has a practice of providing the initial margin as an advance and transferring it to an interest-bearing account. Assume that the initial margin account is zero at the beginning of the transaction and that the agribusiness has to first fund the initial margin account. The producer's loan account is adjusted with the mark-to-market movement when the inventory is received. The mark-to-market movements are as follows:

Date	M-to-m: option contract	M-t-m: futures contract
30 April	ZAR200 per ton	ZAR800 per ton
31 May	ZAR100 per ton	ZAR900 per ton

The journal entries in the agribusiness's accounting records will be as follows:

15 April	Dr.	Cr.
	ZAR	ZAR
Producer loan account (ZAR150 x 100)	15 000	
Financial instrument liability		15 000
Bill the producer with the option premium		
Interest-bearing account (SAFEX) (ZAR120 x 100)	12 000	
Bank		12 000
Funding SAFEX margin account with initial margin		
30 April		
Bank (ZAR20 000 – ZAR15 000)	5 000	
Financial instrument liability		5 000
Profit on mark-to-market of option contract		
31 May		
Financial instrument liability (ZAR10 000 – ZAR20 000)	10 000	
Bank		10 000
Loss on mark-to-market of option contract		

Source: (Authors)

3.2. Second aspect: Accounting for options

The next aspect under discussion is how to account for these options once a producer physically delivers the grain. Options can be used in two different situations, either by i) the producer or processor or by ii) the agribusiness to hedge against commodity price risk. A pre-season minimum price contract is an example of a producer using an option contract to hedge against commodity price risk. The accounting treatment of these two situations is different. Only the accounting treatment of the first situation will be considered. In order to simplify the transaction flow, scenario 3 (based on the information in scenario 2) is provided below.

Scenario 3: Accounting for options

A SAFEX put option contract on a white maize future is purchased with a strike price of ZAR1 000 per ton. The option premium is ZAR150 per ton. SAFEX requires an initial margin of ZAR120 per ton. The option premium is immediately charged to the producer's loan account. The agribusiness has a practice of providing the initial margin as an advance by transferring it to an interest-bearing account with interest charged at 10% per annum. The mark-to-market movement is settled when the producer physically delivers the maize. The producer physically delivers the maize on 30 June. The last mark-to-market was performed at the following prices:

Date	M-to-m: option contract	M-t-m: futures contract
31 May	ZAR100 per ton	ZAR 900 per ton
Situation 1 (30 June)	ZAR 0 per ton	ZAR1 100 per ton
Situation 2 (30 June)	ZAR 50 per ton	ZAR 950 per ton

Two different situations will be discussed. In situation 1 the spot price of white maize futures increases to ZAR1 100 per ton on delivery date while in situation 2 the spot price reduces to ZAR950 per ton on delivery date. The option contract will expire a few days before delivery date. SAFEX repays the initial margin on the expiry of the contract. In both situations SAFEX will reduce the margin account of the agribusiness with the ZAR120 per ton initial margin and the mark-to-market movement on the option contract. Each producer has a loan account with the agribusiness which will increase with the option premium of ZAR150 per ton. The producer always delivers the physical maize at the spot price.

Situation 1: The option contract is "out of the money" with ZAR100 per ton [ZAR1 100 (mark-to-market price) less ZAR1 000 (strike price)]. The option is regarded as worthless and lapses which means that the entire option premium of ZAR150 per ton is lost. The producer delivers the maize at the spot price of ZAR1 100 per ton and the funds are settled against his or her loan account with the agribusiness. SAFEX repays the initial margin of ZAR120 per ton. The producer therefore receives ZAR950 per ton (ZAR1 100 less ZAR150).

30 June	Dr. ZAR	Cr. ZAR
Inventory	110 000	
Producer loan account (ZAR1 100 x 100)		110 000
Producer physically delivers maize and receives ZAR1 100 per ton		
30 June		
Bank	12 000	
Interest-bearing account (SAFEX)		12 000
Repayment of initial margin by SAFEX		
30 June		
Bank	300	
Interest received		300
Receiving interest on funding initial margin (12 000 x 3/12 x 10%)		

30 June		
Producer loan account (ZAR110 000 – ZAR15 000)	95 000	
Bank		95 000
Settling producer's loan account		

Situation 2: The option contract is “in the money” with ZAR50 per ton [ZAR1 000 (strike price) – ZAR950 (mark-to-market)]. The option is exercised at the strike price of ZAR1 000. The producer delivers the maize at the spot price of ZAR950 per ton with the funds settled against the producer's loan account with the agribusiness. SAFEX reduces the agribusiness' margin account with the ZAR50 per ton mark-to-market of the option contract, while the agribusiness transfers the ZAR50 per ton profit on the cumulative mark-to-market of the option contract to the producer's loan account. SAFEX repays the initial margin of ZAR120 per ton. The producer therefore receives ZAR850 per ton (ZAR950 + ZAR50 – ZAR150).

30 June	Dr ZAR	Cr ZAR
Inventory	95 000	
Producer loan account (ZAR950 x 100)		95 000
Producer physically delivers and receives ZAR950 per ton		
30 June		
Bank	12 000	
Interest bearing account (SAFEX)		12 000
Repayment of initial margin by SAFEX		
30 June		
Bank	300	
Interest received		300
Receiving interest on funding initial margin (12 000 x 3/12 x 10%)		
30 June		
Financial instrument liability (ZAR10 000 – ZAR5 000)	5 000	
Bank		5 000
Loss on mark-to-market of option contract		
30 June		
Financial instrument liability	5 000	
Producer loan account		5 000
Transferring mark-to-market movement to producer's loan account		
30 June		
Producer's loan account (95 000 – 15 000 + 5 000)	85 000	
Bank		85 000
Settling producer's loan account		

Source: (Authors)

4. Concluding discussion and recommendation

Option contracts are sometimes utilised by agribusinesses, producers and processors as a tool to minimise commodity price exposure by providing either a minimum price, maximum price or a band width between which a commodity price can move. Depending on the underlying commodity price movement, option contracts are not always exercised. Option contracts do however require an option premium to be paid for the privilege of the additional risk coverage. Generally the agribusinesses enter into these option contracts on behalf of the producers. An option contract falls within the scope of a financial instrument and is classified as a derivative. IAS 39 requires derivatives to be fair valued. The recommendation can therefore be made that option contracts entered into on behalf of the producer should be fair valued with the fair value movement recorded in the accounting records of the agribusiness.

Scenario 2 was utilised to explain the accounting entries when mark-to-marketing the option contracts. When considering the accounting for option contracts, the business practices the respondents follow has an impact on how it is accounted for in the accounting records. Business practices regarding the following aspects differ between agribusinesses:

- The funding of the initial margin requirement: either as an advance transferred to an interest-bearing account or the producer is required to pay an initial deposit to cover the initial margin requirement;
- payment of the option premium: either it is charged immediately to a producer's loan account or only when the physical maize is received;
- accounting for the mark-to-market movement on option contracts: either as a profit or loss in the accounting records of the agribusiness or recorded as a "cash flow" movement between the agribusiness and the producer without affecting the profit or loss account of the agribusiness;
- recording of the mark-to-market movement on option contracts: either it is transferred to a producer's loan account on a daily basis or when the producer physically delivers the maize.

When considering the last two aspects listed above, the question remains whether the profit or loss on the movement of the option contracts can be accounted for in the Statement of Comprehensive Income of the agribusiness as a profit or a loss? The opinion of the auditors is that the option contract is taken out by the agribusiness on behalf of the producer and the risk and reward then lies with the agribusiness. In order to mitigate the risk for the agribusiness, there is a contract in place between the producer and the agribusiness transferring the risk from the agribusiness to the producer. The agribusiness therefore cannot reflect the fair value movement of the option contract as their profit or loss in the Statement of Comprehensive Income. The following recommendations can therefore be made:

- The fair value movement on the option contracts taken out on behalf of the producer by an agribusiness should not be reflected in the agribusiness's accounting records as a profit or loss.
- The fair value movement on the option contracts taken out on behalf of the producer by an agribusiness should be transferred to the relevant producer's loan account.

6. Limitations and future research

The reader should take note that the accounting standards on financial instruments are currently in a period of flux with the replacement of IAS 39. The focus on this study was however not only on the accounting treatment of commodity options but also on the varying interpretations of the standards and the business operations affected by commodity option contracts. The findings of this study were based on interviews conducted with representatives from the sampled case studies. The annual financial statements of the entities partaking in the study were not analysed and compared. The findings found and conclusions reached were based on the knowledge and interpretation of the interviewees.

Future research areas could include:

- The effects of the newly issued accounting standard (IFRS 9) have not been taken into account in this research study. Areas for further research could include investigating the accounting treatment of commodity option contracts taking into account this new statement.

Another topic for further research could investigate the impact of these new standards on the *business practices* of entities.

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A STUDY ON STUDENTS' PERCEPTION ON M-LEARNING ALIGNMENT OF EDUCATION

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Abstract. The paper discusses mobile learning alignment within our university, with respect to a prototype system tested against students' preferences and interest. In order to accomplish this, a survey was processed, in two phases: pre-implementation and post-implementation.

JEL Classification: C88

Keywords: m-learning, e-learning, students, survey

1. Introduction

Mobile learning is currently in its infancy, being the next development stage for the e-learning paradigm. In another approach, mobile learning technology is known to be a subset of e-learning, e-learning being itself a subset of distance education (dLearning), while dLearning is a subset of flexible learning (fLearning). M-learning and e-Learning have different goals, but their strengths can be superimposed:

- M-Learning: spontaneous, focused, personal, conscious content, targeted, private.
- E-Learning: rich information environment, institutional, intelligent, premeditated, many connections, usable, connected, interactive, desktop.

The next sections of the paper will discuss some related works; will present the results of an on-line survey targeted to our students, some technical details regarding the proposed mobile system and the results of the same survey after the students had contact with the proposed system.

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2. Related Works and Motivation

From the specialized literature, we know very few applications that really deal with m-learning. For example, Basaeed et al. (2007) propose an architecture of a Web-based Context-Aware m-Learning, but is checked and tested only up to a point. Goh et al. (2003) propose a system based on web services, the main disadvantage of the architecture would be the usage of OS Detection in HTTP headers, to decide if the equipment is functional for m-learning. Black and Howkes (2006) present an architecture which is a user-centered collaborative model for m-learning environments, the interface is developed to facilitate m-learning including voice input, but their prototype need improvements such as using WML package (Wireless Mark-up Language), in order to allow the development of pages for wireless device's browsers. Issack et al. (2006) describe an architecture called M-E adaptive architecture, designed to use mobile devices and e-learning tools integrated into a single infrastructure based on portable computers, but neither these authors and neither the authors mentioned above didn't make a preliminary study regarding the usage requirements of such facilities. Kinshuk (2010) said "*While the adaptivity based desktop environments and Attention HAS attracted much sophistication in e-learning environments, mobile learning is still struggling with basic pedagogical and Technological Problems*", but before proposing this classification he didn't study the necessity of introducing these issues on the market. Crow et al. (2010) examines institutional practice applied in universities regarding integration of mobile technologies in e-learning. The study has shown remarkable results, which gives us confidence to apply it in our own university. Also (see Evans, 2008) the students indicate that they are more receptive to the learning material in the form of a mobile device than a traditional lecture or textbook. Kim et al. (2006) tell us that "increasing numbers of institutions of higher education offer courses using mobile wireless technologies as alternative teaching and learning tools". So, the motifs for introduction the mobile devices and integrate them with e-learning are obvious.

Today's telecommunications industry offers a wide range of mobile phones, PDAs, handhelds, palmtops and smartphones, and the number of those who buy them is in constant growth, thus there are great opportunities in cultivating the new form of education, namely mobile learning (Klassen et al., 2001, Mocean et al., 2001, Morar et al. 2010, Mohamed, 2009, Herrington et al., 2009). Ryu and Parsons (2009) focused on a theoretical foundation and its pragmatic application to designing learning activities with mobile technologies and the result is a conceptual framework to provide systematic support for mobile learning design.

3. The Survey

The use of e-learning applications is a desideratum, an innovation and an important contribution to education reform in European countries. As an extension of e-learning, m-learning makes the system more precise and more flexible and universities consider m-learning as a less expensive system for academic education. The purpose of this research is to study the necessity and possibility of

extending an e-learning system to a m-learning system; it is aimed primarily to establish how the system is perceived by the users and what improvements can be made. To test the system we used five groups of 20 people (100 students from our university) aged between 21 and 28 years, students of our faculty. The testing process was performed in the morning, during weekend, between 9 and 12, after having established the rules of the questionnaire.

The online questionnaire was preferred against a paper form because, as specified in [6], in the case of complex questionnaire, the respondents will answer more carefully and completely on-line than they would do off-line. The questionnaire consists of complete answers to open questions and to multiple-choice questions with single answer. The overall number of questions is 10, divided hereby: 5 of them are open questions, 5 are closed questions with a choice. The header of the questionnaire contains the following fields (all fields marked with an asterisk are required):

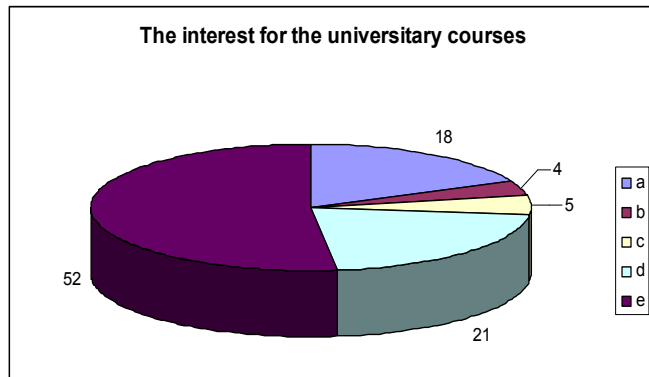
*Personal data, Name and first name, Birth date, Occupation and job *, Studies **

From 100 respondents, 34 have completed all items regarding their personal data and 66 have completed only the required fields. Therefore, 34% of the respondents want to reveal his/her identity. The questions were answered as follows:

Question 1. *The interest in university courses* (see figure 1)

- a) Reading of the university manuals – 18%
- b) Reading of the articles related to the subject taught by the professor – 4%
- c) Participation in lectures held by the professors at courses – 5%
- d) Participation in online training through the proposed system – 21%
- e) Participation in training with mobile devices – 52%

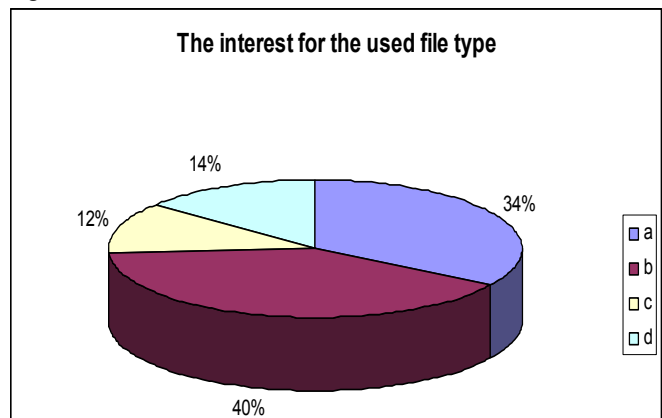
Figure 1. The percentages of the interest for university courses



Question 2. *The interest in the type of files used* (see figure 2)

- a) Preference for .doc file format - 34%
- b) Preference for .pdf file format – 40%
- c) Preference for image file formats – 12%
- d) Other preferences – 14%

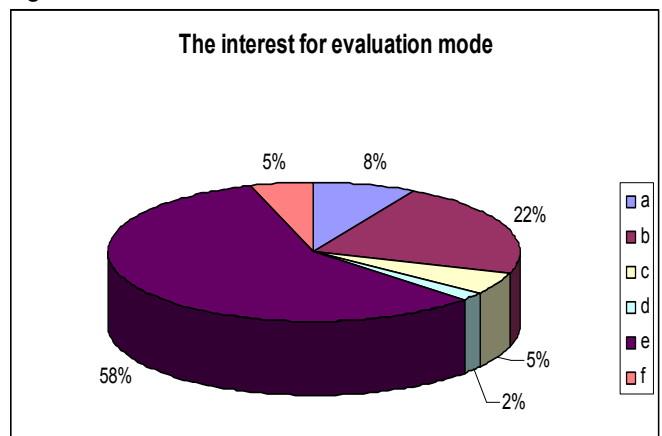
Figure 2. The interest of the students about the used files types



Question 3. *The interest regarding the evaluation method* (figure 3)

- a) Paper evaluation through open questions – 8%
- b) Paper evaluation through scale tests – 22%
- c) Paper evaluation through report – 5%
- d) On-line evaluation through open questions – 2%
- e) On-line evaluation through scale tests – 58%
- f) On-line evaluation through report – 5%

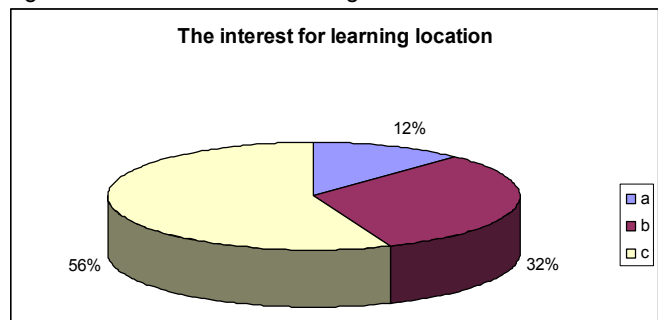
Figure 3. The interest for the evaluation mode



Question 4. *The interest regarding the learning location* (figure 4)

- a) Learning in a classroom – 12%
- b) Learning in a laboratory room – 32%
- c) Learning through mobile devices – 56%

Figure 4. The interest for learning location



Question 5. *The interest regarding the implementation of the system*

- a) The application – 8%
- b) The computer network – 10%
- c) The mobile devices – 54%
- d) The interaction with group members – 6%
- e) The interaction with the professor – 8%
- f) The assistance for using the hardware and software – 14%

Figure 5. The interest of the students for the system implementation

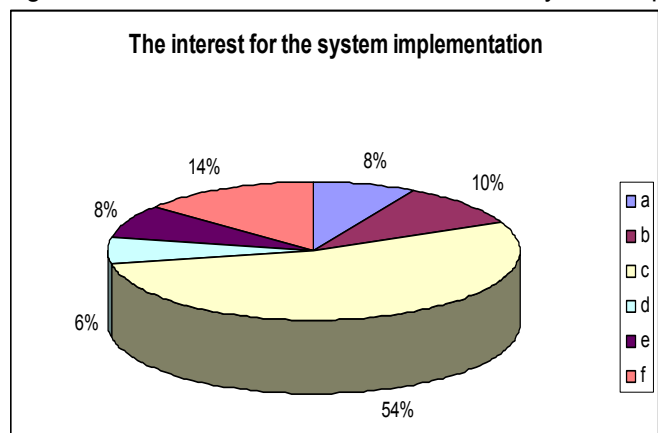


Table 1. The summary of the results

The participation in training with mobile devices	52%
Preference for .pdf file format	40%
On-line evaluation through scale tests	58%
Learning through mobile devices	56%
The interest in the used mobile devices	54%

A summary is presented below regarding the open questions:

1. The curricular content of the studied objects is good.
2. The interface for e-learning system used is very good, the collaboration teacher-student can be improved; there are tasks that could not be executed: image files downloading, file downloading along with student-student communication.
3. Student-teacher communication module is running at full capacity, student-student collaboration is much more difficult, this can be the buffer overload.
4. System security is desired, at first it needs to be realized regarding the existing connections to the database, user authentication and the interception of information while browsing the network, viruses.
5. Flexibility and adaptability of the mobile systems curriculum content of the course are desired.

4. The database model

Based on the previous questionnaire, taking into account the wishes of the users, a database was integrated as a part of the system (Mocean et al., 2010, Morar et al., 2010). The team of researchers has also proposed a model for e-learning application enclosed in an intelligent collaborative learning system. The composition of the database and the relationships between the tables are presented below.

4.1. Database structure

The model is driven by a relational database with 11 tables. The structure of these tables is:

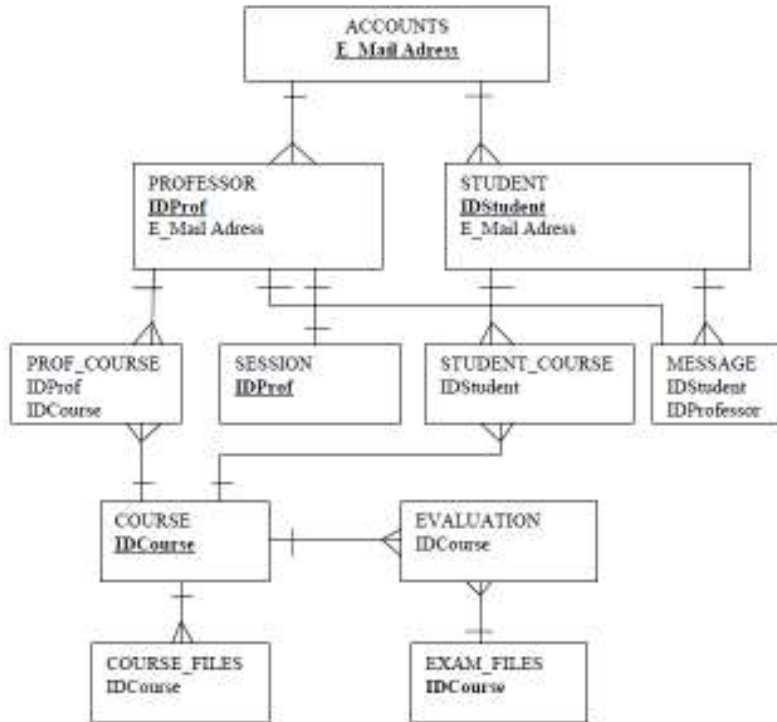
ACCOUNTS (**E-MAIL Adress**, Type, Password)
PROFESSOR (**IDProfessor**, Name, Department, Title, E-Mail Adress)
STUDENT (**IDStudent**, Name, Class, RegsitrationNo, Birth_Date, E-Mail Adress)
SESSION (**IDProfessor**, Begin_date, End_Date, End_Time, Room)
PROF_COURSE (IDProfessor, IDCourse)
STUD_COURSE (IDStudent, IDCourse)
COURSE (**IDCourse**, Course, Type)
COURSE_FILES (IDFile, Path, IDCourse)
EVALUATION (IDCourse, Evaluation Type, Questionnaire, Case_Study, Laboratory)
EXAM_FILES (**IDCourse**, Path, IDEvaluation)
MESSAGE (**IDMessage**, IDProfessor, IDStudent, Date, Text)

The relationships have been defined in order to meet several requirements:

- to support the registration and login of the users;
- to support searching based on a full text index and course filtering/browsing;
- to support message exchange
- to support rights and privileges for various types of users;
- to support graphical interfaces for various types of users.

The tables are linked according to the schema presented in figure 6.

Figure 6. The relationships between tables, using entity-relationship diagram



4.2. System Architecture

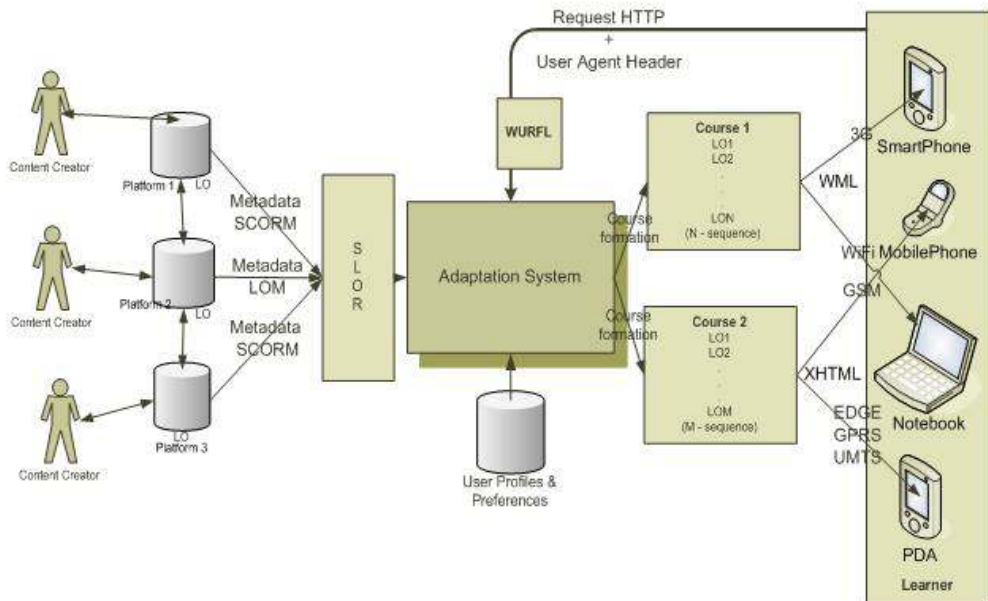
We will use and develop the architectural model presented in Morar et al. (2010). This architectural model has been build taking into account the wishes of users and deployment possibilities. The main features of the proposed model:

- It decomposes the phenomenon of network communication into smaller parts and thus easier.
- It standardizes the components of a network allowing independent development of a particular manufacturer.
- It allows the communication between different types of hardware and software.
- It enables the easy understanding of the phenomenon of communicating using mobile devices.

The general scheme is given in Figure 7. The communication functions within the architectural model from Figure 7 are separated into different layers. Each layer is realizing a subset of functions required for communication with another module of the system. Ideally, the layers should be defined so that the changes made to a layer would not require changes in other layers.

In the following, we will detail the proposed architectural model layers.

Figure 7. The architectural model of the system



Layer 1. The database layer.

The definition of the data structures has in view the necessary memory, the processing speed, the design and the implementation effort. To realize the layer 1 we took into account following factors:

- the data volume;
 - the update and processing operations frequency;
 - operations activity index (the ratio between the number of components used in an operation and the number of explored components for the operation);
 - data access time, dependant on the index of activity; it is known that the access greater than 0.8 is sequential;
 - the lifetime of the structure;
 - optimal use of memory space (compression, segmentation, combination, blocking);
 - the complexity of programming algorithms;
 - protection against accidental damage, possible development of a data backup;
- Data domain decomposition takes place as in Figure 8.

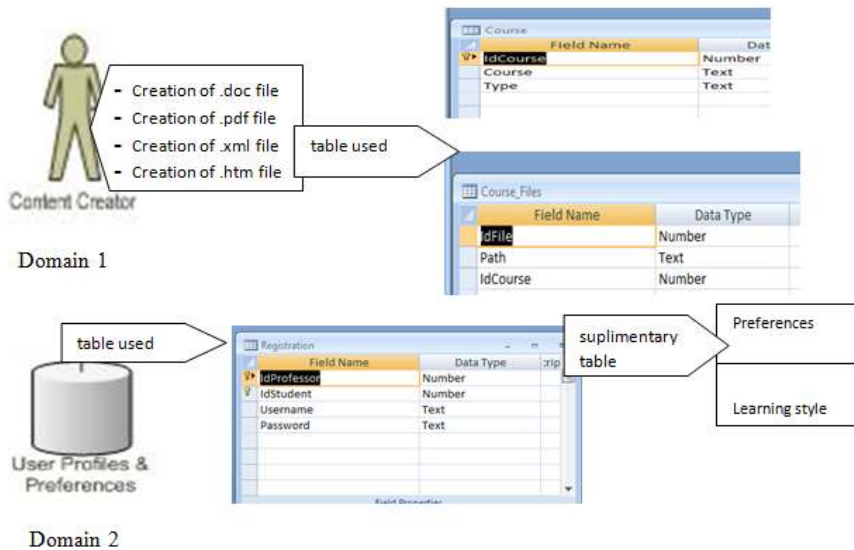
Layer 2. The interoperability layer.

At this layer we want to realize an interface for other systems. We intend that the main functionality is to allow educational resources searching using several types of applications.

The interface that we want needs to meet two main requirements:

- to be interactive, for ease of use;
- the query has to be performed by different types of software agents.

Figure 8. Data domain decomposition



We propose that the creation of this layer should be made by the Access 2007 export tables facility. Each of the 11 existing tables will be exported in .xml format (for the *data* layer), .xsd format (for the *schema of the data* layer), .xsl format (for the *presentation of the data* layer) and .htm format (for browser visualization). We will exemplify for the Accounts table (see Figure 9).

Figure 9. The Export in .xml format

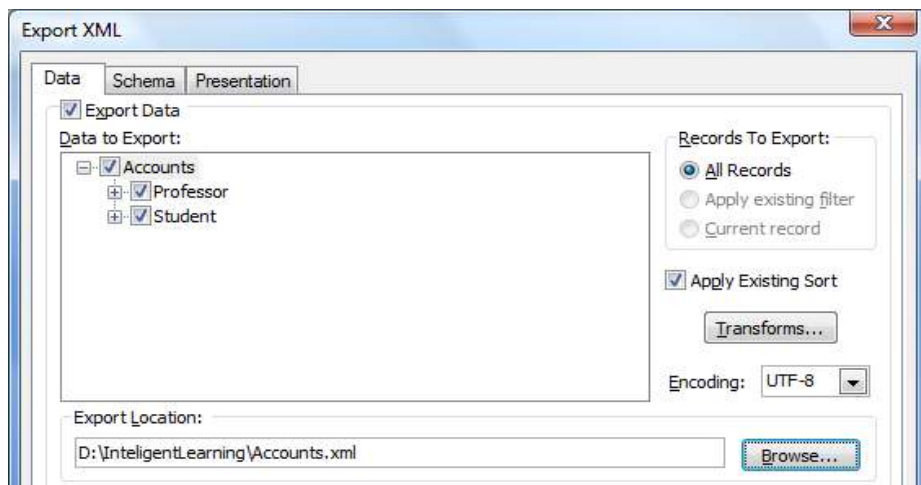
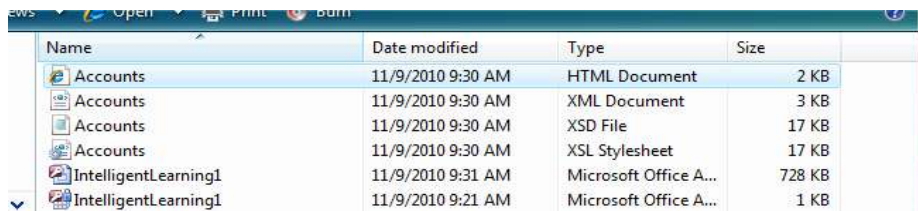


Figure 10. The generated files after export



Name	Date modified	Type	Size
Accounts	11/9/2010 9:30 AM	HTML Document	2 KB
Accounts	11/9/2010 9:30 AM	XML Document	3 KB
Accounts	11/9/2010 9:30 AM	XSD File	17 KB
Accounts	11/9/2010 9:30 AM	XSL Stylesheet	17 KB
IntelligentLearning1	11/9/2010 9:31 AM	Microsoft Office A...	728 KB
IntelligentLearning1	11/9/2010 9:21 AM	Microsoft Office A...	1 KB

Layer 3. Searching layer.

In the XML documents, data mining focuses on two aspects: at first the structured part is processed (tags, attributes, values) and after that the text itself is processed. In the M-learning applications, we should consider the possibility of transmitting large amounts of data to the users and the transmission techniques should be adapted to the mobile environment. In our example, we will try to extrapolate the interrogation methods of the relational databases (exemplified in Access 2007) in XQuery, which is an interrogation language designed especially for XML. XQuery allows us to implement four types of queries:

- of a single document
- of a collection of documents
- of the documents referred by hyperlinks, provided by links to the documents
- the creation of the XLS patterns subsets.

We take for example the file resulted by the export of the Accounts.xml. The contents have the following structure:

```

<Accounts>
  <E-Mail_x0020_Adress>
    monica.ciaca@econ.ubbcluj.ro
  </E-Mail_x0020_Adress>
  <Type>Professor</Type>
  <Password>monica.ciaca
</Password>
<Professor>
  <IdProfessor>3</IdProfessor>
  <Name>Ciaca Monica</Name>
  <Department>IE</Department>
  <Title>Assoc
    Professor</Title>
</Accounts>
</dataroot>

```

In the following query we will search in the .xml file, for all records in the teacher group. The XPath query (which is a subset of XQuery) will be:

Accounts [Type="Professor"] /Professor/Name

The result will be:

Ciaca Monica

5. The post-testing of the system

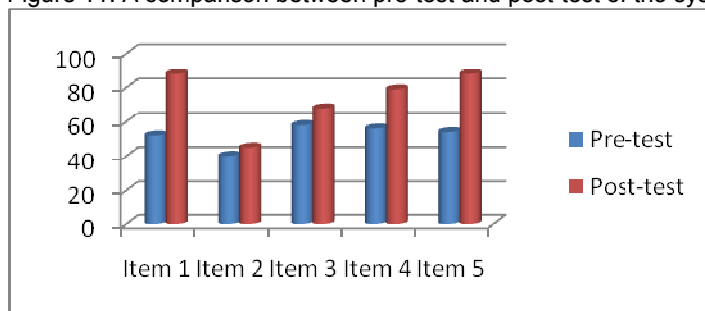
After system implementation, the survey was repeated with the same respondents.

Table 2. The summary of the questions in the post-testing system

The participation in training with mobile devices	88%
Preference for .pdf file format	45%
On-line evaluation through scale tests	68%
Learning through mobile devices	79%
The interest in the used mobile devices	88%

There is an increased interest for e-learning systems and m-learning systems, as it is shown in Figure 11.

Figure 11. A comparison between pre-test and post-test of the system



If we want to process the stored data set in an Excel document, we can use the statistical functions of the application or the procedures obtained from the Data Analysis package, as follows:

Table 3. The items obtained using the facility of Data Analysis

	<i>Item 1</i>	<i>Item 2</i>	<i>Item 3</i>	<i>Item 4</i>	<i>Item 5</i>
Mean	70	42.5	63	67.5	71
Standard Error	18	2.5	5	11.5	17
Median	70	42.5	63	67.5	71
Standard Deviation	25.46	3.54	7.07	16.26	24.04
Variance	648	12.5	50	264.5	578
Range	36	5	10	23	34
Minimum	52	40	58	56	54
Maximum	88	45	68	79	88
Sum	140	85	126	135	142

There is an increase at the item-level and an overall increase of values, the average and the median, without the item 2, are over 50, having equal values (the median used for discrete values) and the range is positive which shows, in this case too, an increase of preferences.

Table 4. The SWOT Analysis of the system

<p>Strengths</p> <ul style="list-style-type: none"> • course delivery system within mobile devices basically integrated with collaboration, communication and cooperation; we think that our system is better than others; • continuous development of teaching skills, by assimilating skills related to on-line training systems and on-line course development; the using of m-technology is not always easy • higher efficiency and, if carefully managed, effectiveness of the educational process using modern platforms and modern equipments for m-learning; 	<p>Weaknesses</p> <ul style="list-style-type: none"> • resistance of web users against modern learning technology preferred by mobile users; • the cost of m-learning technology; • weak involvement of some teachers due to relaxed terms of usage; • weak involvement of some students due to the lack of self-motivation; • possible software glitches or usability issues, with no human assistant to rely on in a real-time manner discouraging the users; • the variety among starting skills for students, which raises a specific requirement of adaptively.
<p>Opportunities</p> <ul style="list-style-type: none"> • m-learning improves auxiliary skills both for trainers and students, related to the use of technology; the experience and the skills will prove helpful in other contexts; • e-learning and m-learning is in itself an occasion to bring together specialists for various fields and define new methodologies and applications and share their opinion for m-learning; • e-learning and m-learning provides higher dynamics in professional development by decreasing the educational time resource consumption. 	<p>Threats</p> <ul style="list-style-type: none"> • e-learning and m-learning seems to be related to a more superficial approach from students who are accustomed to traditional learning and have problems with defining self-motivation mechanisms; • it is not very easy to change the points of view of some teachers and students; • e-learning is subject to technological obsolescence and it is highly dynamic from a management perspective; • there's a need for automated arbitration systems for student evaluation processes;

6. Conclusions

The paper presented a mobile learning system proposal and the results of a survey applied before and after the system implementation on the same groups of students. We consider that target user acceptance and expectances must be surveyed before switching from a traditional system to a mobile learning system and the effects of change must be quantified in order to get a clear image of the impact of mobility on learning.

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POVERTY AMONGST HOUSEHOLDS RECEIVING THE STATE'S OLD-AGE PENSION GRANT: THE CASE OF KWAKWATSI (FREE STATE, SOUTH AFRICA)

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Abstract. The study reported in this article, investigated the level of poverty amongst households receiving the state's old-age pension grant in Kwakwatsi. A questionnaire for measuring poverty was administered to households dependent on the state's old-age pension grant as the main source of income. The results of the study showed that 66.2% of surveyed households live in poverty. The average poverty gap was R858 (122 USD), with the poverty gap ratio of 35%. The state's old-age pension grant plays an important role in the reduction of the impact of poverty amongst these households. However, the grant is not adequate to have a profound impact on poverty levels amongst its recipients; largely due to the need to support additional family members. Information provided by the research is meant to highlight trends amongst households receiving the state's old-age pension grant.

JEL Classification: R21, R22

Keywords: poverty, household, old-age, grants, South Africa

1. Introduction

The fall of apartheid was accompanied by high hopes – the poor were to be enfranchised, and there was to be an equal access to opportunities by all citizens. The Reconstruction and Development Programme (RDP) of the new government promised a better life for all. Reducing poverty and deprivation were to be the main priorities (ANC, 1994:15). De Swardt (2002:2) writes that post-apartheid South Africa has achieved significant political gains, incremental improvements in basic social services, and continuous macro-economic growth. At the same time poverty and economic inequality have increased, making pro-poor socio-economic growth one of the greatest challenges facing South Africa. However, both the extent and multi-dimensional dynamics of poverty in general and urban poverty in particular, are not well understood. Frye (2006:1) asserts that

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the extent of marginalization of poor people from the formal mainstream economy and the opportunities for income generation is of a level that demands that successful interventions must address issues of distribution of resources in South Africa. Effective policy solutions need to be informed by the historical causes of poverty and inequality as well as the ongoing impact of intergenerational poverty and dispossession, and the need to address class as well as racial inequality.

The typical face of poverty in South Africa is no longer that of rural women engaged in subsistence agricultural production. Poverty in South African is evident through a large number of unemployed men who wait daily in vain on street corners for casual jobs, women suffering from among the highest HIV/Aids infection in the world, large numbers of children living in areas with the highest crime and murder rates in the world, and poor black communities who continue to be excluded from the economic riches of the country (De Swardt, 2004:2).

Throughout the post apartheid transition period, spanning the implementation of the Reconstruction and Development Programme (RDP), GEAR (Growth, Employment and Redistribution) and ASGISA (Accelerated and Shared Growth Initiative for South Africa), a consistent policy priority was to reduce poverty (Van der Berg *et al.*, 2007:9). South Africa's social security system is the government's chief initiative in tackling some of these problems. It has two main objectives. The first is to immediately reduce poverty among groups who are not expected to participate fully in the labour market, and therefore vulnerable to low income; the elderly, those with disabilities, and children. The second objective is to increase investment in health, education and nutrition, so as to increase economic growth and development (Samson *et al.*, 2005). South Africa's social security system is widely recognised for its ability to reduce the impact of poverty and unemployment within vulnerable groups (Meth, 2002; Duflo, 2000).

The state's old-age pension grant is the largest grant when it comes to the monetary cost to the national government. Consolidated expenditure on social protection has increased from R72.3 billion (10.3 billion USD) in 2005/06 (4.6 per cent of the GDP) to a projected R118.1 billion (16.9 billion USD) in 2009/10 (4.8 per cent of the GDP). In 2009/10, spending on the state's old-age pension grant alone was estimated to be R28.5 billion (4 billion USD) (National Treasury, 2009). This requires measuring and monitoring trends in policy making to understand the role and effect of different policies and indicate further directions and actions for policy intervention (Van der Berg *et al.*, 2007:9). To measure progress at a micro-economic level, this study was undertaken to investigate the level of poverty amongst households receiving the state's old-age pension grant in a township called Kwakwatsi.

2. Literature review

Social grants in context

South Africa's democratic transition now lies more than a decade in the past, a period long enough to take stock of past achievements and challenges. Economic policies have been geared towards ensuring macro-economic stability (with considerable success) and increasing access to basic social services, especially education and health. A number of special initiatives have also aimed at promoting a wider spread of economic benefits across the population (Bhorat & Kanbur, 2008:18).

South Africa's social security system is at the heart of the government's poverty alleviation strategy. The current system was implemented and reformed in stages, adapted from the legacy of programmes inherited by the post-apartheid government. There are currently five main types of social grants. The first is the State Old-Age Pension (SOAP), which provides support to men from the age of 62 and upwards and to women aged 60 and upwards. The second is the Disability Grant (DG), which provides support to adults with disabilities. The third is the Child Support Grant (CSG), which provides support to families with children under the age of 14. The fourth is the Foster Child Grant, which provides support to families with children, below the age of 18, in foster care. The fifth is the Care Dependency Grant, which provides additional support to families with children, below the age of 18, with disabilities (Stats SA, 2009). While Government's spending on the social grants has increased significantly in recent years, research indicates that this has not reversed the drift into poverty by the majority of the recipients. Social grants are generally not regarded as pension as they bear no relationship to the income the recipient earned when they worked. They are seen as an attempt by the government to ameliorate the plight of the poor and marginalised (Van Driel, 2009:139).

With this in mind, it was important to assess the level of poverty amongst households receiving the state's old age pension grant as the main source of income. Ardington and Lund (1995) in their study, found that the state's old-age pension grant plays an important role through its potential to reach vulnerable individuals. Pension income was found to sustain households affected by extreme poverty and vulnerability, and helped in facilitating economic and social development. Ferreira (2006) found a lower probability of experiencing a decline in living standards in these households compared to those without state's old-age pension income. The study also found a lower incidence of deprivation in households receiving pension grants than in non-pensioner households. To analyse the level of poverty amongst household receiving the state's old-age pension grant, a survey was undertaken to collect household information in the township of Kwakwatsi. The results reported here are at household level and meant to report trends among households receiving the state's old-age pension grant. The article provides a breakdown of households' structures of the state's old-age pension grant recipients and may serve as a reference source when planning interventions related to old-age pension grants recipients. Kwakwatsi is a former black residential township for the town of Koppies. The area could be classified as a semi-rural township, with little economic activity. The area is located 180 km south of Johannesburg, and 280 km north of Bloemfontein in the Free State Province of South Africa. The nearest industrial town of Sasolburg is 70 km away. The estimated population size of Kwakwatsi is 15 095. The area is part of the Ngwathe Municipality (Ngwathe Municipality, 2009).

3. Research methodology

The research reported in this article is based on a survey using questionnaires. The aim was to investigate the level of poverty amongst households receiving the state's old-age pension grant in Kwakwatsi. Maps were obtained for the different areas of Kwakwatsi and a stratified sample was compiled by taking into account the geographical distribution and concentration of people in

different areas of the township. The areas were divided into different extensions and questionnaires were distributed evenly among the inhabited sites.

Questions applicable to this study were selected and arranged in a manner that could yield meaningful results in a cost effective manner. The format and contents of the questionnaire were finalised only after the questionnaire was pre-tested. To ensure ethical clearance for the project, the questionnaire was designed in conjunction with the supervisor at the North West University, and clearance was obtained beforehand from the Research Ethics Committee of the Faculty of Economic and Management Sciences of the North West University.

A total of 180 households were interviewed by two fieldworkers in June 2009. All households approached were willing to partake in the study. To obtain a sample size that would supply statistically reliable results and be representative of the population of the area, the researcher relied on the experience and convention regarding similar surveys conducted in similar locations in South African townships (Slabbert, 2004; Slabbert and Pelupessy, 2001). A total number of 80 households were identified from the overall survey results as dependent on the state's old-age pension grant as the main source of income. This data was then extrapolated and analysed to serve the purpose of this article. The data was captured on a Microsoft Excel® spreadsheet and analysed to the ordinal need of the study. Slabbert's poverty model (2004:55–58), was then applied to the data that had been collected, in order to measure poverty levels amongst these households. The prevailing exchange rate at the time of writing for South African Rand and the US Dollar (1 USD = R6.95) was used to convert monetary amounts to dollars.

The measurement of poverty

Poverty is a debated concept and a human phenomenon that does not seem to go away. Arguments over how poverty should be conceptualised, defined and measured go beyond semantics and academic debates. The conceptualisation, definition and measurement of poverty in many instances lead to formation of strategies to alleviate it. It is therefore vital that the concepts, definitions and measurements of poverty are appropriate to the society in which they are applied (Bhorat *et al.*, 2001:41).

The definitions and measurements of poverty are related both to each other and to other pertinent issues such as the perceived causes of and the solutions to poverty. People do not all perceive poverty in the same manner. This aspect makes policy development and initiatives aimed at combating poverty very difficult. Distinctions between what poverty means to different researchers may be largely irrelevant to those who live with the limitations that inadequate incomes impose. The debates about poverty should not obscure what it means to those who experience it (Alcock, 1997:72).

The importance of understanding poverty stems from the fact that development of strategies in its reduction will require an informed understanding of what the problem constitutes. To devise policies to reduce poverty effectively, it is important to know what the problem entails. Understanding poverty can also help in measuring the success, or lack of success, of any programs undertaken to alleviate it (Slabbert, 1997:21). There are different approaches to the understanding of poverty. The absolute definition of poverty is usually based on the notion of subsistence. Subsistence describes the minimum basic needs to sustain life. According to this approach being below the subsistence level, therefore, is to

be experiencing absolute poverty because one does not have enough to live on. The relative approach is another way of understanding poverty. This approach is a more subjective measure than the absolute approach. The relative definition of poverty is based upon a comparison between the standard of living of those who are worse-off and to that of the society (Alcock, 1997:69).

The other way of looking at poverty is through the monetary approach. It identifies poverty with a shortfall in monetary income (or consumption) from some poverty line. The valuation of the different components of income or consumption is done at market prices, which requires identification of the relevant market and the imputation of monetary values for those items which are not valued through the market. There is the capability approach which focuses on indicators of the freedom to live a valued life. In this framework, poverty is defined as failure to achieve certain minimal or basic capabilities, where basic capabilities are the ability to satisfy certain crucially important functioning up to certain minimally adequate level (Laderchi, *et al.*, 2003:8).

Absolute definitions of poverty necessarily involve relative judgements to apply them to any particular society, and relative definitions require some absolute core in order to distinguish them from broader inequalities. Both definitions seem to have disadvantages, and if these definitions are used as a basis for analysis, measurement and ultimately political action, their disadvantages should be avoided, or there should rather be capitalised on their advantages (Alcock, 1997:2). All of these approaches have their weaknesses, but go a long way in providing an understanding of what living in poverty entails. Each of the different approaches to poverty requires a set of methodological assumptions, which are often not obvious. The different approaches could have different implications with regards to policy, because of the major differences in definitions of poverty (Alcock, 1997:2; UNDP, 1990). An important issue is whether the different approaches identify broadly the same people as poor, because if they do, the theoretical differences may be unimportant in policy or targeting terms. The debates about poverty should not obscure what it means to those who experience it. Poverty is seen in all its manifestations as a denial of opportunities and choices most basic to human development to lead long, healthy and creative lives, and to enjoy a decent standard of living. However, there is no single, universally accepted definition of poverty. People living in and out of poverty may all hold conflicting views on the definition, cause, effect and solution to the problem of poverty (UNDP, 1990:1).

There are various ways to measure poverty. The main measures of poverty, which are used in this study, are the household subsistence level, the headcount index, poverty gap ratio and the dependency ratio. For the purpose of this study, poverty is defined as the inability to attain a minimal standard of living. The standard of living is usually expressed in terms of household income and expenditure. Because this measure does not capture dimensions of welfare such as health, life expectancy, literacy, and access to public goods, consumption based poverty measures are usually supplemented with other non-income measures such as unemployment, education, urbanisation, housing, health, etc (Sen, 1976). These additional measures are beyond this study.

The Household Subsistence Level was used as a poverty line for this study. The HSL makes it easy to calculate the subsistence for individual households. A breakdown of the subsistence level for different age groups of different sexes is given, as well as certain costs for a household as a whole. By calculating the HSL

for an individual household, and comparing it with the combined income of the different members of the same household, the degree of poverty can be measured at micro or household level (Potgieter, 1980).

Potgieter (1980:4) developed the Household Subsistence Level (HSL) and the Household Effective Level (HEL). He defines the HSL as an estimate of the theoretical income needed by an individual household to maintain a defined minimum level of health and decency in the short term. It is based on the lowest retail basket of necessities of adequate quality. This basket includes; food, clothing, fuel and lighting, and washing and cleaning material for each individual in a household and for the whole household, and the cost of rent and transport. Table 1 show a poverty line calculation for Kwakwatsi, using 2009 prices. Using Table 1 as a guideline and allocating a monetary amount required for subsistence, the HSL/poverty line for a family of four members; father (40yrs old), mother (37yrs), son (12yrs) and daughter (7yrs) can be calculated at R2101.04 (301 USD) per month. A household is considered poor if the combined income of all its members falls short of the HSL; thus meaning that this household will be deemed poor if the combined income of all members is less than R 2101.04 (301 USD).

Table 1: HSL/Poverty line for Kwakwatsi

Age and Sex	Food	Clothing	Hygiene	Total
Children				
1–3 years	R 200.07 (29 USD)	R 20.39 (3 USD)	R 11.79 (2 USD)	R 232.25 (33 USD)
4–6 years	R 240.83 (35 USD)	R 40.78 (6 USD)	R 11.79 (2 USD)	R 293.40 (42 USD)
7-10 years	R 299.17 (43 USD)	R 40.78 (6 USD)	R 11.79 (2 USD)	R 351.74 (50 USD)
Boys and Men				
11-14 years	R 358.14 (51 USD)	R 61.17 (9 USD)	R 11.79 (2 USD)	R 431.10 (60 USD)
15-18 years	R 397.86 (57 USD)	R 78.87 (11 USD)	R 11.79 (2 USD)	R 488.52 (70 USD)
19+ years	R 397.86	R 78.87 (11 USD)	R 11.79 (2 USD)	R 488.52 (70 USD)
Girls and Women				
11-14 years	R 345.84 (50 USD)	R 61.17 (9 USD)	R 11.79 (2 USD)	R 418.80 (60 USD)
15-18 years	R 345.84 (50 USD)	R 81.56 (12 USD)	R 11.79 (2 USD)	R 439.19 (63 USD)
19+ years	R 345.84 (50 USD)	R 81.56 (12 USD)	R 11.79 (2 USD)	R 439.19 (63 USD)
Household fuel, light, washing & cleaning				R 300.49 (43 USD)
Housing				R 40 (6 USD)
Transport				R 50 (7 USD)

Source: Slabbert, 2009

The poverty gap was used in the study as a measure of an individual household's income shortfall. The poverty gap was calculated for each individual household. The mean of all households' poverty gaps was taken as the poverty gap for the population concerned. The mean of all individual poverty gap indexes is the poverty gap index for the population concerned. The headcount index for the community is the mean of all individual household's indexes i.e. all households who fall below their individually calculated poverty lines (HSL). The headcount index is the simplest measure of poverty, given by the proportion of the population for whose consumption (or another suitable measure of living standard) y is less

than the poverty line z . Suppose q people are poor by this definition in a population of size n . Then the head-count index is $H = q/n$ (Ravallion, 1992:36).

4. The findings of the study

The next section will provide the findings of the study. The section will provide the demographics of the study population and continue to provide an analysis of the poor sampled population.

Demographics

The average household size for the state's old-age pension grant recipients of Kwakwatsi is calculated at 4. This is in comparison to a household size of 3 for Kwakwatsi as a whole. Using Stats SA (2007:9) figures, the household size for Ngwathe Municipality (of which Kwakwatsi is part of) was calculated at 3 members per household. The composition of households shows that the majority are children (sons 16.4%, daughters 17.8%). The category for others was used to account for grandchildren and other relatives unaccounted for otherwise. The age distribution of the survey population shows that 33.9% of the population is below the age of 20. More than half (53.7%) of the sample population was female (Table 2).

Table 2: Composition of household members

	Frequency	Percentage
Father/Husband	39	12.9%
Mother/Wife	64	21.0%
Son	50	16.4%
Daughter	54	17.8%
Grandfather	3	1.0%
Grandmother	7	2.4%
Uncle	5	1.7%
Aunt	9	2.8%
Other	72	23.8%
Total	304	100.0%

Source: Survey data, 2009

A look at the gender distribution of the state's old-age pension grant recipients shows that 34.2% of pension grant recipients for Kwakwatsi are male, and 65.8% female. Old-age pension grant earners make 26.6% of the whole sample population; this could be said to be the population responsible for the sustenance of its households. The study was on households receiving the state's old-age pension grant as the main source of income. There was on average one old-age pension grant recipient per household. Table 3 shows the marital status of the main recipient of the state's old-age grant in Kwakwatsi. The results of the study show that the majority of grant recipients are widowed. This is in comparison to a

national figure of 28.4% widowed pension grant recipients for South Africa as a whole (SASSA, 2010:14).

Table 3: Marital status of old-age pension grant recipients

	Frequency	Percentage
Never Married	4	5.2%
Married	26	32.5%
Divorced	5	6.5%
Separated	2	2.6%
Living together	0	0.0%
Widow/Widower	43	53.2%
Total	80	100%

Source: Survey data, 2009

Poverty amongst state's old-age pension grant recipients

This section looks at poverty levels amongst pension grant recipients in Kwakwatsi. A common measure used to express the number of poor people as a proportion of the whole population is called the headcount index. This is the simplest measure of poverty, given by the proportion of the population for whose consumption (or another suitable measure of living standard) y is less than the poverty line z (Ravallion, 1992:36). The headcount index for the sample population is calculated at 0.662. This means that 66.2% of old-age pension grant recipients households live below their respective poverty lines. This is in comparison to a poverty rate of 49.06% for the Free State Province as a whole for the year 2007 (Provide Project, 2009:36). Table 4 shows the distribution of households' income below or above the poverty line. If a household's income is greater than its HSL, then that household has income greater than its poverty line and will fall in the categories greater than 100.

Table 4: Households as percentage of the poverty line

	Y/HSL x 100	Frequency	Percentage	Cumulative Percentage
A	0-20	1	1.3%	1.3%
B	21-40	3	3.9%	5.2%
C	41-60	19	23.4%	28.6%
D	61-80	19	23.4%	51.9%
E	81-100	11	14.3%	66.2%
F	101-120	18	22.1%	88.3%
G	121-140	5	6.5%	94.8%
H	>140	4	5.2%	100.0%
Total		80	100.0%	

Source: Survey data, 2009

A further analysis of the poor can be done by looking at the extent of poverty within the area. The poverty gap is the mean shortfall of the total population from the poverty line (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line; it adds up the extent to which individuals on average fall below the poverty line, and expresses it as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence. In order to measure the depth of poverty in an area, the poverty gap measure is normally used in conjunction with the headcount index (Slabbert, 2004:87). The poverty gap index for the poor from the sampled populations was calculated at 0.35. This means that on average, poor households have an income shortage of 35% of their poverty line. The severity of poverty depends on the distribution of the poor below the poverty line. Table 5 shows the extent of poverty by looking at the distribution of poor households below the poverty line. Of the poor population 27.5% are earning income less than 50% of the poverty line, with 2% of the poor earning income between 0 and 20% of their poverty line.

Table 5: Poor households below the poverty line

	Y/HSL x 100	Frequency	Percentage	Cumulative Percentage
A	0-10	0	0.0%	0.0%
B	11-20	1	2.0%	2.0%
C	21-30	1	2.0%	4.0%
D	31-40	2	3.9%	7.9%
E	41-50	11	19.6%	27.5%
F	51-60	8	15.7%	43.1%
G	61-70	4	7.8%	50.9%
H	71-80	15	27.5%	78.4%
I	81-90	4	7.8%	86.3%
J	91-100	7	13.7%	100%
Total		53	100%	

Source: Survey data, 2009

Sources of household income

The respondents were asked about the sources of household income. Table 6 shows the different sources of household income. The state's old-age pension grant makes up 68.9% of household income for the whole sample population, compared to 65.4% for the poor. The second highest contributor is salaries at 10.8% and 13.5% for the sample population and the poor, respectively. If added together, government grants on average make up 91.5% of household income for a poor family. This confirms the importance of government grants in the maintenance of the livelihood of many South African households. The average household income is calculated at R1 537.17 (221.17 USD) per month for the whole sample population, compared to R1 392.98 (200.34 USD) for those deemed poor from the survey.

Table 6: Sources of household income

	Total Sample	Poor Households
Old-age pension grant	68.9%	65.40%
Child support grant	10.8%	13.50%
Other grants	9.2%	12.60%
Salaries	10.8%	7.90%
Help from family	0.3%	0.60%
	100.0%	100.0%

Source: Survey data, 2009

Expenditure patterns

The study also included the collection of household expenditure information to ascertain how the old-age grant is spent. This information is based on the total sampled population. Table 8 shows the mean expenditure per item, and as a percentage of total household expenditure. Food represented the single largest expense amongst old-age pension grant recipients, accounting for 33% of total monthly expenses (table 8). This makes food the most important expenditure for each household. Slabbert (2004:76) cites that a large percentage of household income in poor communities is spent on food; noting that, an increased expenditure on food and cleaning materials shows an increased depth of poverty. Stats SA's (2008b:3) income and expenditure survey for the years 2005/2006 found housing, water, electricity, gas and other fuels, transport, food and non-alcoholic beverages as the main components of household consumption in South Africa. The expenditure on food and non-alcoholic beverages amounted to 14.4% of household expenditure. For the black African population, the study found an average monthly food and non-alcohol beverages consumption of 21.4% of household expenditure. A study by the Economic Policy Research Institute (EPRI) (2004) found that households that receive social grant spend a greater proportion of their income on basic necessities like food, fuel, housing and household operations than non-recipients.

5. Discussions

The results reported in this article show that the level of poverty within households receiving the state's old-age pension grant in Kwawatsi is substantially high. This has policy implication as the grant might not be achieving the intended outcome. The study also collected data on the perceptions of the poor regarding their socio-economic condition. This is important as it recognizes the poor's value judgment regarding their socio-economic conditions. Holman (1978:16) asserts that people tend to habitually judge themselves against a reference group. The poor do the same, having a standard they would like to attain, failing which, they see themselves as poor. Without mention of any reference group, the poor were asked whether they consider themselves poor. Of the households which were found to be poor through the survey process, 64% said that they do not consider themselves poor. The respondents cited that they are beyond working age and no

longer wish for material things. Common utterances were that they have learnt to accept their socio-economic conditions.

Table 7: Households expenditure of poor households

	Mean	% Contribution
Water	R 40.00 (5.7 USD)	2.9%
Electricity	R 67.26 (9.6 USD)	4.8%
Other Energy	R 72.53 (10.4 USD)	5.2%
Food	R 459.40 (62.9 USD)	33.0%
Cigarettes and tobacco	R 46.77 (6.7 USD)	3.4%
Beer, wine and spirits	R 66.25 (9.5 USD)	4.8%
Transport	R 31.86 (4.6 USD)	2.3%
Clothing	R 40.00 (5.7 USD)	2.9%
School	R 28.50 (4.1 USD)	2.0%
Entertainment	R 35.00 (5 USD)	2.5%
Medical expenses	R 41.38 (5.9 USD)	3.0%
Insurance	R 77.25 (11.1 USD)	5.5%
Gambling	R 36.00 (5.2 USD)	2.6%
Savings	R 50.00 (7.2 USD)	3.6%
Licenses (e.g. TV)	R 4.64 (0.7 USD)	0.3%
Housekeeping services (e.g. Garden)	R 62.50 (9 USD)	4.5%
Telecommunication	R 44.25 (6.3 USD)	3.2%
Furniture	R 100.00 (14.3 USD)	7.2%
Other	R 89.10 (12.8 USD)	6.4%
Total	R 1 392.69 (199.8 USD)	100%

The poor were further asked whether they have enough income to support their families. In contrast to not considering themselves poor, the majority of respondents (76%) answered no. Deaton (1997:5) cautions against over-emphasizing these approaches above tested tools of measurement, pointing out that there are cases where accepting someone's own assessment of his/her own standard of living could be misleading. He says that people may be accomplices in their own deprivation due to social acceptance of certain situations. He further gives an example that if some villagers believe that someone who has no sons is poor, no policy can be developed to eradicate this poverty. To bring home the question of poverty, the poor were asked whether they are able to have the normal three meals each day (breakfast, lunch and supper). Fifty five percent of the poor said that they are able to have three meals a day. The percentage of those who are not able to have three meals a day (45%) is still substantial and indicative of the extent of poverty amongst households receiving the state's old-age pension grant.

When it comes to the monetary amount of the old-age pension grant, 56% of pension grant recipients said that the grant is enough while 44% were of the opinion that the grant should be increased. The average amount captured from those who wish for the grant to be increased is R323 (46 USD) per month. The respondents who are happy with the grant cited the grant does go a long way in assisting them as they do not have to do anything to receive it. They are thankful to the government for providing the grant, without which they will be in dire poverty. The average household size among the poor households was found to be 4. This is in comparison to a household size of three members for Ngwathe Municipality (Stats SA, 2007:81).

6. Conclusions and recommendations

The aim of the study reported in this article was to measure the level of poverty amongst households receiving the state's old-age pension grant in a township of Kwakwatsi. The HSL was used as a poverty line as it is a widely accepted measure of poverty and makes it easy to calculate the subsistence of individual households. The World Bank (2008:70) reports that extensive poverty has lasting harmful effects on society. Poverty is found to result in hunger, malnutrition, poor physical status and increased health care costs, which undermines economic growth at large. In addition, poverty negatively affects cognitive functioning, leading to the inattentiveness of learners, which militates against their later success. The study showed that poverty is high amongst these households. The headcount index was calculated at 66.2%, with the poverty ratio of 35% of household income. The state's old-age pension grant is not enough to cater for the needs of the different households members within the sampled population. Its expenditure is on items which enable the day to day survival of household members. Food expenditure represented the highest expenditure for each household. The study propagates an investigation into additional measures to ameliorate the impact of poverty amongst these households.

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