STATEMENT OF ORIGINALITY

I Killian Ticharwa Muzongondi declare that this article is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references. Research findings and final conclusions have not been included.

Date: 16 April 2021

TOPIC:

An investigation of the influence of green logistics on allocating financial resources in transport infrastructure investment projects

TABLE OF CONTENTS

1. INTRODUCTION

Constant awareness towards the destruction of ozone layer, global warming and various externalities on the environment has changed the dimension through which businesses engage. This has a whipping effect of the financial resources as which should be closely monitored and at the same time liberally released for the benefit of the society and environmental sustainability

2. BACKGROUND

Until recently, climate issues have been neglected and left in the hands of lobbyists and pressure groups to speculate with no corresponding action being taken.
However drastic changes in the climate have seen a sudden interest on issues such as global warming, greenhouse effect and ozone layer preservation.

Economists have taken a step as witnessed by the recent developments of the World economic forums' preceding conferences in Davos where it has been put as part of the agenda, closing remarks and follow-up item. Even our own Republic through the President has taken an initiative to that effect by sending and vowing to back a representatives including young climate activist to give a report and recommendations on climate change.

Politicians, economists and economists are at loggerheads as no one is prepared to take responsibility of mitigating climate damage. But is all that going to be enough to spearhead behavioural change towards climate conservation. Or more action is needed from every sector including economic, political and civic society groups.

With such high standards and expectations demanded, transport infrastructure provision and maintenance needs a greats thought for it to happen. This considerably alters the decision-making matrix of an enterprise in all aspects, more so when it comes to budgets decisions.

3. PROBLEM STATEMENT

With the above in mind, how sustainable is transport infrastructure investment and who should be financing such. Every investment has associated costs, benefits and externalities. Creswell (p149. 2013) recognises a research problem as an issue that stimulates desire for further study. Resistance towards going green as the saying goes will mean an enterprise remaining alone as the rest of other businesses progress towards saving the ecosystem and preserving the cosmic balance of nature. Acting negatively towards the environment willingly or out of ignorance has no defence as this brings negative consequences from pressure groups, communities and the legislative framework stipulating policies of saving the environment from all sorts of damage, be it through gaseous emissions, incorrect waste disposal and all sorts of improper environmental discharges.

To save the enterprise there is need to bring into place measures to operate in a sustainable manner and hence leading way towards a green and safe environment.
However this comes at a cost especially to investors who, though obliged to participate at their expense, may not directly benefit from the good deeds. Hence the is need to investigate green logistics affects financial decision-making plans towards resource allocation. In the end the research will bring harmony of environmentally sustainable resource utilization within the context of transport infrastructure investment

4. RESEARCH OBJECTIVES

4.1. Primary research objective

The main objective of this research project is to critically analyse how green logistics compliance impacts on financial resource allocation in transport infrastructure investment project of network upgrade of N1/ Kempton park interchange

4.2. Secondary research objective

4.2.1. To explore trends green logistics and urgent need to preserve nature

4.2.2. To establish effects of environmental externalities on budget decisions

4.2.3. To critically analyse factors considered when allocating financial resources.

5. LITERATURE REVIEW

5.1 Introduction

Sustainability and environmental preservation is gaining popularity within the business arena as this ensures survival only to compliant businesses. This is achievable by making aligning business operations towards the global trends. Eliminating wastages and improving productivity and efficiency in business aspects is key to sustainability.

The study is aimed at investigating how green logistics influences allocation and distribution of financial resources in transport infrastructure investment projects. It starts off by highlighting the relationship between the above three elements namely green logistics, transport infrastructure and capital investment. The scope of investment projects will also be discussed. Furthermore it expounds on limitations and motivating factors enabling investment towards "going green", as the saying goes.

Vaguely put, going green entails taking the environment into consideration in an organisation's activities rather than merely focusing on financial gains and profitability. Based on the works of (McKinnon, Browne, Whiteing & Piecyk. 2015:6), green logistics is evolving through three spheres from private to public, operational to strategic and finally local to global thereby broadening the horizon such that it has become a force to reckon. Whether an enterprise is willing or not, eventually concepts of green logistics will be part of its blueprint.

5.2.Transport infrastructure

(Rietveld and Bruinsma. 1998:17) defined infrastructure as capital that provides public services basic to any production capacity, large and costly installations. Provision and maintenance of it comes at a huge price

Transportation requires infrastructure in order to operate efficiently. Failure of infrastructure or lack thereof leads to adverse externalities to the environment as well as failure of the economy. (Biehl 1993) as cited by Rietveld and Bruinsma categorised transport infrastructure as roads, railways, waterways, airports, seaports, pipelines, telecommunications systems, tolling interchange and terminal facilities where freight and passenger enter and exit the road network. (Banister, 2005) acknowledges the significance of transport in providing mobility and accessibility.

To remedy this, (Ndulu, Chakraborti, Lijane, Ramachandran & Wolgin. 2007) boldly suggested improvement or expansion of current infrastructure or construction of a new one.

For this to happen, large capital injection will be required.
In order to comply with green initiative, the proposed N1/ Kempton park interchange need to be designed such that it increases traffic throughput without congestion and related externalities such as pollution and accidents.

5.3.Green logistics and environmental performance monitoring
Though acknowledging the significant role played by transportation system in providing accessibility and mobility relevant to economic growth, (Banister 2005) shows concern about the rapid change in the climatic environment caused by human activities with transport being at the centre of it all. These include excessive carbon emissions leading to global warming and acid rain formation.
(Mckinnon *et al* 2015:4) defined green logistics as, 'the study of the environmental effects of all the activities involved in the transport, storage and handling of physical products as they move through supply chains in both forward and reverse directions'. It combines of economic and environmental aspects of goods transport whereby a good transport system is a product of sound infrastructure coupled with corresponding technology to support it as well as human resources competent to run and operate it.

(Karia 2015) strongly suggests that in order to attain sustainable logistics, there is need to venture into green innovations which have no negative implications on the environment. Though they may have a financial burden, an enterprise may gain good reputation and market share by being view as eco-friendly due to their positive contribution towards a safe environment.
Times are moving and organisations should also move along to avoid being obsolete, extinct and left behind. (Christopher & Peck 2004) are not ignorant of the fact that if an organisation fails to move with the dynamics of the century (going green) they will expose themselves to the vulnerability of environmental risk pressures. In other words organisations should be agile meaning they should have the ability to adapt and change by quickly reacting to unpredictable events.

5.4.Towards sustainability
According to (Mala & Musova 2015) an enterprise can ensure sustainable development by focusing on how its operations affect the environment. (Vandekerckhove, Leys, Alm, Scholtens, Signori and Schäfer 2011:183) defined sustainable development as, 'a development that meets the needs of the present without compromising the ability of future generations to meet their own needs'

(Chang and Qin 2008:97) regard green logistics as plan, control, management and implementation of the logistics system through the advance logistics technology and environmental management which aim to reduce the pollutant emissions. For advancement in technology there is need for investment to take place in order to take care of any financial burden that may be caused. Transition towards sustainability and green logistics has been hampered by lack of business opportunities for the investors, lack of a legislative framework that gives pressure to go green as well as lack of clear cut requirements on how transport system at large should offer greener services.

5.5.Infrastructure investment
Failure of infrastructure or lack thereof leads to adverse externalities to the environment as well as failure of the economy. To remedy this, (Ndulu et al 2007) boldly suggested improvement or expansion of current infrastructure or construction of a new one. For this to happen, large capital injection will be required.

Griggs (2010) has no doubt that transportation is the largest infrastructure sector. Capital injection needed for investment is extremely high. Estache (2003) recognises how capital

intensive it is to finance and fund an infrastructure project. Investment towards any course should be given a thought lest an enterprise becomes insolvent in the process. Both Griggs and Estache agree that the complexity of transport system and infrastructure cannot be sorely financed by traditional means but rather by smarter and different ways. For a firm to remain viable it has to fulfil the triple bottom line which is regarded as pillars of sustainability founded upon social, financial and environmental dimensions. For a firm to remain relevant it has to satisfactorily fulfil these three.

(Lynch 2006) concurs to the notion and further says that it also gives an organisation competitive advantage in the marketplace.

For an investment project to occur, cash flow will be analysed to ascertain the liquidity of a firm lest it becomes insolvent and fails to sustain its operations during any phase of the project. (Doussy, Jansen van Rensburg, Nqcobo, Rehwinkel, Scheepers & Scott. 2016:291) in simple terms defined cash flow as the inflow and out flow of cash and cash equivalents. They also went on to simplify investment activities as the acquisition and disposal of long term assets. Fabozzi and Drake (2009) pointed out that infrastructure may need a short term investment which can be financed from the operational expenses or it may be a long term requiring futuristic investment decisions. At the end of it all, there is need to safeguard the financial interests of the investors through profit maximisation and wealth preservation decisions.

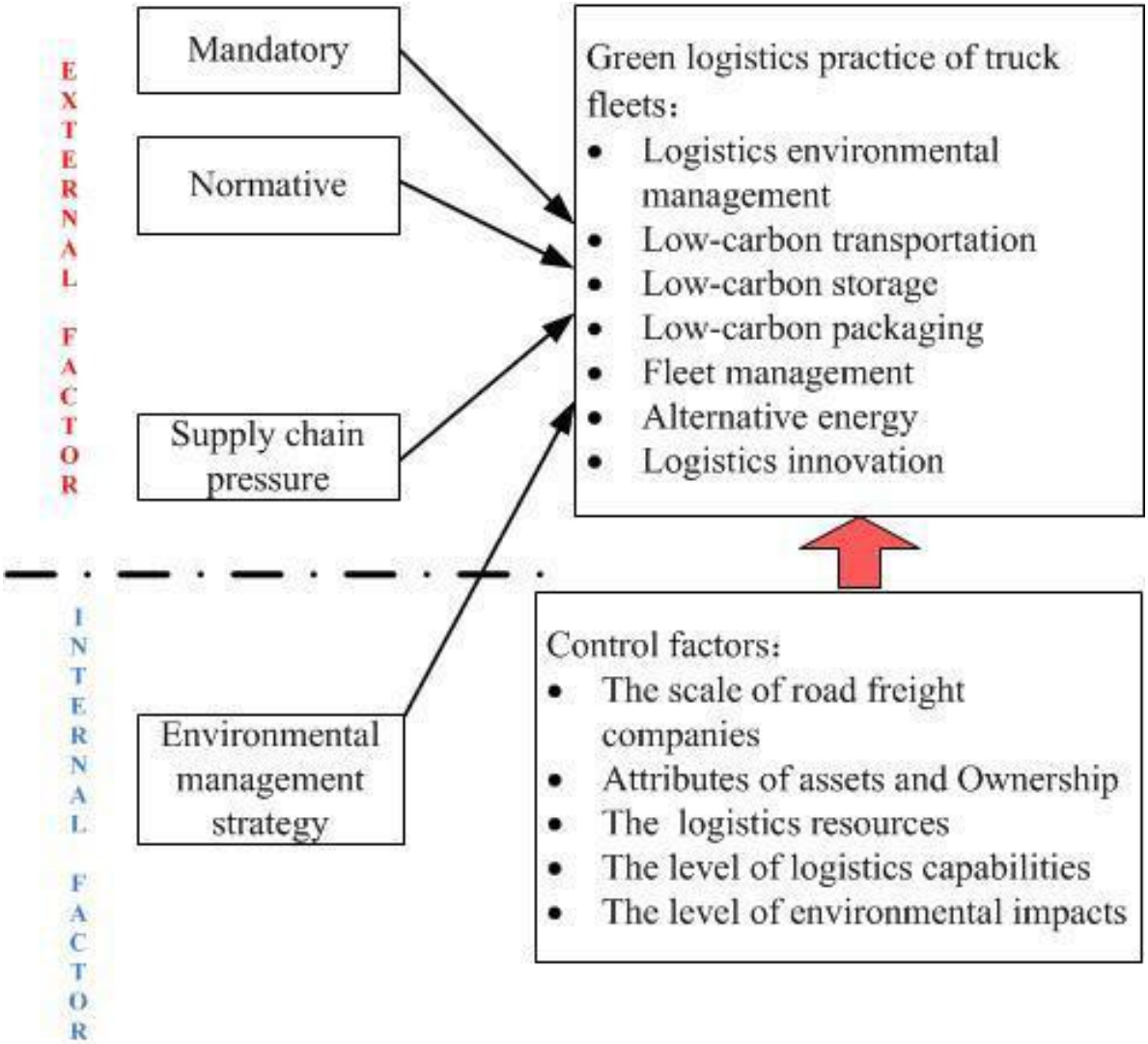
Doyle and Havlick (2009) highlighted that not all investment projects offer satisfactory rate of return on investment as the majority of them do not live upto expectation especially of the investors. As such investors at times are reluctant to fund as this doesn't make much economic sense or add value to their businesses unless responding to societal, developmental and economic demands such that they are left with no alternative. To a greater extend financial considerations including budgeting and funds allocation will revolve around the green logistics.

5.6.Investment considerations

Green logistics is all about reducing waste and environmental damage through efficiency, productivity and improved way of operation that is not detrimental the the environment both in the long run and in the immediate future. Since investment in transport is costly and at times permanent, it is important to plan and investigate before coming with a decision. Desirability analysis helps he decision makers to justify the investment whether it will benefit the intended users. This is only possible through investment and initiatives to develop the current and innovate into the future. Green technology and implementation of such is beneficial.

(Fabozzi and Drake 2009) identified types of investment projects as follows:-

Replacement projects are for restoration, maintenance and infrastructure rehabilitation. Shut-down maintenance, overhaul and replacement of obsolete and deteriorating parts is done to increase efficiency of equipment. Expansion projects deals with widening the sphere of existing products. Investment projects pertaining to new products and markets are projects that new concepts being introduced in the markets. Mandated projects are such as those imposed by government through legislation and policies. Companies are forced to comply or else face the wrath of the law or risk legal action which would tarnish their image and reputation



Adapted from: Analyzing the Promoting Factors for Adopting Green Logistics Practices: A Case Study of Road Freight Industry in Nanjing, China, Zhanga, Y. Thompson R, G. Baoa, X. and Jianga, Y. 2014.

6 RESEARCH METHODOLOGY

.

6.1 Research approaches

Silverman (2010) puts forward that the choice of a research method, also known as approach is based mostly on the type of research to be carried out. Creswell (2014) defines research approach as a plan or procedure through which a research is carried out. An approach is selected based on the nature of the research to be conducted. Generally used research approaches are qualitative and quantitative. According to Wyse (2011), qualitative research explores events in order to shed more light. Salkind (2007 p13) regards it as a study of phenomena within the social and cultural context in which they occur. Salkind and Wyse concur that the qualitative research is more inductive while quantitative is deductive in nature.

Bryman (2012 p34) differentiate quantitative and qualitative research by highlighting quantitative research as a strategy which emphasizes on quantification in the collection, analysis and interpretation of data and qualitative approach which rather focuses on words than figures. The two approaches are opposites of each other. Quantitative research is deductive in nature which means it works from backwards in order to prove a theory or hypothesis. Qualitative on the other hand is inductive and exploratory starting from nothing to formulate a theory at the end of the study.

The aim of the study is to find out how green logistics influences decision making by exploring trends in global green trends and how they affect economic and business orientation. Based on the above brief discussion the researcher opted for a qualitative approach as it seems more suitable to investigate further. Qualitative approach is aimed at gaining deeper understanding of the effects of green logistics in influencing strategic financial decision making. The relevance of the qualitative research method according to Creswell also comes from the fact that it, “it occurs in natural settings where human behaviour and events occur.”

6.2 Participants

Selection of participants is critically important in order to get results with are valid enough for implementation. It is the responsibility of the researcher to ensure that the participants are relevant for the study. In a qualitative research, participants can be obtained through sampling. Salkind (p33) defines a sample as a smaller group selected from a population. Sampling, if done properly can save resources such as time and money.

The study relates to the influence of green logistics and as such various parties within the supply chain are considered in giving input towards the research. To start with, Inductoserve logistics management (ILM), through which the study is directed is the main participant. Under ILM the senior management representing finance, technical maintenance and corporate affairs are to be interviewed. Drivers are also participants in the study. Vicinity in which the operations are taking place have a contribution towards what will be happening. As such, the community’s contribution is paramount since they are likely to benefit of be affected much by any project that takes place around them.

Consultant companies including Murray and Roberts and G4 civil engineers who deal much in civil engineering, road construction and infrastructure development are also participants in the study. They give valuable information of trends in the construction industry more importantly on how their activities impact on the environment. Their insight on trends towards green construction and reduction in pollution while doing their work and after is of paramount importance.

Environmental protection groups have their contribution as they are much influential in lobbying towards a pollution free environment, they contribution is equally important. They help interpret the trends towards pollution on local and global scale. Also includes is the environmental management authority.

Government though the department of transport are part of the participants as they do have policies that impact on whether the project can be done and where. Land allocation for infrastructure development has to be considered either from private property or state.

6.3 Research instrument and data collection methods

Creswell (2014 p234) boldly states the relevance of the researcher in qualitative research as the key research instrument who collects analyse and interpret data. Both primary and secondary data are necessary in research. The researcher will use data gathered from both primary and secondary sources. Collection of data from multiple sources also referred to by Creswell as triangulation of data to ensure. Sources of data are surveys, focus group discussions, in-depth interviews, key information interviews, observations, questionnaires, documents, case studies, online and social media groups. Tuckman (2012) views interviews as a way of getting data from people by asking them, rather than observing and sampling their behaviour. Case studies are relevant instrument of data collection. Surveys are necessary for extracting data. Surveys are used to get a wide range of information about the research as they assist in collection of vast amount of information in a short period.

6.4 Data analysis

Russell (p452) describes analysis as the search of patterns in data and for ideas that help explains why those patterns in the first place. Data analysis for qualitative research is done simultaneously. Various data analysis techniques are employed in order to aid in the research process. The researcher will analyse data through the following means based on guidelines by Creswell (2007 p260). Bryman also categorised them as primary and secondary and according to him primary analysis of data includes coding or grouping similar data into categories, thematic analysis and narrative analysis.

Continuous and repeated observation to be done from time to time to ensure data is in line with the trends. Colleagues and friends also have a part in the examination and analysis of data. This helps to reduce bias towards the outcome of the study.

Correct interpretation and validation of data will also be done. In every research, validation of data is of paramount importance. Verifying and ensuring accuracy of gathered information is done through various forms as discussed forth. Qualitative validation as defined by Creswell means, means that the researcher checks for the accuracy of the findings by employing certain procedures. The procedures include but are not limited to the once highlighted by Creswell (p251) which are: triangulation of gathered data to establish themes. Peers and members can also check accuracy of findings by reverse interviewing participants to check coherence. Bias in the research process has to be clarified and nullified. The researcher may be biased toward a conclusion and hence this need to be clarified to ensure unbiased results. An external auditor is also necessary to have an undistorted opinion towards the research.

6.5 Limitations.

The rate at which green issues are being pursued means rate of investigation has to be high. However the trend is global and much of the information does not relate to our economic situation. Main limitation is the time frame. Considerable amount of time is needed to gather and process complex data involved in the research.

There are no adequate resources locally for the researcher to fully explore the topic. Resources include financial resources for travelling since the researcher needs to be at the natural setting for data collection. Confidential information especially on business financials and also strategic plans are not readily shared to the researcher.

Multi-cultural diversity made it difficult for the researcher as much knowledge is needed to address native participants in their language of choice. Considering 13 official languages, the researcher has to be familiar with all of them or get a translator as some are unwilling to compromise on their mother tongue and hence may be reluctant to give correct information or fully participate in the research.

6.6 Ethical implications.

Salkind highlighted 4 major areas of concern regarding ethical considerations. He highlighted that participant, whether humans or animals should be protected from any form of harm. Secondly there is need to maintain privacy in conducting a research. Researcher is bound to come across privileged information about the participants of the study at large and hence he has to maintain high level of confidentiality by not disclosing such as it may harm the reputation of participants or organisation under study. Participants should not be intimidated or forced to give information but rather be at their own accord. Lastly Salkind puts it that for any research to be deemed ethical, the participants should willingly consent to participate. In some instances consent fetters are issued before conducting research so that participants have an idea of what they are expected to contribute and if interested they then agree.

Research designs are implemented to facilitate the research process. They should be

suitable enough to give in-depth research so that no stone is left unturned in an effort to solve a study question. Both qualitative and quantitative research follow different structures and different research instruments are used.

7. CONCLUSION

Fourth industrial revolution which includes automation and mechanization, elimination of human in industry by introducing robot is fast approaching but in the end the spirit of human-ness will evaporate. Compliance towards international standards such as ISO 14001:2019 environmental management systems certification is the way to go. Green logistics can be attained through lowering carbon footprint and carbon budget, design and selection of material that is eco-friendly as well as efficiency in production. All these effort comes at a price.

However complexity of transport infrastructure makes it difficult to draw the line as to who has the overall responsibility of investing projects. Investors have no much incetive especially of projects with less financial gain. Moreover when it comes to greening, not only the infrastructure needs attention but there should be a total turnaround from the users to the providers of transport services. Knowledge of how the green environment works has to be educated to all sectors. These come at a cost and need to be encorporated when implementing green infrastructure investment.

There should be structural changes in the decision making system to facilitate resource allocation. Using clean energy sources such as green fuel, green design, green purchasing in infrastructure investment through procurement of environmentally-friendly raw material is part of the journey.

In order to have the N1/ Kempton park interchange constructed with according to ‘green standards’ further understanding of all affected and interested parties is needed. Existing literature mostly dwells on environmental aspects ignoring the green supply chain, green production and design.

8. BIBLIOGRAPHY

Banister, D., 2005. Unsustainable transport: city transport in the new century. Taylor & Francis.

Bell, J., (2014). *Doing Your Research Project: A Guide for First-time Researchers*. 6th ed., Open University Press, Buckingham. ISBN: 9780335264469.

Bowersox, DJ, Closs, DJ & Cooper, MB. 2010. Supply chain logistics management. International edition. New York: McGraw-Hill.

Bryman, A. 2012. Social Research Methods. 4th Edition. New York. Oxford University press.

Chang, Q. and Qin, R. 2008. Analysis on development path of tiajin green logistics. International Journal of Business Management, 3, 96-98.

Creswell, J.W. 2014. Research design: qualitative, quantitative and mixed methods approaches. Sage Publications, Inc. United States of America.

Creswell, J.W. (2013). Research design, qualitative, quantitative and mixed methods approaches. Sage Publications, Inc

Doussy, F. Jansen van Rensburg, JS. Nqcobo, RN. Rehwinkel, A. Scheepers, D. Scott, D. 2016. About financial accounting volume 2. 6th Edition. LexisNexis. Durban

Doyle, M W. and Havlick, D G. 2009. Infrastructure and the Environment. Department of Geography, University of North Carolina. Doi: 10.1146/annurev.environ.022108.180216

Ekurhuleni Metropolitan Municipality Integrated Development Plan 2013/14

Ekurhuleni Metropolitan Municipality. April 2015. Metropolitan Spatial Development Framework: Review 1st Draft

Empirical research on the core factors of green logistics development. 2017. Volume 16. Issue 2

Estache, A. 2003. Infrastructure Performance: What We Know vs. What We Should Know. Unpublished paper, World Bank, Washington, DC.

Fabozzi, F.J. and Drake P,P. 2009. Finance: Capital Markets, Financial Management, and Investment Management. John Wiley & Sons, Inc., Hoboken, New Jersey

Gramlich, E.M. 2001. Infrastructure and Economic Development. Speech at the Texas Trade Corridors New Economy Conference, San Antonio, Texas.

Grigg, NS. 2010. Infrastructure Finance The Business of Infrastructure for a Sustainable Future. John Wiley & Sons, Inc. United States of America

Heaver, T.D. and W.G. Waters II (1995). *The Implications of Logistics Management for the Value of Time in Transport Infrastructure Management paper presented at the 1995 Transport Association of Canada (TAC) Annual Conferenc*e, Victoria, British Columbia.

Gosse, C.A. Clarens. A F. (2013). Quantifying the total cost of infrastructure to enable environmentally preferable decisions: the case of urban roadway design
Department of Civil and Environmental Engineering, University of Virginia, Thornton Hall B228,351 McCormick Road, PO Box 400742, Charlottesville, VA 22904-4742, USA doi:10.1088/1748-9326/8/1/01502

Karia, N. 2015. Green Innovations in Logistics Industry: Sustainability and Competitive Advantage Universiti Sains Malaysia, Penang, Malaysia.

Mala, D. Musova, Z. 2015. Perception of implementation processes of green logistics in SMEs in Slovakia. Elsevier B.V. doi: 10.1016/S2212-5671(15)00900-4

McKinnon, A. Browne, M. Whiteing, A. and Piecyk. M. 2015. Green logistics : improving the environmental sustainability of logistics. 3rd edition. Kogan Page Limited. Great Britain

Ndulu, BJ. Chakraborti, L. Lijane, L. Ramachandran, V. Wolgin, J. 2007. Challenges of African Growth: Opportunities, Constraints, and Strategic Directions. World Bank, Washington, DC.

Rietveld, P. Bruinsma, F. 1998. Is Transport Infrastructure Effective? Transport Infrastructure and Accessibility: Impacts on the Space Economy. Springer-Verlag Berlin. Heidelberg

Russell, B.H. 2006. *Research methods in anthropology: qualitative and quantitative Approaches*. 4th Edition. Rowman and Littlefield Publishers. Lanham.

Silverman, D. 2010. *Doing qualitative research: A practical handbook*. 3rd Edition. New Dehli. SAGE Publication.

Tuckman, B.W. 2012. *Conducting educational research*. New York: Harcourt.

Vandekerckhove, W., Leys, J., Alm, K., Scholtens, B., Signori, S. and Schäfer, H. 2011. Responsible Investment in Times of Turmoil. Springer, Dordrecht.

Wyse, S. 2011. *What is the difference between qualitative research and quantitative research*? http://www.snapsurveys.com/blog/what-is-the-difference-between-qualitative-research-and-quantitative-research/

Zhanga, Y. Thompson R, G. Baoa, X. and Jianga, Y. 2014. Analyzing the Promoting Factors for Adopting Green Logistics Practices: A Case Study of Road Freight Industry in Nanjing,China. Elsevier Ltd. Open access under CC BY-NC-ND license. DOI: 10.1016/j.sbspro.2014.01.1486