

ARCOM DOCTORAL WORKSHOP

SUSTAINABILITY STRATEGIES IN CONSTRUCTION

Construction and Infrastructure
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PROGRAMME

9.30-10.00	<i>Registration and Tea/Coffee</i>		
10.00-10.05	Dr. R. Gameson (ARCOM) - Welcome & Introduction		
10.05-10.45	Prof. Q. Leiper	Carillion PLC	<i>The business case for sustainability: strategy and delivery(keynote speaker)</i>
10.50-11.20	B. Abubaker	University of Wolverhampton	<i>Barriers towards the sustainable implementation of lean construction in the United Kingdom construction organisations</i>
11.20-11.35	<i>Break - Tea/coffee</i>		
11.35-12.05	O. Awodele	Heriot Watt University	<i>Understanding and managing risks –necessary condition for success and sustainability of privately financed market projects in Nigeria</i>
12.10-12.40	M. Thompson	WMCCE	<i>Buildings and Construction Contribution to the Energy Challenge in the West Midlands</i>
12.45–1.30	<i>Lunch</i>		
1.30-2.10	Prof. L. Ruddock	University of Salford	<i>Economics of the green transformation of the industry (keynote speaker)</i>
2.15-2.45	N. Kokkarinen	Liverpool John Moores University	<i>Exploring sustainability strategies: how can education help?</i>
2.50-3.20	D. Dohmeher	Liverpool John Moores University	<i>Security of Land Rights and Sustainable Agricultural Investment in Africa?</i>
3.20-3.30	<i>Discussion and Close</i>		

BARRIERS TOWARDS THE SUSTAINABLE IMPLEMENTATION OF LEAN CONSTRUCTION IN THE UNITED KINGDOM CONSTRUCTION ORGANISATIONS

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ABSTRACT

The success achieved by adopting Lean production principles in manufacturing industries made the Egan's report "Rethinking Construction" recommend their adoption in the United Kingdom construction industry to improve quality and efficiency, eliminate waste and increase value for the client. Lean construction is a production-based management strategy that enables construction companies to maximise profits by maximising efficiency and eliminating waste of resources. The implementation of lean construction methods promotes sustainability by minimising energy consumption, improving health and safety, and eliminating materials waste. Despite the significant benefits gained by adopting the concept in various countries, the concept does not seem to be generally applied among UK construction organisations. For the sustainable implementation of Lean construction to be achieved, benefits can be explored, however it becomes inevitable to identify and overcome the factors hindering its application. A review of literature relating to lean construction reveals its contribution in promoting sustainable construction process. The barriers to its sustainable implementation are identified and discussed in this paper. Based on an in-depth analysis of these barriers, they were categorised into financial, educational, governmental, attitudinal, managerial and technical. Therefore when implementing lean construction, the aforementioned barriers should be considered.

Keywords: Barriers, Lean construction, Sustainability, United Kingdom and Value.

INTRODUCTION

The term *Lean Construction* was first brought up in 1992 by Lauri Koskela on the basis that to improve quality and efficiency of construction processes, construction materials, labour and manpower will need to be maximally utilised with a view to eliminating waste and any non value adding activity while delivering value to the client (Koskela 1992). Even after about two decades the uptake of this concept in the UK has been sparse. Henceforth, the implementation of *Lean Construction* in the UK needs to be looked at from two angles. First, the role of lean construction principles in promoting sustainable construction practise amongst the UK construction organisations. Second, what are the barriers that need to be trounced for lean

construction to gain acceptance and change the volte-face of construction norms and tradition to a new model in rethinking construction and development.

This paper, part of a doctoral study, focuses on the relevance of lean construction in promoting sustainable construction as well as the barriers that need to be overcome to achieve a successful implementation of lean construction.

LEAN CONSTRUCTION IMPLEMENTATION AND SUSTAINABILITY

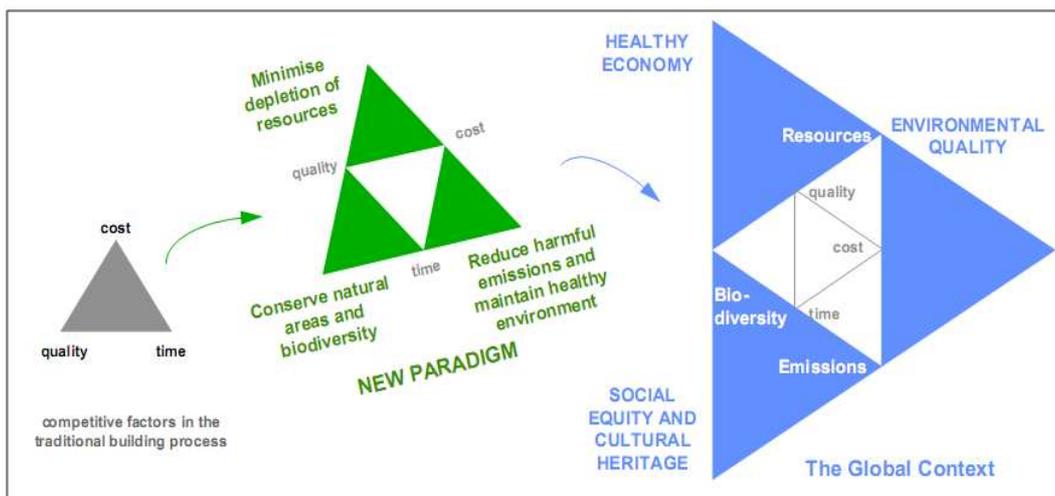
The UK construction industry employs about 1.8 million people and contributes about 10% of its gross domestic product (Hughes and Ferret 2008). Research has shown that construction activities are responsible for over half of carbon emission, water consumption, landfill waste and 13% of the raw materials used in the United Kingdom (BERR 2010). According to Jones and Greenwood (2002), Construction activities consume a vast amount of natural resources and generate about 70% of the waste in the United Kingdom. These wastes include off cuts, damaged materials, unused materials and demolitions which mostly end up in landfill (BRE 2009).

Another major issue facing the industry is its poor safety record. The sector has the highest death rate due to accidents on construction sites. This discourages workers, delays project progress, increases overall project cost, reduces productivity and tarnishes the public image of the industry (Walsh and Sawhney 2004; Sacks *et al.* 2009; Thandawee 2009). Furthermore, the accidents resulted in productivity losses, low morale and additional project cost (Abdelhamid *et al.* 2003; Jang and Kim 2007). Lean construction considers both construction waste and poor safety as potential wastes that hinder flow of value to the client and should hence be eliminated. The creation of this waste can be prevented by applying Lean construction principles.

Ehrenfeld (2008) defined sustainability as a continuous improvement process that involves managing processes in a way that the environment will continue to support future activities as it presently does. It seems that the adoption of sustainable approaches to construction activities means rethinking and restructuring the pre-construction, construction and post construction processes in a way that will improve the economy, protect the environment and improve social responsibility (Shelbourn *et al.*, 2006; Klotz *et al.* 2007; Rogers *et al.*, 2008) through improved environmental quality, energy efficiency and improved health and safety (Lapriski *et al.*, 2006).

Womack and Jones (1996) identified the principles of lean production as value identification, value stream mapping, making value flow, achieving customer pull and striving for perfection and continuous improvement. However, Seneratne and Wijesiri (2008) suggest that the elimination of waste, flow obstacles and other non-value adding activities are the core principles of lean construction. The minimisation of material waste helps in conserving both renewable and non-renewable resources. It also protects the human health, the environment and reduces the effects of global warming by preventing carbon emission from landfill facilities. Nahmens (2009) identified material waste elimination as the most efficient and cost effective approach to promote sustainable practice on construction sites. Similarly, the promotion of health and safety practice can contribute to sustainable construction by enhancing

workers' social life and minimising direct and indirect cost of accidents. The principles of Lean construction focus on creating a sustainable change by stressing on efficient, waste-free and safe flow, storage and handling of materials to minimise cost, energy and resource consumption, and provide value for clients and end users (Mossman 2009). Anecdotal evidence has shown that the implementation of lean construction principles and tools could minimise accidents and promote safety on UK construction sites (Mitropoulos *et al*, 2007; Thandawee 2009; Nahmens and Ikuma 2009). Hence, Lean Construction and Sustainability share a common goal on eliminating material waste and promoting health and safety in construction activities (Bae and Kim 2008; Nahmens 2009). Figure 1 outlines the evolution and challenges of the sustainable construction concept in a global context.



Source: Adopted from Pekka Houvila and Lauri Koskela (1998)

Figure 1: Sustainable construction concepts.

The aim of the on-going doctoral study is to investigate the potentiality and applicability of lean strategies in promoting health and safety initiatives, so as to support sustainable construction practice in the UK construction industry. Despite the significant benefits gained by adopting the concept in various countries, the concept does not seem to be generally applied among UK construction organisations. Henceforth the next section of the paper discusses barriers for sustainable implementation of lean construction.

BARRIERS FOR SUSTAINABLE IMPLEMENTATION OF LEAN CONSTRUCTION

Several researches have been conducted in various countries to investigate factors that could affect the successful implementation of lean construction. The research classified these barriers into six different categories based on a thorough and critical review of international literature relating to the take up of lean practice.

a. Management issues

The top management of every organisation has a major role to play in achieving a successful implementation of innovative strategies (Salem *et al.*, 2005; Hudson 2007). The success of lean practice lies in their commitment in developing and

implementating an effective plan and adequately providing the required resources and support to manage changes arising from the implementation. However, barriers identified in several studies seem to be related to management issues. A thorough review of research by (Common *et al.*, (2000), Alarcon *et al.*, (2002), Forbes and Ahmed (2004), Olatunji (2008) and Alinaitwe (2009)) found delay in decision making, lack of top management support and commitment, poor project definition, delay in materials delivery, lack of equipment, materials scarcity, lack of time for innovation, unsuitable organisational structure, weak administration, lack of supply chain integration, poor communication, use of substandard components, lack of steady work engagement, long implementation period, inadequate preplanning, poor procurement selection strategies, poor planning, inadequate resources, lack of client and supplier involvement, lack of customer focus and absence of long term planning are among major barriers to lean practice. Though some appear easy to be addressed, the overcoming of these barriers is very critical to the implementation of lean construction across organisations.

b. Financial issues

The implementation of innovative strategies like lean construction requires some funds. Adequate funding is needed to motivate the workers, provide relevant equipments and employ lean specialist to guide both employers and employees in implementing the concept. Financially related issues are among the most common barriers to lean practice across different organisations in various countries. However, the nature of this barrier varies across countries. An analysis of studies reported by Common *et al.*, (2000), Olatunji (2008) and Mossman (2009) identified some of these barriers to include corruption, inadequate projects' funding, inflation, implementation cost, poor professional wages, lack of incentives and motivation, and risk aversion. Unless adequate efforts are made to overcome these barriers, several companies could be discouraged from implementing lean in their organisations.

c. Educational issues

There have been several efforts to provide awareness, guidance and knowledge relating to lean construction by academics, researchers, practitioners and bodies such as Lean construction institutes, Construction Lean Implementation Programme (CLIP), Construction Excellence (CE) and British Research Establishment (BRE). However, these bodies operate in very few countries. Despite the large amount of publications made by researchers, it seems educational issues appear to be the most common barriers to lean practice. This may be related to the fact that the concept was adopted from the manufacturing industry. Some of these barriers are identified by Common *et al.*, (2000), Cua *et al.*, (2001), Alarcon *et al.*, (2002), Castka *et al.*, (2004), Olatunji (2008), Jorgensen and Emmitt (2008), Alinaitwe (2009), Abdullah *et al.*, (2009) and Mossman (2009) to include lack of understanding, lack of technical skills, high-level illiteracy, lack of training, lack of holistic implementation, inadequate knowledge, lack project team skills, inadequate exposure to requirements for lean implementation, lack of awareness programmes, difficulty in understanding concepts and lack of information sharing. Hence, it can be suggested that educational barriers pose a great threat to the sustainability of lean practice.

d. Governmental issues

Despite the significant economic contribution made by the construction sector in various countries, it faces numerous problems which appear to be related to

government policies. Some studies reveal that certain barriers arose due to government attitudes towards the construction industry in some countries. An indepth-analysis of research findings in Olatunji (2008) and Alinaitwe (2009) reveals barriers like government beaurocracy, inconsistency in policies, lack of social amenities and infrastructure, materials unavailability and unsteady price commodities. Furthermore, some of the financial barriers like inflation, professional wages, and corruption practices could also be related to government issues.

e. Technical issues

The implementation of lean construction may be affected by barriers which are technical. These barriers are considered technical because they have a direct impact on applying certain lean construction principle and tools such as reliability, simplicity, flexibility and benchmarking (Koskela 1992). Some of these were identified by Ballard and Howell (1998), Koskela (1999) and Alinaitwe (2009) as lack of buildable designs, incomplete designs, poor performance measurement strategies, lack of agreed implementation methodology, lack of prefabrication, uncertainty in supply chain, lack of design constructability, inaccurate and incomplete designs. Furthermore, Mossman (2009) also identified the fragmented nature of industry as a barrier to teamwork and collaborative partnering. Though these issues relate to certain tools, they could hinder a holistic implementation of the concept. A haphazard implementation may not yield the full benefits of lean construction.

f. Human attitudinal issues

According to Howell (1999), human attitude is one of the major factors affecting the implementation of lean construction in various construction industries. Based on studies carried out by Common *et al.*, (2000), Cua *et al.*, (2001), Alarcon *et al.*, (2002), Castka *et al.*, (2004), Forbes and Ahmed (2004), Alinaitwe (2009) and Mossman (2009), some of these factors are lack of transparency, cultural change, lack of team spirit, lack of self-criticism, lack of teamwork, lack of cooperation, poor house keeping, poor leadership, leadership conflict, poor understanding of client's brief, misconceptions about lean practice, over enthusiasms, seen as too complex and alien, and fear of unfamiliar practices.

DISCUSSION

A change is necessary for construction companies to continuously meet clients' needs and respond to the global, social and environmental challenges. Companies must take advantage of research and technological developments to continually improve efficiency and quality of products and services so as to withstand existing and future market competitions (Paton and James 2008). However, for a change to be effective, its implementation has to be well managed.

A sustainable change requires building trust and establishing a new culture of constant learning, improvement and perfection among employers and employees. A Lean construction expert can be consulted to create awareness among clients, contractors, subcontractors, suppliers and consultants on the aims, objectives, goals and benefits of Lean construction and its advantages over traditional management approach. The extent and mode of applying lean techniques should be discussed to clear misconceptions and misunderstandings.

The steps to be taken in order to overcome the barriers in implementing lean construction in the UK is to work behind the shield on improving performance, taking full advantage of enlightenment/training of staff at all levels on lean; engagement of skillful site operatives; competent/ skillful professionals; promotion of the concept to companies, professional bodies and major stakeholders. There is the need for the UK construction industry to engage in funding workshops and research that could generate more literature to guide lean implementation.

CONCLUSION

The relevance of lean construction in promoting sustainable construction in terms of environmental protection, economical and social life of the workers are discussed. An indepth analysis of the barriers to the implementation of lean construction categorised them into financial, educational, governmental, attitudinal, managerial and technical issues. This helps to identify and shares responsibilities in overcoming the barriers among the stakeholders. The next stage of this research identifies strategies to overcome the barriers. The research also proceeds with investigation into the potentiality of lean construction as a route to promoting health and safety in the UK construction organisations so as to support sustainable construction practice.

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UNDERSTANDING AND MANAGING RISKS- NECESSARY CONDITION FOR SUCCESS AND SUSTAINABILITY OF PRIVATELY FINANCED MARKET PROJECTS IN NIGERIA

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ABSTRACT

Traditionally, the criteria used to measure project success in the construction industry are “the iron triangle” of time, cost and quality. These criteria are no longer sufficient as other factors related to project sustainability are being demanded. Sustainable procurement policies require that projects provide social and economic gains to host communities. Construction works procured using public private partnership arrangement (PPPs) are more risk prone than those procured using other forms, primarily due to the lengthy concession period and the multi-parties involved in the arrangement. In Nigerian, researches on the assessment of the performance of projects procured using PPP are few due to the novelty of the approach. Many projects are still at pre-construction and construction stages whilst few are at the operation stage.

Markets are very important to sustainable economic development in emerging economies. This paper addresses the factors that can impact the outcome of a privately financed market project based on data gathered through several approaches: interviews with stakeholders, questionnaire survey, review of project documents and direct observations on a privately financed market. The study reveals that understanding and adequate management of economic, construction, cultural and political risks have much effect on cost, time, quality and financial performance of the market. Thus, adequate consideration should be given to the aforementioned risks factors at the inception of such projects to forestall poor performance. Only then can a market development project meet the needs of the present generation without compromising the ability of future generations to meet their needs.

Keywords: Privately Financed Market, Project success, Risk, Sustainable development, Risk management.

BACKGROUND

The fact that construction industry performance in Nigeria is poor is no longer disputable as the industry is characterised by repeated delays, cost overruns and incessant building collapse. The poor performance of the industry has attracted the attention of both public and private sector clients. This is of great concern because the

industry can no longer cope with the high demand put on it as a result of increased population and shortage of fund to finance much needed infrastructural facilities. Consequently, successive governments are challenged by the need to provide new infrastructure and also to maintain the existing ones as the majority of the facilities are in a state of disrepair.

In trying to ameliorate the infrastructure deficit problem, which has greatly constrained the economic growth and development of the country, the present democratic government in Nigeria has envisioned a “Seven- Point Agenda” aimed at improving the quality of life of the people. At the centre of this agenda is the provision of infrastructure which requires massive investment that is beyond the means available to the government. The Nigerian government therefore sought to partner with the private sector through Public Private Partnership (PPP) arrangements. This led to the inauguration of the board of the Infrastructure Concession Regulatory Commission (ICRC) by late President Umaru Musa Yar’Adua in 2008. The commission is to serve as a major vehicle in operationalizing the process of private sector participation in infrastructure finance in Nigeria. The Commission is expected to epitomize best practices in Public Private Partnership (PPP), and be a beacon for sub-national entities to take their bearings from (Nigeriafirst, 2009).

There seems to be a recent embrace of private sector participation in market development in Nigeria. The performance of the markets will be a function of the satisfaction of the stakeholders to the project. This is so because a market is a service delivering project and its sustainability depends on the satisfaction of the end users. The purpose of this paper is to assess the level of satisfaction of the stakeholders of market project developed using PPP arrangements. The satisfaction level of the stakeholder’s i.e the public client, the private investor, the contractors, consultants as well as the end users, of the privately financed market and the factors responsible for the performance level were assessed and possible solution identified for success and sustainability of privately financed market projects in Nigeria.

LITERATURE REVIEW

Construction Industry and National Development

In Nigeria, in the 1980s the construction industry alone contributed up to 7% to the Gross Domestic Product (GDP) (NBS, 2008). This significant contribution of the industry to the GDP corroborates the assertion by Walsh and Sawhney (2002) that construction activity is an important contributor to GDP in most industrialized countries and contributes significantly to global economic growth. Although Nigeria has yet attain the status of an industrialized country the country is aspiring to get there soon. The contribution of the construction sector in industrialised countries like the United State of America (USA) and Australia were, in 1996, around 10.7% (Walsh and Sawhney, 2002) and 6.3% respectively (Croese *et al.* 1991). It is evident, therefore, that the industry plays a prominent and significant role in national development. However, by 2002 construction contribution to GDP in Nigeria had been eroded to a mere 1% of the GDP (AFO/OECD, 2004). This has been attributed to high fragmentation of the industry, political instability, poor performance combined with low productivity over the years (Okuwoga, 1998; Adeyemi *et al.*, 2005 cited in Oladapo, 2007).

The Nigerian construction industry in the past two or three decades has largely been supported by substantial public spending to fund the construction of basic infrastructure; as evident in the yearly budgetary allocation to capital expenditure. The situation has been changing given the Federal Government's budgetary constraints vis-à-vis the quantum of resources required to rebuild, maintain, upgrade, and expand the country's critical infrastructure. The concession programme as envisaged in PPP arrangement would therefore leverage effectively on private capital. Government will then focus on planning and structuring, while the private sector engages in management, investment, construction and finance of infrastructure development.

Public Private Partnership Projects (PPP) and Performance measurement

PPP has been popularly used worldwide, but the extant literature suggests that the UK first found success in the form of the Private Finance Initiative (PFI) (Cheung *et al.*, 2010). Raisbeck and Xu (2010) also opine that the UK pioneered the development of the PPP procurement framework and as a result there has now developed a large body of literature on the approach. This arrangement is new phase in the construction industry in Nigeria. The first celebrated Build–Operate–Transfer (BOT) project in Nigeria at the federal level was the construction of Muritala Mohammed Local Airport in 2000. Since then many State governments as well as Local government within the country has been adopting this method in the procurement of social and economic infrastructure in their respective localities. Today, with the official inauguration of ICRC board and the establishment of Public Procurement Act in 2005 and 2007 respectively, the coast is now free for more partnerships between the public and the private sectors.

Apart from the obvious financial advantages of adopting PPPs, other attractive factors have been identified by researchers. The following advantages are of particular relevance to this study: (1) risk sharing or outright risk transfer to the party that can best manage them in PPP, (2) cost saving as a result of the private sector's innovation and efficiency, (3) Value for money, (4) cost certainty, (5) Time certainty, (6) PPP frees up fiscal funds for other areas of public service and improve cash flow management and last, but not the least, is the issue of (7) business opportunities (British Columbia, 1999; Li, 2003; Akintoye *et al.*, 2003; Grimsey and Lewis, 2004; United Nations Economic Commission for Europe, 2004; Li *et al.*, 2005a; Chan *et al.*, 2006; So *et al.*, 2007 and Loosemore, 2007).

In the UK and Australia where PPP has been used extensively, research has been conducted to provide explanation for the increase in the popularity of PPP by the government, the level of application as well as the type of model used. Others have also worked on the criteria that favour successful PPP adoption on projects. Unfortunately, the existing literature has not addressed the performance or the satisfaction of the stakeholders to PPP projects in the region. Therefore there is need to assess the success and sustainability of the concept. Since the agenda of sustainability is growing rapidly, the construction industry as the prime mover of the economy needs to take a bigger step towards addressing sustainability in its performance. According to Yuan *et al.*, (2009) PPP performance objective should reflect the public client's overall strategic plan and mission objectives, private sector's long-term development and payoff strategy, and the general public's requirements of quality public facilities and services. The implication then is that all the

aforementioned objectives or specification of the requirements from each stakeholder's perspective is the first principle in the performance management system. Thus, the key to successful implementation of a PPP project is the feasibility of the project in relation to the economy, environment, society, politics, legislation and financing. All these feasibility and viability criteria will help to ensure that the best value can be achieved in those given conditions (Salman *et al.*, 2007).

Market development in Nigeria

Nigeria is famous for her large population of about 140 million people. There are 3 main indigenous languages spoken by the 3 predominant ethnic groups in Nigeria. These are the Yorubas in the West, the Hausa-Fulani in the North and the Igbos in the East (NPC, 2008). Nigeria has an area of 923,768 square kilometres, including about 13,000 square kilometres of water. With this expanse of land as well as diverse but united people, the country is divided into six geopolitical zones: (i) South–West Zone, (ii) South–South Zone, (iii) South–East Zone, (iv) North–West Zone, (v) North–Central Zone, and (vi) North–East Zone for administrative purposes.

Nigeria has different climatic conditions, varying from tropical in the coastal areas to arid land in the north. This allows production of different agricultural products that can be grown in both tropical and semitropical areas. It is a common for households to have gardens around their buildings where food crops like tomatoes, melon and vegetables are planted for family consumption. As such, a vast majority of the population in Nigeria is involved in subsistence farming. The varying climatic condition in the country necessitates the need for exchange of produce from the arid regions to the tropical parts of the country. For instance, in the southwest zone of the country, food crops such as cassava, maize, yam are grown in abundance while in the north sorghum, onions, tomatoes, beans are the usual crops. The need for exchange of these produce across the country account for the creation of markets; where buyers and sellers can interact. Markets, in this context, are infrastructures whereby people trade, and goods and services are exchanged, forming part of the economy. These facilities vary in size, range, geographic scale, location, types and variety of human communities, as well as the types of goods and services traded. Good examples include Neighborhood markets, central markets which are held in the centre of town/cities, local markets in villages etc. Hodder (1965) classified markets in the country under two broad headings as: (i) period markets and (ii) daily markets. He remarked that it is common to see a market in the centre of the town, surrounded by major buildings such as the parish church, town hall and the King's palace.

Just as in the medieval times, apart from markets being used as economic centres, political information and meetings of the local chiefs with their subjects are done in the market. In the past there were no permanent covered market buildings, and the entire area is an open clearing with no buildings, normally trees with wide-spreading branches provided shade. Awodele *et al.*, (2009) observed that with the growth and prosperity in the towns, goods and services increased and there is then the need for a place to keep these goods safe till the next market day. This led to the construction of some lock-up shops where individuals could keep their goods secured till the next day. The construction of lock-up shops was later taken over by the local authority to which market tolls were paid.

Nigeria has a very rich cultural background; there are different forms of dance, arts, music, dressing and philosophy. Proverbs and adages form an important part of everyday language, (for instance the proverb: “One here, two there, the market is filled up” explains how markets are filled up daily). Music is also very important, and can be used as a form of communication. The talking drum is often used as a means of communicating in olden days and is still in use today. Culture develops over time, as it is handed down through the generations over hundreds or thousands of years. They have also inherited customs, art, crafts, dance, stories, language, spiritual life, family structures, attitudes to the environment and land, eating habits, and knowledge about making tools, homes and other objects essential for survival.

In order to retain this emotional, spiritual and mythological link with the physical world, they always stress the fact that their heritage is acknowledged and preserved, by both Indigenous and non-Indigenous people. Indigenous people can ensure their culture is kept alive and is passed on to future generations by maintaining traditional practices and beliefs. A range of social, cultural, community services and heritage laws, provided by Local, State and Federal governments, help the wider community preserve and acknowledge Indigenous culture. It is imperative therefore, that in the development of any market in Nigeria, either through direct funding from the budget or through public-private partnership, the custom, values and tradition of the people need to be considered if such development will get the desired acceptance by the people whom the market is developed for.

Achieving sustainability in market construction

Parkin, (2000a) define sustainable construction as a construction process which is carried out by incorporating the basic objectives of sustainable development. The Government Construction Clients’ Panel (GCCP) Sustainable Construction Action Group (2000) describes sustainable construction as the set of processes by which a profitable and competitive industry delivers built assets (buildings, structures, supporting infrastructure and their immediate surroundings which: (i) enhance the quality of life and offer customer satisfaction, (ii) offer flexibility and the potential to cater for user changes in the future, (iii) provide and support desirable natural and social environments and (iv) maximise the efficient use of resources.

DERT (2000b) suggests ten key factors for action by the construction industry towards more sustainable construction as follows; design for minimum waste, applying lean construction principles; minimising energy in construction and use; pollution reduction; preservation and enhancement of biodiversity; conservation of water resources, respect for people and local environment; and setting targets; monitoring and reporting in order to benchmark performance. We want to argue therefore that for a successful and sustainable market development, especially privately financed market, it is imperative that the goal of the development should be to enhance the quality of life and offer satisfaction for both the present users and the future beneficiaries of the market. While doing this, the natural, social and cultural heritage equally need to be preserved as all these can be said to be at the heart of the social responsibility dimension of sustainable construction.

Risks in Privately financed market projects and their management

Risk can be said to be a social construct in that the concept of risk varies according to people’s viewpoint, attitudes and experience. People tend to perceive events

differently because most of the time our perceptions are influenced by our value system, our attitudes, our judgements, emotions and our beliefs. It then implies that risk may have different meanings to different people. In the context of a construction project, risk has been defined by Baloi and Price (2003) as, the likelihood of a detrimental event occurring to the project. They argued that since the objectives of construction projects are usually stated as targets, the most important risks in construction are the failure to meet established targets for function, cost, time and quality. Given the complexity, size, the time frame of concession contracts, and the multitude of stakeholders involved, PPP projects delivery methods have been adjudged to be full of risks (Xenidis and Angelides, 2005).

Akintoye *et al.*, (2003); Li *et al* (2005), Ayeni (2005); Ibrahim and Price (2006); Xenidis and Angelides (2005) and Ibrahim *et al.* (2006) produced a total of 66 risk factors related to PPP projects generally. In a preliminary survey of a privately financed market project in Lagos; while adopting the two broad classifications of risk by Ibrahim *et al.* (2006), Awodele *et al.*, (2009) found that out of the twenty-four exogenous risks (i.e risk external to the projects) seven were critical to the PPP market under study. Thirteen out of forty-two endogenous risks (i.e risk internal to the project) were found to be critical. It was generally agreed by the researchers that there are possibilities for differences in opinions by the key stakeholder groups. To further expand study in this area, this study explores risk factors that actually affected the performance of a privately financed market project. We cannot avoid risks as they are like life surprises which are born with us; they live and exist with us. The situation is same in construction projects. No matter how well we plan, “if anything can go wrong, it will” (Murphy’s Law). Therefore, all we need to do is to identify, assess, monitor and control these risk factors/events to be able to increase the probability and impact of positive events, and decrease the probability and impact of events adverse to the project’s objective.

RESEARCH METHODOLOGY

The study adopted a case study methodology. Data were collected on the reconstruction of Erekesan Market in Akure using various data collection methods: semi-structured interviews with key project stakeholders from both the public and private sectors, questionnaire survey, reviewing of project documents as well as direct observations on site. The research approach was adopted because the study is explorative in nature. Love *et al.*, (2002), and Yin (2009) have argued that triangulated approaches should be used when: (1) a single method may not reveal some unknown aspects of the results obtained because of the restrictions in the method; (2) triangulation facilitates gaining complete understanding of a given construction management research phenomenon; and (3) triangulation enables both qualitative and quantitative data collection to be used to understand the research proposition(s). A case study protocol (CSP) was developed for the conduct of semi-structured interview in line with the assertion of Yin (2009) that it is essential to develop CSP when conducting a multiple-case study. The essence is to increase the reliability of case study research and also to guide the investigator in undertaking the data collection.

Case Study

The case study is the reconstruction of Erekesan market in Akure. The market is situated in front of the King's palace; right at the centre of Akure town. Following the destruction of the old King's market (Deji's Market) by inferno in year 2000, agreement to redevelop the Old market to an ultra-modern market was reached between the Ondo State government, Akure South Local government (public) and Spring Bank plc - then Omega Bank Nigeria PLc. (private). The trio formed a special purpose vehicle (SPV) company called Sunshine International Venture Limited. The concession agreement was to jointly finance the project with the bank providing much of the finance. Akure South local government provided the land as her own share of equity while Ondo State government was to contribute 20% of the fund. Two years construction period was agreed and market was to be operated for a period of 20 years before being transferred to the government. Six contractors were involved in the construction as the whole project was divided into six packages. Block A, B, C, D, E and Traditional market side. Omega Bank Plc., through its subsidiary mortgage company Omega Saving and Loans, managed the project, while private consultants were employed to design and carryout the initial documentation on the project. With these multi-party nature of the project, five set of stakeholders are identified on the project viz: (i) government (i.e State and Local), (ii) Bank, (Omega bank Plc.), (iii) Contractors (Six of them), (iv) Consultants, and (v) end users (Traders and Shoppers to the market). Interviews were conducted with the information gatekeepers (usually top management officers) of the stratified groups. In addition, the first author spent two weeks for fieldwork in the market to interview traders and shoppers in the market.

Findings and Implications

From the interviews with the various groups identified above, it was revealed that the reconstruction of the market started in October 2004 and it was commissioned in 2007. The project experienced both time and cost overrun (about 12 months and ₦150 million approximately £683,123.449). Although it was commissioned in 2007, the occupancy rate is still about 50%. Moreover, the users were asked regarding their satisfaction with the market in terms of: (i) the amount paid for a space/stall in the market, (ii) accessibility of the facility, (iii) ease of locating goods, (iv) appropriateness of the size of the facility, (vi) ease of transporting goods in and out of the facility, (vii) adequacy of parking spaces, (viii) the environment around the facility, (ix) security in and around the market, and (x) general neatness of the market. The general response was that they were dissatisfied on all the aforementioned criteria. However, the respondents were highly satisfied with (i) the modern look of the market, (ii) security in and around the market, and (iii) the attractiveness of the market. When the respondents were asked regarding the factors responsible for the level of their satisfaction with the market or the factors that were responsible for the poor general performance of the market, cultural, political, economic and design risk factors were said to be responsible for the poor performance of the market

From the content analysis of the interviews, it became evident that cultural and political risks are most severe while design risk is also very important. The reasons given by the respondents are as follows: (i) cultural heritage of the people was not given adequate consideration when planning the market. (e.g closing up the market especially during festivals or for sacrifices); (ii) the economic status of the target customers where not considered as it is extremely difficult to expect someone whose whole business is not more that say £50 to be paying about £14 per month as rent on a

shop; (ii) the design of the market, although having a modern look, is not so user friendly, as it is rather difficult for customers to locate where a particular set of goods are being sold. It was gathered from the interviews that the agreement between the Reagent and the SPV Company on the market was dropped when a new King was installed in Akure. Furthermore, on issue of political risk, when the administration of the previous government in the state was dissolved as a result of court order declaring another party as the elected governor in the state, there was difficulty in convincing the new government to accept the agreement which also slow down the smooth running of the market. The overall opinion of the people interviewed was that although, the intent of providing an ultra modern market for the people was met, the project's performance is rather poor and customer satisfaction is far from being achieved. One respondent referred to the projects as "*Monumental loss to Ondo State in general and Akureland in particular*".

CONCLUSION

This paper has presented a review of market development in south-western Nigeria and ways of achieving sustainable development in a privately financed market project using a case study of the reconstruction of Erekesan Market in Akure. The project's performance has been assessed from the perspective of all the key stakeholders to the project. It is evident that although the intent of providing an ultra modern market has been met, the project's performance generally from the viewpoint of time, cost and quality is very poor. This is at odds with the principles of sustainable development since the project failed, not only to offer the flexibility required and the potential to cater for user changes in the future; it also failed to offer customer satisfaction.

Emerging from the case study is the necessity for understanding the needs of all the key stakeholders to a project from the outset of the project and to endeavour to keep them satisfied if a successful and sustainable privately financed market is to be developed. Understanding the cultural heritage of the people is very important especially in a setting like amongst the Yorubas who are very conscious of and protective of their cultural values. To enable the findings of this study to be generalised across the chosen geopolitical zone, (South-west zone) data are already being collated on two other similar projects within the zone. It is expected that these additional cases will provide a broader sample for the study

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EXPLORING SUSTAINABILITY STRATEGIES: HOW CAN EDUCATION HELP?

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ABSTRACT

Construction organisations are reacting to the move towards sustainability due to imminent changes in legislation, whilst also realising that it may give them a competitive advantage. There are numerous reports which have evaluated what unsustainable practices construction organisations have engaged in and made recommendations as to what and how more sustainable practices could be implemented. The question then remains- who is going to implement them? The main drivers for change in construction organisations are the government and professional bodies such as the Chartered Institute of Building, for example. However, these are not the only drivers for change. Education can play an important part in promoting sustainability by preparing future construction professionals with skills which will be complementary to the changes the construction industry will have to adopt. It is vital that construction organisations implement change; but by having education match these outcomes could be of tremendous value as construction professionals would not need further training when they enter work, thus providing an alternate strategy for promoting sustainability in construction organisations. The ecological worldview of a sample of built environment students has been measured and correlated with psychological factors which have been related to environmentalism. The results indicate that the students had a slightly above average amount of environmental knowledge; the challenge then is to get this knowledge to become internalised as an attitude.

Keywords: Construction organisations, Education, Psychology, Sustainability.

INTRODUCTION

Reports from professional bodies such as the Chartered Institute of Building (CIOB, 2001) among others have reported how the construction industry can move sustainable development forward while still making a profit. Although these initiatives have been put into place, the level of desired effect has not been met. While these initiatives are still in place, it may be worthwhile to introduce an additional strategy such as education.

What is and can be done to Promote Sustainability?

The UK government tends to offer two strategies by which they expect the construction industry to incorporate sustainability; these being reports and legislation. Examples of these reports are the Office of Government Commerce (OGC, 2007) which provided details as to how the construction industry can achieve sustainable procurement. Legislative implementation such as the Duty of Care places the responsibility of appropriately disposing of waste to those who are in contact with the materials, including producers, and importers (Dainty and Brooke, 2004). While numerous initiatives similar to these are in place more can be done by complementary institutions to push for sustainability.

Cotgrave and Al Khaddar (2006) noted that construction industry professional bodies had some influence over curriculum design but that a majority of the responsibility lies within the University. Chan, Chan, Scott and Chan (2002) added that more influence from professional bodies should be incorporated into the education of future construction professionals so that they receive academic as well as industrial perspectives. Incorporating topics such as new legislation and government policies may also be beneficial to the programme (Cotgrave and Al Khaddar, 2006) by engaging with the material in this way would reinforce student understanding (Chan *et al.*, 2002).

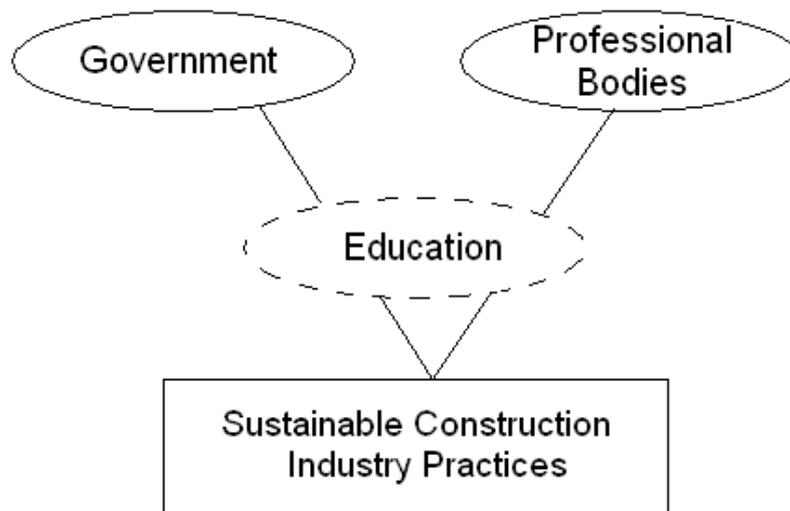


Figure 1. Influence of various drivers for change on the construction industry

Figure 1 depicts how both Government and Professional Bodies directly influence the construction industry. However, both can also influence the educational sector as strategies put into place can be taught to future construction professionals, thus possibly making a difference in sustainable construction practices.

Implementing Psychology into Built Environment Education

The assumption that a person's intelligence is directly linked to their academic performance has prevailed in educational settings. However, after the emergence of

personality theories, there has been a shift in thought from intelligence alone predicting educational success to certain personality traits influencing educational performance, especially in higher education (Furnham, Chamorro-Premuzic and McDougall, 2003).

The accuracy of personality inventories tends to increase the predictive power of academic performance while cognitive ability declines as a predictor at university level (Furnham *et al.*, 2003). Three traits in particular have been found to predict performance; these being conscientiousness, extraversion and neuroticism. Conscientiousness is characterized by dutifulness, achievement striving, responsibility and order which positively correlate with academic performance. Extraversion correlated negatively with performance as extraverts are likely to spend more time being social rather than introverts who spend more time studying. Likewise, neuroticism correlated negatively with academic performance as anxious individuals may not be able to cope with examinations (Furnham *et al.*, 2003).

Emotional intelligence (EI) is a psychological construct which identifies how emotionally aware individuals are of their emotional state and that of others. The notion emerged from the search for a set of measurable capabilities which combined with traditional intelligence, may predict academic and life success (Fox and Spector, 2000). The Trait Meta-Mood scale was developed to provide an indicator of individual differences in mood regulation; these scores are believed to reflect stable individual differences (Fitness and Curtis, 2005). EI focuses on intelligence behaviour in natural settings, and unlike traditional or academic intelligence, can be used to solve problems which are important to the emotions, plans, needs and well-being of an individual (Fox and Spector, 2000). It is hoped that through matching personality to adequate educational interventions will enable built environment students to extend their concern for others into concern for the environment.

By assessing these constructs in an educational setting may enable a more successful integration of sustainability within future construction professionals. This would work parallel to the efforts which the government and professional bodies are expecting from practicing professionals. Therefore, once students graduate, they are able to enter the workforce without requiring additional training for their position in industry. It was believed that built environment students would have a relatively high ecological world view and that their scores on agreeableness, conscientiousness as well as openness to experience would have a relationship with EI and their ecological world view.

METHODOLOGY

A sample of 99 built environment students completed three online questionnaires which assessed their Environmental world view (Dunlap, Van Liere, Mertig, and Jones, 2000), personality (Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, and Gough, 2006), emotional intelligence (Salovey and Mayer, 1990). The three questionnaires have high alpha coefficients reported in previous studies, and in this present study, the alpha coefficients were $\alpha=0.85$ for environmental concern, $\alpha=0.84$ for personality and $\alpha=0.82$ for emotional intelligence.

RESULTS

The mean age of the participants was 28.71 years (SD= 11.25). The sample contained more male (82.2%) than female (17.8%) participants. The descriptive statistics of the scale scores in Table 1 showed that the cohort of respondents had a slightly above average ecological worldview and were moderately emotionally intelligent. When looking at the subscale scores for the five personality traits, it can be seen that the cohort are highly agreeable, which is associated with empathy, conscientiousness which is associated with responsibility and dutifulness and are open to experience. Participants were moderately extraverted and not very neurotic.

Table 1: Descriptive statistics for each measurement scale

Scale	Mean	S.D
Ecological World View	50.66	10.94
Emotional Intelligence	103.38	11.19
Extraversion	33.77	7.62
Agreeableness	39.37	5.96
Conscientiousness	35.03	7.49
Neuroticism	30.56	8.23
Openness to Experience	36.67	5.15

Correlations revealed that there were no significant relationships between agreeableness, conscientiousness, openness to experience, emotional intelligence and ecological world view as hypothesised. Neuroticism ($p < .05$), agreeableness ($p < .001$) and extraversion ($p < .005$) showed positive relationships with emotional intelligence; while neuroticism and extraversion correlated negatively with ecological world view. Results are summarised in Table 2.

Table 2: Correlation Charts

	NEP	EI
Neuroticism	-.22	.30
Agreeableness		.46*
Extraversion	-.32*	.31*

*Significant at 0.01

DISCUSSION

The initial hypotheses were rejected. It was surprising that built environment students had a slightly better than average environmental world view even though they are taught about environmental issues. Neuroticism and extraversion correlated negatively with ecological world view. It could be interpreted that neurotic individuals may have low ecological world views because their thoughts are preoccupied with other worries. As for extraverts, this negative correlation may signify that when they are being social they are not talking about environmental issues; this finding is supported by Furnham *et al.* (2003). To overcome this, neurotics should be taught positive ways of thinking about how they can care for the environment. Extraverts might benefit from

participating in group sessions or tutorials to discuss and exchange information about environmental issues. While there are strategies in place to move the construction industry toward sustainable practices, higher education can disseminate the relevant knowledge to students while they are learning the basics of their discipline. They will be able to promote the construction industry to be sustainable when they enter into it as professionals.

The findings of this pilot study will form the basis of a questionnaire specifically designed to address topics relevant in the built environment curriculum. A longitudinal design will be employed and educational interventions implemented in order to see whether these are successful in changing student attitudes toward the environment.

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SECURITY OF LAND RIGHTS AND SUSTAINABLE AGRICULTURAL INVESTMENT IN AFRICA

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ABSTRACT

It is often argued that land tenure security guarantees investment in land-based activities, particularly, agriculture which has the potential to reduce poverty among the poor rural farmers. However, various empirical studies conducted in Africa have not been able to establish a discernible link between security and investment. The aim of this paper is to critically examine the model linking security to investment and to provide theoretical reasons as to why such studies have found no link between them. This paper argues that security may only influence willingness to invest but by itself alone cannot guarantee sustainable investment due to: (a) the presence of the cobweb phenomenon in the agricultural sector; (b) the existence of poverty in pandemic proportions; (c) lack of adequate government support; and (d) the deprived nature of rural communities in terms of socio-economic infrastructure. Government intervention through the provision of socio-economic infrastructural facilities like irrigation and storage, credit and improved transport system is recommended as the way forward.

Keywords: Africa, agricultural investments, land tenure security.

INTRODUCTION

The quest for secure rights to land dates back to several centuries ago. Feder and Nishio (1999) referring to the books of Genesis 23 and Jeremiah 32 in the Holy Bible explains how Abraham and the prophet Jeremiah sought for secure rights to different parcels of land some 4,000 years ago. Land was and still remains a great symbol of wealth to many people especially in the developing world. The fight for securing one's land rights could thus be seen as a fight for survival.

It is often argued that secure land tenure tends to increase the demand for land related investments (Roth and Haase, 1998). It is further argued that when ownership rights are secure, then people are more willing to adopt land conservation practices to ensure sustainability of their resources for both present and future investments (Pender and Kerr, 1998). Such investments are then expected to increase farm yield per acre, increase farmers' income levels and hence reduce poverty especially among the poor rural farmers. Security of land tenure as a result is considered by authors like Deininger and Chamorrow (2002) as a precondition for sustainable economic growth and development in Africa. Research across various countries has examined the

relationship between land tenure security and investment. For instance, various studies in Paraguay (Carter and Olinto, 1996) and Honduras (Lopez, 1996), show that land tenure security influences land related investments, land values and access to credit. On the contrary, studies conducted in Ghana, Kenya, Rwanda, Uganda, Senegal and Burkina Faso have concluded that security has no clear cut impact on productivity, investments and access to credit (Brasselle et al., 2001; Migot-Adholla et al., 1991; Pender et al., 2004; Place and Hazel, 1993).

Security of land tenure refers to the certainty that a person's land rights will be recognized by law and, especially, by members of the society and protected when there are disputes or challenges to such rights (Abdulai, 2010). Thus, enforceability and clarity of land rights as well as absence of disputes over land are examples of parameters of land tenure security.

The aim of this paper is to attempt a theoretical explanation of why security per se may not guarantee investment on a sustainable basis especially in Africa. The rest of the paper is organised as follows. The next section discusses the security-investment model and explains why it may not be realisable. The last section is devoted for conclusion.

SECURITY AND INVESTMENT

The purported theoretical linkage between land tenure security and investment has been explained by Roth and Haase (1998) and Feder et al. (1986) as follows. Security is perceived to promote investment through two main channels which are the demand-side and supply-side effects. The demand-side effects deal effectively with the incentives that security provides farmers to invest in land. It postulates that higher levels of security increase the demand for investment by farmers. On the supply-side, security is said to influence investment through the provision of incentives to the financial institutions to provide farmers with funds for investment. A diagrammatic representation of the above model is presented in Fig 1 below.

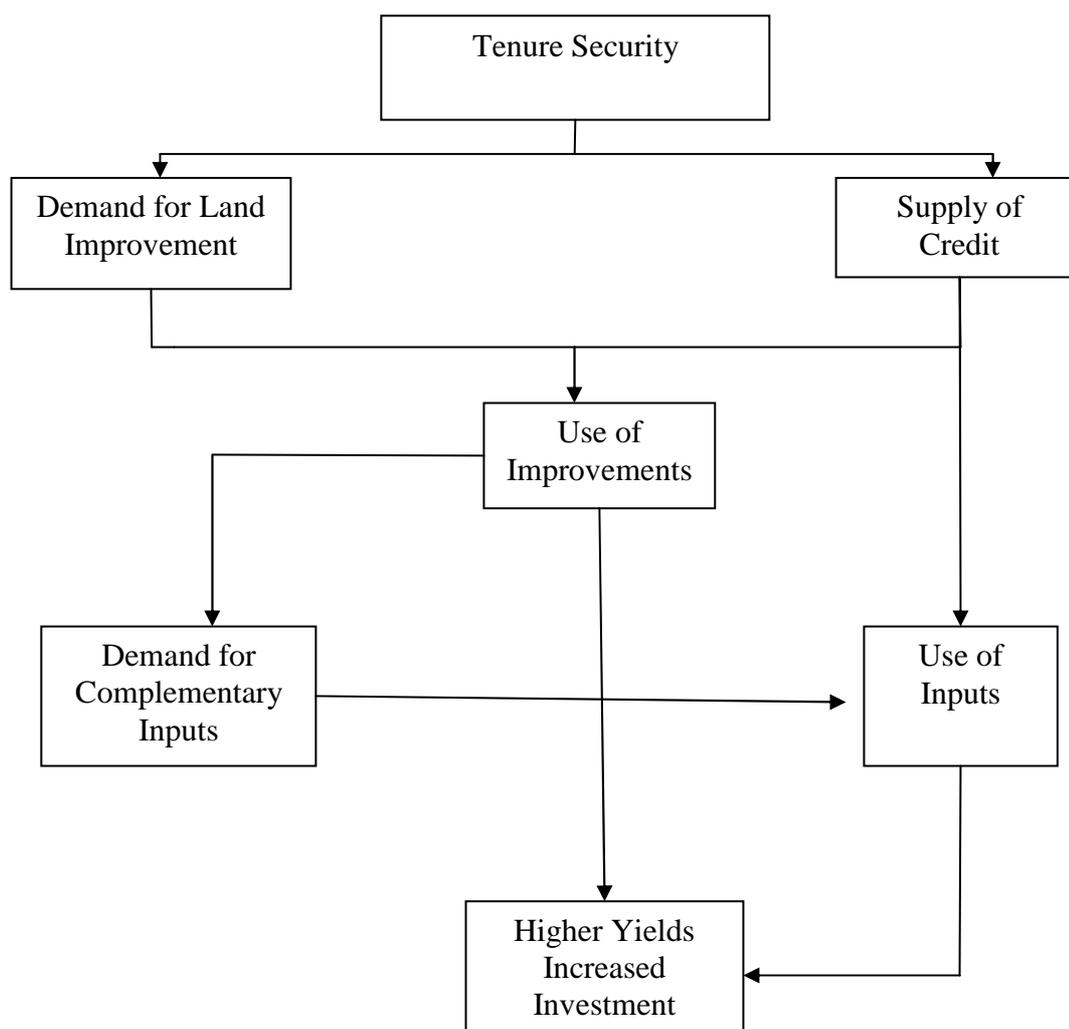


Fig 1: The Security-Investment Model

Source: Roth and Haase (1998)

The demand-side effects as postulated by the above model appear to have some inherent weakness that will not permit the realisation of the claimed investment and increase in productivity. The model fails to specify the degree of security required to achieve the investment and productivity outcomes it predicts. Demand is an economic concept that involves two key elements - willingness and ability. Willingness and ability go together such that the absence of one has the potential to hinder any investment activity. Security may only provide the incentive to invest which means it only influences to some extent the motivation or willingness to invest and that cannot be equated to demand for investments. Assuming without admitting that farmers have funds to invest (which is usually not the case) the demand side effect will still be subject to availability of the appropriate investment environment. Unfortunately, Plateau (1996) observes that this enabling environment does not exist in most African countries.

Security may also fail to yield the expected demand side effects because of the high poverty levels in Africa. The World Bank's research shows that Africa is a critical development priority since it has some of the world's poorest countries and during the past two decades, the number of poor people in the region has doubled to 300 million,

which is more than 40% of the region's total population (World Bank, 2007). This shows that farmers in Africa are financially incapable of undertaking various investments. Thus, it appears that the lack of willingness and ability to invest in agricultural activities in Africa is attributable to the above and not insecure rights to land.

Failure to realise the supply side effects may also be explained by the cobweb theory in economic literature propounded by Nicholas Kaldor in 1934. It explains the continuous or repetitive fluctuations in the price and output of agricultural products. The theory is diagrammatically illustrated in Fig 2 below.

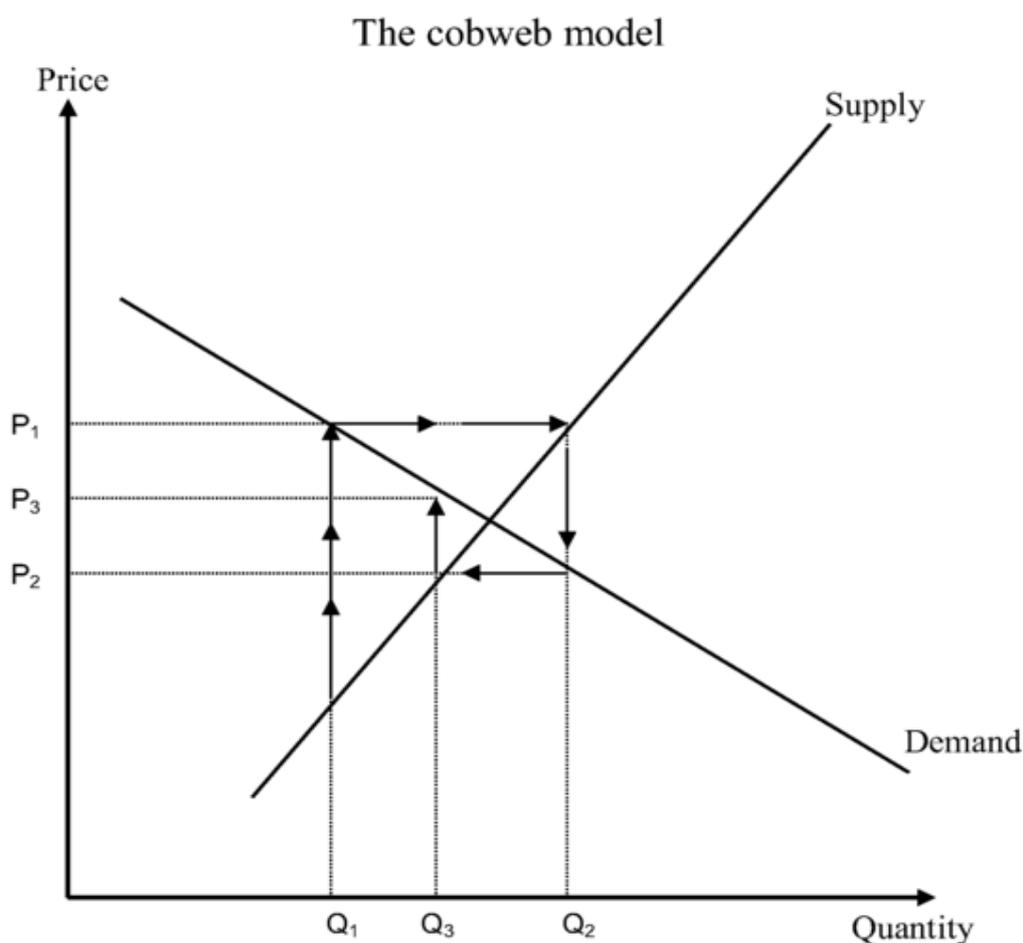


Fig. 2: Cobweb Model

Assume three time periods T_1 , T_2 and T_3 where T_1 is the current time period, T_2 is the future time period after T_1 and T_3 the future time period after T_2 . If for example farmers experience low harvest in any particular period, say, T_1 , and this moves supply to Q_1 . At Q_1 , demand will exceed supply creating a shortage in the market which will in turn put upward pressure on the price to rise to P_1 . If farmers then expect that P_1 will persist, they will plan to increase their supply to Q_2 at T_2 . However, this large increase in supply as shown in the diagram creates a surplus in the market and farmers cannot sell all their stock unless they accept lower prices. This will exert

downward pressure on the price to fall eventually to P_2 . This cycle repeats itself with fluctuations between very high prices and low supply (P_1 Q_1) on one hand and very low prices and high supply (P_1 , Q_2) on the other hand.

During periods of good harvest, in an environment that lacks storage facilities and ready markets, prices reduce so low and farmers are faced with the option of accepting very low prices for their products or allow these products to go rotten.

Periods of favourably high prices, however, are associated with a considerable reduction in supply as shown in Fig. 2 above. Under circumstances like that the farmer loses, whether the price level is favourable or not. This makes farmers' revenue highly volatile and unreliable. Thus, it seems that this cobweb phenomenon is responsible for the highly risky, unprofitable and unattractive nature of agriculture to formal lenders in Africa. Without any deliberate comprehensive intervention by government, this price-output spiral will continue and the seemingly rising poverty amongst farmers may never come to halt irrespective of whether or not land rights are secured.

The possession of secure land in remote areas will fail to qualify as good collateral to attract financial institutions as realisation of such land may be difficult by virtue of their location. As a result the poor rural farmers who need credit the most will not benefit from credit market even with secure land rights.

Wannasai and Shrestha (2007) pointed out in their study that some residents in the study area whose land rights were considered insecure were also found to be undertaking long term investments. The above indicates that at least not all people are so much bothered about security issues in taking investment decisions. Farmers at any point in time could be expected at any level of insecurity or risk to invest to meet their needs under a given budget constraint, they will not starve because of insecurity. Life is all about risk taking and it should be recognised that people usually do not fear taking risk if the benefit is expected to be crucial and substantial for their survival.

CONCLUSION

This paper has sought to examine the theoretical model that links security of land tenure to investment. The importance of security appears to have been overblotted by commentators. Security is just one factor that may enhance individual's willingness to invest, but the demand for investment appears to be more dependent on ability to invest, individual need and conduciveness of the environment for agricultural activities. Thus, these factors provide sufficient motivation to farmers to invest irrespective of whether or not their land rights are secure.

Individuals will accept some amount of insecurity to undertake investments if they have the funds to do so and if other conditions are right. The demand and supply side effects will not be realisable in Africa due to the high poverty levels, the absence of a conducive agricultural investment climate, and deprived nature of the rural communities where most farmers reside. To stimulate agricultural investment, various critical factors need to be given the required priority and these include various interventions by government to tackle the very basic problems that have made African agriculture highly risky, unprofitable and unattractive. As far as investments are

concerned, security appears to be the last thing that deserves attention by government and donor agencies. Land tenure security per se cannot guarantee agricultural investment.

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