

EXAMINING THE CONSTRUCTION WASTE MANAGEMENT CONSTRUCT IN ABUJA NIGERIA: A VALIDATION STUDY

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Abstract

This study validates construction waste management (CWM) constructs among construction organisations in Abuja, Nigeria. Using a structured self-administered questionnaire, the data was duly collected from one hundred and seventy-eight project managers/managers of construction organisations. Partial Least Square – Structural Equation Model (PLS-SEM) technique was employed; the data was analysed using Smart-PLS 2.0 M3 software statistical package. Results of this study revealed that all the dimensions of technology readiness namely; optimism, waste recycling and waste reduction were highly relevant. Adequate level of internal consistency reliability, convergent validity and discriminant validity for each of the construct of the construction waste management were established. Based on the results, it is recommended that the CWM instrument could be useful for measuring all the constructs of construction waste management among construction organisations for the achievement of efficient and correct operative construction waste management practice.

Keywords: construction waste management, waste reduction, waste recycling, optimism, Abuja.

Introduction

The waste generation per unit output is greater in Nigeria compared with other developing world due to the inefficiency in construction processes (Opeyemi, 2012). Studies have been conducted by scholars to examine the problem of waste management in an attempt to address the issues associated with the construction and demolition waste management. For instance, a study was conducted on the practice and advantages of the on-site waste reduction as well as the construction waste technology for the reuse of construction and demolition waste (Andersen, 2011). In a related study, Wang (2008) examined the on-site complexity of waste management through the use of a system dynamics approach; it was found that the lack of sufficient Waste Management skills and the use of traditional construction techniques were among the problems associated with waste management. In another study, it was revealed that, lack of motivation to execute the construction and demolition on-site reduction of waste contributed to the ineffectiveness in the management of construction waste. In addition, there is urgency for a set of government rules on Waste Management relatively with low charges of landfill in China (Yuan, 2008). Poorly designed landfill management creates unpleasant environmental impacts in African countries. Cases in point are, windblown waste, breeding pests, and fluid leaked generation. Also, one more basic result of landfills is the release of offensive gas, where the gas is transported from the anaerobic breakdown of the natural environment. The problems of odour created by the gas tend to destroy the natural vegetation and contribute to greenhouse gas (Nagapan, 2012). The ineffective and inoperative waste management practices among construction organisations necessitate for this study.

Review of Literature

Construction waste management has been considered as the collection, transport, treatment and disposal of waste including maintenance of disposal sites (Gbekor, 2003). According to Yusuf *et al* (2016) the construction waste management is referred to as the planning, coordinating, implementing, controlling, supervision and control of non-hazardous material waste or debris created or generated as a result of construction or demolition works to achieve optimum efficiency and better environmental quality. EL-Haggar (2010) stated further that, appropriate construction waste management will offer economic benefits by diminishing the project cost through appropriate waste management plan implementation. The model includes factors, for example, the series of construction activity, the types and the quantity of rate of construction materials, the material waste rate created, the resource availability and capability of waste collection bins, costs and incomes. The key objective of this model is to provide engineer's tool, and to allow the planners and contractors to focus on the best waste management plan situation for construction sites.

They closed by proposing a further development of the model to foresee and develop an efficient waste management. Their work focuses on the effect of waste management reduction. Garas *et al.* (2001) while

examining the construction industry in Egypt, identified the absence of waste management in the Egyptian construction industry plan before the execution stage among others as factors deemed responsible for material wastage. The government waste administration scheme in Hong Kong, obliges contractors to plan and actualise a waste management and carry out on-site sorting of waste before specific payments are made (Poon *et al.*, 2004). Likewise, McDonald and Smithers (1998) submitted that appropriate waste management has significantly helped waste from the site to be eliminated, where there was approximately fifty percent (50%) cost savings for handling charges of waste, fifteen percent (15%) of the volume of waste reduction close to reaching on site, and about forty three percent (43%) of waste reduction in landfill. Additionally, Poon *et al.* (2004) submitted that a point by point waste management plan is imperative for building sites to accomplish a sound waste management and waste reduction. Construction waste Management, renovation and demolition or destruction of projects are part of the growing movement to better manage materials and make sustainable communities. Building and demolition exercises are integrating "sustainability" or "green" management strategy design to ensure the environment, save resources (including financial resources), and monitor the energy to guarantee the prosperity of current and future generations.

Dimensions and Operationalisation of Construction Waste Management

The dimensions of construction waste management considered for this study include: Waste reduce and waste recycling.

Waste Reduction: Studies have shown that waste reduction regarded as "resource optimisation, is the most vital and the first step in waste prevention practice and materials efficiency". It consists of a set of actions to eliminate or reduce the quantity of on-site waste material utilisation before being disposed to landfill. For instance, reducing the quantity of packing that goes to the "site or using proficient framing techniques in reducing the amount of packaging that will be taken to site or using efficient framing techniques (Vleck, 2001). Gören (2015) maintained that another alternative way to reduce waste is to change design principles and practices as part of the waste reduction efforts. A modular basis structure should be designed by the architects that fit the utilisation of standard size materials. Additional to the modular plan, however, the estimating is very important. Any large quantities of materials brought to the construction site will at least be used, or stolen. Therefore, materials are sometimes transported to another job site for utilisation. Planning is the key to reducing; by thoroughly planning the entire construction process, reduction can simply be facilitated". Waste reduction is referred to as the most efficient construction waste management method. It is a way of minimising the production of construction waste, however, slashes the waste transporting, recycle and disposing cost (Esin and Cosgun, 2007).. However, previous researches extensively examined the waste reduction as the highest priority for managing construction waste.

Waste Recycling: Waste recycling includes waste being segregated into recyclable materials and non-recyclable materials. Therefore, the wastes that are recyclable are somehow reused; normally in the production of new materials using recycled materials. Virgin materials are replaced with recycled material, thereby protecting and preserving natural resources and energy. However, the economy will be improved through the adoption of this recycling method, also by way of supporting both occupations and creating investment opportunities. Therefore, the recycling industry had employed over 13,000 individuals in Florida (Victoria, 2005). Steps to reduce the disposal of waste in landfills have been achieved by some developed countries such as Hong Kong and Germany. Recycle activities have been supported by the Germany government very well. An investigation of the lightweight concrete raw material demonstrates the country's commitment to sustainability. Hence, it indicates that there is full commitment for adopting green practice in their country (Kralj, 2011).

Research Method

This study used Nigerian construction organisations as the target respondents, 178 out of the 331 managers participated in this study. In particular partial least square (PLS) demands considered smaller sample size. The minimal recommended range for PLS is 30 to 100 cases, being at the organisational level of analysis. The sample size of this research is rather small (that is, 30 or less in the pilot study and 178 or less in the main study).

In this regard, GPower 3.1 was employed to acquire better sample size. According to the result obtained from GPower statistics, the suitable sample size of 331 was measured having power ($1-\beta$ err prob. = 0.95). Moreover, according to Sekaran and Bougie (2013), the ideal sample would be 89. In the light of aforementioned discussion, the study managed to get response from 178 respondents, whereas the survey was self-administered which is the most suitable approach if the survey is limited to locality where potential respondents can be approached. Though taking care of an important factor of "heterogeneity of sample, the number of variables used in the study and intended statistical tool to be used for the data analysis", the choice of proportionate stratified random sampling was made and utilised. Proportionate sampling approach is simpler, easier, appropriate, and more affordable to collect data from one or multiple strata, compared to other sampling techniques. Keeping in view the total numbers of eligible respondents in every stratum which is the project managers of construction organisations in Abuja-Nigeria, samples were randomly selected. This study validates the construction waste management (CWM) constructs in the context of construction organisations in Nigeria. Using a structured self-ministered questionnaire, the data was duly collected from one hundred and seventy eight project managers of construction organisations. Keeping in view the prime importance of the phenomenon, this study investigates construction waste management among construction organizations.

Results and Discussion

Demographic profile

The respondents' demography is provided in Table 1 where category of organisation, designation, age, marital status, gender, qualification and years of organisations' operation are displayed. This study shows that among the four categories of construction organisations in Nigeria, category C constituted 69 responses, representing (38.7 %) of the total response, followed by category D with 44 responses, representing (24.7%), the next is category B with 38 responses, representing (15.3 %) and lastly category A had 27 responses representing (15.3%). Regarding the designation, 178 responses (100 %) are managers of construction organizations in Nigeria. As regard the age, 98 out of the total responses representing (55%) are between the age of 26 – 50years, then between 51 – 70with 56 responses (31.5%), and finally age group between 18 – 25 years with 24 responses (13.5%). In terms of the marital status of the respondents, the married dominated with 124 responses (69.7percent) while the Single had 54 responses (30.3%). Most of the responses in this study were given by male with 161 responses or 90.4 percent while the female had 17 responses, representing 9.6 percent. In terms of the educational qualification, those with PGD/Master's Degree holders constituted 86 responses or 48.2 percent of the total responses, followed by HND/Degree holders with 56 responses which represent 31.5 percent. Those with PhD certificates were 30 in number; representing 16.9 percent while finally those with other certificates amounting to 4 responses represent only 3.4 percent of the total responses. This points out clearly that majority of the construction organisation managers are the holders of PGD /Master's degree certificate followed by HND/Degree holders, and the next are those with PhDs and lastly other certificates with the least percentage of (3.4%) which is insignificant. In the meantime, with regard to the number of years in operation, 100 respondents had between 11 – 21years in operation (56.2%), 49 respondents (27.5%) had less than 10 years, 26 respondents (14.6%) had between 21 – 30years of existence, whereas 31 – 40years accounted for the least number of respondents of just 3(1.7%).

In validating the construction waste management among construction organisations in Nigeria, PLS path modelling was employed to investigate the data by using Smart-PLS 2.0. Equally the PLS-SEM is good for better forecasting and analysing statistical framework. As a familiar second generation structural equation modelling technique (Ringle, Wende & Will, 2005; Wold, 1982), it is considered as a useful and appropriate tool to analyse complex model and real time applications. The development and validating of complex model are been carried out with PLS path modeling (Zhao and Chua 2003; Zhao and Chua 2003; Akter, D'Ambra & Ray 2011; Fornell & Bookstein 1982; and Hulland 1999). Additionally, PLS allows the use of multiple outcomes variables at the same time, calculates error model and direct computation and incorporation of moderator into a model. Non-normal data is accepted by PLS in social science studies as one of the common issues.

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Table 1: Demographic

Demographic Variables	Category	Frequency	Percentage
Category of organisations	Category A	27	15.3
	Category B	38	21.3
	Category C	69	38.7
	Category D	44	24.7
Designation	Manager	178	100
Age	18-25years	24	13.5
	26-50years	98	55.0
	51-70years	56	31.5
	70 and above	0	0.00
Marital status	Single	54	30.3
	Married	124	69.7
Gender	Male	161	90.4
	Female	17	9.60
Educational qualification	HND/Degree	56	31.5
	PGD/Masters	86	48.2
	PhD	30	16.9
	Others	6	3.40
Years of operation	Less than 10years	49	27.5
	11-20years	100	56.2
	21-30years	26	14.6
	31-40years	3	1.70

SEM has been endorsed as one of the most trustworthy statistical tools for social and behavioural sciences that allows the investigation of more than one relationship simultaneously. While following the analysis mood and objectives to validate construction waste management constructs, measurement model approach was employed in the study (Figure 1). Items validity, individual reliability, internal consistency, convergent validity and discriminant validity by looking at three values: outer loading, average variance extracted (AVE) and the composite reliability (Henseler, Fornell & Larcker 1982; Barclay *et al.* 1995). Hulland (1999) suggests that values of AVE and outer loadings should be greater than 0.5 each. Composite Reliability, according to Hair *et al.* (2011) should be greater than 0.7. Hulland (1999) recommended that items with loading values of less than 0.4 should be deleted.

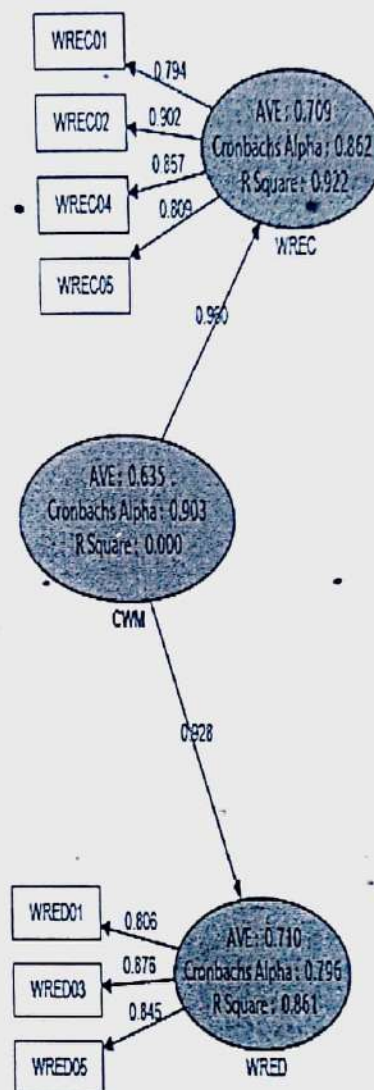


Figure 1: Measurement Model

Table 2
Code

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Table 2: Results of the confirmatory factor analysis for Construction Waste Management

Code	Indicators	1	2
WREC01	Our organisation Management Support waste recycling	0.79	
WREC02	Our organisation Set Goals for recycling waste	0.90	
WREC04	Our organisation is Finding Markets for recycled waste	0.85	
WREC05	Our organisation encourages education and Motivation for waste recycling	0.80	
WRED01	In our organisation, we avoid damage by handling and storing materials properly		0.80
WRED03	In our organisation, we use materials efficiently and use less of them		0.87
WRED05	In our organisation, we reduce the use of non-recyclable materials		0.84
	Average Variance Extracted (AVE)	0.70	0.71
	Cronbachs Alpha (CA)	0.86	0.79
	Composite Reliability (CR)	0.90	0.88

WREC=Waste Recycling, WRED= Waste Reduction

Individual Item Reliability: In confirming the component of individual reliability, each item reliability of construction waste management scale is considered. The Individual item reliability was assessed through outer loadings. Usually, the bench mark for the outer loading value of 0.4 and above is considered to validate individual item reliability (Duarte and Raposo, 2010; Hair, 2014). Further the standardized loadings for all the 11 items were observed; 7 items associated with waste reduction and waste recycling were found greater than the standard cut-off i.e. above 0.4, whereas four items (WREC03, WRED02, WRED04 and WRED 06) from "Waste Recycling and Waste Reduction" were removed due to the lower value. In total, 7 point loadings ranged between 0.79 and 0.90, were kept. Following Nasidi, Bamgbade, Adeleke, and Ali (2016) all the retained items sufficiently met the acceptable criterion set for individual item reliability.

Internal Consistency Reliability: The internal consistency reliability can be defined as "the degree to which every item in an individual scale (or sub scale) measures the same concept" (Bijttebieret *et al.*, 2000; Duarte & Raposo, 2010). Two methods i.e. Cronbach's alpha coefficient and composite reliability, have been widely employed for internal consistency reliability assessment (Bacon, Sauer and Young 1995; McCrae, Kurtz, Yamagata, and Terracciano 2011; Peterson and Kim 2013). This study, while following the suggestions of Hair *et al* (2011) and Bagozzi and Yi (1988), employed cronbachs Alpha and composite reliability coefficient for the assessment of internal consistency reliability of the construction waste management (CWM). According to Bagozzi *et al.* (1988), Wong *et al.* (2013), Nunnally *et al.* (1997), Chin (1998), and Hair *et al.* (2011), the cronbachs Alpha and the composite reliability should be greater than 0.7. The composite reliability coefficients, provided in Table 2, retained the value ranged between 0.796 and 0.862. While the composite reliability ranges between 0.88 and 0.97. The acquired values of coefficient retained shows that, all the variables of this study confirmed sufficient internal consistency reliability (Hair *et al.*, 2011).

Convergent Validity: Convergent validity is defined as "the degree by which items truly represent the intended latent constructs and correlate with other measures of the same latent construct Hair *et al.*, 2006. The convergent validity was established considering the average variance extracted (AVE) of the latent constructs obtained. According to Chin (1998), the AVE loadings for each of the latent construct should be 0.5 or above. Table 2 shows that the AVE obtained for waste recycling and waste reduction were found greater than required cut-off value i.e. above 0.5 and valued as 0.709 and 0.710 respectively.

Discriminant Validity: Discriminant validity can be defined as the level to which a certain item varies from the other one (Hulland, 1999). According to Chin (1998), it can be measured by assessing the cross-loadings by following the rule where "the items should have a higher correlation with the latent variable that they are supposed to measure than with any other latent variable in the model". Further, the square root of the AVE for each construct can be used to examine the discriminant validity. According to Fornell and Larcker (1981), the square roots of AVE coefficients should be placed in the correlation matrix next to the side of the diagonal. The results are considered confirmed for the discriminant validity, if the squared AVE

is found greater than squared correlation estimates, where "the diagonal coefficients or elements must be greater than the off-diagonal coefficients or elements in the corresponding rows and columns" (Chin, 1998, Hair et al 2006). Keeping in view the above mentioned criterion, table 3 provides the confirmation of discriminant validity.

Table 3: Discriminant Validity

Latent Variable Correlations	1	2
Waste Recycling	1.492	
Waste Reduction	0.787	1.493

The boldface values shown in Table 3 are square root values of the average variance extracted. Since, all the values of square root of AVE were greater than the correlations, the AVE values show that all the latent constructs have successfully confirmed sufficient level of the discriminant validity (Ali, Nawanira, Nasidi and Bamgbade, 2016). Hence, it can be concluded that all the measures of the CWM have met the discriminant validity requirements.

Discussion and Conclusion

Vleck (2001) established a construction waste reduction and waste recycling questionnaire to facilitate study in investigating the integrated waste management. A thorough literature review made it obvious that integrated waste management have been studied in the perspectives of developed and Asian countries. For the reasons present, the study investigates construction waste management among construction organizations in Abuja Nigeria, according to World Bank Report 20014 a country with a population of over 178 million, with high construction activities to meet the infrastructure need of the populace in terms of residential, commercial, agricultural, transportation and other land use purposes, lead to the creation of large quantities of construction waste with little attention on effective and efficient waste management system. Empirically, construction waste management related studies show inconsistent results. This study validated CWM constructs among construction organisations in Abuja, Nigeria. The targeted population for this purpose was the construction organisations. All the constructs have met the criterion and proved that the construction waste management constructs are appropriate to measure construction waste management among construction organizations in Abuja. Results of the confirmatory factor analysis, reliability, and validity tests established the appropriateness of CWM dimension i.e. waste recycling and waste reduction. For the prospect study, the scale can be studied further in the different perspective.

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Abstract
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A PHENOMENOLOGICAL APPROACH TO VALUING CONTAMINATED FARMLANDS IN NIGERIA

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ABSTRACT

The payment of fair, adequate, equitable and full compensation to agricultural land owners or occupiers could serve as a deterrent to continued indiscriminate land pollution by industry and individuals globally. This research paper examines the perceived impact of oil pollution on agricultural land yields and suggests methodologies for a comprehensive assessment and appraisal of the loss of agricultural income to land owners arising from the contamination. It examines the process of valuation of contaminated land, conducts empirical phenomenological research and hypothesizes that a combination of scientific and qualitative research methodologies could form a basis for the recommendations on good practices in compensation assessment. It recommends that the value of compensation determined in a particular context has a relationship with the prevailing land-use pattern and that adopting a single-method approach to valuation or compensation in cases of oil pollution, is not sustainable. It also recommends a combination of alternative approaches as each particular land pollution situation demands.

Keywords: Environmental impact assessment, compensation; contaminated land; oil spills, statutory valuation.

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INTRODUCTION

Contaminated land has been defined variously with each definition having an impact on land users in different ways. Warren (2001) defines contaminated land as any land that contains a substance or substances that may adversely affect people or the environment. In the UK Environmental Protection Act 1990, s.78A(2), contaminated land is defined as

"any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that (a) significant harm is being caused or there is a significant possibility of such harm being caused."

It is further defined within the context of cultural property in s. 78A(2)(a)(iii) as

"death, disease, other physical damage to livestock, crops, produce or domesticated or wild

animals subject to hunting rights, amounting to 20% or more of their value (an animal or crop) effect"

In reality, meaning can only be ascribed to contaminated land within a particular context linked directly to the land use and as such, what may be regarded as contamination to an agricultural land user may be insignificant for an industrial heavy-duty truck park. Again, contaminated land examined within the context of the environment has a different level of emphasis from contaminated land resulting in damage to personal property which has to be compensated for, in full by the perpetrators. In one context, the focus is on our common resource the environment while in the other, the focus is on loss of income resulting from the presence of contamination to a property owner. This paper focuses on loss of income as perceived by local farmers suffering the impact of oil pollution in the Niger delta, and not only on the impact on the environment as a rich resource.

In the UK, the government in its white paper of 1

September 1990 commented on the inherent difficulties in dealing with contaminated land as follows: "contamination of land by chemicals and waste products is hard to define and measure exactly". Issues dealing with contaminated land appear to continually focus on contamination in relation to human and environmental health vis-à-vis the costs/benefits of clean-up and remediation to make the land suitable for a particular use and nothing else. The understanding behind the logic may be attributed to an understanding that contaminated land resulting from years of industrial activity is a price to be paid for collectively but the future will see wiser use of this environmental resource. The Guidance to the contaminated land provisions in the 1990 Act in the UK, states that the Government objectives in this regard, underlie the "suitable for use" approach to remediation which is composed of 3 elements as follows:

- *Ensuring that the land is suitable for its current purpose*
- *Ensuring that the land is made suitable for any new permitted use*
- *Limiting the requirements for remediation to the work necessary to prevent unacceptable risk to human health or the environment in relation to the current use or officially permitted future use of the land.*

The Guidance notes however, provide for complete removal of the contamination where it has resulted from a breach of an environmental license or permit, as a deterrent to prevent new contamination. By reviewing all three elements mentioned above within the context of contamination of agricultural lands, the "suitable for use" principle associated with remediation does not capture the time interval between contamination and restoration to make the land suitable for agricultural use in the future. The interval comes at a cost to agricultural profits and should be assessed.

VALUATION FOR COMPENSATION IN NIGERIA

The Estate Surveyors and Valuers (Registration ETC) Act, CAP E13 LFN 2004, and the Rules and Regulations made under the Act, states that only Registered Estate Surveyors and Valuers can determine or estimate value of any or all interests in all types of property in Nigeria. This includes valuation for all purposes ranging from sale or rental value to compensation value following compulsory acquisition or damage due to pollution. The Land Use Act, Cap L5 LFN 2004 also makes provision for the methods of valuation to be as approved by the "appropriate officer" usually the Chief Lands Officer in the State.

The statutory basis for the assessment of compensation in Nigeria is outlined in various statutes which govern compensation that is as a result of compulsory acquisition or compensation resulting from pollution and damage to property. The Land Use Act, Cap L5 LFN 2004 is the primary statute guiding the practice of compensation assessment which not only defines the basis of assessment and method, but also describes the office that is responsible for decisions on the methods to be used. In the extractive industries, legislation such as the Petroleum Act Cap P10 LFN 2004; the Nigerian National Petroleum Corporation (NNPC) Act Chapter 320 LFN 1990; the Oil Pipelines Act Act Cap 07 LFN 2004 all make provision for compensation due to damage property arising from the execution of licences and permits. The Oil Pipelines Act Cap 07 LFN 2004 s.20(5) states that "in determining compensation in accordance with the provisions of this section, the court shall apply the provisions of the Land Use Act so far as they are applicable and not in conflict with anything in this Act as if the land or interests concerned where land or interest acquired by the President for a public purpose. Again the Oil Pipelines Act specifies that the methods of assessment should adhere to those contained in the Land Use Act.

Mineral and Mining ACT Cap M12 L.F.N. 2004 s.227(1) provides that in addition to any reimbursement payable to the Federal Government, the holder of a lease or licence shall pay to the owner or occupier of any land within the area of the lease or licence, compensation for any crop, economic tree, building or work damaged, removed or destroyed by the holder of the lease or licence or by his agent or servant. The statutes are all intricately woven together and can be interpreted together in order for a complete picture in the absence of a compensation code in the country. The assessment of Petroleum related compensation under the Land Use Act provides for all such assessments are to be based on the provisions of the Petroleum Act which does not provide any method of assessment.

Compensation under the Land Use Act, is "for an amount equal to the rent, if any, paid by the occupier during the year in which the right of occupying was revoked" referring to compulsory acquisition and not damage. In the assessment of crops s.29(4)(c) the Land Use Act, provides for the assessment of crops "for an amount equal to the value prescribed and determine by the appropriate officer". In the absence of a regulatory compensation code for normative patterns have developed over the years

residential and commercial property and not agricultural property as this paper suggests Patchin (1994), discussed the issue of 'contaminated property' and environmentally impaired property transactions. The thrust of this discussion is in the application of a comparable sales approach and the measurement of losses resulting from contamination through the analysis of market data on contaminated properties. The issue of uncertainty in the valuation of undeveloped contaminated land has also been addressed by Weber (1997) who discusses how the presence of contamination might alter the highest and best use of undeveloped land. Noting that the valuation of contaminated land can be among the most challenging appraisal assignments requiring the appraiser to have a number of typical skills and good understanding of the environmental assessment and remediation processes. He considered the relative financial risks of contaminated sites by performing risk analysis on comparable sites.

Schoenbaum (2002), examines the assumption that pollution systematically affects land use and development which had earlier been identified in Schoenbaum (2000), as an assumption underlying brownfields legislation in the study area.

The International Valuation Standards Committee guidance notes on the valuation of agricultural properties recognize the value of agricultural lands and sets out the basis of valuation of such properties. It does not however address specific methods for use within the context of contaminated land but it is assumed that this can be considered following the extent to which the contamination influences the cash flow pattern which is the focus of the proposed study. Syms (1996) discussed the 'risk assessment' approach to valuation of contaminated land which dwells on calculating and deducting from it all discounted costs of remediation and arriving at the impaired value. This approach also included the effect of stigma on the impaired value.

Richard (1996), considered 'best practice' approaches which Valuers can use to produce open market valuation of contaminated land and the freehold investment properties and the determination of the types of valuation approach actually being utilized by the profession in order to test if the 'cost to correct' approach was applicable or not. The paper notes that contamination can hold different value implications for different end users and where the end or current user is for agricultural purposes such as farmlands, the valuation requires

VALUATION OF CONTAMINATED LAND

and from case laws.

There is a strong body of literature on contaminated land valuation and several authors have addressed the subject of contaminated land valuation from different perspectives. Syms and Weber (2003), note that the presence of contamination in land can affect not only the value of the land but render it unsalable in normal markets and un-mortgageable. They also agree that the more information available to valuers, the greater the accuracy of their valuation as ultimately, the report should describe the information on which it is based. Dixon (1995) and Richards (1996), are of the opinion that the environmental risk must first of all be assessed prior to valuation of contaminated land. They suggest that the traditional investment valuation methods should serve as the framework for this sort of valuation following an assessment of the direct costs, indirect costs, and property factors affected by the contamination. They address the stigma associated with contaminated land valuation.

Catney et al in Dixon et al (2007), outline that within the context of the United Kingdom, contaminated land is framed primarily within the context of 'economic terms' particularly where it forms an obstacle to economic progress and urban development or re-development. The context within which contaminated land is assessed is to minimize open-urban blight, protect economic interests and harness market led development processes to restore contaminated land to productive use. Dixon and Richards (2003) discuss that in the UK, the issue of contaminated land is viewed to the extent in which it serves as a hindrance to development and or necessarily as a critical environmental or health concern and that valuation methodologies follow after this underlying framework to a large extent. This position however contradicts with the provision of the 1990 Act. The responsibility of ensuring that a land is 'suitable for use' rests with the potential investor and as such valuation methodology uses on capturing as much detail as possible, on assessment of all the likely costs associated with making the land suitable for use within an investment framework.

ns (1995, 1996, 1999); Syms and Weber (2003); on and Richards (2003); Patchin (1991); Lizieri (2005); discuss the issue of stigma within the context of impaired property and the valuation of contaminated land. Patchin (1991), explored the potential negative effect on market value of the land attached to contaminated properties after all cleanup costs and related tangible factors have been considered. Their discussions focused on