THE EFFECT OF GOVERNMENT POLICY ON THE RELATIONSHIP BETWEEN ORGANIZATIONAL FACTORS AND CONSTRUCTION WASTE MANAGEMENT IN ABUJA, NIGERIA

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The Effect of Government Policy on the Relationship between Organizational Factors and Construction Waste Management in Abuja, Nigeria

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ABSTRACT

Poor motivation for the implementation of the construction on-site waste reduction, insufficient waste management skills, the shortage of appropriately designed and decently handled landfill system, lack of team work, unequal workload and task distribution among the divisions is the result of poor organizational structure among construction organizations in Nigeria. Lack of frequent staff training, performance management and human resource management practices and the problems of waste management regulations is the result of improper enforcement of waste management policy and planning framework for waste management. Further the inadequacy of unified waste management regulations and operational system for the enforcement and control of construction waste management practices among others are accountable for the unsuccessful construction waste management. Drawing upon the resource base view theory, this study aimed to examine the effects of government policy on the relationship between organizational factors and construction waste management. A stratified simple random sampling was adopted for the four categories of construction organizations that are registered with the Corporate Affairs Commission. Out of 331 questionnaires' distributed to the construction organizations a total of 178 completed and valid questionnaires were returned, yielding a 53.7 percent response rate. Structural equation model, smart PLS algorithms and bootstrapping were adopted to achieve all of the research objectives. This study found out that organizational structure has a strong and positive relationship with construction waste management. Organizational resources established a strong and positive relationship with construction waste management among Nigerian construction organizations. The government policy shows a strong, positive relationship with construction waste management among construction organizations and it also moderates and strengthens the relationship positively between organizational structure and construction waste management in Abuja. Finally, the study further found that government policy also moderates the relationship between organizational resources and construction waste management in Abuja. The results support the hypothesized direct relationship of the organizational structure and construction waste management with the t-value of 7.09, organizational resources and construction waste management with the t-value of 10.16, government policy and construction waste management with the t-value of 5.42. Government policy moderates the relationship between organizational structure and construction waste management with the t-value of 2.61 and also it moderates the relationship between organizational resources and construction waste management with the t-value of 1.66. The study provides appropriate theoretical, practical contributions to the academic, industry and the policy-makers. It is therefore recommended that construction organizations should focus on organizational factors that influence construction waste management. This study focused on non-hazardous material waste. The study suggested that hazardous waste, time and overrun waste should also be considered; while case study or qualitative method could be adopted in future research.

Keywords: organizational structure, organizational resources, government policy, construction waste management

ABSTRAK

Struktur organisasi yang lemah dalam kalangan organisasi pembinaan di Nigeria telah mewujudkan bukan sahaja motivasi yang rendah untuk pelaksanaan pengurangan sisa di tapak binaan, ketidakcukupan kemahiran pengurusan sisa, kurangnya sistem kambus tanah yang direka bentuk dengan sesuai dan dikendalikan dengan memuaskan, kurangnya kerja berpasukan, malahan menyebabkan ketidaksamarataan agihan beban kerja serta agihan tugas dalam kalangan bahagian di negara tersebut. Selain itu, penguatkuasaan dasar pengurusan sisa dan perancangan untuk pengurusan sisa yang tidak wajar turut menyebabkan kurangnya latihan pekerja yang kerap, kurangnya amalan pengurusan prestasi dan amalan sumber manusia serta masalah pengawalaturan pengurusan sisa. Tambahan pula, ketidakcukupan pengawalaturan pengurusan sisa dan sistem operasi yang berpadu dalam amalan penguatkuasaan dan kawalan pengurusan sisa merupakan antara penyebab yang mendorong kepada kegagalan pengurusan sisa pembinaan. Kajian ini yang mengupayakan teori pandangan asas sumber berhasrat untuk meneliti kesan dasar kerajaan terhadap hubungan antara faktor organisasi dengan pengurusan sisa pembinaan. Persampelan rawak berstrata yang mudah telah digunakan untuk empat kategori organisasi pembinaan yang berdaftar dengan Suruhanjaya Hal Ehwal Korporat di Nigeria. Sejumlah 331 borang soal selidik diedarkan kepada organisasi pembinaan dengan pulangan 178 borang sah yang telah dilengkapkan. Pulangan borang soal selidik ini memberikan kadar respons sebanyak 53.7 peratus. Pemodelan persamaan berstruktur, algoritma PLS yang pintar serta *bootstrapping* diupayakan untuk memenuhi kesemua objektif kajian. Kajian mendapati bahawa struktur organisasi dan sumber organisasi mempunyai hubungan yang kukuh serta positif dengan pengurusan sisa pembinaan dalam kalangan organisasi pembinaan di Nigeria. Dasar kerajaan juga memperlihatkan hubungan yang kukuh dan positif dengan pengurusan sisa pembinaan dalam organisasi pembinaan dan turut menyederhana dan memperkukuh hubungan secara positif antara struktur organisasi dengan pengurusan sisa pembinaan di Abuja. Akhir sekali, kajian mendapati bahawa dasar kerajaan juga menyederhana hubungan antara sumber organisasi dengan pengurusan sisa pembinaan di Abuja. Hasil dapatan menyokong hubungan langsung yang dihipotesis dengan sebanyak 7.09 nilai t untuk hubungan struktur organisasi dan pengurusan sisa pembinaan, sejumlah 10.16 nilai t untuk hubungan sumber organisasi dengan pengurusan sisa pembinaan, dan sejumlah 5.42 nilai t untuk hubungan dasar kerajaan dengan pengurusan sisa pembinaan. Dasar kerajaan menyederhana hubungan antara struktur organisasi dengan pengurusan sisa pembinaan dengan sebanyak 2.61 nilai t dan turut menyederhana hubungan antara sumber organisasi dengan pengurusan sisa pembinaan dengan sejumlah 1.66 nilai t. Kajian ini memberikan sumbangan teori yang bersesuaian serta sumbangan amali kepada khalayak akademik, pihak industri dan penggubal dasar. Selain itu, kajian ini yang bertumpu kepada sisa bahan tidak berbahaya menyarankan agar organisasi pembinaan memberikan perhatian kepada faktor organisasi yang mempengaruhi pengurusan sisa pembinaan. Kajian juga mencadangkan agar kajian kes atau kaedah berbentuk kualitatif kajian diupayakan pada masa akan datang serta fokus kajian turut melihat aspek sisa berbahaya, masa dan sisa berlebihan.

Kata kunci: struktur organisasi, sumber organisasi, dasar kerajaan, pengurusan sisa pembinaan

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LIST OF ABBREVIATIONS

AVE	Average Variance Extracted
CCME	Canadian Council of Ministers of the Environment
CEN	Centralization
CIDB	Construction Industry Development Board
CDWM	Construction and Demolition Waste Management
CWM	Construction Waste Management
DNSWM	Department of National Solid Waste Management
EGSPA	Environmental Goals and Sustainable
EWM	Environmental Waste Management
f^2	Effect Size
FOR	Formalization
GP	Government Policy
HND	Higher National Diploma
LISREL	Linear Structural RELationship
OGL	Organizational learning
ORGR	Organizational Resources
ORGS	Organizational Structure
OYAGSB	Othman Yeop Abdullah Graduate School of Business
PAYT	Pay As You Throw
PGD	Post Graduate Diploma
PhD	Doctor of Philosophy
PLS	Partial Least Squares
Q2	Construct Cross validated

R2	R-Square Values
SEM	Structural Equation Model
SPSS	Statistical Package for Social Science
SWMP	Site Waste Management Plan
TRL	Transformational Leadership
UK	United Kingdom
VIF	Variance Inflated Factor
PC	Composite Reliability

CHAPTER 1

INTRODUCTION

This chapter presents the background of the study at the global level, the Nigerian scenario; next, the problem statement, focusing on the gap identified and current issues related to the construction waste management in Nigeria. The next section presents the research questions and the objectives of the study. Then, the significance of the study presented and followed by the scope of the study. The organization of the thesis and last but not least an operational definition of key terms was presented.

1.1 Background of study

The term waste was derived from the Latin word “vastus”, meaning to destroy, to leave, deserted, or to fail to be developed (Pohjola, & Pongracz, 2002). Gourlay (1992) opined that wastes could be defined as unwanted things or unusable things. For this reason, waste is regarded as materials that are unwanted because they are deemed to have no value. The expression "waste" is defined as portable objects that are abandoned by the owner (this is the subjective meaning of waste) (Gutberlet & Hunte, 2008).

Construction waste is referred to as waste produced from the construction activities. It comprises of different materials resulting from different activities such as earth materials, for instance; vegetation, soil, and rocks as a result of excavation work, levelling of land, clearance of site, among others (Fatah *et al.*, 2003). For example, the wastes that could be

produced from road construction are metals, wood, glass paper, concrete, bricks, gravels, steel, and soil.

In the same line of reasoning, construction waste is used to describe a large number of waste materials produced by the construction, excavation of buildings and civil infrastructure. However, many waste materials from construction projects are virtually the same, where the quantities produced will vary greatly based on the type and nature of the project, and the waste produced which is a result of construction projects is about 20 to 30 times more (Recycling Council of Ontario, 2006).

According to the Waste Management World (2013) the term waste management is referred to as the "classification, collection, handling, monitoring, treatment, reuse and the disposition of solid wastes effectively and appropriately. Solid wastes are of different types; there is the municipal solid waste, which includes (commercial, residential and institutional), there is also special waste, such as waste from health care, sewage, hazardous household wastes and agricultural waste among others. For this reason, it is also regarded to as unwanted material generated as a result of human activities, therefore, to reduce the effect on health, the aesthetics and the environment, the process has to be generally undertaken (Waste Management World, 2013).

Waste management is termed as the emphasis of keeping away or reducing to the barest minimum the effect of contaminated waste materials from the immediate surroundings, free from the effects of contaminated waste materials (Gbekor, 2003). He further

emphasised that the waste management includes “the collection, conveyance, handling and waste disposal, comprising the proper maintenance of disposal sites.

According to Bilitewski et al. (1994); Gilpin (1996) waste management consists of the collection, storage, treatment, transporting, recovery and waste disposal. Minks (1994) also described the term as an integrated rational system method for the accomplishment and protection of sustainable environmental quality development. According to Hagger (2007), next, economic benefit will be achieved in terms of the project cost with appropriate/proper construction waste management plan implementation (Telford, 1995; Cunningham, 2001; Tam *et al*., 2007). In this study, construction waste is referred to as the waste or debris created or generated as a result of construction or demolition works.

According to Hoornweg & Tata Bhada (2012) about 1.3 billion tons of wastes are currently generated by cities around the world and this value is anticipated to increase by 2025 to about 2.2 billion tons. The increase is anticipated to be the greatest in lower-income countries. Related to this is the annual global waste management cost that is expected to increase from $ 205 billion to about $ 376 billion in 2025, (Hoornweg & Bhada-Tata, 2012).

One of the processes in the management of waste is to deposit the waste into landfills after the initial treatment of the earth’s surface to reduce the contamination with ground water for the protection of the environment; in fact, the increase of the concern in the demand for reducing natural resources in making sustainable construction organizations

appears to be among the factors responsible for the emergence landfill. All together, these factors encourage various municipalities and governments to encourage the integrated waste management system, i.e. (reduce, reuse, recycling, and disposal) of the Construction & Demolition waste. This resonates with the fact that the European countries such as Belgium and Denmark have made a significant lead in recycling more than 80 percent of their C&D waste by the late 1990s (Symonds & Associates, 1999).

While land filling is a component of handling construction waste, effective management of such waste could reduce a significant amount of waste deposited in landfills. For instance, public filling facilities and landfills will run out soon in Hong Kong, according to their government's estimation, while in the mid-2010s three landfills were expected to have been full. In the meantime, waste reduction measures of construction need to be implemented on sites (EPD, 2012).

In the Canadian provinces such as Nova Scotia, effort has also been made, where currently more than 80% of the wastes from construction activities are being diverted from the storage to the landfill by the Halifax Regional Municipality (Chassie, 2011).

Construction wastes are usually debris from buildings for instances, concrete, steel, earth, rubble, timber and diverse materials from site clearance; most often they are also organic materials or a mixture of immobile materials. Every construction activity across the globe generates large amount of wastes, for instance, the United States (US) Environmental Protection Agency (2002) reported that roughly 136 million tons of Construction

Demolition wastes were generated in 1996 in the US and the bulk of the wastes produced was approximately 44% to 48% respectively.

It appears that the volume of waste generated in each country varies. This, perhaps, can be attributed to the volume of the construction and construction method. For instance, in the United Kingdom, it was reported that approximately seventy million tons of construction and demolition/soil materials did end up as wastes in the nineties. McGrath & Anderson (2000) stated that the rate of wastage in the construction company in the UK was as high as 10-15%. DEFRA (2013) reported that in the UK, the construction, excavation and demolition sectors are among the biggest contributing sectors to the generation of waste. Hence, about 81.4 million tons of wastes were generated in 2008, and it was reduced to 77.4 in 2010.

In the mid-90's, about one million tonnes of wastes from construction were sent to landfill each year (Red, Drop & Ryan, 1997), hence, Bell (1998) said that the construction and demolition waste was estimated to account for about 16 percent to 40 percent of the total waste generated in Australia. Furthermore, in Hong Kong, annually the construction and demolition waste generated in nine years from 1993-2002 was more than twice of the waste generated to about 20 million tons as of 2004 (Poon, 2007). The waste management practices are not the same across countries, rural and urban areas, as well as the industrial and residential sectors (Davidson, 2011).

Waste management involves different stakeholders or organizations that carry out various functions in assisting to maintain a safe, pleasant and clean environment within human settlements for the well-being and the protection of the populace, health and the environment in general. Construction waste management is one of the growing challenges for most municipal governments, particularly in the developing countries.

This study seeks to provide answer to the following questions: (1) what is the relationship between the organizational structure, organizational resources and the construction waste management in Abuja, Nigeria? (2) What is the relationship between government policy and construction waste management? (3) What is the moderating effect of the government policy on the relationship between the organizational factors and construction waste management in Abuja, Nigeria?

1.1.1 Location of the study

Abuja is the Nigeria's Federal Capital Created in 1976. It was designed for a four-phase development plan; sub-divided into districts. The city was planned to accommodate between 100,000 to 250,000 populations in each sector. Therefore, the expected population of the district was 1.6 million and a total population of three million at the end of phases one and two. 500 hectares of land (1.9 per cent was allocated for the Federal Capital Control Area) were to be used by the government; 891 hectares that are 3.49% were reserved for other essential services and for residential developments 12.486. 9.29 hectares were reserved for future light industries, infrastructure was given 180 hectares

and for commercial purpose 561 hectares and for the green areas 8,300 hectares reserved for the aesthetics of the city (Afun, 2009).

Furthermore, the Federal Capital Territory (FCT) as the administrative seat of the government seeks to carry out the following responsibilities: to plan and develop within the Federal Capital Territory, to embark on Development control, to arrange for the provision of social services, to serve as the FCT Administration, Land Allocations Planning regulation among others (Nasiru,2009).

The city was primarily designed as an Administrative and Service sector. Therefore, the housing sector is one major area that needs the private sector participation in the construction of various projects. However, the population was on the increase so it automatically places undue pressure to the existing housing facilities, where there is a call for the construction of more facilities. Therefore, the private sectors were motivated by investing in real estate and in the construction of various projects (Afun, 2009).

Therefore, for the housing need to be met in Abuja, both the public and private organizations were encouraged to invest in the construction projects in the FCT. In relation to the construction waste management issue, in essence, in the population of 3 million in Abuja, the original concept has been exceeded. To meet up with the challenges of infrastructures, more concentration was given to the construction of various projects that was on the rise, and subsequently, more construction waste is being generated on a daily basis. With the poor, inefficient and ineffective construction waste management

system, this creates a lot of environmental problems and it becomes an eyesore to the environment. (Nasiru, 2009).

The rapid population growth, economic development, various constructions, demolition and relocation of projects in Nigeria are among the factors responsible for the generation of large amount of waste, which necessitate urgent, more efficient, better and effective management practice. The generation of Construction & Demolition waste is related to the construction sites' waste management. While various issues influence the Construction & Demolition waste management, essentially, making an in-depth study of the factors behind the achievement of efficient Construction & Demolition waste management is very important in this regard (Liu, Wang, & Lin, 2012).

1.2 Problem Statement

The waste generation per unit output is greater compared with other countries due to the inefficiency in construction processes (Opeyemi, 2012). The problem of the construction waste management has become a major concern and a national issue for the Nigerian construction industry major stakeholders. This unwanted development has led to the organizing of workshops and seminars to address the problem of waste management in Nigeria (WMA Bulletin, 2009). For instance, the Abuja Environmental Protection Board (AEPB) has organized a workshop and summit with the themes 'sustainable city development on waste management and waste to energy' and 'Financing Waste

Management in Developing Economies', for the stakeholders in construction organizations (AEPB, 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 onsite-waste reduction as well as the construction waste technology for the reuse of construction and demolition waste (Christensen, 2011).

In a related study, Wang and Yuan (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 are among the problems associated with waste management. In another study, Wang and Yuan, (2006) revealed that the lack of motivation to execute the construction & 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). Among all the studies reviewed, none examines the issue of organizational factors in relation to construction waste management, which is the gap identified for the present study.

Construction practitioners in most African countries do not practice or adopt the on-site sorting of waste materials on the site for the promotion of the reuse method in the

management of waste. As a result, the lack of sorting method will create problems, in terms of reusing different types of waste generated (Oluwaleye, 2012). Construction waste management in Abuja is still in its infancy. Institutional and policy frameworks, where they exist, are not in line with global best practices. Specific data on waste necessary for planning are also not readily available (Akoni, 2007). The composition of construction waste in Nigeria suggests a recyclable content of over forty percent with recycling rate estimated at 8-22%, carried out by the informal sector (Wilson et al., 2009). Other disposal options are open dumping, open burning and composting (Imam et al., 2008; Ogwueleka, 2009).

Waste disposal to landfill includes burying the waste which still remains a usual practice in many countries. Hence, landfills are established as frequently relinquished or abandoned borrow pits, mining voids. However, there is a lack of appropriately designed and decently handled landfill system for the disposal of waste. Poorly designed landfill management creates unpleasant environmental impacts in Nigeria. For instance, windblown waste, breeding pests, and fluid leaked generation (Oteng-Ababio, 2011). Also, one more basic result of landfills is the release of bad 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 organizational structure of an organization is the framework for the facilitation of communications and efficient work processes (Oteng-Ababio, 2013).The major problems

in an organization structure are the low productivity levels, employee empowerment constraints, poor vertical communication; inefficient resource allocation, the lack of conducive environment for job assignment completion by the employees in an efficient manner. Furthermore, there is the issue of the lack of team work, unequal Workload, unequal task distribution among the divisions/department as a result of poor organizational structure among construction organizations in Nigeria (Oteng-Ababio, 2011). There is also the issue of Slow Decision Making which does hamper innovations and opportunities in the Nigeria construction organizations. The lack of optimization of organizational structure for the direction of the decision-making body to the suitable individual, or the movement done by several management layers before rendering a result, may lead to the change of the organizational structure (Copeland & McKenney, 1990). Hence, necessitate the need to examine the influence of organizational structure (i.e., formalization, centralization, specialization) on construction waste management.

Lack of innovation is also a major issue of the construction organization as a result of uncoordinated organizational structure leading to the slow progress of innovativeness in Abuja, Nigeria. The existence of new ideas channel is probably lacking and even if it does exist, it is hampered by poor communication, meaning that it is difficult for the idea to reach the appropriate channel for implementation /development. Consequently, new ideas are not encouraged as workers with new ideas most often forget about them or the ideas will be transferred to new employers (Oteng-Ababio, 2011).

Among the dimensions of organizational structure is the formalization, which provides direction to employees and reduces ambiguity (Fredrickson, 1986). A high degree of formalization actually reduces innovativeness because the environment does not promote the freedom of creativity and introduction of new ideas among the construction waste management organizations in Abuja, Nigeria. The fact is that the frequent occurrence of strategic decision making in organizations is only when a crisis has erupted. A formalized structure of the construction waste management organizations in Nigeria is likely associated with reduced motivation and job satisfaction as well as a slower pace of decision making. Fredrickson (1986) emphasized that the service industry is particularly susceptible to problems associated with high levels of formalization. Therefore, lower-level employees have limited power to resolve a service problem and are constrained by stringent rules that outline a limited number of acceptable responses.

This type of organizational structure prevents members of the staff in the construction waste management organizations in the course of performing their day-to-day jobs from performing different activities or rather multiple activities (Banai & Reisel, 2007). Hence there is a need to examine the influence of formalization on the construction waste management.

Organizations with a centralized structure comprise of a number of layers of management that control the company by maintaining a high level of authority, which is the power of decision-making, concerning construction waste management activities in Abuja, Nigeria. An organization with a centralized structure has a limited authority to the staff

employees to carry out tasks without prior approval. The centralized structure focuses on top-down management, where the top executives communicate with the middle managers, who then inform the first- level managers, who in turn instruct the staff on what and how to do it.

This organizational structure is bureaucratic in nature, where employees have little freedom. Centralized organizations are known for the decreased span of control where a limited number of employees report to the managers of construction waste management organizations, who then report to the next management level, and so on up the ladder to the head of the organizations (Orlikowski, 2000). In the context of the construction waste management of construction organizations that practice a centralized structure which restricts the authority of the managers, both the decision-making and sole decision power rest in the hands of the chief executive or directors. Thus, centralization stops the staff members or even managers from being flexible or from taking the initiative when performing their duties (Katsikea *et al*., 2011). Therefore, this necessitate for the examination of the influence of centralization on construction waste management.

With regard to the specialization as a dimension of the organizational structure, it leads to lower level of employee job satisfaction and productivity over time. Argote (1999)'s study has found that the job simplification leads to many problems with regard to the attitude and productivity of employees. The employee will feel less motivated and bored as they have to repeat the specific type of work every day, simultaneously causing fewer challenges for the employees in the process of learning new things from the work.

The employees lack the experience and are not qualified with another part of the task, and it is usually hard for the employee to transfer their attention to others and replace with others (Fried & Ferris, 1987). Also, the employees have to keep the same pace in the production or service provision in maintaining the operation efficiently in the construction waste management organization. The lack of autonomy leads to the decreased job satisfaction and lower interest of the worker when it comes to job improvement, efficiency and effectiveness (Huckman & Pisano, 2006). Thus, there is a need to examine the influence of specialization on construction waste management. Tangible and non-tangible financial resources are crucial to any organizational routine operations. It is evident that construction organizations would require a substantial amount to effectively manage all construction wastes (Schübeler *et al.*, 1996).

Groenewald (2009) stated that the focus and direction towards achieving high levels of competency, and competitiveness of an organization could be attained through human resource management practice by contributing to the goals, quality and profitability in line with the vision and mission of the construction waste management organizations. In addition, the staff training, and performance management are some of the tools for human resource management practices where these will shape the organizational role into satisfying the stakeholder's need but in reality, they are lacking.

Groenewald (2009) added that the common procedures for human resources must be followed by the organization that will form basic rules on its practices. Also, the

coordination between the management and the junior staffs are not sustained at different levels, thereby, it eliminates the communication breakdown the relationship between the workers of construction waste management organizations.

Chun et al. (2009) found that the idea of charismatic leadership served as a value-based leadership style that leads to an emotional relationship between followers and leaders. Their self-interests are later transcended based on their belief in a collective purpose. A charismatic relationship hence implies respect, trust, admiration and commitment to the leader. Charismatic leadership is also an empowering style with a view to improve the future of the organization (Conger &Kanungo, 1998; Eagly *et al.*, 2003). According to Murphy and Ensher (2008) because of some characteristics charismatic leaders achieve targeted transformation which includes: strategic visioning and communication behaviour, sensitivity to the environment, unconventional behaviour, and personal risk, sensitive to organizational members' needs, and deviation from the status quo.

Eagly et al. (2003) further distinguished transformational leadership and indicated that this type of leadership is characterized by the avoidance of any involvement in critical situations and the general failure to take responsibility for managing. Hence, the need to examine transformational leadership and construction wastes management.

Organizational learning refers to a significant component of the process of organization's efficiency (Meeus & Oerlemans, 2000). Likewise, organizational learning is an interesting result in the creation of knowledge to play a helping role in the development

of the efficiency of an organization (Caballe, Juan & Xhafa, 2008). In essence, this can be realized by the transformation of knowledge and the technical ideas that will lead to competency in the construction waste management, procedure, business and services, on the basis of interaction among diverse technologies, knowledge, and the processes of internal characteristics of the organization, and the fact that the process of organizational learning has been lacking (Guadamillas *et. al*, 2008). In view of the forgoing, thus, there is the need to examine organizational resources and construction waste management.

Several policies have been enacted by the Nigerian government at all levels, such as indiscriminate waste dumping on the drain, road, river, and other illegal areas. Environmental sanitation, construction waste regulations/policy, management, provision and use of litter bin in all important areas and disposal in approved landfills but hampered by the problem of monitoring (Afun, 2009).

However, the enforcement of waste management laws (waste management regulations/ policy) has been a major problem. Despite the saying that in vacuum," laws do not operate", the regulation and management of the waste, by enforcement have not been successful because they are affected by various problems (Nwufo, 2010).

Imam (2008) emphasized that among the problems of waste management regulations in Nigeria, is the proper enforcement of waste management legislation / policy and planning framework for waste management by enforcing relevant clauses in development guidelines. Lack of unified waste management regulations and operational system for the

enforcement and control of construction waste management practice in Abuja, Nigeria is among the major obstacle in achieving good construction waste management practice (Onwughara, 2010).

Adekunle (2011) further, reiterated that the in ability of the government to set a clear roles and responsibilities among the three tiers of government i.e., the federal, state and local government, for the construction organizations for the attainment of effective and efficient construction waste management practice in Abuja, Nigeria.

Government policy on construction through the regulation has been recognized as seldom being the major factor influencing the construction waste management in Abuja Nigeria. Investigation established that construction waste management policies and regulations were not properly enforced, where these laws were accepted or not well understood by most Nigerians (Afun, 2009). For instance, over 80 percent of Nigerians have no knowledge or have low level of understanding of sustainable waste management (Afun, 2009). The government has also not promoted the recycling of aggregates for concrete and paving blocks (Lam, 2011). Furthermore, Wang (2011) stated that legislative powers are not employed by the government to compel the construction players to embrace the recycling process.

The core of the problems of construction waste management in Abuja, Nigeria, is the absence of adequate policies, enabling legislation, and an environmentally stimulated and enlightened public. Government policies on the environment are piecemeal where they

exist and are poorly implemented this is a setback issue in waste management (Agunwamba, 1989).

Nevertheless, this resonates well with the findings of Oluwaleye (2012) that the instrument used in compelling the contractors and developers to reduce waste is the waste landfill charges, incentives and government support which apparently are not effective in Abuja, Nigeria. Thus, there is a need to examine the effect of the government policy between organizational factors and construction waste management.

There is no doubt that across Nigerian cities there has been an ultimate failure and neglect in managing waste. As a source of concern and anxiety, there are the depressing consequences for aesthetics and human well-being and the public health.

In Nigeria, it appears that the stakeholders (i.e., the regulators and governments) viewed the problems of waste generation and safe disposal of wastes as unnecessary and intractable. However, the refusal in the adoption of appropriate measures in addressing the root cause of the problem of construction waste management, at a later time, will lead to incurring severe penalties. This may be the unnecessary loss of resources and the devastating adverse environmental impact on the safety of the Nigerian public health. The government should be aware of the danger/consequences for poor/improper waste management, the avoidance or reduction may be achieved with a lot of positive commitment and enforcement measures (Afun, 2009).

There are many studies on construction waste management and minimization strategies done by researchers in many countries [examples are Lawson (2001) in the UK; Yates (2013) in the United States; Poon et al. (2007) in Hong Kong; Ling & Nyuyen (2011); Arif et al. (2012); Osmani (2013) in India; Yuan & Shen (2010) in China; Yean &Ling (2013) in Vietnam, Liu, Wang and Lin (2012)] among others, but the effect of government policy on the relationship between organizational factors and construction waste management in a single study in Abuja, Nigeria has been scarcely examined.

Some of the studies conducted in the Nigerian context include the study of Babatunde (2012) which recognized transit waste, cutting waste, vandalism and theft waste, and application waste as the four major types of construction waste in the Nigerian construction site. Wahab and Lawal (2011) evaluated the form, causes and factors incidental to construction waste management control, and they also indicated that most construction firms have not been able to calculate the waste indices that will help in the determination of the amount of waste that could be generated on site. Olatunji (2008) studied the waste management plan at construction sites in Nigeria, and in his studies, he identified staff training as one of the ten identified factors in the implementation of effective waste management plan.

The study of Dania et al. (2007) revealed that the universal practice of Solid Construction Waste Management and site waste management is still inadequate and there is need for serious improvement. The construction waste management Professionals found that inefficient adoption practice which is hampered by ineffective legislation and government

incentives. As a result of limited studies in Nigeria and the neighbouring African countries, this has left the researcher with no option but to use most literature from Asian countries where more studies have been conducted on construction waste management.

While the volume of construction waste being generated increases due to the increase in the construction activities, a proper management of the waste has not been given considerable attention. Coupled with the scarcity of research addressing waste management in the Nigerian construction industry, this research seeks to examine the factors that could enhance the management of construction waste among construction organizations.

Due to the aforementioned, the present study seeks to examine the effect of government policy on the relationship between organizational factors and construction waste management in Abuja, Nigeria.

1.3 Research Questions

1. What is the relationship between organizational structure and construction waste management in Abuja, Nigeria?
2. What is the relationship between organizational resources and construction waste management in Abuja, Nigeria?
3. What is the relationship between government policy and construction waste management in Abuja, Nigeria?

4. What is the moderating effect of government policy on the relationship between organizational structure and construction waste management?

5. What is the moderating effect of government policy on the relationship between organizational resources and construction waste management?

1.4 Research Objectives

This study is aims to examine the effect of government policy on the relationship between organizational factors and construction waste management among construction organizations, with the following objectives:

1. To examine the relationship between organizational structure and construction waste management.

2. To examine the relationship between organizational resources and construction waste management.

3. To examine the relationship between government policy and construction waste management.

4. To examine the moderating effect of government policy on the relationship between organizational structure and construction waste management.

5. To examine the moderating effect of government policy on the relationship between organizational resources and construction waste management.

1.5 Significance of the Study

The significance of this study can be grouped into three (3): practice, policy and academics. The academic contribution is also classified into three: 1) dimensional factors influencing construction waste management in the context of construction organizations, 2) the proposed research model for this study, and 3) extending the resource based theory to suit the construction organizations. Most previous researchers did not examine organizational factors such as organizational structure and organizational resources; therefore, the present study attempted to narrow the gap identified in the literature.

Nevertheless, the development of a new framework for examining the moderating effect of government policy on the relationship between organizational factors and construction waste management will provide a direction for future studies. Furthermore, the study of construction organizations will present a yardstick for assessing the construction waste management organizations.

The framework for this study will strive to determine the importance of the moderating effect of the government policy influencing the relationship between organizational factors and construction waste management organizations. Particularly, ten factors were assembled to develop five hypotheses based on the research model of the construction waste management organizations that leads to improved efficiency and effectiveness. This model will offer future researchers with the framework needed to investigate other parts of the construction waste management among construction organizations and also complement the existing literature.

Theoretically, the study assess and test the model developed for organizational factors with the aim of utilizing the dependent variable (construction waste management).The research study can provide an instrument to the policy makers and private organizations, so as to assess how external factors such as government policy (construction waste management regulations/policy) could affect the adoption of a good management system. Underpinned by the resource-based theory, empirical evidence will be provided by this study to bridge the knowledge gap with regard to the measurement and organization of the construction waste management among construction organizations in Nigeria.

In practice, identifying the level of Nigerian construction waste management among construction organizations will be useful when it comes to benchmarking. In addition, the present framework, perhaps, will be the right drive to change the current state, from inactivity towards a better construction waste management practice among construction organizations in Abuja, Nigeria.

1.6 Scope of the Study

Construction and demolition waste is considered as those materials generated as a result of "alteration, construction, destruction rehabilitation or repair of any man made physical structure, including houses, buildings, industrial or commercial facilities, and roadways" (Ohio EPA, 2011). Therefore, this study has identified material waste and time waste, as the types of waste commonly in Abuja, Nigeria. Material Waste is the waste generated as result of construction activities, for example, damaged/spoiled materials, scrap,

expendable and interim construction material, and also which excludes the materials in a completed project, waste created as a result of workforce and packaging materials (Tam, 2012). In construction work, the major inputs comprise of material and labour. Therefore, studies have shown that substantial quantities of material waste in the construction project have been generated (Lu *et al*., 2011). However, material waste is described as "the unwanted remnants removed or generated as a result of renovation work, construction, and demolition of buildings sites/workplaces and civil engineering structures" (Al-Hajj & Hamani, 2011).

Time Waste is the second type of waste. The period of construction job comprises of the procedure time, time of inspection, movement time, and the holdup time (Koskela, 1992). Simply procedure time is considered as the activities that add value. Hence, the others are those activities that are non-value adding. Furthermore, Koskela (1992) considered the activities that are value-adding as those material and information that lean more towards the needs of the client, whereas, the activities that are non-value adding (additionally referred to as waste) are those activities that are time, space or resource-consuming, and yet, they do not add value. On the other hand, most of the value adding time is classified as procedure time, and not all the procedure time is value-adding. Therefore, the present study focuses only on the material waste.

In Nigeria, construction organizations are saddled with responsibilities of "Project Management, Building Construction, Building Maintenance, Facility Management Reactivation of abandoned projects, Building Surveying, Litigation and Arbitration,

Feasibility and Viability Studies, Variation and Fluctuation, Resident Supervision, Prime Consultancy among others" (NIOB,2014). They are grouped into four categories A, B, C, D, depending on the type of category the organization registered for (Fagbenle, 2010).

This study surveyed all the four categories, where each of the categories is a starter. Furthermore, the study will cover the six area councils of Abuja, Nigeria. While there are different dimensions of organizational structure, this study chooses to examine Formalization, centralization and specialization; therefore, in the context of organizational resource dimensions, transformational leadership, organizational learning and staff training was examined. Next, the government policy as the moderating variable was examined as the construction waste management regulations/policy. This was followed by an examination of the construction waste management with four dimensions; wastes reduce, waste reuse, waste recycling and waste disposal to landfills.

This study focused on the non- hazardous material type of waste. The moderating roles of government policy (construction waste management regulation/ policy) in influencing the relationship between organizational factors and construction waste management in Abuja, Nigeria were investigated as well. The study was conducted among construction organizations in Abuja, Nigeria.

1.7 Organization of the Thesis

The organization of this thesis is in five chapters; Chapter 1 presents the background of the study, as well as the statement of the problem, objectives of the research, the scope and significance of the study and operational definitions of key terms. Chapter 2 presents the review of relevant literature on the variables. It begins with the construction waste, specifically the types of waste on construction waste. Next, construction waste management and their dimensions. Next, the organizational structure and their dimensions, organizational resources and their dimensions are discussed in the chapter. Next, government policy was also looked into (construction waste management regulation/ policy).

The relationship between organizational structure and construction waste management, the relationship between organizational resources and construction waste management and the relationship between government policy and construction waste management was revised. Next, the effect of government policy moderating the relationship between organizational structure and construction waste management, the effect of government policy on the relationship between organizational resources and construction waste management shall be studied. Next, we shall be elaborating on the resource based view theory, also the conceptual framework for this research. Lastly, research hypotheses are developed and presented at the end of the chapter.

1.8 Operational Definition of Key Terms

Operational definitions of the key terms used in this study are presented below.

1.8.1 Construction Waste Management

Construction Waste Management is defined as a systematic control of waste reduction, waste generation, waste separation, waste collection, waste storage, waste transportation, processing/reuse, recycling, recovery and final disposal of construction waste in an effective, efficient and acceptable manner (Galpin, 1996).

1.8.2 Organizational Structure

The organizational structure in this study is viewed as the formal system of responsibility and reporting relationships that enables expected outcomes to be achieved by the employees by means of coordination and motivation (George & Jones, 1999).

1.8.3 Organizational Resources

Organizational resources are defined as where different resources are brought together for the use and achievements of the organizations goals. For instance, the organization's major resources are expressed as financial, human, physical, and information resources (Barna, 2014).

1.8.4 Government Policy

Government policy is operationalized as construction waste management regulations/ policy, controls, government support and program of action which aims at changing a definite state of affairs for the achievement of certain goals (Nidirect Government Services, 2014).

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter presents the review of relevant literature, on the variables examined in this study. It begins with the definitions of construction waste, specifically the types of waste on construction sites. Next, construction waste management and its dimensions the organizational structure and its dimensions, organizational resources and their dimensions are discussed. Next, the government policy on construction waste management will be examined. This chapter discusses the relationship between organizational structure and construction waste management, followed by the relationship between organizational resources and construction waste management therefore, the relationship between government policy and construction waste management was included. Next, the moderating role of government policy on the relationship between organizational structure and construction waste management also subsequently, the moderating effect of government policy on the relationship between organizational resources and construction waste management was also discussed. Next, we shall be delving into the theoretical framework, then the hypotheses developed based on previous studies; the underpinning theory, before the summary of the chapter is established.

2.1 Construction Waste

Since the research is on construction waste management, the definition of construction waste will be relevant to the study. Based on several definitions provided by different scholars, "Construction and demolition waste" means waste which is normally produced

because of the construction and demolition of buildings, and it includes all materials which are the by-product of construction work or created as a result of the destruction of structures, including, blocks, concrete rubble, workmanship materials, paper, gypsum boards, wood, elastic materials and plastics. Construction and demolition waste does exclude friable asbestos-containing materials, fluid waste, hazardous waste, or decorations from demolished structures (Nebraska Department of Environmental Quality, 1992). In his investigation, Sapell (1995) described the construction waste "as any material by-product of human and industrial activity that has no residual value".

The construction waste not "limited to the amount of waste of materials on the site" is included. For this reason, the waste in the construction industry has received considerable attention lately. Some of the scholars have focused on the environmental damage resulting from the generation of material waste. For example, various studies are basically concerned with the economic aspect of waste in the construction industry (Tam, 2012). He further stated that construction waste is the waste produced by construction activities, for example, scrap, damaged or spoiled materials, temporary and expendable construction material, and aids that are excluded in the completed project, packaging materials, and waste created by the workforce. Construction site waste can be portrayed as the non-hazardous by-products as a result of activities in new construction and renovation. It is produced by the construction process due to site arrangement, material use, material damage, and material non-utilize, excess procurement and human lapse (Macozoma, 2002).

Waste is often legally considered to comprise of particular things by law or under an ordinance. Waste is further categorized into three separate classifications: by structures, sources or its related effects to people or the environment. The waste definition and classification influence the corresponding maintenance, treatment and disposal details and requirements as well as the exchanging of materials over the fringe (Spinka, 2004).

Ekanayake and Ofori (2004) described waste to be "every material separated from earth materials, which is required to be transported somewhere else, but not the construction site or rather meant for planned, or purpose for a particular project because of damage, excesses or unused materials on site that cannot be utilized due to non-compliance with the specification, or any waste/material damages as the result of the construction process".

Studies have shown that construction waste has been categorized by sources that are comparable, however, marginally diverse crosswise over the entities of the organization for instance, the transformation of the guidelines of an environmental issued by the Department of Environment and Conservation (NSW), in Australia provides the meaning of construction waste which is generally categorized as " materials created as a result of de-erection, demolition, construction, repairs or modification of structures, repair or adjustment of types of infrastructure development, for example, bridges roads, tunnels railways, dams, airports, and such that are not mixed with the other kinds of waste" (Department of Environment and Conservation,1999).

Regardless of the variation in construction projects, potential material waste was brought on by comparative inadequacies in the procurement, the handling of materials, and the leftover on site waste (Formoso *et al*., 1993). Studies reported that clients could create the waste through variations, careless inspection procedures, and the design stage negligence, so these can prompt excessive waste that calls for the need for over-requesting to stay away from shortage of materials on- site (Graham & Smithers, 1996). Table 2.1 shows the definition of construction waste from various literatures over the years.

Table 2.1: *Definition of construction waste.*

Source	Definition of construction waste
NDEl Q (1992)	Any material from demolished structures.
Sapell (1995)	Any material by-product of human and industrial activity that has no residual value.
Department of Environment and Conservation (1999)	They are materials created as a result of the demolition, erection, construction, repair or modification of structures or from the construction, repair or adjustment of infrastructure-type development, for example, roads, bridges, tunnels dams, railways, airport, and which is not blended with whatever other kind of waste, and does not contain asbestos waste.
Formoso *et. al.* (1999)	Construction waste are not just referred to the amount of material waste on site, they are also identified with a few activities, for example, overproduction, holding up time, material maintenance, transforming record and workers' movement.
Environmental Protection Agency, (2002)	Construction waste is usually the type of building debris, concrete, steel, rubble, earth, timber and diverse site clearance material, most often it is also a mixture of immobile and organic materials.
Macozoma,(2002)	Construction site waste can be portrayed as the non-hazardous by-products as a result of activities in new construction and renovation. It is produced by the construction process due to factors, for example, site arrangement, material use, material damage, material non-utilize, excess procurement and human lapse.
Fatah *et al.*, 2003	Construction wastes are waste created from the construction activities. They comprise of different materials as a result of different activities such as earth materials, for instance; vegetation, soil, and rocks as a result of excavation work, levelling of land, clearance of site.

Ekanayake and Ofori, (2004)	Any materials separated from earth materials, which required to be transported somewhere else from the construction site itself other than the planned particular purpose of the project because of damage, abundance or non-utilize or which can't be utilized because of noncompliance with the specification, or which is a by-product of the construction process.
Recycling Council of Ontario, (2006)	Construction waste is used to describe a large number of waste materials produced by the construction, excavation of buildings and civil infrastructure. However, many waste materials from construction projects are virtually the same, the quantities produced will vary greatly based on the type and nature of the project, the waste produced as a result of construction projects are about 20 to 30 times much.
Tam, (2012)	Construction waste produced by construction activities, for example, scrap, damaged or spoiled materials, interim and expendable construction material, and aids that are excluded in the completed project, packaging materials, and waste created by the workforce

(Source: *As indicated*)

In line with the above concept and definitions, for the purpose of this study construction waste is considered as non- hazardous materials or debris created as a result of construction activities, which is consistent with the concept of (Nebraska Department of Environmental Quality, 1992; Macozoma, 2002; Gutberlet & Hunter, 2008; Tam, 2012).Therefore, the types of construction waste considered for this study are discussed in the next section.

2.2 Types of Construction Waste

Construction waste comes in two types; material waste and time waste. However, the scope of this study only revolves around the construction material waste, which is discussed below.

2.2.1 Material Waste

According to Ekanayake and Ofori (2000) the materials, are considered as some materials, that are separated from earthen materials, which need to be moved somewhere from the site of the construction or utilized within the construction site, apart from the intended specific purpose for the project because of material damage, surplus, non-utilize, or non- compliance with the specifications or being a by-product of the construction process. Previous studies, for example Formoso et al. (1999) have shown that:

1) Building material waste is much more than the figures presumed.
2) The variability of waste records among the site is very high. In addition, there are varying levels of waste for the same material at similar sites.
3) Most of the organizations do not appear to be concerned with their material waste, since relatively simple waste avoidance measures on site cannot be applied on-site.

In view of the above, this reveals that a significant part of the wastage can be reduced to the barest minimum.

2.2.2 Classifications of Waste

Wastes can be classified as: waste by nature and waste by resources, which are discussed below.

2.2.2.1 Waste by Nature

According to Formoso et al. (1999) waste by nature can be defined as preventable and non-preventable waste. The preventable waste is where the waste cost is essentially much higher than the cost of forestalling. When the investment for waste reduction is higher than the product economy, it is termed as unavoidable waste. The organization and the specific site tend will be relied upon when it comes to determining the rate of unavoidable waste in every process.

2.2.2.2 Waste by Resources

This is viewed as waste by losses, and it comprises of indirect or directs waste .The direct waste includes the loss of materials completely, because of the way they are unusually lost or mostly spoilt. Therefore, the removal of the wastage from the site is usually needed (Formoso *et al.,* 2002). Also Shen et al. (2004) considered direct waste as the loss materials that are damaged, so they could not be repaired, but still can be utilized or those lost in the construction process. Formoso et al. (2002) stated that indirect waste is where materials are not lost physically, but it creates just monetary loss, hence, waste created as a result of casting the thickness of concrete slab bigger than the design specified. In essence, indirect waste principally comes from the material replacement, in the process of material utilization in excess of quantity as contained in the agreement due lapses (Shen *et al.,* 2004). This study is concerned with the direct waste of materials and among the types of waste identified in the study, the non-hazardous waste is considered for the

purpose of this study which is in line with the study of Ekanayeke and Ofore (2000) and (Fomoso *et al*., 1999).

2.2.3 Magnitude of Construction Waste

There is a considerable greatness of construction waste on sites and due to this; there is a need to examine its magnitude. It has been verified that the rate of waste is distinctive among developed and developing nations, for example, Bossink and Brouwers (1996) who established that the quantity of waste generated in each building material is around 1 percent and 10 percent of the purchased amount in the Netherland, depending on the material type. In addition, an average of 9 per cent (by weight) of the total construction material purchased was presumed to have been regarded and sent away as site waste.

In Hong Kong, construction & demolition waste is considered a real issue because of the increase in the population density; therefore, there is the accessibility of rear space, the infrastructure and the economic development. Furthermore, in 2000, about 37,690 tons /day of the construction & demolition waste were produced, of which 30,210 tonnes/day (80) percent were sent to open reclamation filling zones utilization, whereas, about 7,480 tons/day (20) percent were discarded in landfills. The idle construction and demolition waste materials are usually sand, blocks, and concrete, and equally, they are suitable for reclamation and the formation of land and works, and were discarded to the public filing. Hence, the non-idle section are plastics; bamboo; glass; wood; paper; vegetation and the natural materials that end up in construction waste landfills (Poon & Jaillon, 2002).

Datta (2000) asserted that in the developing nations such as (Nigeria, Botswana, Zambia, Tanzania and Zimbabwe) it was estimated that 40percent of the development is rework, and 30 to 40percent of work are probably utilized, hence, 8 percent of the total cost of the project are accounted for accidents while, 20 – 25 percent were discarded as waste.

Nevertheless, studies reported that the rate of waste in the construction industry in Brazil is 20 – 30 percent of the weight of the material aggregate on the site (Formoso *et al.*, 2002). Furthermore, Fatta et al. (2003) reported that every $1000m^2$ of activities in the building involve the creation of $50m^3$ of waste in Greece. Generally, only 46 percent of the working time was spent by workers on the value adding activities, while 15 percent was spent on the important contributions, and the remaining 39 percent was spent on holding up & sitting (Zhao & Chua, 2003).

In the Gaza strip, Enshassi (1996) found that about eighty six (86) housing projects contained direct and indirect waste of approximately 3.6 to 11percent, thereby; essentially it was higher than the normal values of 2 to 4 percentage usually allowed in Egypt. In addition, Garas et al. (2001) stated that in Egypt, thirty experienced contractors answered questionnaires on the rates of waste created from the operations, and according to them, the waste was around 4 to 13percent, which was extensively higher than normal permitted values and the acceptance rates for cement and steel. Table 2.2 below presents the summary of magnitude of waste by countries.

Table 2.2 *Magnitude of waste by countries*

Source	Country	Magnitude of waste
Bossink & Brouwers, (1996)	Netherland	1% and 10%
Enshassi, (1996)	Gaza strip	3.6-11%
Datta, (2000)	Nigeria	20 – 25%
Garas *et. al,* (2001)	Egypt	4-13%
Poon & Jaillon, (2002)	Hong Kong	20%
Formoso *et al.*, 2002	Brazil	20 – 30%
Fatta *et. al,.* (2003)	Greece	In every $1000m^2$ of activities in the building involve the creation of $50m^3$ of waste
Zhao & Chua, (2003)	China	39%

Source: (*As indicated)*

Table 2.2 above presents the summary of magnitude of waste by some countries- in Netherland; the waste material generated in each building material is around 1 – 10% which is considerably lower than that of the Gaza strip with 3.6 – 11%. In the Nigerian case 20-25% of the total cost of project is discarded as waste which is a serious problem and creates a lot of wastage on construction projects. Furthermore, in Egypt the waste gathered is around 4-13%, in Hong Kong 20% of waste is discarded into landfills, in Brazil 20-30% while in Greece in every $1000m^2$ of building activities, about $50m^3$ of waste is generated.

2.2.4 Global Perspective of Construction Waste Management

The importance of construction waste management has drawn the attention of various researchers worldwide, for instance, in Europe a series of initiatives have been

established to improve the performance of construction waste management, such as: (1) Diverting waste from the landfill, (2) defining waste catalogue (3) establishing a waste management hierarchy (4) outlining waste management target (Environmental protection Agency, 2009).

Based on intensive research and demonstration projects, the recycling rate of construction waste increased from about 12 percent in 1986 to 80 percent in 1990. In Denmark, the regulation of waste management is by the Environment Protection Act, which limits the problems related to waste disposal and promotes recycling. Danish waste policy primary objective is to reduce the amount of waste and the environmental burden as a result of waste disposal. The high degree of responsibility is given to the local Authorities under the Act, who are in charge of the collection and disposal of waste. Waste producers have a duty to follow the local authority waste disposal directives and employ local collection schemes. This is named "The Danish Model" (Veltze, 1999).

In Germany, the construction waste comes from four major sources, namely, excavated material, building demolition waste and construction site waste, and road demolition waste. Usually it accounts for more than 50 percent of the total waste generated (Eurostat 2010). The recycling of the construction waste necessitates the product standards and certifications of recycled materials. The State Association of Waste established regulations on standards of recycled concrete aggregates (Weil *et al*., 2006). However, the current construction waste from structural engineering is extensively utilized as loose bed material in civil engineering.

Germany places the emphasis on the recycling techniques and standards of secondary materials. In 1995, the State Task Group on Waste established technical regulations for the "Use of Road Demolition and Construction and Demolition Waste in the Construction of New Roads". The German Standardization Association for Reinforced Concrete has introduced the possibility to recycle construction waste as the aggregate for structural concrete (Tam & Tam, 2008).

In the Netherlands, some economic instruments were imposed together with administrative instruments so as to improve waste recycling and control waste generation. These economic instruments include deposit-refund schemes and subsidies taxes on raw materials and products and fiscal incentives (Oosterhuis *et al.,* 2009). The Netherlands also has the specifications of crushed concrete aggregate utilization in new concrete (Tam & Tam, 2008).

The construction waste management in the United States depends heavily on the policy instruments in different states. It is reported that the construction waste management is not very successful since the recycling rate of construction waste is lower than 30 percent (Jaillon *et al*., 2009). Another study showed that most construction waste in the Northeast ends up in a landfill, with approximately 10 percent of estimated generation was recovered for an end use outside a landfill (Northeast Waste Management Officials' Association 2009) Therefore, the Environmental Protection Agency promoted the reduction of construction waste through the concepts of reduce, reuse, recycle and re-buy.

Different government authorities have also issued a number of policy instruments to improve construction waste management performance, including site waste management plan, differential tipping fee, landfill ban, deposit-refund scheme and minimum recycling standard. Site waste management plan is adopted in California to facilitate the 50 percent recycling rate of construction waste. In particular, the City of Oakland (2000) requires contractors to submit a Job Site Recycling and Waste Reduction Plan for construction projects worth more than $150,000. Differential tipping fees are charged in many cities including the city of San Diego (Environmental Services Department of San Diego 2012).

In Canada, 35 percent of total construction waste comes from Ontario, in which the recycling rate of construction waste is relatively low at 12 percent (RIS International Limited 2005). In order to deal with the large amount of construction waste, Ontario government authorities require a site waste management plan for projects with a floor area more than 2,000 square meters and establish recycling targets (Eunomia *et al*., 2009).Albert government authorities conducted research projects to examine the applications of extended producers' responsibility and investigated the possibilities of adoption of these construction waste management methods in Albert (Sonnevera International Corporation 2006).

According to the EPD (2007) there are five categories of solid waste, sources and the plan for waste handling. Therefore, these kinds of waste classify accordingly as municipal solid waste; waste in construction; special waste, chemicals waste and other

solid waste classes. Hence, the construction waste is initially regarded as the construction and demolition waste, and based on this report it is regarded as "a mixture of surplus materials emerging from the clearing of site, excavation, construction, refurbishment, renovation, demolition and road works". Over 80% of construction wastes are latent, which include debris, rubble, earth, and concrete, and they are found suitable for site formation and land reclamation. At the point when sorted, materials, for example, concrete and asphalt can be reused in the construction. The remaining non-latent substances, which include bamboo, timber, vegetation, packaging waste and other natural materials, not suitable for land reclamation, are disposed of in landfills" (EPD 2007a, pp. 17-18).

In Hong Kong, the construction & demolition waste management, thereby, reported that waste is divided into materials, machinery, energy, and labour. Nevertheless, according to Neo (1995) accounting for material wastage alone is inadequate to account for all wastages in construction; he contended that time ought to be included as well.

Previously, Construction &demolition waste was blended with general public waste and utilized for landfill. Furthermore, for this approach the government was charged over HK $200 million every year for the disposal at the landfill, while, profitable landfill space was taken at the rate of around 3,500m^3/day (Poon *et al.*, 2001). Other different methods of disposal, for example, incineration, are currently used and there is still a significant quantity of material that is disposed of at reclamation sites or landfills. In any case, for

sustainable development this is no longer an acceptable approach to dispose of the Construction &demolition material.

There are now fewer reclamation site and landfill spaces in Hong Kong. Thereby, the expectation was raised that Hong Kong $235 billion would be used for construction projects within the years 2002 and 2007 (Hong Kong Government, 2001). In the meantime, however, more financial investment will enhance the standard of living; hence, concerns are continuously raised about how to deal with the enormous quantity of solid waste created by the construction-related activities. Owing to the prospective of seeing damage to the environment from landfill sites, the landfill diminishing space, and the Hong Kong growth of the public opposition, the waste reduction ought to be actualized based on the current trend regarding the disposal of solid waste

Moh'd Nasir et al. (1998) found that in Malaysia's southern and central regions, around 28 percent of waste was caused by industrial waste or waste in construction. However, the minimization of waste, the reuse practice, also recycling are restricted in the construction organization, also, the waste management and the natural resources and illegal dumping still remain the problems for the authority (Begun *et al*., 2009).

Additionally, Begun et al. (2009) indicated that mandatory requirement is not in existence for construction organizations to practice waste management and sustainable resource; hence, illicit dumping has become a big problem for the government. Accordingly, an agency formed by the Government, namely (CIDB) "Construction Industry Development

Board" is constituted with the aim of changing construction industry through the enhancement of environmental performance.

In line with the Malaysian national policy, CIDB seeks to fortify the commitment of the industries towards the implementation of sustainable development, and also serves as a responsible environmental industry for the "Construction Industry Master Plan" (CIDB, 2007). Nevertheless, the functions include continuing educating the key players in the industry with a series and sequence of training and retraining of courses, organizing various workshops and raising more awareness in various proceedings. Furthermore, the GBI was also introduced with the outline framework for green sustainable building construction; hence, the institution also has the responsibility to raise the level of awareness within the sector.

Notwithstanding, as of 2009, it was reported by the construction sector of Malaysia that there is productivity growth of about 5 percent "(Malaysia Productivity Corporation, 2009)". In essence, the number shows that the construction sector of Malaysia has played a crucial role in the government contribution and commitment towards achieving sustainable development. In addition, based on the foregoing predictions, it was upheld that the rates of construction waste generated will rise continuously, therefore, waste management infrastructure of the country will be over-stretched by exerting more pressure on the existing one.

Greenwood (2000) and Haggar (2007) stated that practitioners and researchers have decided to address the numerous economics problems of construction waste management and make a substantial degree of efforts to play some positive role in encouraging the construction sector to pursue sustainable development. Different benefits for implementing waste management in construction organizations have gained recognition internationally among various researchers. Bossink and Brouwers (1996) emphasized that the practice will minimize the over-utilization of non-renewable materials, thus, it will tend to encourage renewable resources and other auxiliary resource utilization, further drawing out the landfills lifespan. Dantata et al. (2005) additionally, asserted that the environment should be kept clean from the pollution by reducing the waste stocks and also diminishing the utilization of the natural aggregate (Hadjieva *et al.*, 2003).

The construction waste management's focal points for good performance can be manifested in the two mainstays of sustainability in construction, namely minimizing resource consumption and alleviating environmental pollution (Peng *et al.*, 1997). Therefore, the increasing volume of construction waste and running-up landfills have become a major challenged to governments and the urban areas throughout the world, for a very long time, and this has been a problem in the achievement of waste minimization construction & demolition activities. However, as a result of serious government commitment, in this regards the quantity of waste from construction and demolition activities can be drastically reduced. For example, the quantity of construction & demolition waste produced in Hong Kong had been drastically reduced in 2004 from around 6,595 tons/day to 2,659 tons/day in 2008 (EPD, 2008).

However, despite the issues with respect to the construction & demolition waste management, the execution has increasingly attracted researchers' attention in China since the early 1990s, but as of now the expertise and application of the construction industry waste management has been low (Wang *et al.*, 2010). Furthermore, in China the identification of the real obstacle for the implementation of construction & demolition waste management is essential because it enables the understanding of the impediments by the major decision makers, however, is also serves as the basis for promoting the waste management performance by exploring various strategies. In line with the above global perspective, the current study will stress on the construction waste management under the Nigerian perspective.

2.3 Construction Waste Management as Criterion Variable

Gbekor (2003) defined construction waste management as involving "the collection, transport, treatment and disposal of waste including maintenance of disposal sites". Similarly, (Gilpin, 1996) also defined waste management as "purposeful, systematic control of the generation, storage, collection, transportation, separation, processing, recycling, recovery and disposal of solid waste in a sanitary, aesthetically acceptable and economical manner". The protection of the environment from waste material pollution and the safe guarding of public health and the natural environment must be ensured. Thus, the priority of a waste management system must always be the provision of a cleaning service which helps to maintain the health and safety of citizens and their environment (Cooper, 1999).

Considerable measures of purposeful exertions have been made by different bodies to reduce waste. The collaboration among the industry stakeholders was monitored and acknowledged by the Waste Advisory Reduction Committee for the development and execution of various strategies for the declining amount of construction, and renovation waste deposit in Alberta to the landfill (European Environment Information and Observation Network 2006). However, Hagger (2007) developed the waste management hierarchy, which serves as valuable frames that guard adequately the development of the waste management plans.

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 include 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) emphasized in a related investigation 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 actualize a waste management and carry out on – site sorting of waste before specific payments are made (Poon *et al.,* 2004). Likewise, McDonald & Smithers (1998) submitted that appropriate waste management has significantly helped waste from the site to be eliminated, where there was approximately 50 percent cost savings for handling charges of waste, 15 percent of the volume of waste reduction close to reaching on site, and about 43 percent of waste reduction in landfill. Additionally, following Poon et al. (2004) a point by point waste management plan for building sites to accomplish a sound waste management and waste reduction would be a good idea.

Greenwood et al. (2003) noted that the waste management plan aims to save a lot of money on construction projects. For instance, in United Kingdom three separate projects used waste management plans that accentuate material reuse, recovery and segregation and the three organizations had saved a considerable amount of money and reduce the environmental effects. They maintained that contractors can minimize waste at first by developing waste minimization, which records the analysis and the evaluation activities needed. This is to comprehend the conditions affecting waste minimization initiatives.

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 (Department of energy and environmental protection, 2013).

The construction or demolition waste management does not have to be extensive or complicated to be effective. The identification of the types of waste to be generated in the project and also, the identification of how most of the waste streams are going to be handled are to be considered in preparing a “waste management plan. A successful” waste management plan” will contain the information below: Waste reuse objectives, waste recycling, approximate kind and amount of materials produced from the project site, projected and intended disposal methods for these materials, proposed strategies for handling the materials or waste, extensive guidelines for the subcontractors and workers on how to separate or collect the materials at the project site (Department of energy and environmental protection, 2013).

The organizations’ average for waste created at the new construction site is six pounds per day per square foot, nevertheless, the waste can be put to another use, or even better than what was already great, be recycled if proper planning is carried out in the design phase. The most important of these is firstly to decrease the quantities of waste produced during construction on projects by compelling the subcontractors and providers of material to bind the amounts of materials and packaging for those essential for the task itself (Department of energy and environmental protection, 2013).

A “Site Waste Management Plan” (SWMP) gives a guideline that aids project managers in forecasting and recording the quantity and type of expected construction waste that is created in a project, and support for reducing the quantity of waste that goes to landfills by properly setting up management activities. (WRAP, 2007).Thereby, the material resource efficiency has to be improved in the implementation of reuse, recycling and recovery through a proper construction management and issues of illegal dumping have to be minimized (Defra, 2009).

Napier (2012) indicated that responsible waste management is a crucial part of sustainable building. Additionally, effective waste management means eliminating where possible; minimizing where achievable; and reusing materials that may not become waste. The reduction, recycling, and reuse of waste have been identified in Solid waste management practices as very important for sustainable management resources.

The statistics in the UK shows that, waste ranging between 335 million tons and 220 million tons is the construction and demolition waste (CISP, 2007). In addition, in the UK, the construction and demolition waste generated about one hundred and twenty million tons per annum and thirteen million tons of unused material (Osmani, 2012). In the UK, the methods such as waste management regulation combination, economic instruments and voluntary agreements and out of this only one have been implemented by the government to reduce the waste generated to achieve the target on ethical, social, and environmental performance for the sustainable development. The UK government plays a

role in attracting the stakeholder in the development of by-laws for the country of embedding the environmentally friendly concept (Osmani, 2012).

In Vietnam, Ling (2013) found out that there is a lack of awareness in construction and waste minimization. Subcontractors with waste management knowledge were employed for effective waste management, providing close supervision of subcontractors and workers, conducting training, audit and sequence activities to reduce damage to completed work, set the level of wastage allowance, and enforce these through rewards and punishments. In addition, Hwang (2011) “established key materials used in projects, project size in terms of total installed costs, and type of project have perceptual impacts on benefits from construction waste management”. Meanwhile, based on the '3’R', the waste hierarchy standard of waste “re-use recycle and reduction”, was broadly approved in the UK (Vijayaraghavan, 2013).

For this reason, waste hierarchies are mostly employed as designers’ guide to accept a waste minimization approach to the projects (Kramal, 2012). Also, in the waste hierarchy, the earlier choice of measures in the management of waste is the avoidance and reduction of waste (Department of Environmental Affairs, 2010), expressed that the avoidance of unavoidable, rather it ought to be “recovered, reused, recycled and treated” and disposal should be the last resorts.

According to Osmani (2012) the 3’R system is considered to be not realistically related to most designers’ parameters, and further, it disagrees to the fact that the occurrence of

waste at the design stages is diverse and cannot be predicted. Hence, the establishment of (WRAPA) “Waste and Resources Action Program” by the government of the United Kingdom for the enhancement of the waste management practice (Osmani, 2012) for example, "SMART waste" which was introduced by WRAP as an instrument for facilitating “on-site auditing, waste management, and cost analysis” which handled the waste produced, (CISP, 2007) (Department of Environmental Affairs, 2010; WRAP 2012).

The implementation of waste management can be improved by the enforcement of existing laws and client preference. The practices followed are “waste quantification, waste segregation, and the implementation of the 3Rs (reduce, recycle, and reuse)”.Therefore, the major challenges associated with the implementation of waste management practices in India are the “congestion of construction sites, sites in greatly built-up areas” which have no ability to have an “alternate storage of materials on site, lack of awareness and education of the construction workforce and the lack of ownership of waste” because of the presence of multiple contractors on the construction site (Arif *at el.*, 2012).

The previous waste hierarchy model in China shows that the landfill occupied over 80 percent of waste disposal, and the priority of the waste hierarchy is landfill (National Bureau of Statistic China). To further enhanced the waste management system in china the government changed the “China Waste Model” to” Danish Waste Model, which is more effective for the decrease and minimization in the proportion and quality of

landfills through the integrated waste management system (Li and Liu, 2010). In addition, the Denmark executed the model and succeeded in the realization of recycling high rate of waste for the construction & demolition activities (Danish Natural Protection & Agency, 2012). Therefore, due to the fact that China prefers the Danish Model because of the scarcity of landfill in China, "The Danish Waste Model" was adopted by the Chinese government for the management of land and the minimization of waste disposal through the waste reuse and recycles method.

However, according to McDonald & Smithers (1998) waste management will possibly reduce non-renewable waste and conserve natural resources. Waste to landfill has been identified to be an important contribution. For this reason, the declining landfill resources need to be conserved. The main aim of waste management system is to reduce unnecessary utilization and help reusing and recycling parts and materials (Ling & Lim, 2002). In addition, the effectiveness of waste management on a construction site may be ascertained by the utilization of quantities of materials in the project (real and plan); quantity of waste created (Actual and Plan); the amount of waste re reused (real and most extreme reusable amount); quality execution of reused or recycled waste; extent to which waste generation level causes problems; and the level of waste management accomplishment. For environmental and economic reasons, there is a need to reduce the construction and demolition waste (Teo & Loosemore, 2001).

Some efforts have been made by the government to deal with the waste problem by establishing a policy; the stakeholders are too obliging and ready for the execution of the

waste management plans for all the projects in China (Bhagwat, 2008; Jaillon *et al*., 2009; Poon *et al*, 2004). The government introduced an outing ticket system approach for controlling the transfer of waste for contracting public work, where it also served as framework to be completed by the contractors for the specification of waste weight to be disposed to landfill (Ben, 2013). This arrangement is to ensure contractors are in compliance with government policy and also to enable them to properly discuss the construction waste by way of tracking its destination (Lu & Yuan, 2012).

Similarly, Siddiqui (2010) stated that Singapore is among the country with the highest per capita wages on the planet. Considering that the obstacle to rapid development is the attainment of proper waste management in Singapore. Furthermore, the depletion of natural resources and encouragement by the government towards green building is driving stakeholders to introduce another option of acquiring building materials (Marusiak, 2013).

An attempt for the creation of few industries in Singapore can develop products from being recyclable waste towards attaining sustainability, quality, idea, and expansion and the ability to reuse the materials (Chew, 2010). In Singapore, waste and its disposition is very important through an effective structure, and the "The National Environment Agency" designed well-recognized plans to develop, and supervise a waste management advancement system in Singapore (NEA, 2011).

Yuan et al. (2011) found that the major obstacles to implementing effective construction waste management are; “insufficient support of the authority, inadequate training, weak awareness, economic consideration, immature market and barriers related to site activity” among others. Meanwhile, enhanced environmental credentials; savings in disposal and transportation costs; income from reusing and recycling; and reduced cost of materials are the potential advantages of waste management (McDonald and Smithers, 1998; Teo & Loose more, 2001).

Hagger (2007) reiterated that the procedure for waste management involves “reduction of material in planning and the design stages, dwindling waste/scrap at the construction site, on site material reuse, and recycling of unusable materials”. Routines and possible choices to conventional construction strategies, waste disposal and planning practices alternatives to fuse the ideas of advance waste management procedures and in addition their cost and benefits are used to address the plan. There are five significant steps in the management of waste, namely: (1) Reduce. (2) Reuse (3) Recycle (4) Recover (5) Disposal (Hagger, 2007).

The most vital step in the reduction of the construction waste management problem is decreasing the waste quantity created. Hence, the most imperative step is reducing, followed by reusing, recycling, and finally disposal. (Kibert & Lanquell, 2000).

For the purpose of this study, the construction waste management is referred to as the planning, coordinating, implementing, controlling and 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, and this in line with the studies of (Gulpin, 1994; Gbeko, 2003 Minks, 2004; & Napier, 2012).

2.3.1 Dimensions of Construction Waste Management

The dimensions of construction waste management considered for this study include: Waste reduce, waste reuse, waste recycling, waste disposal are discussed below.

2.3.1.1 Waste Reduce

Studies have shown that waste reduction is regarded as "resource optimization, 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 onsite waste material utilization 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). Alternatively, changing design principles and practices is part of the waste reduction. A modular basis structure should be designed by the architects that fit the utilization 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 utilization. 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 minimizing the production of Construction waste, however, slashes the waste transporting, recycle and disposing cost (Esin & Cosgun, 2007). However, previous researchers had extensively examined the waste reduction as the highest priority for managing Construction waste.

Furthermore, Lu et al. (2006) stated that "Mathematical models and information technology can assist in the waste handling process and can be optimized", and they further lamented that waste reduction can be achieved through workers' motivation (Chen *et al*., 2002; Li *et al.,* 2005), also Hao et al. (2007b) stated that in the understanding of the dynamic interactions of Construction waste management process key areas can best be facilitated.

In essence, Five categories of summarizing the measures for construction waste reduction are as follows:" (1) waste reduction through governmental legislations, (2) waste reduction by project design, (3) through an effective waste management system development (4) Through the adoption of low-waste construction technologies, and (5) The improvement of attitudes of major stakeholders toward waste reduction".

In addition, the effectiveness of legislation in construction waste reduction has drawn considerable interest. For instance, the implementation of the waste management plan proposed by the Hong Kong government" was examined by Tam (2008). Furthermore, the charging scheme of construction wastes in Hong Kong was also examined (Hao *et al.*, 2008). He also reported that there is a reduction of construction waste by roughly 60 percent in landfills, around 23 percent in public fills, next around 65 percent of total waste generation within 2005 & 2006. Therefore, to a high degree, it can be confirmed that government policy has a significant part to play in the reduction of construction waste. "Modelling information flows in the design process might be used to evaluate design solutions for reducing waste in high-rise residential buildings" (Baldwin *et al.*, 2007; 2008).

According to McGrath (2001) in the development of a Waste Management System intended for construction projects, impressive results can be achieved. In a nutshell, the Waste Management System development is a holistic approach for waste generation minimization in the construction process (McDonald & Smithers, 1998). However, Poon *et al*., (2001) stated that a Waste Management System normally encompasses five key elements, namely: "(1) waste management policy, (2) planning, (3) implementation and operation, (4) checking and corrective action, and lastly (5) management review, constituting the Waste Management System's key components", and some studies highly emphasized on the importance of a waste management plan (WMP).

2.3.1.2 Waste Reuse

Reuse as the second level of the waste management hierarchy is also important to ensure efficiency when it comes to the prevention of waste. For this reason, effective reuse preserves the present structure of a material and does not oblige extra time or energy for utility. For instance, reuse includes the immediate reuse of materials on the site extracted from a demolition / deconstruction project or reusing leftover materials for a future, or on-going project at another site (Vleck, 2001).

The idea of reuse also comprises the idea of Re-buy. In essence, Re-buy implies not only obtaining salvaged materials; it also includes purchasing items that are designed for source reduction as well as constructed from recycled materials. This practice supports market and technology improvement for materials and products that conserve resources and avoid waste, for example, utilized building material centres (Vleck, 2001).

According to Wang (2010) in Germany, technology was developed using reused construction materials. The Siemens Company used the technology; it comprises of the distillation, drying and burning of the waste method therefore allowing the reuse of the waste material. Afterwards, various types of technique for the reuse of construction waste are available. “Broken blocks, stones are a sub-grade of the access road to the construction site are used” by some of the contractors (Wang, 2011). Construction practitioners in Hong Kong adopted the on-site sorting of waste materials on the site for the promotion of the reuse method in the management of waste. As a result, the sorting method will assist in the reuse of different types of the waste generated (Poon, 2004).

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2.3.1.3 Waste Recycling

The succeeding level in the waste management hierarchy is the waste recycling. It 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, natural resource, and energy will be protected. 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).

According to Lam (2011) the Hong Kong government has promoted paving blocks and concrete aggregates recycling. Wang (2011) therefore, lamented that legislative powers are employed by the government and they compel the construction players to embrace the recycling process. Nevertheless, this resonates well with the findings of (Yuan, 2012), that the instrument used in compelling the contractors and developers to reduce waste is the waste landfill charges.

According to Ben (2014) the need to recycle Construction &Demolition waste has encouraged the waste management companies to optimize collection systems and in so doing, increase the volumes of recycling. This is because the European Construction and Demolition Recycling Services Market, in addition, found that the revenues earned were $18.75 billion in 2013 and they were expected to be on the increase to $23.85 billion in 2020. About 25.9% rise in the volume of waste has been estimated by 2020- this was alleged to be intensifying the demand for limited landfills, whereas the rising cost of land filling Construction &Demolition will lead to the increased use of sustainable solutions.

In addition, Construction & Demolition waste can be expensive and difficult to sort, collect and transport because the material is extremely heterogeneous and voluminous. These stress the need for an integrated smart management solution that will smooth the progress of material recovery and related business economics (Ben, 2014).

2.3.1.4 Waste Disposal

Waste disposal is referred as the final measure for achieving effectiveness in the waste management. There are, somehow, different disposal methods adopted by various countries in waste disposal at landfills. For instance, the "DNSWM" reported in the Malaysian exiting landfills in Malaysia is about 289 (Nagapan, 2012). It was asserted that based on the perception of the contractors, the direct method of disposal of construction waste in landfills has become a culture. Because of the problems of the disposal of waste to landfill, The Malaysian government constituted the "Construction Industry Development Board" and also the "Solid Waste Management and Public Cleansing

Corporation" (PPSPPA) saddled with the responsibilities of promoting recycling and Industrialized Building Systems (IBS) and also the reduction in the quantity of waste being deposited in landfill. The method of disposal which is not a positive choice for the position of sustainable waste management is the reduction in the quantity of waste discharged (Nagapan, 2012).

Waste disposal to landfill includes burying the waste which still remains a usual practice in many nations. Hence, landfills are established as frequently relinquished or abandoned borrow pits, mining voids. However, an appropriately designed and decently handled landfill can subsist a moderately and hygienic cheap system for the disposal of waste. Poorly designed landfill management can create unpleasant environmental impacts, for instance, windblown waste, breading pests, and fluid leaked generation. Also, one more basic result of landfills is the release of bad gas, which is delivered from the anaerobic breakdown of the natural environment. The problems of odour can be created by the gas that can destroy natural vegetation and contribute to greenhouse gas. (Nagapan, 2012).

However, the last resort for biodegradable waste is the landfill. The key driver to divert waste from landfill is the landfill tax, to ensure that the EU targets are met, "under the Landfill Directive". Therefore, by 2020 the assertion is that not all the waste in landfill will be diverted. Hence, some wastes can only be discarded in the landfill as the worst and the last option Waste Review (2011). Figure 2.1 shows the waste management hierarchy.

The figure below is the waste management hierarchy. The process of waste management comprises of material reduction in the planning and design stages, waste and scraps reduction at the construction site, on site material reuse, and the recycling of materials that cannot be reused on site. The first stage is the reduction stage, were the project resources is being optimized and waste reduction at the design stage of the construction project, then the preparation of accurate estimation and ordering of the construction materials for proper reduction of waste are performed. Also at that stage there should be implementation of efficient framing technique, for example precast building materials are to be employed for construction to reduce the quantity of waste generated in construction activities. The second stage is the reuse; this is where the waste materials from the construction site are reused on site or transferred to another site for maximum utilization, then the materials from deconstruction are salvaged for another purpose like landfilling and other works for the purpose of construction waste minimization/reduction on site.

The third stage is the recycling stage in which it involves the in-house recycling programme of construction waste, hiring a full-service recycling contractor, the use of the materials' recycling service and to make subcontractors responsible for their own waste to encourage the adoption of the construction waste material construction, the last of the hierarchy of the construction waste management is the disposal at landfill; these make up for the integrated waste management method for sustainable construction waste management practice that is adapted and examined by the present study.

The objective of this chart is to address techniques and potential alternatives to conventional techniques of construction, the planning practices, and waste disposal options to incorporate the concepts of advanced construction waste management techniques. Reducing the amount of waste generated is the most important step in reducing the construction waste management burden. The waste management hierarchy is shown in figure 2.1. The reduction step is the most important, followed by reusing, recycling, and as a last option, disposal at land filling.

Construction Waste Management Hierarchy

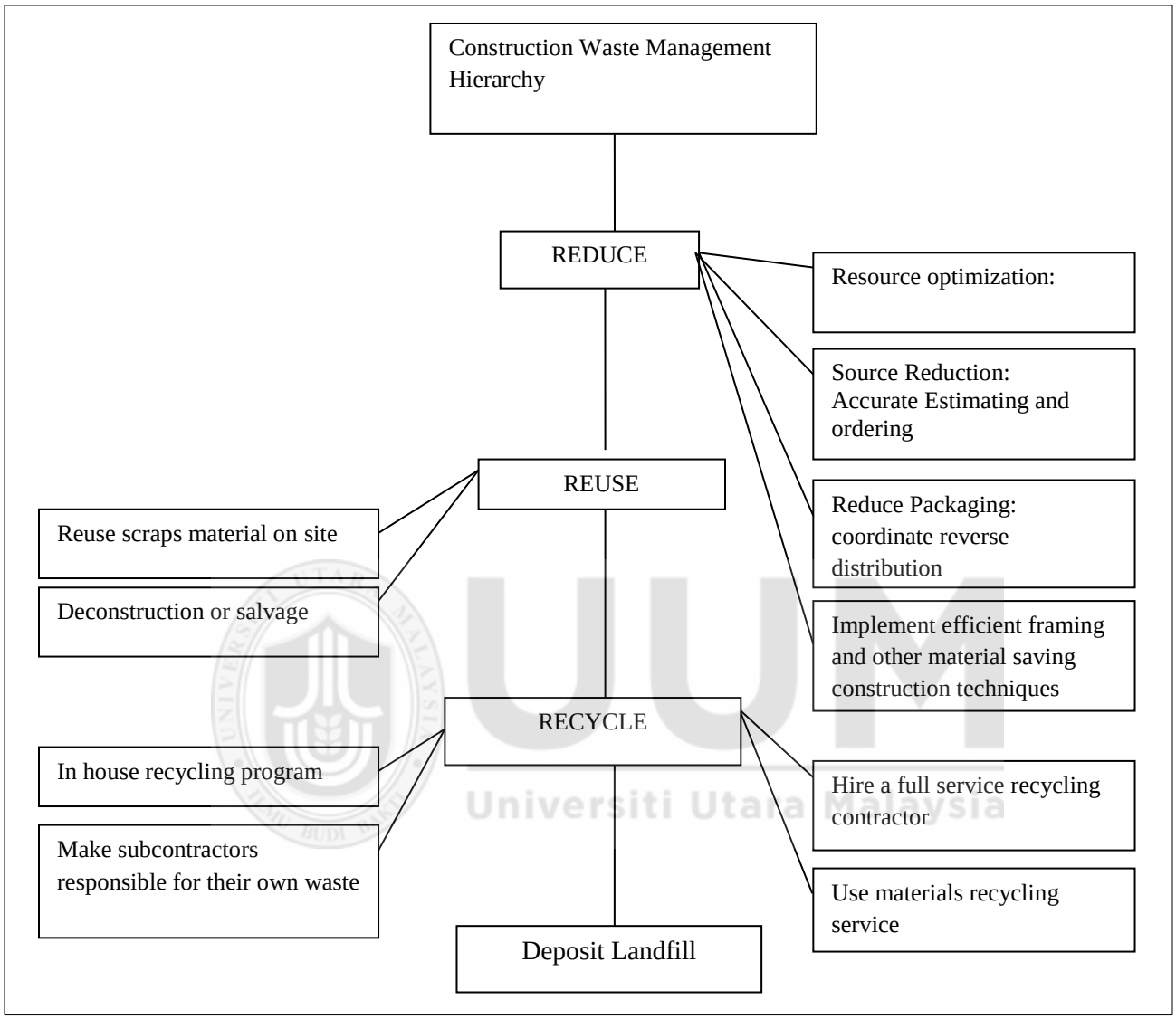

Figure 2:1 *Construction Waste Management Hierarchy*
Source: *Kibert & Lanquell (2000).*

The next section presents the independent variables for this study; they include Organizational structure and its dimensions, organizational resources and its dimensions and government policy.

2.4. Organizational Structure

Organizations as indicated by Daft (2007) are viewed as" social entities that are goal - directed, designed, deliberately structuring and coordinating activities, and having a system linked to the external environment". The key element of an organization is not a building or a set of policies and procedures; organizations constitute individuals and their relationship with each other. An organization exists when individuals interact with each other to perform important functions that help attain goals" (Daft, 2007). The organizational structure is described as how an organization can be assembled. The organizational structure is described as how job tasks will be coordinated officially, grouped and divided. Since, the organizational structure is institutionalized, the way and manner on how individuals will interact with one another, the method of communication flow, method of rewards distribution, method of how authority relates, are all defined (Daft, 2007).

Anand and Daft (2006) stated that "organizational structure provides the basic template for the continuance of an organization's society, norms, culture, value philosophies and informal activities. Also, according to the article 'What is the Right Organization? By Duncan, (1976), "organizations are undergoing change". Meanwhile, the organizational structure development is categorized into divers' periods that move from medium to near horizontal.

Organizational structure is defined by Sehanovic and Zugaj (1997) as the means in which organization is categorized with the end goal of accomplishing expected result.

Sehanovic and Zugaj (1997) further expressed that organizational structure has the aim of representing the totality of connections and relations among its components at the organizational levels to a quite defined extent.

Dalton, Todor and Spendolini (1989) described the organizational structure to comprise of the organization that makes resources and formulates a rational plan of the environment, hence, the organization of the functioning personnel, and task, the internal relationships, and also the time sequence of tasks determination. Essentially, two aspects of organizational structure exist in all organizations: configuration and structural. In addition, he emphasized that organizational hierarchies are part of the configurational issues; hence, the decision rests on whether the level is low or high, and on what types of activities are attached to which hierarchies.

It is difficult to distinguish between good and bad, in the organizational structures of waste management because of limited room for conducting tests, and it is difficult to accomplish change, yet within fairly narrow limits. Nevertheless, whenever the structural problems subsist, their origin is always obvious, because of their solution; however, the improving achievement is certainly hard to realize for the reason of regulatory control. On the other hand, some organizations are more successful, based on their work aside from their organizational structures. As a result, there are also issues of approach, preparation and motivation, and to a great extent not as much of an issue of structure. The strategy, for instance, empowerment and flexibility, further differentiates one management approach from another. Once more, this is more or less an issue of

structures. Nevertheless, by experiencing the discrepancy caused by different strategies it shows that the real benefit will be gained (EWM, 2006).

EWM (2006) reported that in regard of the similarities and differences from one another, an organization can best be understood and hence the nature of best practice is appreciated, observations on how the organizations operate. Therefore, the organization's qualities, the corresponding influence of the work are among the operations of waste management that have been accomplished and will be made visible in a significant manner.

According to Subramanian & Nilakanta (1996) the configurational dimensions of an organization are presented normally as an organizational chart. The extent of formalization and specialization make up the structural dimensions. The centrality of taking decision at the top is referred to as centralization, where the personnel's specialized skills would come in helpful for the whole functional areas in the organization. The current study organizational structure is operationalized by formalization, centralization and specialization in line with (Subramanian & Nilakanta, 1996), who intended to examine the effect of government policy moderating the relationship between organizational factors and construction waste management among construction organizations, in Nigeria. The organizational structure in this study is viewed as the formal system of responsibility and reporting relationships that enables expected outcomes to be achieved by the employees by means of coordination and motivation (George & Jones, 1999).

In this study organizational structure refers to how organizational job tasks will be officially coordinated, grouped and divided because the organizational structure is institutionalized.

2.4.1 Dimensions of Organizational Structure

The dimensions of organizational structure considered for this study are; formalization, centralization and specialization.

2.4.1.1 Formalization

Martin (2007) defined formalization as the degree to which regulations and procedures of an organization are followed. Therefore, across various organizations, the element varies greatly. For instance, the coming and leaving times to and from work are made clear in any organization, for the control of conduct the use of 'clock in' has been emphasised. Furthermore, it is comprehended in different organizations that employees do spend adequate time on the job in accomplishing their tasks. Therefore, most of the activities in a few organizations are covered by rules and regulation, while other people exercise their judgement as permitted.

However, Jaworski & Kohli (1993) described formalization as the extent to which rules, penalty, roles, influence, and relationship, channel of communications, procedure and norms are described in the organization. Fundamentally, Auh & Menguc (2007) considered formalization as a means of sustaining the rules and standards in guiding the

workers while accomplishing organizations' goal. Furthermore, in examining the effect of formalization in organizations, Hartline et al. (2000) emphasized that the formalization makes the employee become rigid and obey the rules of the work in which obviously their creativity is obstructed. On the other hand, production-oriented organizations, routine, procedure and standard guiding the employee and avoiding the replication of similar activities are brought about by formalization. It similarly serves to control and provide guidelines for taking care of organizational problems (Auh & Menguc, 2007).

Formalization is regarded as the extent to which the job process can guide and control the work procedure of the organization. Therefore, the common idiom distributed between members is provided as a result of the formalization, and it also enables an organization to conduct proficient communication (Wyn & Bodewes, 2002). In addition, formalization can be said to be a signal to the extent in which the rules and obligations of the members of the organizations are determined and also the extent to which they are written as rules, instructions and procedure (Schminke, *et al*, 2000). In addition, the organizational setup of this nature prevents staff members in the construction waste management organization from carrying out different activities when carrying out their daily work (Banai & Reisel, 2007).

In this study, formalization is referred to as the extent to which decision and working relationships are controlled by formal rules and standard policies and procedures in construction waste management organizations. Following Daugherty and Stank (1992); Pertusa-Ortega, *et al*. (2010), the organization of construction waste management with a

formal structure will require the establishment of specific rules and procedures that indicate what needs to be done by the staff members (Katsikea, *et al*., 2011).

2.4.1.2 Centralization

Centralization can be said to be the procedure in which organizations' activities, in essence, regarding planning, and decision-making get to be focused on in a particular location or group.

Centralization is the junction of spans of control, decision-making, and communication within an organization. The top executive makes the decision for a centralized organization. Therefore, the enforcement of the policies is through various organizational levels after progressively expanding the control pending when its base level will be achieved.

Communication flow is usually required in centralized organizations through a central person or location. In centralized organizations, individual leaders play a major part and have a great deal of power in decision-making. Leaders in centralized organizations have more prominent access to information and, along these lines, they can exercise more influence over group members by controlling the flow of Critical Information and Knowledge Communication (2014).

In relation to assigning power of decision-making in an organization, there is the degree of the participation of the members of the organization in making decisions (Jaworski &

Kohli, 1993). John & Martin (1984) characterized "centralization as the point to which marketing planning related activities and decision are concentrated in a few positions".

Also, in Daugherty and Stank (1992); Pertusa-Ortega et al. (2010) they described "centralization in their study as the locus of "decision-making authority and control within an entity of construction waste management organizations. Centralization is referred to as the degree to which the power of decision making is focused on the apex of the organizations' managerial level and a centralized structure is to be practiced in an organization once the decision-making task is concentrated in the hands of the fewer organizations" (Willem, Buelens, & De Jonghe, 2007).

In addition, the broad purpose of this centralization as a composition in an organization is to produce uniform rules and actions, mitigate the propensity for making mistakes by a member of staff because of the absence of skilfulness and information, also to empower the employees for central skill utilizations and specialized expertise, and for an organization to have a tighter control of operations (Katsikea, Theodosius, Perdikis & Kehagias, 2011).

In this study, the construction waste management organization's centralized structure confines the manager's authority, regarding decision-making, where the chief executive officers (CEO) or the directors have the decision power and control. Therefore, centralization keeps the managers and members of the staffs be flexible and makes them take the initiative when performing their duties (Katsikea *et al.*, 2011).

2.4.1.3 Specialization

Specialization is described as the division of labour, or the procedure of dividing most of the activities required for the organization into individual tasks. Therefore, in the human resources management, practice duties are assigned to staff of various positions (Fried & Ferris, 1987). The entire philosophy of an organization is concentrated on the concept of the division of work and specialization. Therefore, the division of work is regarded as an assigned obligation to a particular person or a group of staff. Nevertheless, when the responsibility for a particular job is assigned to a designated expert in a field, it is called specialization. To ensure coordination, some of the workers occupy management positions at the different phases in the process (Fried & Ferris, 1987).

Also, the perception of specialization plays key role in the area of the operations' management evolution. The large scale operations caused by the Industrial Revolution, require the need to categorize means of simplifying the complex processes by Frederick Taylor, that involved breaking down of task, optimization of the component steps, thereby encouraging workers focus on repetitive task (Taylor, 1911). Quick completion of the main tasks by workers is achieved through specialization (Newell & Rosen Bloom, 1981; Argote 1999; Schultz, McClain & Thomas, 2003). In relation to an individual worker, there is a great benefit in the specialization because where individual staffs remains in the same task over time, knowledge related to the job or gain, can help improve his or her performance (Huckman & Pisano, 2006; Humphrey, Nahrgang, & Morgeson, 2007). Nevertheless, there will be a motivational benefit as workers change tasks; the benefit is positioned so that it will likely be offset by the gains of

specialization. At this point, there are greater benefits for the junior staff with low level of experience than those with diverse experiences (Argote, 1999).

In this study, specialization is defined as division of work. The division of work is the act of assigning responsibility to each organizational component or specifically to a specific individual or group thereof. It becomes specialization when the responsibility for a specific task lies with a designated expert in that field. The efforts of the operatives are coordinated to allow the process at hand to function correctly. Certain operatives occupy positions of management at various points in the process to ensure coordination in the construction organization. This is in line with the study of Fried and Farris (1987). The next organizational factor examined in this study is organizational resources.

2.5 Organizational Resources

According to Inmyxai and Takahashi (2009) organizational resources are in the form of "tangible, intangible and human. Assets are tangible resources; they include labour, land, capital and equipment. The non-physically seen are referred to intangible resources, for example, knowledge. Training and educating of owners and the managers are part of human resources". Henderson and Cockburn (1994) referred to organizational resource as an asset or erstwhile production input, tangible or intangible ownership, access control, by the organization.

Barna (2014) regarded organizational resources as where resources are brought together. Different resources are used by organizations to achieve their goals. For instance, the organization's major resources are frequently expressed as financial, human, physical, and information resources. The responsibility for acquiring and managing the organizational resources for the accomplishment of the organizational goal is on the managers.

Both the technical and non-technical day-by-day operations are required for the managerial and human resources of an organization. Furthermore, human resources refer to the physical as well as organizational resources when referring to the staff members. Alternatively, it is also viewed as the intangible in reference to the knowledge accumulation of management staff. Penrose (1995) stated that the human resources comprise of mostly the aspect of the organization with the purpose of contributing to the everyday procedure of the construction waste management organizations. Equally the skilled and unskilled labour, financial, administrative, clerical, management and staff were considered by Penrose. The organization's intangible human resources are developed over a period of time. Thus, skills, expertise, knowledge, capacity and behaviour, skills and decision-making of the organization are developed over a period of time (Grant, 2002).

In addition, the organizational resources are the process, the system and the structure of the organizations that allow for the acquisition and dissemination of training and information, also for the motivation of the members of the organization (Andrew, 1971).

Therefore, Ropo and Hunt (1995) reported that organizational resources embrace the expertise of the employees, the system, policies and management system. Next, Brush & Chaganti (1998) agreed to financial structure, the system and control system, also Bracker & Persons, (1986) reported that employee skills &culture of an organization were also part of the organizational culture. Dollinger (1995) stated that most probably the system of the management, employee skill and routine is necessary in providing a better level of services. In this study, the organizational resource definition is in line with the study of Andrew (1971). Further conceptualized are the transformational leadership style (Geib & Sweanson, 2013); organizational learning (Yamen, 2010); staff training (Bartlett, 2001). There are many dimensions of organizational resources, Following Geib & Sweanson (2013); Yamen (2010) and Bartlett (2001), this study selects three dimensions to review, and improve upon: transformational leadership style, organizational learning and staff training in relation to construction waste management.

2.5.1 Dimensions of Organizational Resources

The dimensions of organizational resources considered for this study are; transformational leadership, organizational learning and staff training.

2.5.1.1 Transformational Leadership

Hoffman et al. (2011) stated that "Transformational leaders are referred to as the idea for emphasizing the process whereby collective aims are consistent with values of the

subordinates, encouraging the act of using followers in recognizing organizational goals as their own and make extra effort toward the accomplishment of the goals". Furthermore, Simola et al. (2012) described transformational leadership as the kind of leadership where the dealings are organized with interested parties "around a collective purpose" hence it "motivates, transforms and improves the ethical aspirations and actions of followers."

Transformational leadership is regarded as numerous patterns of actions as follows: Transformational leadership utilizes the personality of the leaders to get the trust of the stakeholders and respects and inspires pride in the latter. Also, charisma underlines the condition of a sense of mission and common vision required for the transformation. Secondly, the attribute is motivational through which symbols used to redirect follower's efforts are employed by leaders; that express, simplistically, as the primary aim of the process of transformation, and the clear communication that accompanies higher expectations. Thirdly, intellectual stimulation is charismatic. Intellectual employees are stimulated by the leaders by emphasizing creativity and consistency in situations of problem-solving (Bass, 1990).

In addition, Transformational leadership is the type that seeks optimistic transformations among the followers and of the changes that are required through the achievement of the organization's "strategy and structure (Geib & Swenson, 2013). Furthermore, transformational leaders with exemplary behaviour focus toward the team, for instance, providing the team with a vision and solving interpersonal conflicts, increasing the

likelihood that individual followers are satisfied with their jobs" (Braun et al., 2013). He further express that the direct consensus model was relied upon, which encourages consensus among lower level units to specify another form of a construct at a higher level. This model makes such assumption because transformational leadership (a) includes team focused and individual-focused behaviours and as a perspective leadership style, the mental model convergence in the team has been established" (Braun *et al*., 2013).

In transformational leadership, both the led and the leaders' transcendence interest are represented (Dillard, 1995) concurred to Bennis (1959) who improved on the concept of "transformative leadership as the ability of touching souls of others by an individual in a manner which raises the consciousness of human intent, builds meanings and inspires humans as the source of Power". Likewise, Leithwood (1994) using a different modification of Burns, which bears on (Bass, 1985) stated that the transactional and transformational leadership are the two- factor theory which represents the converse ends of the quantum of the leadership content. In addition, he further upholds that both can be complementary Bass and Avolio (1994) extended Burns' theory. The transformational leadership includes four factors; idealized influence, motivation, inspiration, stimulation, intellectual and individualized consideration (House & Shamir 1993; Bass &Avolio, 1994; Gardner &Avolio, 1998; Jung &Avolio, 2000).

In this study, transformational leadership followed the study of Geib and Swenson (2013) and it needs to be examined because it has been shown in empirical studies that it is

universally effective across cultures (eg. Zagorsek, Marko & Stanley, 2004). There is an expected result that the difference in culture will not influence the findings related to the transformational leadership examined in this study. Additionally, the transformational leadership theory has been recognized as the most advanced because it encompasses the symbolic, emotional and highly motivating behaviours that produce better results than the ordinary leadership. The succeeding sections discuss the issue of organizational learning.

2.5.1.2 Organizational Learning

The organizational learning ability was taken into consideration. The organization and the character of the administration that enable organizational learning process play an important role (Chiva, Alegre, &Lapiedra, 2007). Furthermore, by means of invisible sources or abilities by the institutions' organizational learning abilities, it creates a competitive advantage and new characters among the management and organization (Chiva & Alegre, 2009). Organizations tend to have a non-stop process that improves its collective ability to accept, understand, and respond to internal and external changes.

"Some researchers found that a focus on organizational learning has great potential to build the joint and continuous improvement programs that promote organizational performance" (Levine, 2001). In essence, organizational learning promotes creativity. Ramus & Steger (2000) built the parallel among the attributes of learning organizations and those expressed in organizations' literature designed for innovation support and the creativity of employees, and organizational outcomes are promoted by organizational learning as established where several professionals advised that effective method of promoting organizational learning by an appraisal tool is highly

recommended. However, Pace (2002) further revealed that organizational learning outcomes are measured by the impact of the performance, finances, productivity and production of waste, continuous improvement, management of waste, employee behaviours, satisfaction, customer focus and performance.

In a situation where people get information through learning, and translates the learned information, simultaneously developed it to a team-based learning, the acquisition of the team's outcome at the conclusion of learning reflects the entire organizational behaviour, which means organizational learning does take place (Aksoyturk, 2008). Akgun et al. (2009) stated that individual process is even learning in itself, which is achievable for an organization to keep up their subsistence through the learning process in the international business world, where exceptional rivalry and technological transformation leave their mark.

According to Gizir (2008) he described organizational learning as having a motive of integrity among policies of the organization, the learning of an individual and behaviours, social standards between the employees and the organization. Phang et al. (2008) and Yamen (2010) asserted further that, organizational learning is a system of administration of an organization that is able to monitor their activities, which attempts to investigate the outcome of alternative actions, having the capacity of changing the action with a specific end goal to increase their performance. Therefore, organizational learning is a continuous procedure which permits construction organizations to solve their construction waste management problems on site by reacting to the requirement of environmental changes

(Akgun *et al.*, 2009). Consequently, efficient exchange of information is empowered through organizational learning within the organization. In this respect, Yamen (2010) said organizational learning is regarded as an information management strategy. Finally, Yamen (2010) added that learning is considered as the ability to create harmonized information with the motive and the utilization for the creation of information. Hence, a change in the environmental conditions was adopted by the organization through construction waste management.

In this study, organizational learning is regarded as the process whereby new knowledge and understanding are developed by the organization from the common experiences of people in the organization, and has the potential to influence behaviours and improve the organization's capabilities.

According to Weerd-Nederhof, Pacitti, Gomes, and Pearson (2002), there are four stages involved in the learning process: knowledge acquisition, distribution, and memory. The process of knowledge acquisition is the process which organization uses to acquire knowledge and information. The process of knowledge distribution involves the sharing of information between employees in an organization. Knowledge interpretation involves transforming information into shared knowledge. An organization's memory is used to store information and knowledge for future use (Jimenez-Jimenez & Sanz-Valle, 2011). The succeeding sections elaborate on the issue of staff training.

2.5.1.3 Staff Training

Training plays an important function in the aspect of the commitment established. Meanwhile, the workers accord greater importance on training programs and this is highly appreciated by co-workers, managers, supervisors, managers, hence, greater commitment outcomes can be achieved where organizations that create an environment of training can be approved and appreciated by employees (Bartlett, 2001). Furthermore, Stavrou, Brewster and Charalambous (2004) alleged training as the ability of employees from working in any place, also the non-professional and the assembling of the abilities to attain to the professional level.

Furthermore, Apospori et al. (2008) reported that organizational performance is influenced by the significant impact of training. Hence, Stavrou, Brewster and Charalambous (2004) stated that training and development increase employees' performance and development, and it can also increase the performance of training and development activities of the construction waste organizations. "The strong approach assumes the employees in the organizations as simple resources to achieve the objectives of the organization, so under the flexible approach the employees are viewed more as valued assets capable of development" (Tyson & Fell, 1986).

According to Akinpeju (1999) the procedure of training and development can be an uninterrupted one. Being able to do the job well is an indication for adequate impact of training and development, and thus, effective construction waste management practice can be achieved through methods of training and development. Furthermore, the

employees' performance can further be enhanced depending on how good the training and how devoted the employee will be in the assimilating and distributing of the training that can improve the efficiency of worker of the construction organization in carrying out his job. Therefore, the training of workers sticks to the organization and this altogether supports the staff development (Meyer & Allen, 1990).

Bartlet (2001) pointed out that there is an existing relationship among the employees' awareness on training and organizational obligation, also the staff perception of training is positively linked with the employees' ability, the readiness to participate, and the support from the senior managers on training in the organization. For this reason, the development program and comprehensive training assist in considering the skills, knowledge, and the attitudes necessary for the creation of competitive advantage and achieving the organizational goals (Peteraf, 1993). Also Oribabor (2000) stressed that competencies like, managerial and theoretical, human, technical competencies are developed and can be achieved through training and development for the continued growth of the organization and the individual.

Furthermore, Pit Field (1982) stated that the principal targets of training are provided for skills, aptitude and knowledge in performing the required job effectively, therefore, to develop the worker, this will progress to the increased efficiency in construction waste management for the reduction of poor work, mishandling of the machines and physical reduction of risks. In addition, Garavan (1997) found that the overall service quality can

cover the improvement of the overall service quality for instance where the receptionist receives training in social skills.

There is a direct relationship between staff training and employees' performance, whereby training is regarded as the systematic and formal change of behaviour as a result of learning that essentially occurs because of proper instructional development, education and planned experience" (Armstrong, 2000).

Furthermore, the practical implication of training is important and effective training is significant (Ginsberg, 1997). Considering today's business world, employee's skills are necessary for them to perform better, and this can only be possible through training. Most of the staff are trained by their company. The high levels of commitment and motivation among the employees are achieved as a result of training in which they are seen as an opportunity for improvement in the construction waste management organization competency. Therefore, the term training is defined as "the intervention that is planned to enhance the determinants of individual task performance" (Chiaburu &Tekleab, 2005). To develop the possibility of realization of its goals the much-needed training will help reduce their anxiety or annoyance as a result of work demands, or as a result of their unfamiliarity to them, and the fact that they lack the skills in handling their job effectively (Chen *et al*., 2004).

For this reason, to increase the organization's productivity, training is recognized as a vital variable. Various studies as in Colombo and Stanca (2008) and also Oguntimehin (2001) categorized the importance of training into: improving work quality, increasing

the productivity, improving the skills, knowledge, enhancing the use of tools and machine, understanding and attitude, reducing waste, accidents, turnover, delay, and other overhead costs of the construction waste management organization, eliminating obsolesce in skills, technologies, methods, products, assets management, etc. It brings incumbents to that level of performance.

This study is in line with the concept of Colombo and Stanka, (2008) and Oguntimehin (2001). This shows that there is a relation between the employees' training and organizational obligation, the staff training is positively linked with the ability of employees, the readiness to participate and the support from the senior managers of the organization for training which will bring about efficiency and effectiveness in the construction waste management practice. The succeeding section will discuss the government policy on the construction waste management.

2.6 Government Policy

The term "Policy" is "described as a course or general plan of action to be adopted by any government, party or person. As defined in the modernizing government white Paper of 1999, policy making is the process that governments use to translate their political vision into programmes and actions to deliver "outcomes", or desired changes in the real world" (Waller, 2009).

According to Anderson (2005) the policy is the guiding principle that is used to establish organizational regulations. Furthermore, policy is a course of action that leads or

influences decisions. Also, it is used as a guide for making judgment following an assigned event within the structure of goals, objectives and the management philosophies as defined by the senior management.

In addition, the Nidirect Government Services (2014) described" government policy" as the program of action which aims at changing a definite state of affairs. Therefore, the government uses policies as the starting point for them to execute a course of action to achieve a real life change. Hence, policies are used to tackle a wide range of issues. In fact, policies can even change the amount of tax and individual or organization pay, parking fines, immigration laws and pension, landfill tax. Similarly, the government can change the law when a policy is created and it can also affect the people or particular issues or everyone in the society at large.

Government departments, agencies for example the Land and Property Services and other councils enact policies that will affect the lives of their subjects. Furthermore, these policies can be influenced in many ways: The instrumental basis for implementing the strategic plan comprises a legal and regulatory framework which is elaborated in the form of by-laws, ordinances and regulations concerning waste management, and includes corresponding inspection and enforcement responsibilities and procedures at national, state, and local levels"

In that case, regulation and controls are not the only types of instrument available for achieving waste management goals. Other options include economic incentives, the

internalization of externalized costs, according to the "polluter pay" principle and non-economic motivations based on environmental awareness and solidarity of the population. Authorities should consider the full range of available instruments within the policy framework" (CEPA, 1999).

The policy environment that governs waste management is mainly reflective of the legislation enacted at the provincial level and decisions made in relevant case law. Federal participation in waste management efforts focuses on Trans -boundary waste because most waste management falls under the provincial jurisdiction and authority under the division of federal and provincial powers outlined in The Constitution Act (1867). As a result, the Federal government is involved in the regulation and management of certain types of toxic substances, pollutants, and wastes through the Canadian Environmental Protection Act (CEPA, 1999).

In essence, the Federal government also regulates the Hazardous Products Act (HPA) which requires a supplier to provide for a controlled product at the time of (or prior to) sale or importation. The Federal government can influence waste management in these provincial jurisdictions by developing national goals, policies and funding programs (CEPA, 1999)

In the late 1980's, the municipal solid waste had been the center of attention among the media as a major problem in Canada and in 1989, "the Canadian Council of Ministers of the Environment" (CCME) adopted a national waste diversion goal of 50 percent in the

year 2000 and developed a “National Packing Protocol” which aimed to reduce packaging waste by 50% by the year 2000 (Wagner & Arnold, 2008). Also, at around the same time, the waste management in Nova Scotia was becoming an increasing concern in the media and for the citizens. According to Wagner (2007), the provincial government adopted the CCME waste diversion goal and opted to develop a waste management strategy that focused on waste recovery and waste minimization rather than expanding and improving the options of waste disposal.

For this reason, the Environmental Goals and Sustainable Prosperity Act (EGSPA, 2007) Policy is another avenue through which the government plays a role in waste management. Although, the EGSPA does not include provisions that allow the government to enforce or regulate waste management regulations, but it does commit the government to the achievement of a variety of environmental objectives by the year 2020, and one of these objectives is to meet the 300kg per person per year disposal rate that is outlined in the Environment Act (Nova Scotia Government, 2010).

Therefore, the pay-as-you-throw (PAYT) waste management is referred to as the use-based pricing, variable rate pricing, or unit pricing, which has emerged as a way of reducing the waste generated. Under the PAYT waste management system, users are charged a fee for waste collection and disposal. In general, combining the user fees ensures that those responsible for generating the waste are responsible for disposal costs (USEPA, 2009).In addition, there have been shifts of some of the responsibility of waste minimization to citizens and producers in (Park, 2009).Similarly, PAYT systems have

been implemented in many countries, including parts of America (USEPA, 2009), parts of New Zealand; in Taiwan (Snow & Dickinson, 2001). Nevertheless, this system entices waste generators to decrease the quantity of waste they generate, and to salvage the waste to avoid from having to pay additional charges (Kim, 2002; Miranda *et al.*, 1994). In essence, the charges can be designed for the discount to be awarded to waste generators who produce limited amounts of waste, while heavy producers pay increased rates per volume of waste as volumes increase (Liss, 2000).

2.6.1 International Construction Waste Management Policies

Different categories of policy instrument concerning waste management are existing as a result of various criteria and reasons. For example, in Europe eighteen policy instruments were investigated by Tojo et al. (2006) where they are divided into (3) three categories: administrative, economic and informative; furthermore, these instruments were categorized into five mechanisms: mechanisms that influence design, voluntary mechanisms, financial mechanisms, regulatory mechanisms and permitting mechanisms (Sonnevera International Corporation, 2006).

Speck and Markovic (2001) pointed out that the policy instruments were illustrated in the central and eastern European countries in economic instruments and other instruments; Eunomia et al. (2009) distinguished a range of different policy instruments into three categories: command & control instruments, economic instruments and negotiated agreements. In this study, the categorization of waste management policy instruments follows Tojo et al. (2006), that is, administrative, economic and informative. From the

perspective of the level of cohesiveness, policy instruments can be categorized as mandatory, voluntary and negotiated agreement.

Administrative instruments cover various measures concerning the fulfilment of certain tasks, for example, the achievement of a certain recycling rate, the elimination of the use of certain substances and prohibition of landfilling. Once mandated via legislation, the target entities need to achieve certain tasks or refrain from doing certain things, in accordance with what is demanded in the legislation. Unless an exemption is granted, the target parties have no choice but to obey.

Typical administrative instruments include substance restriction, source separation, take-back obligation, collection, reuse, refill, recycling targets, minimum recycled material content standards, landfill restriction targets, and environmental sound treatment standards, demolition protocol, and site waste management plan. In addition to the administrative instruments, economic instruments are drawing significant attention from governments and researchers due to its monetary incentives. These instruments provide monetary incentives (subsidies, refunds, etc.) when the parties carry out tasks that the instruments wish to promote, or disincentives (tax) when the parties cannot fulfil the required actions).

Speck and Markovic (2001) distinguished them into five categories, namely, taxes & charges, deposit refund systems, tradable permits/liability, enforcement incentives (non-compliance fines, performance bonds) and subsidies. Tojo et al. (2006) presented the

economic instruments as landfill tax, waste disposal tax, recycling credit scheme, subsidies for secondary products/taxation of quarry products, "pay-as-you-throw" approach and deposit-refund systems. Oosterhuis et al. (2009) illustrated the economic instruments implemented in the Netherlands as waste taxes, waste collection taxes, taxes on raw materials & products, deposit-refund schemes and subsidies & fiscal incentives.

Eunomia et al. (2009) summarized a number of economic instruments for general waste management, including user charges, product charges, taxes, tradable, transferable allowances, credits, deposit-refund schemes, non-compliance fees, performance bonds, liability payments and subsidies. With respect to the construction waste management, landfill levy, tax on aggregate and incentives affecting construction waste are discussed in detail. In particular, landfill taxes in EU countries were investigated and compared to explore the potential use of landfill taxes (Fischer *et al.,* 2012).

2.6.2 Nigerian Policies and Regulations in relation to Waste Management

The major deposit of toxic waste in Koko, Nigeria, in 1978 necessitated the establishment of "Federal Environmental Protection Agency (FEPA) by Decree No. 58 of 1988." The ministry of environment was later created by the federal government in June 1999. Ministries of environment were created by state governments. The whole of this effort is for the enhancement of the strategy for waste management practice in Nigeria but no change has been noticed in this regard.

In tackling the issues of waste management and environmental degradation, the following intervention measures were put in place by the Federal Ministry of Environment:(1) "The revised policy on the environment, 1999; (2) the National Agenda 21 published in 1999, which touches on the various cross-sector areas of environmental concern and maps out strategies on how to address them, and (3) these instruments complement what has existed in the form of guidelines and standard for environmental pollution control in Nigeria and other regulations that deal with effluents, industrial pollution, waste management, and environmental impact assessment, federal ministry of environment" (FME, 2003).

Among FEPA's instructions in combating environmental degradation are the Waste Management Regulation S.I.9 of 1991 and Environmental Impact Assessment (EIA) Decree No. 86 of 1992. The (FEPA's) Policies regulate the collection, treatment and disposal of solid, hazardous waste for municipal, construction and industrial sources and makes EIA mandatory for any major development project that is likely to have an adverse impact on the environment. The environmental sanitation edits of 1997 are also in existence, of which one Saturday in a month was declared as environmental cleaning day for at least three hours strictly enforced by the government in some major states in Nigeria. The post –1988 environmental laws and regulation continued to prevail without any change (Federal Ministry of Environment Publication, 2003).

Some of our personal and organizational freedom was disrupted by the law but our environment was protected in return (Bruce, 1983). In Nigeria a high standard of waste

management burden reduction and hygiene can be achieved by legislation and its important role. The effectiveness of regulations and legislations has already been felt in some states like Lagos, Niger, Cross River and Abuja Metropolis, among others.

It is realistic that the legislation /regulation listed considerable contributions that could be achieved in solving construction waste problems in Nigeria. They are: (1) Waste dumping in unauthorized areas such as; drains roads, rivers and other illegal areas. (2) Strict sanctions on indiscriminate waste littering and scrap abandoning on offenders by making them pay fines for environmental clean-up. (3) Offenders on construction and demolition should be fined under the implementation of effective Management of construction materials. (4) Traffic waste on parks and highways should be fined. (5) Litter bins should be placed in every work place (sites), office and disposal is to be done at approved sites for separation, treatment and recycling of the waste material.(6) Waste management education must be introduced at schools and grass-root level (Afun, 2009). Government commitment to construction waste management is examined through the construction waste management policies, for instance the amount of resources allocated to the construction waste management sector (Afun, 2009).

2.6.3 Government Policy as a Moderating Variable

Some studies have been conducted on government policy in different fields, and its component as either dependent, independent, and moderating variables with different results, for instance, the study of Chang (2006). The effect of the government's

manufacturing automation promotion policy in Taiwan. (2006) investigated the "Effect on the Government's Manufacturing Automation Promotion Policy" in Taiwan, where the government policy stands as the dependent variable. Using two hundred and thirty-one enterprises as their sample size, the primary data was collected using the structured questionnaire and "SPSS 8.0" was used as a statistical tool of analysis. The findings reported a significant relationship between automation adoption and government policy.

However, in the assessment of the Relationships between Selected State Government Policy Measurements and Sustainable Development, Tam *et al*. (2007) indicated that, the existing waste control ordinances (government policy) allow for a skewed distribution of commitments and responsibilities of controlling construction waste among project stakeholders.

Allard and Martinez (2008) examined the influence of government policy and non-governmental organizations (NGOs) on capturing private investment; Government policy was used as the independent variable, and the study reported that government social policies are statistically strong and significant.

In addition, Obaji and Olugu (2014) conceptually probed into the role of the government policy in entrepreneurship development, and they concluded that the behaviour of government policy determines the success of the entrepreneurial activities of any nation. Soares, Rohman and Solimun (2014) examined the moderating role of Government Policy on Entrepreneurship, using two hundred and seventy-five SMEs, using PLS and it

was found that government policy is not significant (path coefficient = -0.080), meaning that the effect of entrepreneurship Orientation on Business Performance is not moderated by government policy.

In this study government policy is the regulations/ policy, rules, government support and action programmes which guide the conduct, functions and operation of construction waste management, is conceptualized as construction waste management regulations, and is used as a moderating variable in this study.

2.7 Relationships between Organizational Structure and Construction Waste Management

Previous studies have revealed that decentralized and informal organizational structures assist in the effectiveness of the construction waste management. This is a consequence of the flexibility and directness of this kind of structure, through the innovative ideas and support from members of the organization (Subramanian & Nilakanta, 1996). Therefore, centralization of authority is established to be a significant obstacle in adopting effectiveness in an organization that is centralized (Aiken & Hage, 1971).

Similarly, Cohn and Turyn (1980) suggested that the formalization and centralization can discourage effective implementation in the construction waste management. On the other hand, it was hypothesized that f formalization is the degree to which decision-making in an organization is placed at the top of the hierarchy.

According to Subramanian & Nilakanta (1996) centralization is considered as decision-making and the training concerning a functioning department in an organization. Therefore, formalization is considered as job written descriptions, rules, and procedures which guide the employees' actions in the organization. Considering that, Specialization is further defined as the written commitment and willingness of the employee to be transferred between various departments in an organization.

It has been established by Katz & Allen (2004) in their study that the numerous parts of organizational structure influence effectiveness. Therefore, structure is classified into categories of: (1) the organic structure (2) mechanistic structured kind of organization. Hence, the organic structure is that type of structure where there is integrated specialization, while the employees work together, with tasks functioning to encourage coordination; and teams functioning as the mechanism for primary integration.

Meanwhile, the mechanistic structured organization centres on the individual specialization, where the employees work separately and they specialize in a single function, and also with a well-defined hierarchy of authority. In addition, Duncan (1976) in his studies proposed that organization that is considered as an organic structure will, therefore, be likely to enhance the construction waste management commencement, while the mechanistic structured type of organization constitutes a new look.

For this reason, measuring organizational structure is in the direction of the relationship with organizational effective performance (Bedeian, 1986). Therefore, in determining the

effectiveness of an organization, Bedeian (1986) stated that organizational efficiency in the construction waste management can be an essential subject in the study of organizations, and it is one of the most cited and yet least understood concept in the organizational theory. He further continued that failing to consider the organization's goal, constituents and characteristics can lead to faulty assumptions of performance.

Zaltman, Duncan and Holback (1973) disagreed with the fact that the bureaucratic and mechanistic kinds of structure discourage the organizational ability to be efficient. On the contrary, the bureaucratic structure cuddles simplified tasks, so the centralization of authority and power can encourage efficiency (Thompson, 1965). Furthermore, organizations that have a mechanistic structure can be found to be ineffective. Similarly, Aiken and Hage (1971) disagreed that the organizations that practice an organic kind of structure are therefore, likely to be more innovative.

Hence, such effective organizations will lose the structure that place less emphasis on a thin definition that has overlapping responsibilities and duties. Nevertheless, Rogers (1983) recognizes that the complexity, size, and organizational slack are positively correlated to the organizational level of efficiency. The formalization and centralization are related negatively to the organizational efficiency of construction waste management. Equally, the formalization and centralization therefore, influence the capability of construction organization efficiency. Hence, in this study as far as the construction waste management organization capability and efficiency is concerned, the mechanistic

structure has been chosen to and adopted because the mechanistic structure improves the organizational efficiency in relation to construction waste management.

2.8 Relationships between Organizational Resources and Construction Waste Management

The transformational leadership style and the human resources, related to the capability of the organization, is seen to be very effective in relation to construction waste management. For this reason, the transformational leadership style is associated with organizational effectiveness.

Groenewald (2009) emphasized on the focus and direction towards achieving high levels of competency, and he asserted that the competitiveness of an organization could be attained through human resource management practice by contributing to the goals, quality and profitability of the vision and mission of the construction waste management organizations. In addition, the staffing, training, compensation and performance management are some of the tools for human resource management practices that will shape the organizational role in satisfying stakeholders' needs.

Groenewald (2009) added that the common rules and procedures for human resources must be adhered to by the organization that will form basic guidelines on its practices. Also, the teamwork between the management and the junior staffs ought to be formed and sustained to be of assistance at different levels, to eliminate communication

breakdown and foster a better relationship between the workers of construction waste management organizations.

Furthermore, contrary to the observation that categorized the top managers as an obstacle to improvement, Yadev, Prabhu and Chandy (2007) reported that the chief executive has immense influence on the organizational effectiveness. In a related study, it was observed that the leadership influences the members of the team, hence the outcome exposed that the clarity of leadership is associated with effectiveness (West *et. al*., 2003).

Therefore, organizational learning refers to a significant component of the process of organization's effectiveness (Meeus and Oerlemans 2000. Likewise, organizational learning is an interesting result in the creation of knowledge to play a helping role in the development of the effectiveness of an organization (Caballe, Juan, &Xhafa, 2008).

In essence, this can be realized by the transformation of knowledge and the technical ideas that will lead to competence in construction waste management, procedure, business and services, on the basis of interaction among diverse technology, knowledge, and the processes of internal characteristics of the organization (Guadamillas *et al*., 2008). Similarly, the process of organizational learning includes the acquisition of information and the distribution of such to the stakeholders of an organization and the easy understanding, transformation, and the interpretation of the knowledge into intangible resources of the organization (David & Skerlavaj, 2009).

2.9 Relationship between Government Policy and Construction Waste Management

The policies, regulations and Acts established by the government indicate the willingness, desires and commitment to come up with an efficient management of construction waste. Nevertheless, the construction practitioners adhere to implemented few policies. It is a fact that to ensure environmental, economic and social protection there is a need for a more holistic policy (Nagapan, *et al*., 2012). "Waste policies and other waste regulations in recent years have been considered as significant instruments in supporting the construction sector in considering its contribution on environmental impact and improvement of waste management practices. Hence, the European Union Framework Directive on waste in 2011 was changed into the UK law. In addition; the United Kingdom Government in 2011 delivered a Waste Review policy for England. These were considered for implementation towards a zero waste economy; this is for the reduction in the amount of material wasted for the new target of potential new landfill for 2014, 2020 and beyond" (WRAP, 2011).

Construction wastes constitute a large portion of municipal wastes. Therefore, for a proper dealing with construction waste there must be a better policy to have a pollution free environment. Hence, the Malaysian Government has developed a regulatory body such as, "Construction Industry Development Board (CIDB)"for the transformation of the construction industry through environmental performance improvement (Papargyropoulou, *et al.*, 2011).

2.10 Moderating Effect of Government Policy on the Relationship between Organizational Structure and Construction Waste Management

The term, "policy is set by the Government for the management of waste, the key drivers being the protection of the environment and the reduction in consumption of raw materials. Some of this policy is set at a European level, through the Revised Waste Framework Directive",

DEFRA has implemented the waste hierarchy, at the top of which is waste prevention, and will work with businesses, including the construction sector, to help them reduce the amount of waste they produce, whilst continuing to recycle the waste that is generated. The Government also sets policy for sustainable construction, encouraging the industry to move towards a low carbon future and to improve its resource efficiency. For example, the introduction of the Site Waste Management Plan Regulations in England in 2008 has led to companies saving money as a result of reducing waste and has helped them to secure work" (Defra, 2011).

In addition, "regulators, such as the Environment Agency and local authorities also have an important role to play in providing consistent advice, guidance and enforcement of relevant waste management legislation. WRAP (Waste & Resources Action Programme), which is funded by the Government, also provides much advice and guidance to the construction sector, including initiatives such as, having Waste to Landfill Commitment and helping to stimulate the demand for recycled materials. Similarly, Government assists the construction industry in meeting the halving Construction, Demolition&

Excavation waste to landfill target by reviewing regulatory barriers to the reuse of waste most especially excavation waste (WRAP, 2011).

The (CIDB) has produced a Construction Industry Master Plan to further enhance the construction key players in the awareness of sustainability. In these regards, the government established Standard Specifications for Building works (SBW) that has been governed by the Ministry of Works, while "Pembinaan Malaysia Act 1994 (PMA)" also governed by CIDB respectively. The aim of Specific Building Works is to make sure that the garbage and construction waste clearance is done twice a week and will send into landfill while Pembinaan Malaysian Act prevent and reduce the pollution that is caused by the construction waste (Nagapan, *et al*., 2012).

Regional legislation defines Construction &Demolition waste disposal methods and facilities. In essence, the Nova Scotia Environment Department does not regulate Construction &Demolition processing sites. However, the processing may be written into approvals for disposal sites were Construction & Demolition may be processed). The diversion targets for Construction &Demolition are left to the prudence of municipalities and individual waste management regions. Whereas, Incentive to divert Construction &Demolition waste from landfills is provided by the provincial government as they provide credit and funding to municipalities for construction & demolition waste diverted from landfill (NSE, 2009; Walker & Atlantic, 2004).

Even though, the Human Resource Management is making the effort to reduce waste disposal by imposing Construction &Demolition waste diversion requirements in their waste management plan, efforts may be hindered if waste is shipped outside the region to be processed. To prevent this from happening, HRM passed By-law S602, requiring all C&D waste generated within the region to be processed within HRM's municipal boundaries at certified facilities. This ensures that the waste is diverted from landfill, and also, that HRM receives the diversion credit (Walker *et al.,* 2004). It is important, particularly, to be aware of by-laws and policies that may be in effect to ensure they are in compliance.

Finally, waste services for business waste are largely provided by the private sector as there are many of the services furl waste commissioned by local authorities. The Government has been working with local councils to increase the efficiency, the quality and frequency of waste collections the ease of recycling and best management practice" (Skumatz & Freeman, 2006).

2.11 Moderating Effect of Government Policy on the Relationship between Organizational Resources and Construction Waste Management

WRAP (2013) reported that the UK Government reported that recycling and other positive waste operations are best encouraged rather than punished, therefore, it supported a number of trial schemes to test out the rewards and recognition, which is more effective. Furthermore, the Department for Communities and Local Government's £250 million Weekly Collection Support Scheme is funding 82 councils to retain or

reinstate weekly collections of residual waste. Approximately, half of these councils plan to apply some of their funding to introduce recycling rewards schemes. Nevertheless, the Government supports local authorities in improving the quality and quantity of recycling,

In 2012 the Government amended the Waste (England and Wales Regulations, 2011). Meanwhile, these require separate collection of waste materials, glass, metal, and plastic as by 2015, so the separate collection is necessary to get high quality recycling, and it is also practicable. Also, the regulations will transpose the revised Waste Framework Directive. The intention is that these requirements will drive the quality of recycling and from 2015 the default should be separately collected. Separate collection does not mean that each construction site will need more bins (WRAP, 2013).

Furthermore, to help improve waste management, the Waste and Resources Action Programme was funded, local authorities and others were advised the best Practice in collections. Planning Policy Statement Planning for Sustainable Waste Management" sets out the current planning policy to be taken into account by waste planning authorities (Defra, 2013). The suitability is assessed against the criteria set out in the policy by the waste planning authorities. In essence, the policy includes the developmental environmental and physical constraints, proposed and existing adjoining land uses, and other environmental quality that have significant adverse impacts (Defra, 2013).

Furthermore, the Government has consulted the authority on the update of this policy, which upholds the core principles contained in the Planning Policy Statement but adopts

a more streamlined approach consistent with the adopted principles for the preparation of other policy on planning which was once “contained in the National Planning Policy Framework.

2.12 Underpinning Theory

In this study the (variables) or specifically the organizational factors are examined is based on previous empirical studies associated with the construction waste management and waste hierarchy Hagger (2007) (Reduce, Reuse, Recycle, and Disposal,).Yuan, (2011) made in relation to the construction waste management. DEFRA (2013) also related to government policy and waste management.

This study, therefore, considers the organizational structure, organizational resources as Organizational factors; and government policy as the moderating variable /factors to be examined, that will influence efficient and effective construction waste management among construction organizations in Abuja, Nigeria. This study is underpinned by the Resource-Based View Theory (RBV). This theory is chosen among other organizational theories, because of its relevance to the current study.

According to Barney and Ouchi (1986), the theory is applicable to organizational economics. In the same line of reasoning, Caves (1982) and Porter (1980) noted that the resource-based view approach reflects an industrial organization approach. According to Teece and Winter (1990), the resource-based approach centres on individual organizations’ key success factors to achieve competitive advantage using core skills,

routine, unique knowledge and distinctive competence. The organization's competence refers to established fundamental rules and routines that the management at the top uses (Mahoney &Pandian, 1992). Interestingly, the theory is linked to other theories such as the agency theory (Castanias & Helfat, 1999); transaction cost (Williamson, 1999). While translating the approach of transaction cost into the resource based approach, Penrose (1959) asserted that a firm consists of both productive resources pool and administrative organization.

The theory also extends to the industry level theory particularly the industrial organizational theory. The linkage between these two theories is that whilst the industrial organizational theory centres externally on the industry and product market (Tirole, 1988), the resource based view theory focuses on the organization's internal resources (Mahoney &Pandian, 1992).

The justification for choosing the resourced-based view as the underpinning theory is as follows: Firstly, the focus of the current study is on the Construction waste management among construction organizations in Abuja Nigeria. The respondents of this study are among the major players in the construction organizations.

Secondly, the objectives of the current study relate to the relationship between the organizational structure and construction waste management. This is in relation to A Teece and Winter (1990), whereby the resource-based approach centres on individual firms' key success factors to achieve competitive advantage using core skills, routine,

unique knowledge and distinctive competence. The organization's competence refers to fundamental routines and rules that the top management uses (Mahoney & Pandian, 1992).

Various studies have been conducted on construction waste management. However, the summary of some previous studies conducted on construction waste management is presented in; Table 2.3 below.

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However, the summary of some previous studies conducted on construction waste management is presented in; Table 2.3 below.

Table 2.3 *Previous studies on construction waste management.*

Author/Year	Purpose/Objectives	Findings
Wilson, Skitmore & Seydel (1989	On-site waste management operation plan.	Training and process optimization, for the success of a Waste Management Strategy on a construction site.
Kokeskela, (1992)	Assessment of new production philosophy implication for construction waste	The application of traditional design, production and organization concept are in sufficient, improvement potentials and guidance of operational improvement
Alwi *et. al*. (2002)	Investigate the incidence of waste within contractors, companies in Indonesia, focusing on non-residential building and infrastructure projects.	Six factors were found to be the key variables of waste, including repair on finishing works, waiting for materials, delays to schedule, slow tradesmen, waste of raw materials on-site and lack of supervision. Whereas design changes, slowness in making decisions, lack of trades' skill, inappropriate construction methods, poor coordination among project participants, delay of material delivery to site and poor planning and scheduling were identified as the key variables causing waste
Fomoso *et. aI*. (2002)	Studies carried out in Brazil to investigate the occurrence of material waste at 74 building sites located in different regions of that	The results indicate that the waste of materials in the Brazilian building industry is fairly high and that a large variability in waste incidence is found across different projects.

	country.	
Ekanayeke and Ofori, (2004)	Identification of major sources of site waste generation in Singapore and to develop a model to evaluate building designs from the materials waste generation point of view.	Four pre-determined attributes under 'design'; three attributes under 'operation' and one attribute under 'material handling' were critical site waste sources.
Poon, (2004)	Material control on construction sites with high-rise multi-storey buildings in Hong Kong.	Design, material procurement and handling, and site management and practices.
Akinkurolere *at. el.* (2005)	The problem of waste management on construction sites in South Western Nigeria and to unveil inherent dangers material wastage poses to the construction Industry. Identify the various sources of waste encountered on construction sites and how these wastes can be minimized and managed.	The study reveals that some construction companies do not give special attention to the handling of their fragile materials, some of the firms are studied are not in the habit of giving incentives for good handling and minimum waste of materials, this ought not be in if incentives are given to the workers, they will feel more responsible for the materials and they will take extra care in handling such items. From the research, it is obvious that nearly all construction firms in Nigeria are yet to start recycling or reusing waste materials on site. Giving contractors the option of reusing or recycling waste will determine the economic feasibility of such operations
Al-Moghany, (2006)	To minimize waste in Construction projects by determining the cause of waste and the severity of each cause.	The results indicated that reworks that don't comply with drawing and specifications, rework due to worker's mistakes ,cutting uneconomical shapes, ordering of materials that don't fulfil project requirements defined on design documents, and inappropriate storage leading to damage or deterioration are the most five signifying sources of construction waste during the construction process. Similarly, rework that doesn't comply with drawing and specifications, lack of materials, rework due to workers' mistakes, effects of social and political conditions and owner's poor communication with the construction parties are the most five signifying sources of time waste., Knowledge about waste reduction techniques is very little. Insufficient training of the workforce is a problem in the

		Gaza Strip construction industry. So, this study proved that the lack of qualified workers was a major cause of waste. Managerial problems in stages .That precedes production are among the most important causes of waste. These include lack of optimization during the design in the use of resources lead to cutting, mistakes in the procurement of materials and waiting for replacement or ordering additional materials, lack of staking of materials and poor communication with the construction parties.
Begun *et.al*. (2006)	Construction waste generation and composition as well as reuse and recycling in the site	The study shows that waste minimization is economically feasible and also plays an important role in the improvement of environmental management. Economic instruments for minimizing construction waste can be used to raise revenue for environmental policy, encourage prevention efforts, serve to discourage the least desirable disposal practices, as well as to avoid the negative consequences of environmental unfriendly treatment and disposal practices of construction waste materials
Tam *et. al*. (2007)	The purpose is to examine the effectiveness of implementing regulatory measures for reducing construction waste in Hong Kong.	The results indicate that the regulatory measures for controlling construction waste are of limited effectiveness in practice. The study has also found that existing waste control ordinances allow for skewed distribution of commitments and responsibilities of controlling construction waste among project stakeholders. This skewed commitment allocation is considered as one of the key reasons contributing to the limited effectiveness of implementing the regulatory measures in the practice
Khoramshahi et. al. (2007)	Demonstrate the advantages of waste management practices; and to present its basic principles and some practical guidelines for use in the construction industry	The most important step in waste management is waste reducing followed by reusing, recycling, composting, burning and land filling. Moreover, commitment of all corporate levels, especially the highest level, training and awareness are essential for being successful.

Olatunji, (2008)	The possibility of enhancing sustainable values in Nigerian construction projects through the usage of WMP from public and private organizations' perspectives	WMP has high impact on waste reduction and hence can generate or enhance sustainable values in construction projects. It does not have a significant impact on waste reduction in both private and public organizations' projects in Nigeria. Eleven factors required for WMP to generate sustainable values were considered important differently in both private and public organizations. However, there is no significant difference in their opinions about the importance of these factors. Both groups opined ten items considered fits for inclusion in WMP's formulation important differently. However, it reveals that "special handling disposal of hazardous waste" is the most important in formulating WMP for public projects and is least for private projects.
Mou,& Ka-yan (2008)	1. To develop an evolution model to capture the changing roles of government and the involvement of the private sector in construction waste management at different stages of construction. 2. To review the current practices of construction waste management in Hong Kong. 3.To find out the current roles of the HKSAR Government and the involvement of the private sector in managing construction waste in Hong Kong and compare these findings to the model developed from overseas experiences; and 4.To make policy recommendations to the HKSAR Government on its possible role in managing construction waste in Hong Kong and upcoming actions the	The participation of the government in managing construction waste is very crucial and the involvement of the private sector is still very limited.

	Government should take in solving the current problems with construction waste.	
Hao at. al. (2010)	To investigate the complexity and interdependencies of factors in managing C&D waste in Shenzhen Develop-related regulation to improve the Effectiveness of current C&D waste management.	The simulation results showed that the pressing situation of C&D waste management in Shenzhen would aggravate if no effective measures were taken to address it during the simulation period. Participants' active participation and cost consideration are the two major factors affecting C&D waste reduction.
Manowong (2010)	1. Explore the current practices of construction waste management in Thailand; 2.Investigate the influence of sustainability factors on the construction waste management efforts and the achievement of green and sustainable construction; 3. Contribute research results and findings to the construct ion operatives and Waste management practitioners in Thailand and, when applicable, in other developing countries.	Availability of management procedures (collection, separation, transportation, and disposal). Enforcement of CWM policies and plans. . Economic incentives. . Health assurances. . Gender diversity recognition
NagapanAbdl Rahma & Asmi (2011)	To identify various causative factors of construction waste existing in construction field activities.	Founded that out the most significant factor contributing waste are 'Frequent design changes'. Meanwhile Wrong material storage, Workers' mistakes, Poor planning, Leftover materials on site, Ordering errors and Effect of weather also causing for generating waste.

Wahab& Lawal (2011)	Assessment of the forms, causes and factors incidental to waste and measures to effectively control construction waste	Most of the firms do not calculate waste indices which could assist them to determine the amount of waste that could be generated on sites. Sorting exercise that could help firms to identify economy advantage associated with the waste streams is not adequately carried out. It was also discovered that most firms do not incorporate "waste management plan" into the collection of documents that are required by contracting firms during the tendering process.
Yuan et.al. (2011)	To explore the major obstacles to managing construction and demolition waste in China.	The findings show that "lack of a well-developed waste recycling market", "insufficient regulation support" and "waste reduction does not receive sufficient attention in construction design "are perceived as the three barriers of most importance. The results also provide useful information for developing strategies to improve the performance of construction and demolition waste management in China.
Arif, at el. (2012)	The purpose is to provide important insights and highlight some issues related to the implementation of effective waste management practices on construction sites in India.	One of the key findings was that client preference and enforcement of existing laws could actually facilitate the implementation of waste minimization effectively.
Osmani (2012)	To evaluates construction waste minimization drivers and pressures for change in the UK.	The results of the investigation illustrate that legal commitments have been mainly allocated to contractors. Insufficient commitments and responsibilities are allocated to other project participants such as project clients, designers and consultants. The study has also found that existing waste control ordinances allow for skewed distribution of commitments and responsibilities of controlling construction waste

		among project stakeholders. The results demonstrate that there is need for a balanced allocation of responsibilities and commitments among all project stakeholders
Ling&Nguye (2013)	The study aims to investigate the barriers that are faced in implementing waste management and the extent to which waste management practices are adopted. It recommends improvements to management of waste in Vietnam, with a focus on Ho Chi Minh City.	There is a lack of awareness about construction and waste minimization in Vietnam. Effective waste management for Vietnam are: employ subcontractors with waste management ability; Conduct training; audit and provide close supervision of subcontractors and workers; sequence activities to reduce damage to completed work; set level of wastage allowable; and enforce these through rewards and punishments.
Yates (2013)	The purpose of the is to provide scenarios for the incorporation of sustainable waste minimization strategies that were determined during a research project that investigated sustainable engineering and construction processes.	The results determined the main types of construction waste and sustainable strategies that could be used to minimise the amount of waste generated by the construction industry
Yuan (2013)	Encompassing identification of potential management measures for construction waste management .Identification of potential management measures for CWM in China, and, finally, analysis and interpretation of major measures for effective CWM in China.	16 critical management measures being identified. Specifically, "ameliorate the regulatory environment for Construction Waste management," "improve construction contractors' on-site construction management," and "establish systems of rewards and punishments to encourage material saving" are the most critical measures contributing to CWM, whereas "promote effective communications among project stakeholders," "enhance management of packaging materials in construction sites," and "cut and store among 16 management measures. It is worth noting that some management measures, including "adopt

		prefabricated building components" and "increase the landfill disposal fee" are not perceived as critical by the respondents, although these management measures have been widely recognized as effective in managing construction waste in some other economies. This is probably attributable to the particular context of implementing CWM in China
Ismam & Ismail (2014)	To develop a conceptual framework of sustainable construction waste management implementation	The conceptual framework for strategic planning of construction waste management emphasizes few aspects that the government could use in ensuring the successful implementation of construction waste management. It is namely regulation, policy, technology and guideline. These four measures are used to ensure the 3R strategy being implemented efficiently. Moreover, from the comparative analyses, it is identified that the fundamental of the waste management still based on the three principles which are reduce, reuse and recycle in achieving sustainability. However, it is recognized that the principles of waste in developed countries being evolved by adding the 'disposal' at the end of the stage.
Nuria Calvo (2014)	Valorisation of inert wastes, elimination of illegal landfills and stimulation of demand for recycled C&D wastes.	The findings reveal that a complete integration of recycled C&D wastes (30% as the total of aggregates) can be achieved in the dynamic process in just 12 years, regardless of the political instrument adopted. According to the results of the simulation, we conclude that the fulfilment of the goals of recycling and reusing of waste materials for construction a key aspect of sustainable construction requires the active participation of the administration in the short term. Government can boost the recycled market of C&D waste through policy instruments in a dynamic way to provide a better understanding of the interactions in the key areas of the

	C&D waste management process. Measures as economic incentives or tax penalties are options that will allow for the harmonization of the behaviour of waste management and construction companies with the C&D waste management model proposed within a legal framework.

Source: As indicated

2.13 Theoretical Framework

According to Sekaran (2006), the theoretical framework presents the relationships between the variables to be investigated by a researcher in a study. The framework that describes the relationship between organizational factors, Organizational structures, Organizational Resources, Government policy as the independent and moderating variable, and construction waste management are presented in Figure 2.1 below.

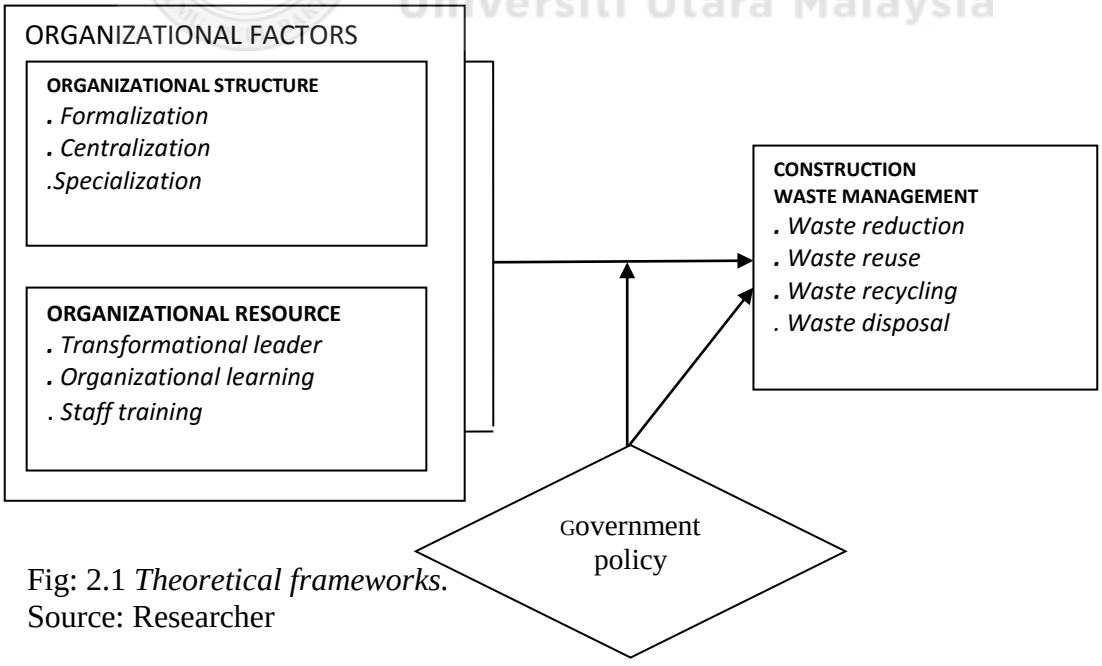


Fig: 2.1 *Theoretical frameworks.*
Source: Researcher

2.14 Hypotheses Development

In the hypotheses, there are two types of relationships that have been identified among variables as non-directional and directional (Sekaran & Bougie, 2013).The relationship direction is not specified but there is an existing relationship among two variables, known as the non-directional hypothesis. In the directional hypothesis there will be one variable direction that affects the other variables for example the independent on dependent variables is referred to as the directional hypothesis.

Following Kamarudeen et al. (2012), non-directional hypotheses were adopted for this study. In testing the factors influencing construction waste management, the following hypotheses are formulated.

H1: Organizational structure is significantly related to construction waste management among construction organizations in Abuja.

H2: Organizational resource is significantly related to construction waste management among construction organizations in Abuja.

H3: Government policy is significantly related to construction waste management among construction organizations in Abuja.

H4: Government policy significantly moderates the relationship between organizational structure and construction waste management among construction organizations in Abuja

H5: Government policy significantly moderates the relationship between organizational structure and construction waste management among construction organizations in Abuja.

2.15 Summary of the Chapter

The concept of the term “waste” is elaborated in this chapter. The types of waste, also the magnitude of waste across various countries and the global perspective of the construction waste management were discussed. The chapter also discusses the construction waste management and its dimensions. Then the organizational structure and its dimensions, organizational resources and their dimensions, the government policy on construction waste management, some existing policies on waste management in Nigeria are also examined The chapter further talks about the related studies on the relationship between organizational structures, not to miss the organizational resources on construction waste management. Then the moderating effects of government policy on the relationship between organizational structures, organizational resources on construction waste management, are also elaborated. The theoretical framework and underpinning theory (Resource Base Theory) for this study are all presented in Chapter Two.

The research methodology adopted for the research, is presented in this chapter, to ensure that the research objectives are achieved. The chapter explains the research paradigms, research design; followed by the procedure for sampling. After that, the Instrument for the data collection also the measurement of the instrument, are presented, prior to the discussion on the pilot study. The statistical techniques and analyses are also elaborated.

CHAPTER 3

METHODOLOGY

3.0 Introduction

The research methodology flow chat and for the research, is presented in this chapter, to ensure that the research objectives are achieved. The chapter explains the research paradigms, research design; followed by the procedure for sampling. After that, the Instrument for the data collection also the measurement of the instrument, are presented, prior to the discussion on the pilot study. The statistical techniques and analyses are also elaborated.

3.1 Research Methodology Flow Chart

Figure 3.1 is the methodological flow chat for the research that provides an illustration of the various stages and process of the research methodology.

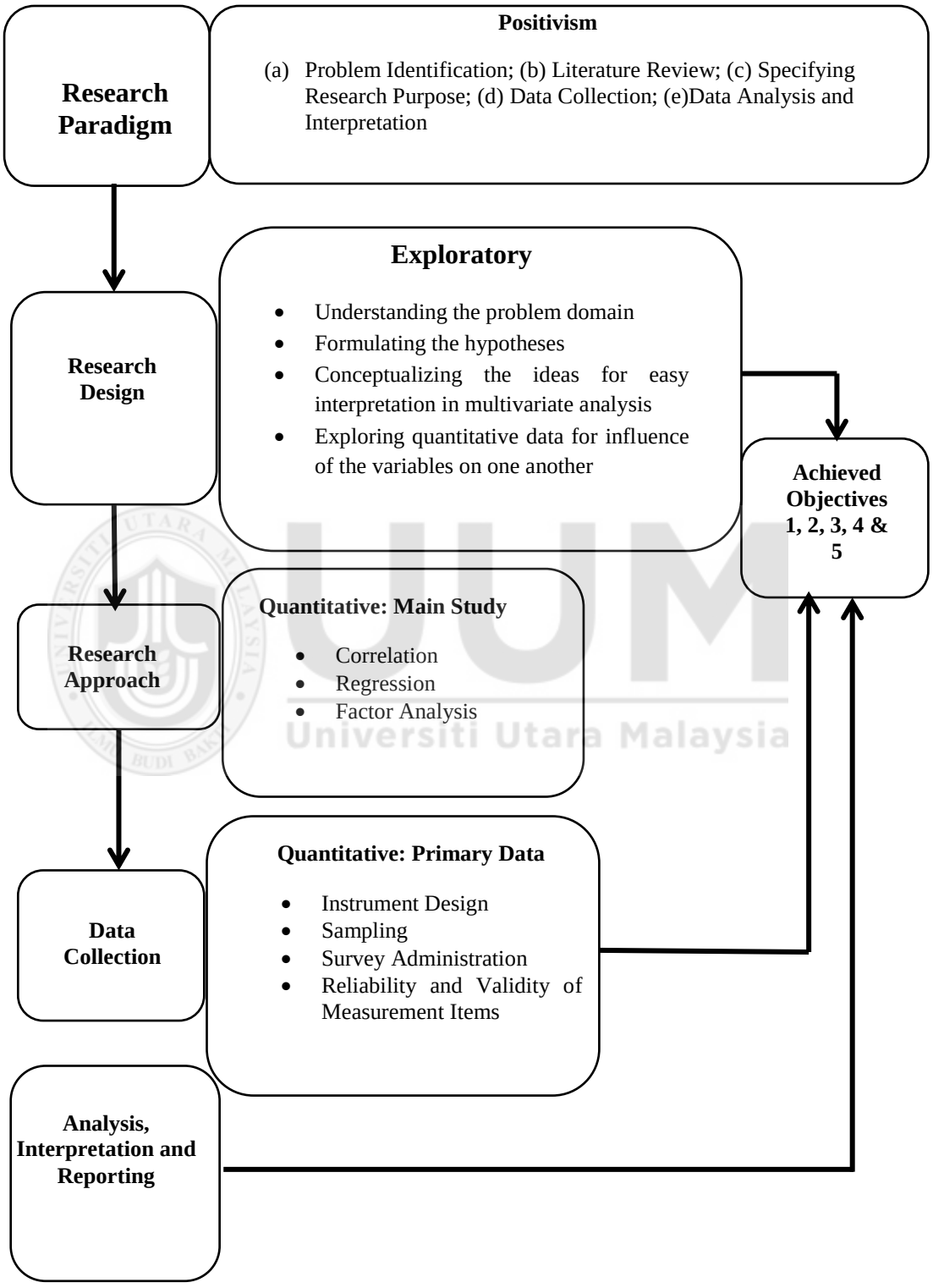


Figure 3.1: *Research Methodology Flow Chart*
Source: *Researcher*

3.2 Research Paradigm

The philosophy which influences the technique and method on how a research is to be constructed and the explanations on the findings are known as a paradigm (Bryman, 2012).Research paradigms have a significant role on the approach in which the research is conducted. There has been a long-standing epistemological school of thought among scientific philosophers and researchers on how research is designed. Basically, there are two schools of thought: The positivism and interpretivism (Bryman, 2012). In the literature these two epistemological paradigms are described as follows.

Positivist paradigm: In this, researcher intends to "predict and explain the happenings in the world through causal relationships and irregularities searching and among its constituent elements" (Burrell & Morgan, 1979, p. 5). Carson et al., (2001) believed that by positivists the objectivity and externality of the world can be unravelled. Hence, in ensuring the objectivity, while observing the subjects they have to (researchers) remained independent, and to draw a conclusion to examine the proposed relationships they have to develop hypotheses (Ikeda, 2009). According to Bryant, Raphael, and Rioux, (2010) positivists examine relationships based on the cause-and-effect and basic laws, and make interpretation generally of everything for the facilitation of simplistic analyses.

Because the method application related to natural science is favoured by positivists to grasp social reality and beyond (Bryman, 2008), the quantitative approach and experiments were adopted by them for testing hypothetical deductive generalizations

(Chen & Hirschheim, 2004). Furthermore, Baker (2000) stressed on the significance of proper procedure for data-collection, explanation and testing of the behavioural patterns.

Straub, Boudreau and Gefen (2004) emphasized that in generalizing the obtained results from a sample of a certain population, it depends on the positivist paradigm. The application of Positivism is widely recognized in management and behavioural-science research where the quantitative research method and tools which are survey and experiment which seek to establish causal relationships are applied by positivists (Brown &Brignall, 2007).

There is quite a difference between the philosophies of interpretivist paradigm and those of the positivist paradigm. The key research objectives in the interpretivist paradigm is the social phenomenon observations which are aimed at finding out the facts and truth about the reality and which tend to achieve social science-related discoveries(Burnett, 2012). The behaviours of human beings are in accordance with socially constructed values instead of causal relationships; interpretivists have the belief that human beings are behaving according to socially constructed values rather than to causal relationships (Remenyi & Williams, 1998).

Marshall and Rossman (2010) emphasized that for a clear understanding of social events, interpretivists are engaged in the social world they belong so as to gather experience in relation to the social reality as the participants do the same. Amaratunga, Baldry, Sarshar, & Newton (2002) added that the use of naturalistic and qualitative methods are considered by interprevists since their approach is based on the realization and

explanations of a phenomenon based on its situation instead of the basic laws or external reasons. Therefore, O'hEocha, Wang, and Conboy (2011); Sarantakos (2005) stated that the framework of the interpretivist depended on the methods qualitative data collection, for instance, observations, interviews, focus groups and case studies.

A conceptual research model and its fundamental hypotheses are intended to be tested in this study by relying on the approach of a survey-based quantitative research since the positivism paradigm is more suitable for this study for the achievement of the research objectives, instead of interpretivism.

Table 3.1 *Positivist and Interpretivist approach to research*

Points of distinction	Positivist paradigm	Interpretivist paradigm
Fields of study	Natural sciences	Human sciences
Concepts	Structure, social and natural facts.	Meanings and social developments, learned human phenomena.
Methods	Quantitative, statistical Inference (hypothesis testing), cause and effect relationships, measurement	Qualitative, generation of hypotheses, interactions, processes
Scope	Seeks explanations for things, generalizations, laws, considers reality as being objective, tangible and unique.	Seeks to understand people, context dependent.
Researcher's role	Uninvolved observer	Actively involved
Analysis	Objective, abstract, fixed, value-free	Subjective, grounded, flexible, political

Source: *Adapted from Ikeda (2009)*

3.3 Research Design

This research focuses on examining the effect of government policy moderating the relationship between organizational factors and construction waste management among construction organizations in Abuja, Nigeria.

Hair, Celsi, Money, Samouel and Page, (2011) noted that a research design is considered as the directions for conducting a research project. According to Bryman (2012) the procedure of data sampling, analysis and collection are presented. The researchers generally adopt the most appropriate research design among the three design types available: case study, descriptive and exploratory (Bryman, 2012).

Over decades, the case-study design in the social science discipline was evident in the adoption of a qualitative method in the clear interpretation of modern phenomena by social scientists (Yin, 2008). The case study approach has been criticized and it was argued that the approach might suffer a lack reliability which may limit the generalizability of the findings, because in this type of design usually the cases studied are in small number (Tellis, 1997). There are some assertions that biased findings may be generated because of a high degree of reliance. However, a case-study design has been admitted by other researchers to be a useful investigative tool (Roberts, & Shapiro, 2009).

Bryman (2012) said that a design that requires a complete analysis that is rigorous and of a single case is known as a case study design. It is an empirical inquiry that aims to explore into an up-to-date phenomenon in the context of a real-life, despite the limitations of non-clarity among the phenomenon and its context (Yin, 2008). Case studies accentuate a detailed conditional analysis of events or circumstances and their associations (Patton &Appelbaum, 2003).

Hair, Celsi, et al. (2011) asserted that a descriptive research design is the type that describes and makes observation without influencing the characteristics of subjects. Generally, a descriptive design is classified as both longitudinal and cross-sectional. Cross-sectional or survey design is interpreted as: "A cross-sectional design entails the collection of data on more than one case and at a single point in time in order to collect a body of quantitative or quantifiable data in connection with two or more variables which are then examined to detect patterns of association" (Bryman, 2008, p. 44). This is commonly known as survey design, and it normally depends on the sample of the survey.

The findings of the research allow for the examination of differences amongst respondents in relation to the age, gender, location, among others (Hair, Celsi, *et al.*, 2011). Exploratory research design is carried out where there is little available information about the problem or opportunity to the researcher. "This used for the discovery of new relationship, ideas, themes and patterns", (Hair, Celsi, et al., 2011, p. 147). Qualitative approach is relied upon by the exploratory design; nevertheless, a quantitative approach is also applicable for the achievement of the quantitative techniques which include case studies, interviews, photograph, as well as the digital videos used by a typical exploratory design (Hair, Celsi, et al., 2011).

There is a quicker facilitation of a research project by the cross-sectional design, since it is a "one-shot, single-point-in-time study" (Frethey-Bentham, 2011). However, according to Heiman (2002) the disadvantage of a cross sectional design is that the circumstances might vary in relation to how many perplexing variables are being presented in a study.

Bryman (2012) stated that a longitudinal design comprises of multiple assessment subjects. Usually this is difficult to conduct, expensive and time-consuming with the possibility of participants dropping the study. Furthermore, a more complex statistical analysis is required for longitudinal design. Regardless of the weaknesses, in obtaining information that is not available in other methods of research design by the researcher, the longitudinal design is much more in place (Bulmer, Gibbs, & Hyman, 2010)

Table 3.2 *Research design and relevant data collection methods.*

Research design	Quantitative method	Qualitative method
Cross-sectional	Typical Form: Survey research or structured observation of a sample at a single point in time. Content analysis on a sample of documents.	Typical form: Qualitative interviews or focus groups at a single point in time. Qualitative content analysis of set documents relating to a single period.
Longitudinal	Typical Form: Survey research on a sample on more than one occasion, as in panel and cohort studies. Content analysis of documents relating to different time periods.	Typical Form: Ethnographic research over a long period, qualitative interviewing on more than one occasion, or qualitative content analysis of documents relating to different time periods.
Case study	Typical Form: Survey research on a single case with a view to revealing important features about its nature.	Typical Form: The intensive study by ethnography or qualitative interviewing of a single case, which may be an organization, life, family, or community

Source: *Adapted from Bryman (2012, p. 76).*

Based on the aforementioned, this research adopts the cross-sectional and quantitative approach, as it is the most appropriate research design for this study based on this reason; the objectives of the study could be achieved well by the adoption of the quantitative approach. The advantages of this design lie in the highly convenient data collection, comparatively low cost, absence of researcher's subjectivity, representativeness, higher degree of reliability, and the use of accurate and precise statistical results. The results

involve the collection of primary data and also the conceptual model testing for predicting future behaviours (Henn, *et. al*., 2006).

However, Divis (1989) stated that for the assumption of any theory, it has to provide a foundation for some testable proposals that can be emphatically investigated. This study will be a correlational, and descriptive kind of study, which will examine the relationship between the dependent and the independent variables, organizational factors, and construction waste management in Abuja and the moderating effect of the government policy between organizational factors and construction waste management in Abuja will be a descriptive form of study. Meanwhile, the descriptive study will seek to examine how things are; therefore the correlational study will aim at finding the relationships between the predictor and the criterion variables (De Vaus, 2002).

Nevertheless, the collection of data and the analyses was conducted at the organizational level; furthermore, the organization (construction organization) in this study is considered as the unit of analysis. Following Knowles et al. (2008) the respondents who participated in the survey are the top managers. The study was designed as a cross sectional study, where the collection of data was obtained through the questionnaire at a particular point in time (Sekaran &Bougie, 2013).

Zikmund (2000) stated that the survey approach should be centred on; the unit of analysis which is the organizations; the population size; all the variables measured; the researcher's bias, and; testing hypotheses. Kerlinger (1973) suggested that the research

design, research problem, data collection method, the types of analysis considered and the measurement, have to be compatible with one another, and they also have to match the epistemological position of the researcher. In conclusion, the aim of this study is to develop a specific hypothesis testing; therefore, the moderating effect on the dependent and independent variables are investigated.

3.4 Units of Analysis

Unit of analysis in a given research represents who or what is being studied. In social science research the unit of analysis is as follows- a group, individual and the organization (Kumar, AbduITalib & Ramayah, 201 3; Creswell 20 12). Organization is the unit of analysis for this study and the managers of the construction organization in Abuja, Nigeria are the respondents. Previous studies show evidence of the use of organizational unit of analysis (Suliyanto and Rahab, 2012; Al-Swidi and Mahmood, 2012; Junaidu, 20 12; Fatoki, 20 12).

3.5 Sampling Procedure

The locations for this research study will be conducted in six (6) area councils in Abuja, Nigeria (Kwali Area Council, Abuja Municipal Area Council(AMAC), Gwagwalada Area Council, Bwari Area Council, Abaji Area council, Kuje Area Council).The local council is the geographical constituent that makes up the entire federal capital territory of Abuja according to (Amended Nigerian constitution 1999). In addition, the selection of the geographical areas comprises of the location where the construction activities are

prevalent. The coverage of all the area councils in Abuja, Nigeria was preferred so that many construction organizations can be included. The construction organizations are organizations responsible for all construction projects and related works in Nigeria; the construction organizations within Abuja are represented regardless of their geographical locations.

Sampling is considered as the research process for selecting suitable members of the population for the study (Sekaran & Bougie, 2013). The present research prefers to adopt the probability sampling design. Furthermore, the probability sampling is preferred rather than the non-probability sampling for each of the elements in the population. A conclusion can be drawn from the population based on the characteristics of the sample chosen which can be generalized. This means the finding of this research will represent the characteristics of the entire construction organizations in Nigeria. Therefore, the generalization of the research findings, applies to the entire population of construction organizations.

In this study, the sampling method adopted entails the processes below. Hence, going by the guideline for the stratified random sampling, following Sekaran (2006) the research population was divided into mutually exclusive groups. Among the four categories or category A, category B, category C and Category D respectively of the construction organizations in Abuja, Nigeria each was regarded as a stratum. Thereby, the sample frame comprises the names and addresses of construction organizations acquired from the 2013 Federal Capital Territory FCT, Abuja directory.

For equal treatment to be ensured in the survey among the four categories of construction organizations, the proportionate stratified random sampling was considered instead of the disproportionate sampling. The proportionate sampling has an equal percentage of a set of strata. Out of a total of 620 construction organizations registered with Cooperate Affairs Commission Abuja, based on the study of Alston and Miller (2001) the logic of sampling, 51% (fifty-one (51) percent of the list in each of the categories of the construction organizations was randomly selected and they were given the questionnaire to complete (Sekaran & Bougie, 2013),

The population for this study was obtained from the 2013 edition of FCT Abuja directory which was an online Abuja Galleria for construction organizations. As of November, 2014 the total number of registered members of construction organizations across the Federal Capital Territory, Abuja, Nigeria is six hundred and twenty (620).

Table 3.3.Presents the categories of construction organizations responsible for construction projects in the FCT Abuja directory.

Table 3.3 *Categorization of Construction Organizations in Nigeria*

Category	Old Value	New Value
A	Up to N50,000	Up to N 2 million
B	N 50,000 – N 250,000	Up to N25 million
C	N 250,000 – N 2 million	Up to N 100 million
D	Over N 2 million	Above N 100 million

Source: *Federal Registration Board 2004; Fagbenle, 2010.*

Table 3.4 shows the distribution of categories of construction organizations in Abuja, Nigeria.

Table 3.4 *Distribution of categories of of construction organizations in Abuja, Nigeria*

Categories of Organizations		No. Of Organization
1.	A	132
2.	B	145
3.	C	154
4.	D	189
Total		620

Source*: Abuja Directory, 2013*

3.5.1Sample size

Collecting data from every element of the total population will be impossible in research investigation. It will be impractical because of the cost, time and other human resource factors(Sekaran & Bougie, 2013) and in this regard, they emphasized the need for researchers to critically view sample size determinations and issues of non-response as essential conditions to deliberate in any quantitative survey design.

The sample size for a given population of 620 construction organizations registered with the corporate affairs commission in Abuja is 237. A formula by (Dillman, 2007) was used to calculate on the sample size:

$$Ns = \frac{(NP)(P)(1-P)}{(NP-1)(B/C)^2 + (P)(1-P)}$$

Where:

Ns= the actual sample size

Np= size of population which is 620

P= the population proportion expected to be chosen among the two response categories is 0.5

B= sample error at 0.05 (5%)

C= confidence level at 0.05 is 1.96.

Therefore, the sample size of this study is calculated as follows:

$$Ns = \frac{(620)(0.5)(1-0.5)}{(620-1)(0.05/1.96)^2 + (0.5)(1-0.5)}$$

$$Ns = \frac{155}{619 \times 0.00065 + 0.25}$$

$$= \frac{155}{0.65235}$$

n= 237.60.

3.6 Data Collection Procedure

The questionnaire distribution and collection was done with the help of their staff, starting from 20 April, 2015 in Abuja Municipal Area Council (AMAC). The survey was completed on 19 September, 2015. Hence, the survey period was five months because there was an indication that no response would likely be received any sooner. The population for this study consists of construction organizations registered with the Cooperate Affairs Commission (CAC) in Abuja, Nigeria as of 25th November; 2014.The

list of the members and addresses in the FCT Abuja directory Galleria 2013 was obtained. The population in the directory comprises of 620 members.

Krejcei and Morgan, (1970) suggested that 5% margin of error is provided; therefore, the sample size of 237 would be essential for a population of 620 for the construction organizations. Physical distribution of questionnaires was done for categories A and B under the construction organizations (1) in order to show the importance of the survey, researcher made a personal contact with the respondents. (2) The respondents need to be informed of the research objectives. (3) To reduce the amount of time taken in obtaining the posted responses and all in all, to improve the response.

The method of postal survey was used on categories C and D of the construction organizations. The approach to improve the response rate, or for example a plaque in appreciation for the contribution can make the study successful to a certain extent (Dillman's, 1978). The logo of the University Utara Malaysia was included on the plaque. The cover page of the questionnaire was designed to bear the logo of the university. English language was used in the questionnaire.

3.6.1 Response Rate

The number of questionnaires returned and completed to be classified by the number of samples eligible for the survey is referred to as the response rate (Frohlich, 2001). Therefore, it shows that 32 percent can be considered for survey research as the average response rate (Frohlich, 2001).

Hence, to improve the response rate in the survey research, he made some suggestions of the following methods.

1) Be sure that the items are well managed and formatted, 2) Conduct a pre-test study and use the existing scale for survey, 3) The respondents should be informed before conducting the survey 4) Mail the questionnaire more than one time,5) Make continuous follow-ups,6) Provide a sincere appeal on the cover letter, 7) Provide result at the end of research,8) Include prepaid postage,9) Deliver the questionnaire to the most appropriate respondent(s), 10) Print a third party logo (such as the FCDA logo) on the questionnaire.

As suggested by Salkind (1997) to further minimize the low response rate from uncooperative respondents, the sample size of 237 was increased by 40 percent making a total of 331 samples. Finally, a sample size of 331 was decided to account for uncooperative respondents and unusable questionnaires. This research has adopted all the methods suggested.

3.7 Questionnaire Design

This research is aimed at establishing the relationship between organizational factors and construction waste management among construction organizations in Abuja Nigeria. The questionnaire is designed to contain the following information:

I. The cover page is the first page.

II. Organizational factors

i. Information about the organizational structure as the construct (Formalization, centralization and specialization) as the dimensions.

ii. Information about the organizational resources as the construct.(Transformational leadership, Organizational learning and staff training) as the dimensions

III. Information about the government policy.

IV. Information about the construction waste management as the construct.(Waste reduce, waste reuse, waste recycling and waste disposal) as the dimensions

V. Respondent's general information

To present a straightforward and understandable questionnaire that is free of ambiguities, the first part of the questionnaire is designed for the organizational structure, the second (11) is concerned about organizational resources, the third (III) Section concerns with government policy, fourth (IV) regarding the construction waste management and finally respondents' information. The questionnaire development, the design, the scale-items development, and the wordings contained, as proposed by (Dillima, 1978) were followed by the researcher. However, the questionnaire is in a booklet form with a cover bearing the logo of Universiti Utara Malaysia., followed by a letter of appeal soliciting for the to the respondents' support in completing the questionnaires.

Sekaran and Bougie (2013) suggested that in the questionnaire design attention should be given on the wordings, the planning and categorization of the variables, the scaling and coding, also the general appearance. Therefore, when developing the questionnaire, the technical terms, the jargon, the ambiguous questions, the double-negative words, the double-barrelled questions, and the unclear wording should be avoided. For easy understanding of the research objectives the researcher did not prefer to choose the open-ended questions over the close-ended questions to ensure that the accuracy of the data

analysis is enhanced (Sekaran, 2006). Lastly, this study uses two independent variables with one moderating variable, and finally one dependent variable.

3.7.1 Measurement and Operationalization of Variables

According to Sekaran (2006) "the relationship between independent and dependent variables can be either negative or positive". Two main independent variables are used for this study, the organizational structure and the organizational resources; government policy as the independent variable and as moderating variable, and the dependent variable for this study is construction waste management. Table 3.6 present the summary of variables and measurement of instruments. Table 3.6 present summaries of variables and measurement of instruments.

Table 3.5 *Summary of Variables and Measurement of Instruments*

Variable & Dimensions	Scale	No. of questions
Organizational Structure		
Formalization	5 points	7
Centralization	5 points	4
Specialization	5 points	5
Organizational Resources		
Transformational leadership	5 points	6
Organizational learning	5 points	6
Staff training	5 points	4
Government Policy	5 points	7
Construction Waste Management		
Waste reduction	5 points	6
Waste reuse	5 points	6
Waste Recycling	5 points	6
Waste disposal	5 points	4
Total number of questions		61

Source: *Researcher*

3.7.2 Organizational Structure

The organizational structure uses three dimensions, namely, formalization, centralization, and specialization. Furthermore, a five-point scale was employed in this study for the measure of all the studied variables secured by 1. = "strongly disagree," 2. = "disagree," 3. = "neutral," 4. = "agree," and 5. = "strongly agree. "Regarding the organizational structure, respondents were asked to score the degree to which the formalization, centralization and the specialization by ticking the scales from 1 to 5. Hence, the managers of the construction organization were the target respondents this in line with the study of (Hair *et. al.*, 2010; Doloi *et.al.* 2012; Bowen *et. al.*, 2014). To measure formalization and centralization, were adapted from Kamarudeen et al. (2011) Specialization is adapted from Adeyoyin (2013).

(a)Formalization

Formalization is measured using seven questions:

1. In our organization, I feel that I am my own boss in most matters.

2. In our organization, a staff can make decisions without checking with any other person.

3. In our organization, employees are allowed to do as they please.

4. In our organization, most employees make their own rules on the job.

5. In our organization, how work is done is up to the person doing the work.

6. In our organization, employees are constantly being checked on for violating rules.

7. In our organization, employees feel as though they are constantly being monitored to see that they obey all the rules.

(b) Centralization

Centralization is measured using five questions:

1. In our organization, there can be little action taken until a supervisor approves a decision.

2. In our organization, small matters have to be referred to top management for final decision.

3. In our organization, i have to ask my boss before I do almost anything.

4. In our organization, any decision I make has to have my boss' approval.

5. In our organization staff member who wants to make his own decision would be discouraged in our organization.

(c) Specialization

1. In our organization Job specialization makes my work easier.

2. In our organization Job specialization makes my job performance better.

3. In our organization Job Specialization makes my job faster.

4. In our organization am fully satisfied with my present area of specialization.

5. In our organization am fully trained to perform my present tasks.

6. In our organization my training does not correspond with my present posting.

3.7.3 Organizational Resources

The organizational resources, construct is operationalized into three dimensions, namely, transformational of leadership, organizational learning and staff training. The following items used to measure transformational leader were adapted from Garcia-Morales et al.

(2006). Items for organizational learning were adapted from Garcia-Morale (2006); Item used for measuring staff training were adapted from Barlet, (2001).

(a)Transformational Leadership

Transformational leadership style is measured using six questions:

1. In our organization, the management is always on lookout for new opportunities for the organization.

2. In our organization, the management has a clear view of its final goals.

3. In our organization, the management succeeds in motivating the rest of the company employees.

4. In our organization, the management always acts as the organizational leading force.

5. Our organization has leaders who are capable of motivating the employees on their job.

6. Our organization has leaders who are capable of guiding the employees on their job.

(b) Organizational Learning

Organizational learning is measured using six questions:

1. Our organization promotes a learning culture.

2. Our organization has a strong commitment to learning.

3. Our organization promotes open-mindedness.

4. Members of the company management team act as learning agent for our firm.

5. Our organization proactively questions long-held way routines.

6. Our shared vision provides a focus for learning.

(c) Staff Training

1. Our organization has training frequently.

2. Our organization has access to training support.

3. Our organization has job related benefit for training.

4. Our organization has Personnel related benefit of training.

3.7.4 Government Policy

The moderating variable construct is conceptualized as one dimension: government policy for construction waste management. The following items used to measure government policy were adapted from Tam *et al.* (2007).

(a) Government Regulations/ Policy for Construction Waste Management

Government policy for construction waste management will be measured using seven questions:

1. The government provides on-site sorting facilities for Abuja construction waste management organizations.

2. Government in implementing waste reduction regulations in Abuja construction industry.

3. Government agencies implementing recycling scheme in Abuja construction waste management organizations.

4. The government introduces Legislative controls on construction waste management

5. Government Agencies implement an environmental management system.

6. Government Controls landfill areas in Abuja.

7. Government introduced a framework plan for construction waste management organizations in Abuja.

3.7.5 Construction Waste Management

The construction waste management constructs are operationalized into four dimensions: waste reduction, waste reuse, waste recycling, and waste disposal. The following items used to measure construction waste management were adapted from Vleck (2001).

(a) Waste Reduction

Waste reduction is measured using six questions:

1. In our organization, we avoid damage by handling and storing materials properly
2. In our organization, we avoid mixing recyclables and non-recyclables waste
3. In our organization, we use materials efficiently and use less of them
4. In our organization, we estimate as accurately as possible; more accurate = less waste
5 In our organization, we reduce the use of non-recyclable materials
6. In our organization we choose strong materials and exploit structural advantages

(b) Waste Reuse

Waste reuse is measured using six questions:

1. Our organization uses salvaged materials from other jobs
2. Our organization reuses job site materials such as concrete forms and fencing
3. Our organization uses a central area for cutting and storage of scraps for reuse
4. Our organization allows for local scavenging, if not a site safety issue
5. Our organization, we donate or sell reusable items from the job
6. Our organization uses methods for construction, temporary structures that allow for reuse, such as screws rather than nails

(c) Waste Recycling

Waste recycling is measured using six questions:

1. Our organization Management Support waste recycling

2. Our organization Set Goals for recycling waste

3. Our organization is Finding Markets for recycled waste

4. Our organization does Collection and Suitable Storage of Recyclables

5. Our organization encourages education and Motivation for waste recycling

6. Our organization does Monitoring and Evaluation of waste recycling

(d) Waste Disposal Landfill

1. Our organization favours landfill as a disposal option.

2. Our organization intends to decrease the amount of waste going to landfill as a disposal

3. Our organization encourages other waste management option.

4. Government regulation discourages waste to landfill disposal

Table 3.7 below presents the summary of the source of items used to measure the variables examined in this study.

Table 3.6 *Summary of the source of items used to measure the variables*

S/N	Variables	Source	Remark
1	Formalization	Kamarudeen *at el* (2012)	Adapted
2	Centralization	Kamarudeen *at el* (2012)	Adapted
3	Specialization	Adeyoyin *et a*l.(2013)	Adapted
4	Transformational leader	Garcia-Morale *et al*. (2006)	Adapted
5	Organizational learning	Garcia-Morale *et al*. (2006)	Adapted
6	Staff training	Barllet (2001)	Adapted
7	Government Policy	Tam *et al.* (2007)	Adapted
8	Waste Reduction	Vleck (2001	Adapted
9	Waste Reuse	Vleck (2001	Adapted
10	Waste Recycling	Vleck (2001	Adapted
11	Waste Disposal	Read *at. El.* (1989)	Adapted

Source: *Researcher*

3.7.6 Pilot study

A pilot study was conducted in this research. In this pilot testing, the objective is to evaluate the reliability and validity of the instrument to ensure that an accurate instrument would be used in the main study (Straub, 1989). The pilot study was conducted in an environment with similar characteristics to those in the main study, but with a smaller number of respondents (Straub, 1989). In the pilot study, carried out in April 2015, the questionnaire, along with a cover letter, was emailed to a subset of the addresses on our questionnaire email list to the respondents who were responsible for the construction within that construction organization (Usually the manager of the organization).

A total of 50 questionnaires were distributed for the pilot study following Diamantopoulos and Siguaw's (2012) guidelines; the data collected was used to test the reliability, convergent validity and discriminate validity of the questionnaire. The questions that failed to pass the tests were dropped from the final instrument administered in the main study.

3.8 Reliability and Validity

Before administering any questionnaire, a researcher has to evaluate the likely accuracy and consistency of the research instrument (Hair *et al.*, 2007). Even if the measures for the constructs are drawn from the literature, they still need to be tested and be validated in the new research (Hair *et al.*, 2007). To ensure the quality of the measures, the questionnaire of the present study was pilot-tested (Hair *et al.*, 2007, Neuman, 2006). In

the pilot test, the instrument was evaluated for reliability, face validity, content validity, convergent validity and discriminate validity, as described in the following sections.

3.8.1 Reliability

Reliability means that to get the result that will be obtained, the indicator should not vary because of the measurement instrument itself or the process of measurement (Neuman, 2006). In other words, reliability is a statement about the measurement accuracy (Straub, 1989), that is, "the extent to which the respondent can answer the same questions or close approximations the same way each time" (Straub *et al*., 2004).

This study examines the reliability of the instrument by calculating Cronbach's alpha coefficient test to measure the internal consistency reliability. Therefore, different acceptable levels of reliability have been suggested by literature; however, Hair et al. (2007) suggested a reliability of higher than 0.7 as the recommended level. Also, reliability can be used as a criterion for selecting or excluding indicators (Moore and (Benbasat, 1991). In cases where removing an indicator improves the reliability of a construct, particularly if the reliability of a construct is less than 0.7, Moore and Benbasat (1991) suggested removing that indicator from the analysis.

Table 3.7 *Summary of Reliability Test for Pilot Test*

Constructs	Number of Items	Cronbach's Alpha
Formalization	7	.799
Centralization	4	.762
Specialization	5	.907
Transformational leadership	6	.885
Organizational learning	6	.896
Staff training	4	.926
Government policy	7	. 916
Construction waste management	22	.886

Source: *Researcher*

The results of the pilot test in Table 3.9 indicate that the Cronbach's alpha for the variables under examination ranges from 0.762 to 0.972 which shows that they are all above 0.70. Therefore, based on the recognized yardstick of 0.70 all the variables have internal consistent reliability and consequently there was no need to remove any items. Further reliability analysis was performed in the actual study based on a larger sample size.

3.8.2 Validity

There is a gap between conceptual constructs and practical indicators in most research, because constructs are typically abstract ideas, whereas indicators are actual observations (Neuman 2006). Therefore, it is always essential to check and validate that this gap is not beyond acceptable ranges. Validity means whether or not an indicator measures what it is

supposed to measure (Hair *et al.*, 2007) or, in other words, how well an empirical indicator fits the conceptual definition (Neuman, 2006).

While there is a plethora of validity tests in the literature, Straub et al. (2004) suggested that researchers need to demonstrate the validity of their work in terms of face validity, content validity, convergent validity and discriminant validity. Face validity and content validity are usually assessed in qualitative manners, whereas convergent and discriminate validity are evaluated using statistical techniques. Convergent and discriminate validity are two sub-types of convergent validity, which is a type of measurement validity of the constructs with multiple indicators. Validity tests (face validity, content validity, convergent validity and discriminate validity) can well introduce the criteria and techniques for examining them.

3.8.2.1 Face validity and Content Validity

Face validity and content validity involve a systematic but subjective assessment on an indicator's ability to measure what it is supposed to measure (Hair *et al*., 2007).

Neuman (2006) defined face validity as "a judgment of the scientific community that the indicator really measures the constructs", while "the degree to which the content of a construct is represented in the measures" is termed as content (Neuman, 2006). According to Neuman (2006) and Straub (1989), these validities can be reached by: 1) drawing the questions from a universal pool of indicators available in the literature, and 2) by consulting a small group of experts to pass judgment on the suitability and comprehensiveness of the indicators.

Therefore, this research has tried to achieve face validity and content validity for its constructs, firstly, by drawing indicators from reliable and well-recognized sources in the literature and, secondly, by asking the participants in the pre-test stage i.e., (6 experts: four academicians and two practitioners) to probe into the content of the questions. The experts will be asked to 1) state whether or not they believe that the indicators fit the construct (face validity) (Hair *et al.,* 2007), and 2) single out pointless questions and suggest new areas for inquiry (content validity) (Straub, 1989). Their judgments were used to refine and improve the questionnaire.

3.8.2.2 Convergent Validity

Convergent validity indicates that multiple indicators of the same construct hang together and act alike or convergent (Neuman, 2006). Content validity is shown "when each measurement item correlates strongly with its assumed theoretical construct" (Gefen & Straub, 2005). In other technical terms, convergent validity is evidenced when each of the measurement items is loaded with a signed t-value on its corresponding construct. Gefen and Straub (2005) suggested that this t-value should be significant, at least at the 0.05 alpha protection levels. In other words, the t-value should be equal to, or greater than, 1.96 to reveal the significance at the alpha level of 0.05. Additionally, Fornell and Larcker (1981) asserted that a construct is convergent when its Average Variance Extracted (AVE) is at least 0.5 and the standardized loading of each individual measure is above 0.7.

3.8.2.3 Discriminant Validity

Discriminant validity tests whether measures and constructs that are supposed to be theoretically unrelated are, in fact, unrelated (Neuman, 2006). Discriminant validity is revealed "when each measurement item correlates weakly with all other constructs except for the one with which it is theoretically associated" (Gefen & Straub, 2005). In terms of statistics, discriminant validity is achieved when the loadings are higher than cross-loadings. In other words, all the loadings of the measurement items on their assigned latent variables should be larger than any other loading (Gefen & Straub, 2005). Furthermore, the square root of AVE for each construct should be larger than any correlation among any pair of latent constructs (Gefen & Straub, 2005).

3.9 Data Analysis

This research uses the combination of both descriptive and inferential statistics methods. The Smart PLS Structural Equation Modelling (SEM) is used to test the relationships between the constructs in its conceptual model. SEM, which is recognized as a second-generation approach, is a powerful alternative to the first-generation approach such as multiple regressions. While the multiple regressions allow only one dependent variable in the model, SEM can simultaneously handle multiple dependent variables (both techniques allow the inclusion of multiple independent variables) (Chin, 1998a). SEM, which is very popular among behavioural science researchers (Gefen *et al*., 2000), offers researchers the ability to incorporate latent (unobserved) variables in the analysis and to perform path-analytic modelling with them (Chin, 1998a). Latent variables are those

concepts that cannot be directly observed and measured in the study and which need to be approximated by other measures (also called items or indicators) (Chin, 1998b). All of the constructs in this research are latent and they need to be measured via their indicators. SEM couples a structural model (also called an inner model) with a measurement model (also called an outer model) (Petter *et al*., 2007; Chin, 1998b).

The measurement model identifies the allocation of measures to latent constructs, while the structural model incorporates the relationships among dependent and independent latent constructs. In due course, this technique enables the research to measure, explain and predict the degree of interrelationships among latent constructs (Chin & Newsted, 1999) 3.10.2 Component-based SEM (PLS) vs. Covariance-based SEM.

There are two distinct types of SEM: Component-based SEM and Covariance-based SEM (Chin & Newsted, 1999). Component-based SEM is usually recognized as the (PLS) Partial Least Squares and covariance-based SEM is sometimes recognized as the Linear Structural RELationships (LISREL) due to the substantial role that LISREL software has played in the development of this approach (Diamantopoulos, 1994). The orientation of covariance-based SEM is a causal model/theory testing by focusing on building models that are meant to explain the covariance of all the observed indicators, whereas the orientation of PLS is predicted by attempting to obtain the best weighted estimates for each block of indicators corresponding to each latent variable (Chin & Newsted, 1999).

In PLS, latent variables are defined as the sum of their respective indicators in which the resulting component score for each latent variable, based on the estimated indicator weights, maximizes the variance explained for dependent variables (i.e., latent, observed, or both) (Chin & Newsted, 1999).

While both PLS and covariance-based SEM has been extensively used in the literature for analysing the SEM model, choosing one approach over the other depends on the objectives and characteristics of the research. The present research chooses to use PLS for the following three main reasons: 1) while covariance-based SEM assumes that the observed variables follow a multivariate normal distribution, PLS is a distribution-free approach (Chin & Newsted, 1999). For that reason, in this research, PLS is a more reliable approach to adopt because there was no evidence indicating that raw data was normally distributed. 2) Unlike the component-based SEM, PLS results in a more accurate analysis when the sample size is small. The minimal recommended range for PLS is 30 to 100 cases, while for the component-based SEM, at least 100 to 800 cases are needed (Chin and Newsted, 1999).

Being at the organizational level of analysis, the sample size of this research is rather small (i.e., 30 or less in the pilot study and 178 or less in the main study). Thus, PLS is a more suitable choice. 3) The covariance-based SEM "uses model fitting to compare the covariance structure fit of the researcher's proposed model to a best possible fit covariance structure" (Gefen *et al.*, 2000, p. 26). It tests the a priori specified model against the population estimate derived from the data. In other words, the covariance-

based SEM tells how closely the proposed model fits the data as opposed to a best-fitting covariance structure (Gefen *et al.,* 2000).

Therefore, this approach is recommended when the objective is theory testing and an a priori solid theoretical model exists (Chin, 1998a, Gefen *et al*., 2000). PLS, on the other hand, seeks to best explain the variances of the factors, for instance, to examine the significance of the relationships and their resulting R-square. Therefore, it is more suitable for predictive applications when the objective is theory building, and an a priori model is not available (Gefen *et al*., 2000, Chin & Newsted, 1999). In line with the given discussion, two PLS soft applications were specifically used in the analysis and presentation of results, they include; Smart PLS 2.0 (Ringle *et al*., 2005) and Chin, (2003) PLS-Graph.

In addition, many software programs were used to process the data analysis; they include the Statistical Package for the Social Sciences (SPSS), Smart PLS, SAS, Excel, SPSS and Smart PLS are the most popular programs used in this study, and the latter was chosen for their simplicity and completeness (Sekaran, 2003).

To attain internal consistent reliability in the data analysis and hypotheses testing, the study made use of several statistical tools from version 22 of SPSS software and Smart PLS 2.0 M3 software to conduct a test of non-respondents bias, data screening and preliminary analyses of missing data, outliers and normality, factor and reliability analysis to access the goodness of the model, validity and reliability of measures, and

descriptive statistics to support the features of the respondents. A relationship analysis can help explain the relationship that exists between the organizational factors and construction waste management.

Finally, SEM PLS analyses seek to test the theorized effect of the government policy on the relationship between the organizational structure, resources and construction waste management.

3.9.1 Model Analysis with PLS

Model estimation with PLS results in the generation of a set of statistics. These include path coefficients and correlations among the latent variables. Factor loadings are for the measures, R-square (R2) for all endogenous constructs, and the Averaged Variance extracted (AVE) of each of the latent constructs. In addition, PLS applies bootstrapping to calculate the significance of both paths and loading by producing a t-value statistic (Gefen *et al.*, 2000). These statistics and terms are defined as follows: Factor loading: weighting which reflects the correlation between the indicators and the constructs. Squared factor loadings are the percentage of variance in an observed item that is explained by its factor (Gefen *et al.*, 2000).

Path coefficient: indicates the strengths of the relationships between the dependent and independent variables (Wixom & Watson, 2001). R-square or R2: the measure of the proportion of the variance of the dependent variable about its mean that is explained by the independent variable(s) (Gefen *et al.*, 2000). Average Variance Extracted (AVE):

measures the percentage of variance captured by a construct by showing the ratio of the sum of the variance captured by the construct and measurement variance (Gefen *et al*., 2000). T-value: a statistics used to identify the significance of the relationship between two factors. A t-value above 1.96, 2.58 and 3.29 indicates the significance of the relationship at alpha protection levels of 0.05, 0.01 and 0.001 respectively.

Bootstrapping: is a non-parametric resampling procedure for examining the precision and stability of PLS estimates. N sample sets are created in order to obtain N estimates for each parameter in the PLS model. Each sample is obtained by sampling with the replacement from the original data set (Chin, 1998b).

In the PLS path modelling approach, the statistics is used to indicate how well the model fits. The Overall model fit in PLS, a good model fit is established with significant path coefficients and a high R-square value (Gefen *et al*., 2000). Furthermore, Thompson et al. (1995) and Gefen et al. (2000) stated that satisfactory internal consistency (i.e., reliability), discriminant validity and convergent validity are indicators for overall goodness-of-fit (GoF).

Therefore, this research examines R2 and path coefficients, together with the internal consistency, convergent validity and discriminant validity to indicate how well its model is performing (the criteria for examining internal consistency reliability, convergent validity and discriminant validity have been previously. Non-parametric re-sampling procedure for examining the precision and stability of PLS estimates was highlighted. N

sample sets are created in order to obtain N estimates for each parameter in the PLS model. Each sample is obtained by sampling with replacement from the original data set (Chin, 1998b).

This research examines R2 and path coefficients, together with internal consistency, convergent validity and discriminant validity to indicate how well the model fits (the criteria for examining internal consistency (reliability), convergent validity and discriminant validity have been previously discussed) .In addition, while there are some debates in the literature about the absence of a formal global fit index in PLS (as is the case with $\chi 2$ and related indexes in covariance-based SEM), Tenenhaus et al. (2005) suggested a global fit measure for the PLS path modelling which is defined as the geometric mean of the average commonality and average R2 for endogenous constructs.

3.9.2 Hypothesis Testing

After the collection of sufficient data that matched the minimum sample size requirements, the researcher coded, summarized and analysed the data with SPSS, factor analysis and PLS SEM. Below are detailed explanations on the instruments that were employed.

3.9.3 Descriptive Analysis

Data was conducted using descriptive statistics to describe the phenomena of interest (Sekaran &Bougie, 2010). The mean, median, mode, range, variance, and standard

deviation are the major descriptive statistics (Tabachnick & Fidell, 2001; Sekaran & Bougie, 2010). Usually, the mean is the total scores in a data distribution divided by the number of scores. The median is the centre point in a data division.

The mode is the highest repeated score in a data distribution. Range is the difference between the highest to lowest scores in a data distribution. Variance is the mean of the squared deviation scores for the mean of a data distribution. Standard deviation is the square root of the variance (Ticehurst & Veal 2000). The most frequently used measurement for inferential statistics is the Pearson correlation coefficient. Final statements about a population on the basis of the sample are determined by the inferential statistics (Sekaran & Bougie, 2010; Sekaran, 2003).

3.9.4 Factor Analysis

An English psychologist by the name of Chales Spearman first developed and used the factor analysis as a statistical modelling approach to study unobservable hypothetically existing variables (Raykov & Marcoulides, 2006). As shown in the literature that the factor analysis also has relatively long history in business researches like the path analysis (Hau& Marsh, 2004; Hair *et al*., 2010). As argued by Raykov & Marcoulides (2006), Spearman (1904) proposed the known individual‘s ability scores which are the manifestations of the general ability known as the general intelligence, and other several similar abilities such as the verbal or numerical abilities.

Generally, the use of the factor analysis could be explained as a modelling approach that is used in studying hypothetical constructs through various indicators or observable proxies that can be measured directly (Byrne, 2010; Hair *et al*., 2010; Raykov & Marcoulides, 2006). Factor analysis is regarded as the Explanatory factor analysis (EFA), if the topic of interest is concerned with knowing how many latent constructs or factors are needed to efficiently explain the associations that exist among a set of observed measures (Hair *et al*., 2010; Hu & Bentler, 1995).

3.9.5 Power of Analysis

Another approach for validating the empirical findings of the PLS path modelling for complex models is to conduct a power analysis (Akter *et al.*, 2011a). Power (1-β), which refers to the probability of obtaining a valid result, is computed by calculating the probability of rejecting the false null hypothesis (H0) when H1 is true. (Baroudi & Orlikowski, 1989; Cohen, 1988). Three parameters contribute to the dynamic of power: the significance level (α), the sample size and the effect size (Cohen, 1988).

While early researchers had to use power charts and tables (Scheffé, 1959; Cohen, 1988), currently handy and efficient software, such as G*Power 3.0.10 (Faul *et al*., 2009), is available for conducting power analyses (Akter *et al*., 2011a).For a high degree of probability of significant result to be achieved where the relationship is truly significant (Cohen 1988), Baroudi and Orlikowski (1989) suggested that the power of statistical tests should be at least 0.8. This research will apply the power analysis, using G*Power 3.0.10, to validate the empirical findings of its PLS analysis.

However, in line with the above, the computation of the power analysis for this study uses the significance level (α) 0.05 and the effect size 0.15, and it has indicated the sample size 89 and the actual power 0.9509755 (i.e. Power (1-β err prob) =0.95). This will be in the summary and diagram below: F tests - Linear multiple regression: Fixed model, R^2 deviation from zero

F tests - Linear multiple regression: Fixed model, R^2 deviation from zero

Analysis:	A priori: Compute required sample size	
Input:	Effect size f^2	= 0.15
	α err prob	= 0.05
	Power (1-β err prob)	= 0.95
	Number of predictors	= 3
Output:	Non centrality parameter λ	= 13.350000
	Critical F	= 3.953209
	Numerator df	= 3
	Denominator df	= 85
	Total sample size	= 89
	Actual power	= 0.950755

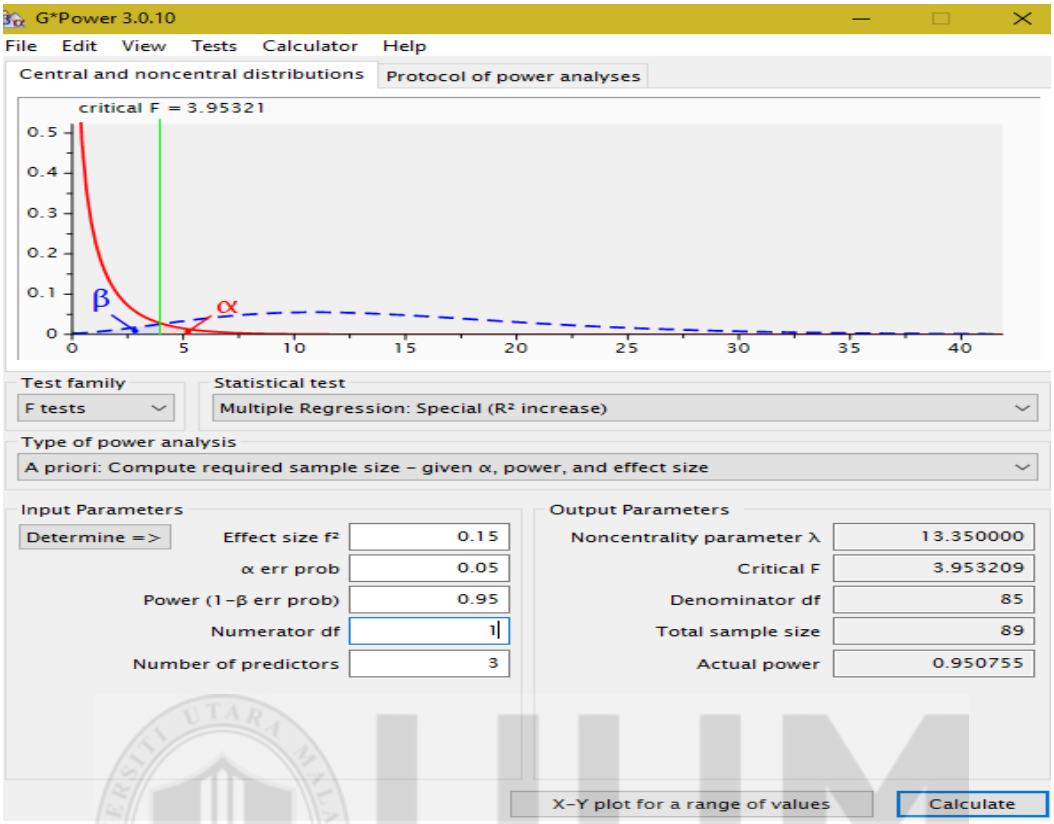


Figure 3.1: *G power analysis*
Source: *Researcher*

3.10 Summary of the Chapter

This chapter begins with the introduction of the chapter, then it describes the research paradigm, research design, sampling procedures, data collection procedures, measurement of operationalization. The present study also adopts the cross sectional research design in which data collected were analysed and interpreted statistically. The unit of analysis in this study was the managers of the construction organizations in Abuja. Nigeria. A proportionate stratified random sampling technique was used in this study. Measurement scales from the previous studies were adapted to measure eight constructs: the organizational structure which is operationalized by three dimensions; formalization,

centralization, and specialization, organizational resources were operationalized by transformational leadership, organizational learning and staff training, government policy and construction waste management. Results of the data analyses are presented in the next chapter.

CHAPTER 4

RESULTS AND DISCUSION

4.1 Introduction

The results of data analyses were presented in this chapter using the PLS path modelling. The preliminary analysis and initial data screening are then discussed. The descriptive statistics result for respondent information and the result of the latent variables are reported. Next, two main sections are used in the presentations of the main results of the present study.

The assessment of the measurement model was carried out to determine the internal consistency, individual item reliability, convergent validity and discriminant validity. In the second section, the structural model result was reported (i.e., the R-squared values, the significance of the path coefficients, effect size and predictive relevance of the model). Finally, the complementary result of the PLS-SEM analysis, which examines the moderating effects of government policy on the structural model, is presented.

4.2 Response Rate

A total of 331 questionnaires were administered to construction organizations in Abuja, Nigeria for this study. Several phone calls, reminders were made in an attempt to achieve high response rates, and also SMS was sent to respondents who were yet to complete their questionnaires after four weeks via emails and telephone calls (Dillman, 2000;

Porter, 2004; Salim Silva, Smith, &Bammer 2002; Traina, MacLean, Park, & Kahn, 2005). Hence, these attempts yielded 195 returned questionnaires, out of 331 questionnaires that were distributed to the target respondents. Seventeen (17) questionnaires out of 195 were unusable because the participants did not complete a significant part of those questionnaires; and those remaining 178 were used for further analysis. This accounted for 53.7 percent valid response rate. Therefore, the response rate of 53.7 percent is adequately considered in the analysis in this study. As suggested by Sekaran (2003) for the sufficient response rate for surveys, 30 percent would be deemed enough. See table 4.1 below.

Table 4.1 *Response Rate of the Questionnaires*

Response	Frequency/Rate
No. Of distributed questionnaires	331
Returned questionnaires	195
Returned and usable questionnaires	178
Returned and excluded questionnaires	17
Unreturned Questionnaire	142
Valid response rate	53.7%

Source: *Researcher*

4.3 Data Screening and Preliminary Analysis

In any multivariate analysis, it is very crucial to conduct an initial data screening because it helps the researchers to identify any possible violations of the key assumptions regarding the application of multivariate techniques of data analysis. In addition, initial

data screening assists the researchers to better understand the data collected for further analysis (Hair *et. al*., (2007).

The entire 178 returned and usable questionnaires were coded and entered into the SPSS before conducting the initial data screening. Therefore, all the negatively worded items in the questionnaires were reverse-coded. The negatively worded items that were reverse-coded include FORI –FOR5, CEN01 – CEN3. After data coding and entry, preliminary data analyses were performed such as: (1) missing value analysis, (2) assessment of outliers, (3) normality test, and (4) multicollinearity test (Tabachnick & Fidell, 2007; Hair, Black, Babin, & Anderson, 2010).

4.4 Data Screening and Editing

In conducting any multivariate analysis, data cleaning and screening are vital. Because of the fact that the quality and the meaningful outcome of the analysis mostly depend more or less on the initial data cleaning the missing data and outliers were checked and treated accordingly.

4.4.1 Missing Data

The data collected were entered into SPSS Software; to check whether there are missing data, the first descriptive statistics were run, 24 were randomly missed, transformational leadership had 1 missing value, category of the organization had 3 missing values, gender, age and years of organizations with 5 missing values each.

Even though in the data set there was no acceptable percentage of missing values for making a compelling statistical inference, it was generally agreed by researchers that the missing rate of 5 percent or less than that is non-significant (Schafer, 1999; Tabachnick & Fidell, 2007).

As suggested in the literature, the easiest way to replace the missing values is by using the mean substitution, where the total percentage of missing data is 5% or less (Raymond, 1986; Little & Rubin, 1987; Tabachnick & Fidell, 2007). Thus, missing values were replaced using mean substitution in this study (Tabachnick & Fidell, 2007). Table 4.2 shows the total and percentage of random missing values in the present study.

Table 4.2 *Missing values*

Items	Number of missing values
Transformational leadership	1
Category of organization	3
Gender	5
Age	5
Highest educational level	5
Years of organization in operation	5

Source: *Researcher*

4.4.2 Outliers

Byrne (2010) described that the outliers in a giving set of data are those whose scores are significantly unrelated from all the others. Tabachinich and Fidell (2007) recommended that in identifying of the univariate outlier, it should be through the observation of z score. Each of the items has to be within the range of 13. 29 (0.001 significance level) of

the z score. Any value exceeding 13.29 in this investigation will be deleted. Therefore, no cases of univariate out1iers were recorded. Additionally, multivariate outliers were identified using the Mahanalobis distance. In this study a multivariate outliers were checked and removed going by figures with 71 at 0.05 degree of freedom.

Therefore, cases 30,35,36,47,62,78,79,86,130,134,137,141,153,165,181,186 were deleted based on the fact that they were above the recommended threshold of chi-square which is 93.17 (p = 0.001). Mahalanobis values that exceeded this threshold were deleted. Following this criterion, furthermore, no more outliers had been found in the data set after the Mahalanobis distance was re-conducted. For further multivariate analysis, the remaining 178 cases were considered

4.4.3 Normality Test

Statistically PLS-SEM was assumed to provide accurate model estimations in circumstances that are extremely non-normal in previous research (e.g., Cassel, Hackl, &Westlund, 1999; Reinartz, Haenlein, &Henseler, 2009; Wetzels, Odekerken-Schroder, & Van Oppen, 2009).

Despite this, this assumption has been critized recently. Hair, Sarstedt, Ringle and Mena (2012) stated that the normality test on the data should be performed by researchers. The bootstrapped standard error estimates can be inflated when they were highly skewed or kurtotic (Chernick, 2008), and the statistical significance of the path coefficient will be underestimated in turn (Dijkstra, 1983; Ringle, Sarstedt & Straub, 2012a).

Therefore, a graphical method adopted to check for the normality of the data collected is employed in this study (Tabachnick & Fidell, 2007). As suggested by Field (2009) when there is a large sample of 200 or more, it will be more important to check the distribution shape graphically instead of looking at the kurtosis and skewness statistics value. Furthermore, the error is being decreased by a large sample which can inflate the kurtosis and the skewness statistical value (Field, 2009), decrease the standard errors, which in turn inflates the value of the skewness and kurtosis statistics. Hence, this justifies the reason for using a graphical method of normality test rather than the statistical methods.

Following Field's (2009) suggestion, in the present study, the histogram and normal probability plots were accessed to make sure that there is no violation of normality assumptions. As shown in Figure 4.1 the data collected has followed the normal pattern because almost all the bars on the histogram are close to a normal curve. Therefore, Figure 4.1 shows that the normality assumptions were not violated in the present study.

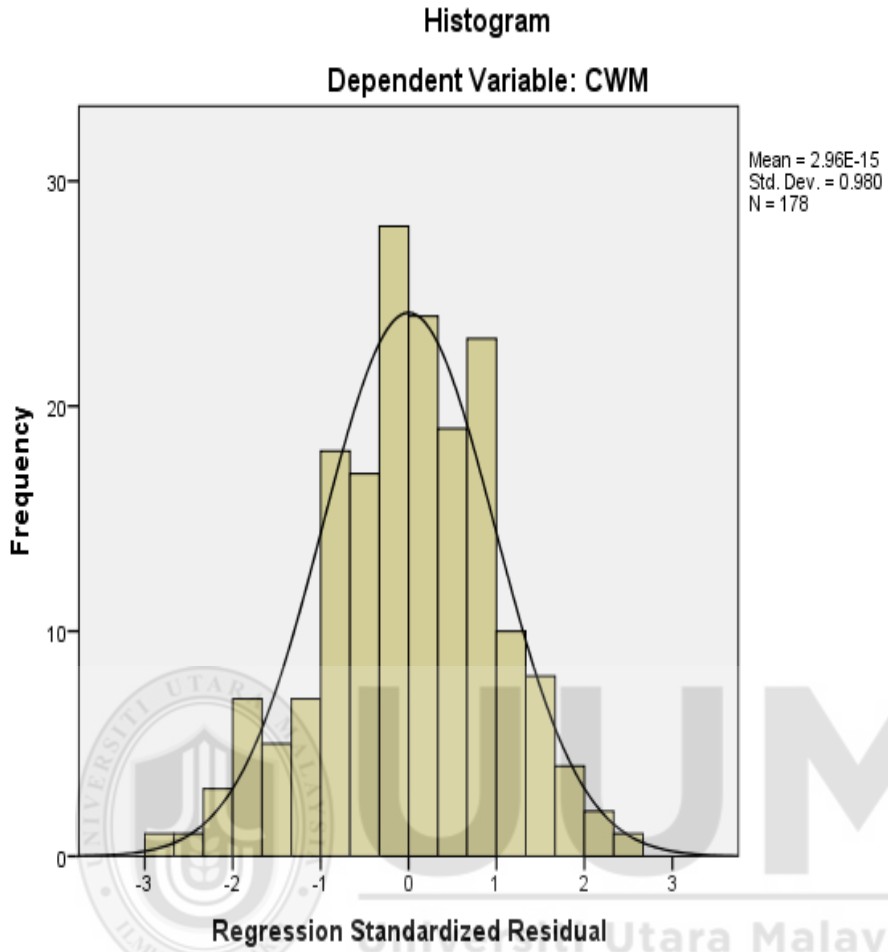


Figure 4.1: *Normality curve*
Source: *Researcher*

4.4.4 Multico-linearity Test

Multicollinearity is where two or more exogenous latent constructs are highly correlated. The presence of multicollinearity among the exogenous latent constructs will distort the estimates of regression coefficients and their statistical significance tests substantially (Chatterjee &Yilmaz, 1992; Hair, Black, Babin, Anderson, &Tatham, 2006). Particularly, Tabachnick & Fidell (2007) stated that the standard errors of the coefficients are

increased if there is multicollinearity, which on the other way round would make the coefficients statistically non-significant. Two methods were used to detect multicollinearity in the present study (Chatterjee &Yilmaz, 1992; Peng & Lai, 2012).

According to Hair et al. (2010) the examination of the correlation matrix of the exogenous latent constructs, also multicollinearity is said to occur if there is the correlation coefficient of 0.90 and above between the exogenous latent constructs.

Table 4.3 *Correlation Matrix of the Exogenous Latent Constructs*

	CEN	FOR	GP	OGL	ST	TRL	CWM
CEN	1						
FOR	0.584	1					
GP	0.659	0.529	1				
OGL	0.690	0.605	0.661	1			
ST	0.612	0.522	0.720	0.682	1		
TRL	0.668	0.515	0.686	0.717	0.688	1	
CWM	0.753	0.628	0.792	0.781	0.776	0.774	1

Source: *Researcher*

Table 4.3, shows that the correlations between the exogenous latent constructs that are below the suggested threshold values of 0.90 or more, indicate that the exogenous latent constructs are not highly correlated and were independent. Multicollinearity is said to occur when the independent variables are extremely interrelated which is as high as 0.9 and above (Tabachnick & Fidell, 2007). As soon as two or more constructs are excessively interrelated, they enclose unnecessary information, and for that reason, not all

of them are required in the same analysis, since they enhance or increase the size of error terms, and weaken the analysis.

If the multicollinearity problem is detected, it can be resolved by deleting the offending variables (s). In this study SPE, WREU, WD were deleted and FOR02, FOR04, CEN03, CEN04, TRL01, TRL02, TRL03, TRL05, OGL01, OGL03, OGL04, OGL05, ST01, ST02, GP02-GP05, WREC03, WREC06, WRED02, WRED04 and WRED06 were deleted as a result of multicollinearity. Next, when it comes to screening the multicollinearity, the regression result from SPSS was used to examine the Variance Inflation Factor (VIF) and tolerance level. Therefore, according to Hair et al., (2010) the rule for the cut-off points is that the VIF and the tolerance values should not exceed 10 and should not be less than 0.10. See Table 4.4 below.

Table 4.4 *Multicollinerity Test based on Tolerance Values and VIF*

Exogenous Variable		Collinearity Statistics Tolerance	VIF
ORGS			
	ORGR	.160	6.265
	GP	.160	6.265
ORGR			
	GP	.284	3.527
	ORGS	.284	3.527
GP			
	ORGS	.269	3.714
	ORGR	.269	3.714

NOTE: ORGS= Organizational Structure ORGR= Organizational Resources GP= Government Policy

Source: *Researcher*

It can be clearly seen from Table 4.4 that tolerance ranges between 0.13 – 0. 41, and significantly >0.10. Similarly, VIF ranges from 2. 39 – 7.63, and, hence, is < 10

(Tabachnick & Fidell, 2007). Thus, it was concluded that the multicollinearity problem among the exogenous variables is not an issue.

4.5 Non-Response Bias

Non-response bias is defined as "the differences in the answers between non-respondents and respondents" (Lambert and Harrington (1990p. 5). To estimate the possibility of non-response bias, a time-trend extrapolation approach was suggested by Armstrong and Overton (1977), which requires comparing early and late responses. It was disputed that late respondents share similar characteristics with non-respondents. In the meantime, to minimize the issue of non-response bias, it was recommended by Lindner and Wingenbach (2002) that 50% minimum response rate should be achieved.

The present study followed the approach of Armstrong and Overton's (1977), by dividing the respondents into two main groups: (i.e., early respondents) responders within 30 days and (i.e., late respondents) responders after 30 days (Vink & Boomsma, 2008). The majority of the respondents in the sample; that is 101 (57%) responded to the questionnaire within 30 days, while the remaining 78, representing 43%, responded after 30 days (Table 4.5).

Particularly, to detect any possible non-response bias, an independent sample t-test was conducted on the variables of the main study, where these include; organizational structure, organizational resources, government policy and construction waste management.

Table 4.5 shows the results of the eight variables of this study which indicated that the independent-samples t-test equal variance significance values revealed that the Levene's test for the equality of variances was greater than the 0.05 significance level based on the suggestion of Field (2009) and Pallant (2010). Therefore, this proposes that the assumption of equal variances between early and late respondents was not violated. Hence, non-response bias is not a major problem in the present study as concluded. In addition, 57% response rate was achieved in this study and it can be said that non response bias is not a main issue, following the recommendation of (Lindner and Wingenbach, 2002).Table 4.5 present the Non-response bias an independent samples t-test.

Table 4.5 *Non-response bias an independent sample t-test*

Variable	Group	N	Mean	SD	Levene's Test for Equality of Variances	
					f	Sig
Formalization	Early Response	101	0.302	0.83	1.30	0.255
	Latte Response	77	0.302	0.85		
Centralization	Early Response	101	0.23	0.68	0.76	0.38
	Late Response	77	0.23	0.68		
Specialization	Early Response	101	0.17	0.83	0.35	0.61
	Late Response	77	0.17	0.85		
Transformational leadership	Early Response	101	0.79	0.92	0.67	0.10
	Late Response	77	0.79	0.95		
Organizational learning	Early Response	101	0.14	0.93	0.11	0.73
	Late Response	77	0.14	0.93		
Staff training	Early Response	101	0.53	0.65	1.38	0.24
	Late Response	77	0.53	0.66		
Government policy	Early Response	101	6.83	1.12	0.39	0.53

	Late Response	77	6.83	1.12		
Construction waste management	Early Response	101	3.27	3.07	2.90	0.90
	Late Response	77	3.27	3.10		

Source: *Researcher*

4.6 Common Method Variance Test

In this study all the items were subjected to a principal components factor analysis, following (Podsakoff & Organ, 1986). Four factors were yielded by the results of the analysis, thereby explaining a cumulative of 66.68% of the variance; with the first (largest) factor explaining 29.55 % of the total variance, which is less than 50% (c.f., Kumar, 2012). Moreover, the results indicate that no single factor accounted for the majority of covariance in the predictor and criterion variables (Podsakoff et al., 2012). Hence, this suggests that common method bias is not a major concern and is unlikely to inflate relationships between variables measured in the present study.

4.7 Descriptive Statistics

In this study descriptive analysis of the Respondents Profile and the Latent Constructs were conducted, thus below.

4 .7.1 Profile of Respondents

Table 4.6 below shows the respondents' demographic profile. The respondents were requested to explain some of their demographic information; they include the category of organization, designation, age, marital status, gender, qualification, years of

organizations' operation. This study shows that among the four categories of construction organizations in Nigeria, category C constituted 69 responses, representing (38.7 percent) of the total response, followed by category D with 44 responses, representing (24.7 percent), the next is category B with 38 responses, representing (15.3 percent) and lastly category A had 27 responses representing (15.3percent). Regarding the designation, 178 responses (100 percent) are managers of construction organizations in Nigeria. In regard of the age , 98 out of the total responses representing (55percent) are between the age of 26-50 years, then between 51-70 with 56 responses, representing (31.5percent), and finally age group between 18- 25 with 24 responses (13.5percent). In terms of the marital status of the respondents, Married dominated with 124 responses (69.7percent), and Single gave 54 responses (30.3 percent). Most of the responses in this study were given by male with 161 responses, representing (90.4 percent), and female 17 responses, representing (9.6percent).

Regarding the educational qualification, those with PGD/master's Degree holders constituted 86 responses, representing (48.2 percent) of the total responses, followed by HND/Degree holders with 56 responses, representing (3 1.5 percent), those with PhD certificates with 30 responses, representing (16.9 percent), and finally those with other certificates amounting to 4 responses representing only (3.4 percent) of the total responses. This pointed out clearly that the majority of the construction organization 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 percent) which is insignificant. In the meantime, with regard to the

number of years in operation, 100 respondents had between 11-21 years in operation (56.2 percent), 49 respondents had less than 10 years (27.5 percent), 26 respondents between 21-30 years of existence (14.6 percent), whereas 31-40 years had 3 (1.7percent).

Table 4.6 *Profile of respondent*

Demographic Variables	Category	Frequency	Percentage
Category of organizations	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%
	51-70years	56	31.5%
	70 and above	0	0%
Marital status	Single	54	30.3%
	Married	124	69.7%
Gender	Male	161	90.4%
	Female	17	9.6%
Educational qualification	HND/Degree	56	31.5%
	PGD/Masters	86	48.2%
	PhD	30	16.9%
	Others	6	3.4%
Years of organization in operation	Less than 10years	49	27.5%
	11-20years	100	56.2%
	21-30years	26	14.6%
	31-40years	3	1.7%

Source: *Researcher*

4.7.2 Descriptive Analysis of the Latent Constructs

In this section, the descriptive statistics are primarily concerned with the latent variable descriptive statistics used in the present study. This is the form of latent variable means and standard deviations. All the latent variables used in this study were measured using a five-point scale whereby "1 = strongly disagree to 5= strongly agree". Table 4.7 presents the results. For easier interpretation, the five-point scale used in the present study was classified into three categories, namely, low, moderate and high. Scores of less than 2

(3/3 + lowest value 1 is considered as low; scores of 3 (highest value 5 - 3/3) is considered high, while those between low and high scores are considered moderate (Sassenberg, Matschke, & Scholl, 2011).

Table 4.7 *Descriptive Statistics for Latent Variables*

Latent Construct	N	Mean	Std. Deviation
Formalization	178	3.49	.78
Centralization	178	3.58	1.12
Transformational Leadership	178	3.46	1.02
Organizational Learning	178	3.48	1.02
Staff Training	178	3.54	1.08
Government Policy	178	3.55	1.06
Construction Waste Management	178	3.47	.95

Source: *Researcher*

Table 4.7 shows that the overall mean for the latent variables ranged between 3.46 and 3.60.This suggests that respondents tended to have high level of score for construction waste management. Table 4.7 also indicates that the mean for the organizational structure conceptualized in this study as formalization and centralization are; formalization was 3.49, with a standard deviation of .78, centralization with the mean score of 3.38, standard deviation 1.12 suggesting that the respondents' level of organizational structure was high. Furthermore, the results show a high score for the organizational resources which is being conceptualized in this study as transformational leadership, organizational learning and staff training.

Under transformational leadership, the mean was 3.46, with Standard deviation 1.02, the mean for organizational learning was 3.48, and the standard deviation was 1.02, while the staff training has the mean of 3.58, standard deviation 1.08. The score for the government policy was high, with mean and standard deviation of 3.55 and 1.06 respectively. The descriptive statistics also showed a high score for construction waste management (Mean=3.47, standard deviation = 0.95).

4.8 Assessment of PLS-SEM Path Model Results

Henseler and Sarstedt (2013) conducted a recent study, where he suggested that the goodness-of-fit (GoF) index is not suitable for the model validation. For example, according to the author, using PLS path models with simulated data, that goodness-of-fit index is not suitable for model validation since valid models cannot be separated from invalid ones (Hair, Ringle, &Sarstedt, 2013). Based on the recent progress about the PLS path modelling in model validation unsuitability, a two-step process was adopted in this study as suggested by Henseler, Ringle and Sinkovics (2009) to evaluate and report the results of the PLS-SEM path. In this study, the two-step process adopted includes (1) A measurement model assessment, and (2) the assessment of a structural model assessment as represented in Figure 4.1 (Hair *et al*., 2012; 2014).

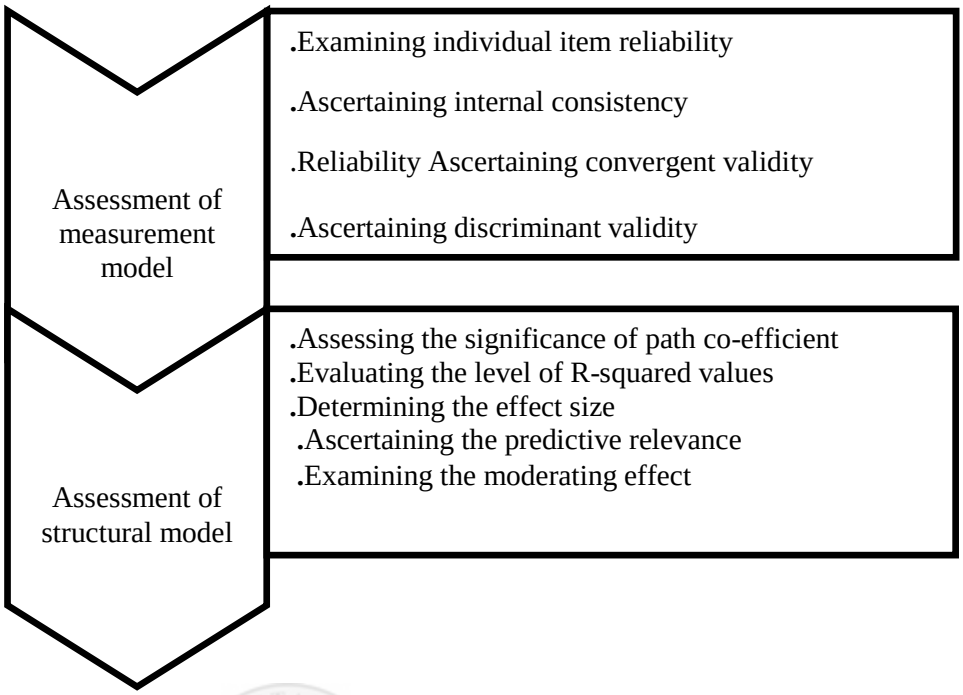


Figure 4.2 *a two- step process of PLS Path Model Assessment*
Source: (*Henseller et al., 2009*)

4.9 Assessment of Measurement Model

According to Hair *et al.,* (2011; 2014) in the measurement model assessment, when determining the internal consistency reliability, the individual item's reliability content validity, discriminant validity and convergent validity are required as shown in the measurement model in figure 4.3 below.

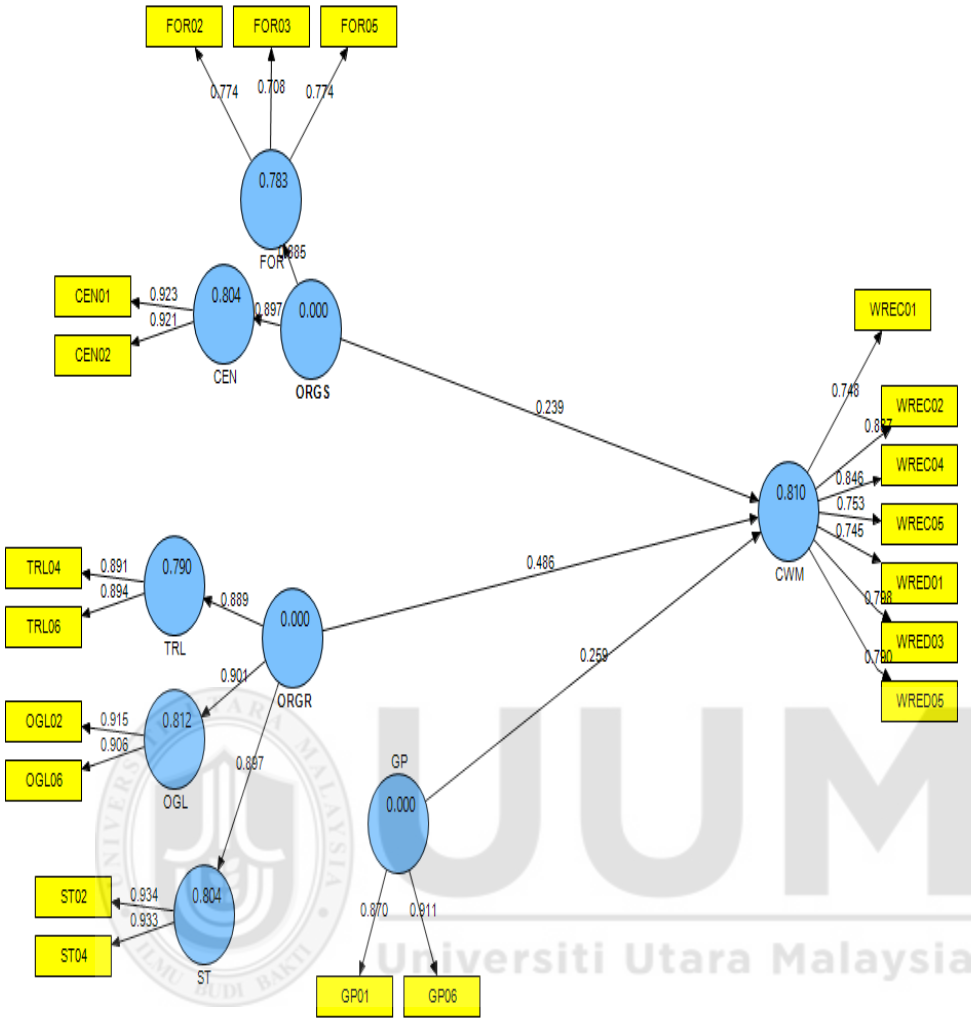


Figure 4.3 *Measurement Model*
Source*: Researcher*

4.9.1 Individual Item Reliability

Hulland (1999); Hair et al. (2012; 2014) pointed out that the individual item reliability was assessed by examining the outer loadings of each construct's measure. Items with loadings between .40 and .70 should be retained (Hair *et al*., 2014), it was realized that out of 61 items, 2 were deleted because they presented loadings below the threshold of 0.40. 38 items were deleted as a result of multicollinearity, following Fuchs &

Diamantopoulos (2009) that the more similar the items are, the less of them are needed to measure a construct, and the more likely it is that single item and multiple item scales match up. In the extreme, if most of the items are identical, a sample of one or two items would be acceptable to represent the item-set. Hayduk and Littvay, (2012) further recommended the use of the few best indicators, for instance one or two indicators are often deemed sufficient. For a model with latent variables to be best estimated, there should be at least two measured indicators in each latent.

This is because the degrees of freedom are increased when estimating such a complex model (Sharpe, 2010). Bergkvist and Rossiter (2007) indicated that single-item measures are equally as valid as multiple-item measures and theoretical tests and empirical findings would be the same if single-item measures are used instead of multiple-item measures. Petrescu (2013) clarified the debate concerning the use of single-item indicators in the marketing research, further providing some examples of types of constructs measurable through single-item indicators. Based on the aforementioned, the items retained for the study are 20 items. The loadings of the item are between 0.774 and 0.934 in the whole model as presented in figure 4.3 and Table 4.8.

Table 4.8 *Loadings, Composite Reliability and Average Variance Extracted*

Latent constructs and Indicators	Standardized Loadings	Crombach's Alpha	Composite Reliability	AVE
ORGANIZATIONAL STRUCTURE				
Formalization		0.616	0.797	0.567
FOR02	0.774			
FOR03	0.708			
FOR05	0.774			
Centralization		0.824	0.919	0.850
CEN01	0.923			
CEN02	0.921			

ORGANIZATIONAL RESOURCES		0.796	0.887	0.796
Transformational leadership	0.891			
TRL04	0.894			
TRL06				
Organizational learning		0.793	0.906	0.829
OGL02	0.915			
OGL06	0.906			
Staff training		0.852	0.931	0.871
ST02	0.934			
ST04	0.933			
GOVERNMENT POLICY		0.741	0.884	0.793
GP01	0.870			
GP06	0.911			
CONSTRUCTIONWASTE MANAGEMENT		0.903	0.924	0.635
WREC01	0.748			
WREC02	0.887			
WREC04	0.846			
WREC05	0.753			
WRED01	0.745			
WRED03	0.798			
WRED06	0.790			

Source: *Researcher*

4.9.2 Convergent Validity

According to Hair et al. (2006) convergent validity refers to the degree at which the items represent the intended latent construct which certainly correlates with other measures of the same latent construct. Convergent validity was assessed by examining the Average Variance Extracted (AVE) of each of latent construct, in this study, based on Fornel and Larcker (1981)'s suggestion. Chin (1988) recommended that to achieve adequate convergent validity, the AVE of each latent construct should be 0.50 or more. In line with Chin (1998), the AVE values in table 4.8 ranged from 0.567 and 0.8771 which revealed high loadings (>0.50) on their respective constructs, indicating that for all the constructs, the convergent validity has been established.

4.9.3 Discriminant Validity

Duarte & Raposo (2010) referred to discriminant validity as the extent to which a particular latent construct differs from other latent constructs. Discriminant validity in the present study was determined using average variance extracted based on (Fornell and Larcker's, 1981) suggestion. He further emphasized that it was realized when the correlations among the latent constructs were compared with the square roots of the average variance extracted.

In addition, following the criterion of Fornell and Lacker (1981), discriminant validity was achieved. Firstly, there was the benchmark for estimating discriminant validity, therefore, Fornell and Larcker (1981) suggested that the (AVE) average variance extracted with a score of 0.50 or more is acceptable. For adequate discriminant validity to be achieved, Fornell and Larcker (1981) suggested that the square root of the average variance extracted (AVE) has to be greater than the correlations among the latent constructs. See table 4.8 above for the values of the AVE which range between 0.56 and 0 .87, signifying acceptable values.

Table 4.9 shows the relationships between the latent constructs compared with the square root of the AVE (bold face value). Following Fornell and Larcker, (1981) all the square roots of the average variances extracted were greater than the correlations among latent constructs as shown in table 4.9, which signifies that there is adequate discriminant validity.

Table 4.9 *Latent Variable Correlations and Square Roots of Average Variance Extracted*

	Latent variables	1	2	3	4	5	6	7
1	Centralization	0.921						
2	Formalization	0.584	0.753					
3	Government policy	0.659	0.529	0.890				
4	Organizational learning	0.690	0.605	0.661	0.893			
5	Staff training	0.612	0.522	0.720	0.682	0.933		
6	Transformational leadership	0.668	0.515	0.686	0.717	0.688	0.892	
7	Construction waste management	0.753	0.628	0.792	0.781	0.776	0.774	0.797

Source: *Researcher*

4.10 Assessment of the Structural Model

The next stage is the assessment of the structural model after ascertaining the measurement model in the present study. The procedure for the bootstrapping through a number of 5000 bootstrap samples and 331 sample size to assess the significance of the path coefficients was applied (Hair *et al*., 2011; 2012; 2014). Structural model, according to Hair *et al.* (2006), illustrates about the reliance and dependence of relationships in the hypothesized model. In partial least squares (PLS), structural model takes before the directional relationships between the variables, their t-values and the path co-efficient. Regarding path coefficient, partial least squares (PLS) is entirely like the standardized beta (Std. Beta) coefficient in regression analysis (Agarwal & Karahanna, 2000). Importantly, the core objective here is to assess the hypothesized relationships among the constructs (Organizational Structure, Organizational Resources, Government Policy and Construction Waste Management).

The study spotlights the evaluation model and then the assessment of the hypothesis of regression and correlation of variables. In the hypotheses structuring perspective, PLS-SEM supports Parsimonious models those offer "as few parameters as possible for a given quality of model estimation results". Equally, Hierarchical component model (HCM) is a higher-order structure (usually second-order) that contains several layers of constructs and involves a higher level of abstraction. HCMs involve a more abstract higher-order component (HOC), related to two or more lower-order components (LOCs) in a reflective or formative way" according to Hair et al., (2012) there are several reasons behind the insertion of Hierarchical component model in PLS-SEM. For instance, it helps in reducing "the number of relationships in the structural model, making the PLS path model more parsimonious and easier to grasp. The HCMs prove impressive if "the constructs are highly correlated; the estimations of the structural model relationships may be biased as a result of collinearity issues, and discriminant validity may not be established. In situations characterized by collinearity among constructs, a second-order construct can reduce such collinearity issues and may solve discriminant validity problems.

Furthermore, Hair et al. (2014) and Becker et al. (2012) suggested investigating the relationship of the constructs directly with dependent variable (s), rather than assessing the dependent variable with the high-order components directly. Following the above recommendations, this study has appropriately examined the relationships between organizational structure, organizational resources and the moderating effect of

government policy on the relationships between the predictor (s) and the criterion variable i.e. construction waste management to fulfill the objective of the study mentioned earlier. Figure 4.4and Table 4.10 present the estimate for the structural mode.

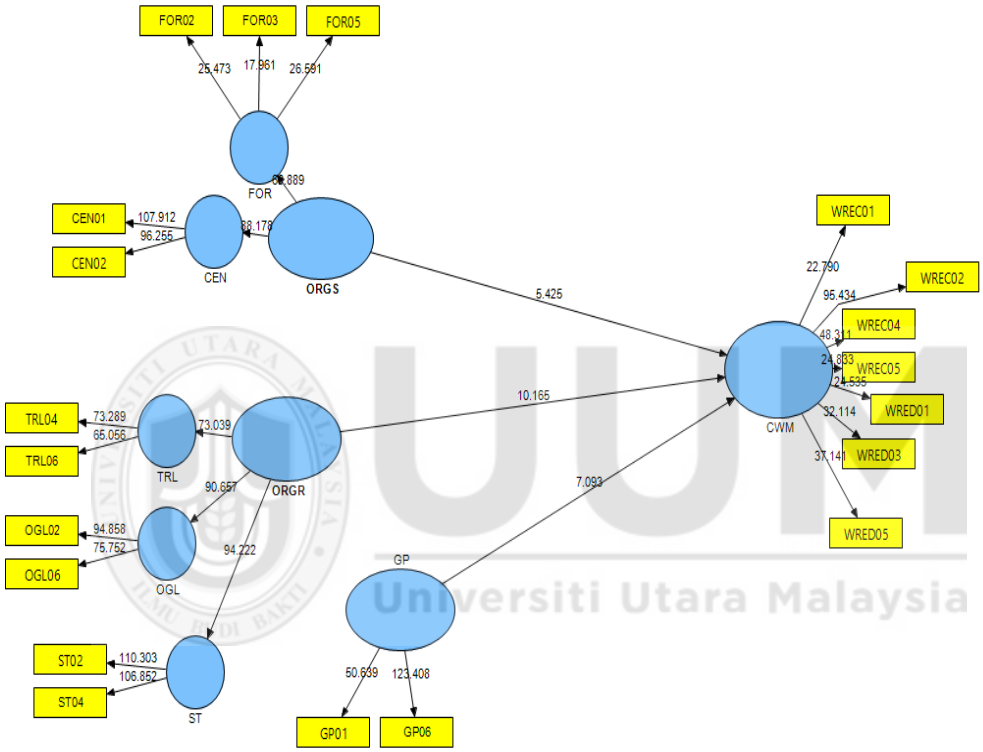


Figure 4.4 *Structural Model*
Source: *Researcher*

Figure 4.4 above is the structural model (bootstrapping) model for this study is for testing the hypothesis of the study the PLS algorithms and Bootstrapping were run.

Table 4.10 *Structural Model Assessment*

Hypotheses	Relation	Beta	Std. Error	T-value	Findings
H1	ORGS -> CWM	0.25	0.036	7.092	Supported
H2	ORGR -> CWM	0.48	0.047	10.164	Supported
H3	GP -> CWM	0.23	0.044	5.425	Supported

Source: *Researcher*

At the outset, Hypothesis 1 predicted that the organizational structure or ORGS is significantly related with the construction waste management, or CWM. Result (Table 4.10, Figure 4.4) has shown a significant relationship between ORGS and CWM (β = -0.25, t = 7.09, p< 0.01), thus hypothesis 1 is supported.

Hypothesis 2 predicted that organizational resources are significantly related to construction waste management. Result (See Table 4.10, Figure 4.4) indicated that organizational resources, or ORGR had a significant relationship with construction waste management, or CWM (β = -0.48, t = 10.16, p < 0.01), so hypothesis 2 is supported. Equally, in examining the influence of government policy GP on construction waste management CWM, the result indicated that government policy had a significant relationship with construction waste management CWM (β = -0.23, t = 5.42, p < 0.01), thus Hypothesis 3 is also supported.

4.10.1 Assessment of Variance Explained in the Endogenous Latent Variables

The (R^2) R-squared is another important criterion for assessing the PLS SEM structural model, which is referred as the coefficient of determination (Henseler *et al*., 2009; Hair *et*

al., 2011; 2012). Elliott & Woodward, 2007; Hair et al., 2010 equally, referred to R2 value to represent in the independent variable the proportion of variation that can be explained by one or more predictor variable (s). Although the research context determined the acceptable level of R^2 value, Falk and Miller (1992); Hair et al. (2010), recommended a minimum acceptable level of an R-squared value of 0.10. In the meantime, it was suggested by Chin (1998) that it can be considered when $R^{2,}$ value is 0.19 ,0.33 and 0.67, categorized respectively as weak, moderate and substantial in the PLS-SEM.Table 4.11 presents the R-squared values of the endogenous latent variable.

Table 4.11 *Variance Explained in the Endogenous Latent Variables*

Latent Variable	Variance Explained (R^2)
Construction Waste Management	81%

Source*: Researcher*

Table 4.11 above shows the research model that explains 81% the total variance in construction waste management CWM. This means that the 3 exogenous latent variables, namely organizational structure, organizational resources, and government policy collectively explain 81% of the variance of the construction waste management CWM. Therefore, following the criteria of Chin's (1998) and Falk and Miller's (1992), the acceptable level of R^2 value of the endogenous latent variables has been achieved and this was considered as substantial.

4.10.2 Assessment of Effect Size (f^2)

The effect size indicates that there is a relative effect of a particular exogenous latent variable on the endogenous latent variables by means of changes in the R-squared (Chin, 1998). It is calculated as the increase in the R-squared of the latent variable to which the path is connected, in relation to the latent variable's proportion of unexplained variance (Chin, 1998). Hence, the following formula could be used to express the effect size (Wilson, Callaghan, Ringle & Henseler, 2007; Cohen, 1988; Selya, Rose, Dierker, Hedeker, &Mermelstein, 2012).

$$\text{Effect size: } f^2 = \frac{R^2_{\text{Included}} - R^2_{\text{Excluded}}}{1 - R^2_{\text{Included}}}$$

Source: *Dierker, Hedeker, &Mermelstein, 2012*

Cohen (1988) described the effect size value or f^2 values, as described by Cohen (1988) to be 0.35, 0.15 and 0.02 or large, moderate and small effects respectively. The respective effect sizes of the latent variables of the structural model are shown in table 4.12.

Table 4.12 *Effect Sizes of the Latent Variables on Cohen's (1988) Recommendation*

R-squared Exogenous latent Construct	Included	Excluded	f^2	Effect size
ORGS	0.810	0.786	0.126	Small
ORGR	0.810	0.736	0.389	Large
GP	0.810	0.784	0.136	Small

Source: *Researcher*

As shown in Table 4.12, the effect sizes for the organizational structure (ORGS), organizational resources (ORGR) and government policy (GP) on construction waste

management CWM, were 0.126, 0.389 and 0.136 respectively. Thus, resonating with Cohen's (1988) guideline, the effect sizes of these three exogenous latent variables on construction waste management can be considered as small, large, and small respectively.

4.10.3 Assessment of Predictive Relevance

The Stone-Geisser test of the predictive relevance of the research model using blindfolding procedures was applied in the present study (Geisser, 1974; Stone, 1974). In the partial least squares structural equation modelling, the Stone-Geisser test of predictive relevance is usually used as a supplementary assessment of the goodness-of-fit. (Duarte & Raposo, 2010). Although blindfolding was used in this study to ascertain the predictive relevance of the research model, it is worth noting that a "blindfolding procedure is only applied to endogenous latent variables that have a reflective measurement model operationalization" (Sattler, Völckner, Riediger and Ringle (2010 p. 320). Hence, the reflective measurement model "specifies that a latent or unobservable concept causes a variation in a set of observable indicators (McMillan & Conner, 2003, p. 1). In this study a blindfolding procedure was applied mainly to the endogenous latent variables, since the endogenous latent variable (s) were reflective in nature.

Particularly, a cross-validated redundancy measure (Q^2) was used in measuring the predictive relevance of the research model (Geisser, 1974; Chin, 2010; Hair et al., 2013; Ringle, Sarstedt, & Straub, 2012b; Stone, 1974). According to Chin (1998); the benchmark for measuring how fit a model predicts the cases of misplaced data is referred

to as Q^2. The research model with Q^2 statistic (s) greater than zero is considered to have predictive relevance (Henseler *et al*. 2009).

Additionally, more predictive relevance is suggested by a research model with higher positive Q2 values.

Table 4.13 *Construct Cross- Validated Redundancy*

Total	SSO	SSE	1-SSE/SSO
CWM	1246.00	608.35	0.51

Source: *The Researcher*

Table 4.13 indicated that the cross-validation redundancy that measures Q^2 for the endogenous latent variable was above zero, indicating that the model has predictive relevance (Henseler *et al.*, 2009; Chin, 1998).

4.10.4 Testing Moderating Effect

The present study applies a product indicator approach using the Partial Least Squares. The Structural Equation Modelling in the present study adopts the product indicator approach to detect and estimate the strength of the moderating effect of government policy on the relationship between organizational structure, organizational resources and construction waste management, following (Chin *et al*., 2003; Helm, Eggert, &Garnefeld, 2010; Henseler & Chin, 2010a; Henseler & Fassott, 2010b). This study considers the product term approach since the moderating variables are continuous (Rigdon, Schumacker, &Wothke, 1998).

According to Henseler and Fassott (Henseler & Fassott, 2010a) "given that the results of the product term approach are usually equal or superior to those of the group comparison approach, we recommend always using the product term approach" For applying the indicator product approach in testing the moderating effects of Government policy on the relationship between organizational structure, organizational resources and construction waste management, in the structural model, the independent variable latent indicators and the moderator variable latent indicators need to be created, thus, these product terms would be used as the interaction term indicators (Kenny & Judd, 1984).

Moreover, to determine the strength of the moderating effect, Cohen's (1988) guideline for establishing the effect size was applied in the present study. Figure 4.6 and Table 4.14 hence, indicate the estimates after applying the indicator product approach to assess the moderating effect of government policy on the relationship between the exogenous and endogenous latent variables.

The result of the hypothesis testing shows that government policy GP has a moderating effect on the relationship between organizational structure ORGS and construction waste management CWM, and particularly, this relationship is stronger than it is for organizational resources ORGR. The results shown in Table 4.14, Figure 4.6 indicated that the interaction terms representing organizational structure ORGS, government policy, GP and construction waste management, CWM were statistically significant (β = -0.08, t = 2.61, $p < 0.01$). Hence, Hypothesis 4 is fully supported. Information from the path coefficients was used to plot the effect of government policy moderating the

relationship between organizational structure and construction waste management, adhering with Aiken and West (1993) Marcus et al. (2002) Dawson and Richter's (2002) recommended procedure. Figure 4.5 shows that the relationship between organizational structure and construction waste management is weaker.

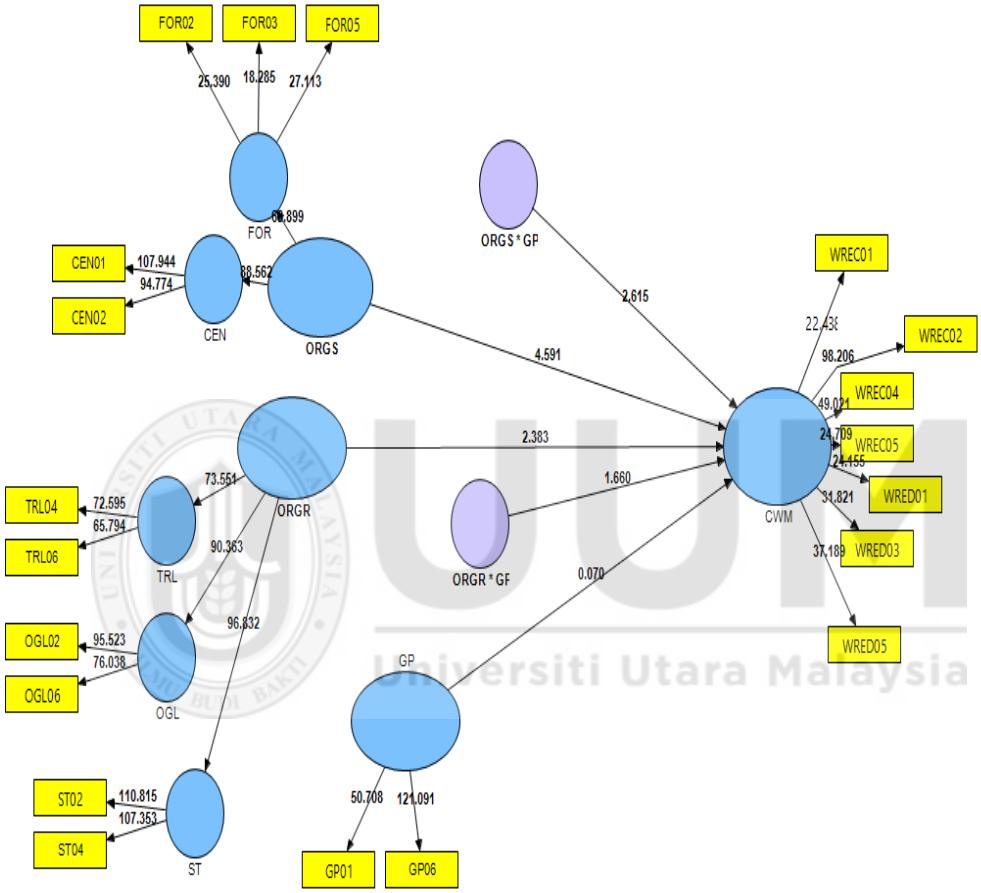


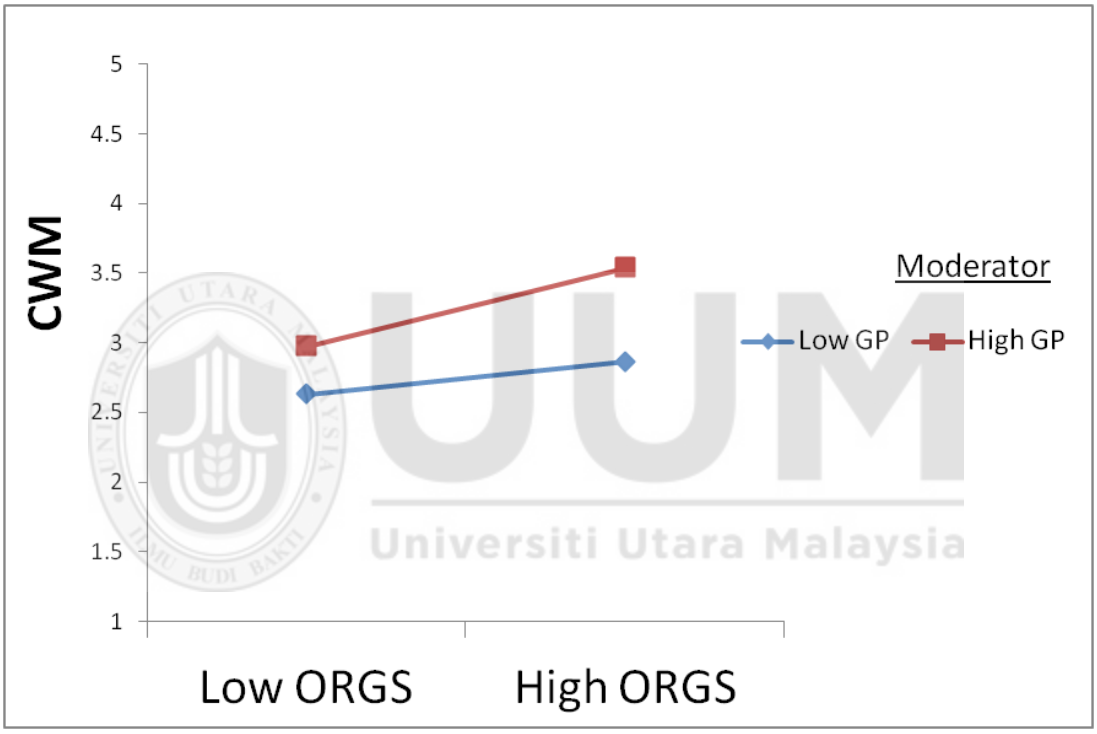
Figure 4.5: *Moderation*
Source: *Researcher*

Figure 4.5 above is the moderation model for testing the moderation hypothesis of the present study. Table4.14 presents the moderation the result of the moderation hypothesis.

Table4.14 *Moderation hypothesis*

Hypothesis	Relationship	Beta	Std. Error	T-Statistics	Decision
H4	ORGS*GP-> CWM	-0.08	0.03	2.61**	Supported
H5	ORGR*GP-> CWM	0.39	0.23	1.66**	Supported

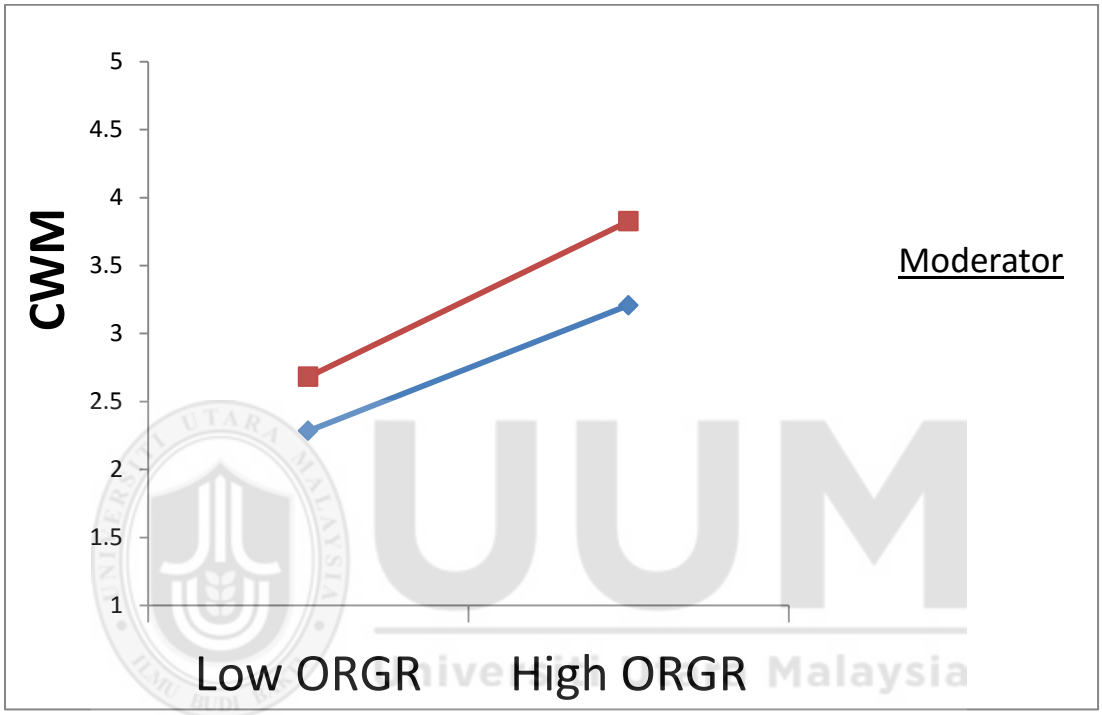
**p< 0.01, *p< 0.05



GP strengthens the positive relationship between ORGS and CWM.

Figure 4.6: *Interaction effect of government policy on organizational structure and construction waste management.*
Source: *Researcher*

The effect of government policy moderating the relationship between organizational structures is depicted in Figure 4.6, which shows a stronger positive relationship between the organizational structure and construction waste management.



GP strengthens the positive relationship between ORGR and CWM.

Figure4.7 *Interaction effect of government policy on organizational resources and construction waste management.*
Source: *Researcher*

Similarly, table 4.14, figure 4.7 supports Hypothesis 5, which states that government policy moderates the relationship between organizational resources and construction

waste management (β = 0.39, t =1. 66, p < 0.05). The moderating effect of government policy on the relationship between organizational resources is depicted in Figure 4.8, which shows a stronger positive relationship between the organizational resource and construction waste management.

4.10.5 Determining the Strength of the Moderating Effects

In determining the strength of the moderating effects of government policy on the relationship between organizational structure, organizational resources and construction waste management, Cohen's (1988) effect sizes were calculated. Furthermore, the strength of the moderating effects can be measured by comparing the coefficient of determination (R-squared value) of the main effect model with the R-squared value of the full model that includes both exogenous latent and moderating variables (Henseler &Fassott, 2010a; Wilden, Gudergan, Nielsen, & Lings, 2013).

Therefore, the following formula could be used in expressing the strength of the moderation (Cohen, 1988; Henseler & Fassott, 2010a):

$$\text{Effect size: } (f^2) = \frac{R^2 \text{ model with moderator} - R^2 \text{model without a moderator}}{1 - R^2 \text{ model with moderator}} \qquad (4.2)$$

Source: *Cohen, 1988; Henseler & Fassott, 2010a*

Moderating effect sizes (f^2) values of 0.35, 0.15 and 0.02 respectively can be considered as strong, moderate and small (Cohen, 1988; Henseler & Fassott, 2010a).

However, Chin et al. (2003), suggested that a low effect size does not necessarily mean that the underlying moderating effect is insignificant. "Even a small interaction effect can be meaningful under extreme moderating conditions, if the resulting beta changes are meaningful, then it is important to take these conditions into account" (Chin et al., 2003 p. 211).

Table 4.15 shows the result of the strength of the moderating effect of government policy. Consistent with Cohen's (1988) Henseler and Fassott's (2010b) rule of thumb for determining the strength of the moderating effects, Table 4.15 shows that the effect size for construction waste management was 0.02, suggesting that the moderating effect was small (c.f., Henseler, Wilson, Götz, &Hautvast, 2007;Wilden et al., 2013).

Table 4.15 *Strength of the Moderating Effects Based on Cohen's (1988) and Henseler and Fassott's (2010) Guidelines*

	R^2			
Endogenous latent constructs	Included	Excluded	f^2	Effect size
Construction waste management CWM	0.814	0.810	0.02	Small

Source: *Researcher*

4.11 Summary of the Chapter

With minor modifications, the confirmatory factor analysis (CFA) with PLS has confirmed the structural composition of the three constructs (Organizational factors, government policy and construction waste management). Using the PLS technique, the

multivariate analysis has provided statistical evidence of the predictive relevance and the importance of government policy as a good mechanism in which organizational factors influence the efficiency in construction waste management. Specifically, results from the PLS analysis have provided support for all the hypotheses for this study.

Findings reveal three significant main effects affecting the relationship between: (1) organizational structure and construction waste management (ORGS) and (CWM); (2) organizational resources and construction waste management (ORGR) and (CWM); (3) government policy and construction waste management (GP) and (CWM); thus, the entire hypotheses are significant. Importantly, regarding the effect of government policy moderating the relationship between the organizational structure, resources and construction waste management, the PLS bootstrap results have demonstrated that all the two formulated hypotheses are significant.

After presenting all the results, including main and moderating effects in the preceding sections, Table 4.16 shows all the results of all hypotheses tested in the form of a summary.

Table 4.16 Summary *of Hypotheses Testing*

Hypothesis	Statement	Finding
H1	There is a significant relationship between Organizational structure and construction waste management	Supported
H 2	There is a significant relationship between organizational resources and construction waste management.	Supported
H3	There is a significant relationship between Government policy and construction waste management.	Supported
H4	Government policy has the significant moderating effect between Organizational structure and construction waste management.	Supported
H5	Government policy has the significant moderating effect between organizational resources and construction waste management.	Supported

Source: *Researcher*

The next chapter will focus on discussions concerning the research questions and hypotheses tested. A summarization of the aim of this study and the implication would be discussed. Additionally, limitation and suggestions for future research are presented.

CHAPTER 5

DISCUSSIONS AND CONCLUSIONS

5.1 Introduction

In this chapter, the findings were discussed based on the research objectives and the research questions were reviewed. The results of all the direct relationships between: (1) organizational structure as exogenous variables and construction waste management (CWM) as an endogenous variable; (2) organizational resources as exogenous variables and construction waste management (CWM) as an endogenous variable; and finally (3) government policy as exogenous variables and construction waste management (CWM) as an endogenous variable, were discussed. The organization of the chapter has been classified into four major parts.

The summary of the result was discussed in the first section. Based on the pattern of the result, the findings of the tested hypotheses and the literature are discussed in the second session. Thirdly, the current findings, applications and the directions for future research were also elaborated. The limitation of this study was presented in the fourth section. Last but not least, the conclusion of the study and finally the impending recommendations were discussed in the fifth and sixth sections, respectively.

5.2 Interpretation of the Results Obtained from Analysis

This study seeks to assess the moderating effect of government policy on the relationship between organizational factors (organizational structure, organizational resources) and construction waste management. Towards this end, 5 hypotheses were developed representing the constructs' relationships. Empirical support was provided by the result for 5 hypotheses, including the main and moderating effects. The findings in relation to previous findings were discussed in the next section.

5.2.1 Relationship between organizational Structure on Construction Waste Management CWM (Objective 1)

Organizational structure in this study has been considered as the formal system of responsibility and reporting relationships that enables expected outcomes to be achieved by the employees by means of coordination and motivation (George & Jones, 1999). The extent of formalization and centralization serves as the structural dimensions. Centralization is considered as the centrality of decision-making at the top (Subramanian & Nilakanta, 1996), while, Auh and Menguc (2007) considered formalization as a means of sustaining the rules and standards guiding the workers in accomplishing organizations' goals.

The current study's organizational structure is conceptualized by formalization also centralization. In relation to the organizational structure and construction waste management organization, this study finds that organizational structure has a significant relationship with the construction waste management, or in short, CWM.

Hypothesis 1 (H1) of this study states that, organizational structure (ORGS) is significantly related to construction waste management (CWM) with. As expected, the finding provides support for the hypothesis. This is due to the fact that the managers of the construction waste management organization have chosen a mechanistic structure to improve the capability and efficiency of the organization.

Bedeian (1986) added that organizational efficiency in construction waste management can be an essential subject in the study of organizations, whereby in the organization theory it is one of the most cited and yet least understood concept. He further continued that failing to consider the organization's goals, constituents, and characteristics can lead to faulty assumptions of performance.

In the current study organizational goals, constituents and characteristics were considered by the construction organization in Nigeria leading to an effective waste management. Furthermore, in the context of construction waste management, it was found that recycling and waste reduction were the most effective waste management method among the 4R concepts of integrated waste management (Reduce, Reuse, Recycle and Disposal) examined among the Nigerian construction organizations.

In addition, the government supports the setting of goals, monitoring and evaluations, collection and suitable storage for recycling wastes. Hence, the avoidance of damages by proper handling of materials, efficient and appropriate use of materials and the

minimization of the use of non-renewable materials employed by construction organizations in Nigeria, contributed to the significant performance.

The current findings provided empirical support for the hypothesis and are, thus, consistent with past studies by Stank (1992); Pertusa-Ortega, *et al*. (2010), who found that the formalization is the extent to which decision and working relationships in construction waste management organizations are controlled by formal rules and standard policies and procedures; furthermore, centralization keeps the managers and members of the staffs make the initiative when performing their duties and also encourages them to be flexible (Katsikea, et al., 2011). In addition, EWM, (2006) reported that the best practice is appreciated by observations on how the organizations operate. Therefore, the qualities of the waste management organizations are influence by the operations of the organization which have been visibly accomplished in a significant manner.

The provision of cleaning service for the maintenance of the citizens' safety, health and environment in particular is the priority of a waste management system (Cooper, 1999). Hagar, (2007) stated that appropriate construction waste management will offer sound economic benefit by diminishing the project cost through appropriate waste management plan implementation. Furthermore, the extent of the organizational structure using the descriptive statistics found that the means for the organizational structure conceptualized in this study as formalization and centralization are; formalization=3.49, with a standard deviation of .78, centralization 3.38,standard deviation 1.12, indicating that the respondents' level of organizational structure is high. This suggested that organizational

structure is significantly related to the construction waste management. Among the four categories of construction organizations in Nigeria, categories C and D with the highest response constituted 69 and 44 responses, representing (38.7 and 24 percent), with 178 responses (100 percent) being the managers of construction organizations in Nigeria who are at the top management level of the organization. Regarding the age, 98 out of the total responses representing (55 percent) are between the ages of 26-50 years, while those between 51-70 had 56 responses which constituted the highest respondents. For the marital status of the respondents, Married people had dominated with 124 responses (69.7percent). Most of the responses in this study were given by male with 161 responses, representing(90.4 percent).Regarding educational qualification, those with PGD/master's Degree holders constituted 86 responses, representing (48.2 percent) of the total responses, followed by HND/Degree holders with 56 responses, representing (3 1.5 percent), those with PhD certificates with 30 responses, representing (16.9 percent).

This pointed out clearly that the majority of the construction organization managers are the holders of PGD /Master's degree certificate followed by HND/Degree holders, then those with PhDs and lastly other certificates with the least percentage of (3.4 percent) and at the same time, deemed insignificant. In the meantime, with regard to the number of years in operation, 100 respondents had between 11-21 years in operation (56.2 percent), 49 respondents had less than 10years (27.5 percent), and looking at the characteristics of the respondents, it delved into the circumstances or factors that influence the relationship between organizational structure and construction waste management among construction organizations in Nigeria.

5.2.2 Relationship between Organizational Resources and Construction Waste Management CWM (Objective 2)

In this study, organizational resource is being considered as 'where resources are brought together'. Different resources are used by organizations to achieve their goals. For instance, the organization major resources are frequently expressed as financial, human, physical, and information resources. The responsibility for acquiring and managing the organizational resources for the accomplishment of the organizational goal rests on the managers (Barna, (2014). Hence, in this study organizational resource is conceptualized as transformational leadership Geib and Sweanson (2013); organizational learning Yamen (2010); staff training (Bartlett, 2000). In relation to the organizational resources and construction waste management organization, this study found that organizational resources have significant relationships with the construction waste management CWM.

In answering the second research question, one research hypothesis was formulated and tested using the PLS path modelling. Hypothesis H2 of this study states that organizational resources (ORGR) are significantly related to construction waste management (CWM). As expected, the finding provides support for the hypothesis.

In the current study, the clarity of the leaders, motivation of the employees, strong commitment to learning, promotion of open mindedness, training, support and benefit were considered by the construction organizations in Nigeria, which further leads to an effective performance of the organizations.

The current findings provided empirical support for the hypothesis and are, thus, consistent with past studies (Dilland, 1995). Transformational leadership represents the

transcendence of self-interest by both leader and the followers, concurred by Bennis (1959) who modified the concept of “transformative leadership as the ability of an individual to touch the souls of others in a fashion which raises the consciousness of humans intent, inspires human and builds meanings that is the source of Power". (Bass &Avolio (1994) extended Burns’ theory.

As it is, transformational leadership includes four factors; idealized influence, motivation, inspiration, stimulation, intellectual and individualized consideration (House & Shamir, 1993; Bass & Avolio, 1994; Gardner & Avolio, 1998; Jung & Avolio, 2000). Pace (2002) revealed that organizational learning outcomes are measured by the impact of the performance, finances, productivity, production of waste, continuous improvement, management of waste, employee behaviours, satisfaction, customer focus, and performance.

Bartlet (2001) stated that there is a relation among the employees’ awareness towards training and organizational obligation, and the staff perception of training is positively linked with the ability of employees, the readiness to participate, and the support from the senior managers of the organization for training. The extent of organizational resources using the descriptive statistics found that the means for the organizational resources conceptualized in this study as transformational leadership, organizational learning and staff training are; Transformational leadership=3.46, with a standard deviation of 1.02, organizational learning with mean score of 3.48,standard deviation 1.02 ,staff training (Mean=3.54,standard deviation 1-08, indicating that the respondents’

level of organizational resources is high and this suggested that organizational resources are significantly related to construction waste management.

5.2.3 Relationship between Government Policy and Construction Waste Management CWM (Objective 3)

The Nidirect government services (2014) defined "government policy" as the programme of action which aims to change a definite state of affairs. Therefore, the government uses policies as the starting point for them to get a course of action to make a real life change. Hence, policies are used to tackle a wide range of issues. In fact, policies can even change the amount of tax and individual or organization's pay, parking fines, immigration laws and pension, landfill tax.

The policy environment that governs waste management is mainly reflective of the legislation enacted at the provincial level and decisions made in relevant case law. Federal participation in waste management efforts focuses on the Trans -boundary waste because most waste management falls under the provincial jurisdiction and authority under the division of federal and provincial powers outlined in The Constitution Act (1867). As a result, the Federal government is involved in the regulation and management of certain types of toxic substances, pollutants, and wastes through the Canadian Environmental Protection Act (CEPA, 1999).This study finds that government policy has significant relationships with the construction waste management, CWM.

In answering the third research question, one research hypothesis was formulated and tested using the PLS path modelling (i.e., H3). It could be recalled that the hypothesis stated government policy (GP) to be significantly related to construction waste management (CWM). The finding provides support for the hypothesis. In this study, it is found that the implementation of waste reduction policy and the control of land to prevent illegal waste dumping in Nigeria, leads to an effective performance of the organization. The current findings provided empirical support for the hypothesis and are, thus, consistent with past studies, (WDO, 2003).

In 1989, a Waste Reduction Framework Plan was launched by the Hong Kong government (WRFP, 1989; Waste Disposal Ordinance, 2003). The aim of the plan was to improve the awareness on waste reduction among the stakeholders. The programmes were set out to minimize and avoid waste recovery promotion, waste reuse and recycling of materials, prolong the life of landfill in existence, increase the cost, treatment and disposal of waste transportation. Therefore, the suggestion on various waste reduction measures can be incorporated by different economic sectors into their business practice.

It is expected that it will bring about changes in the old method of waste collection and transportation to the recent method of prevention and reuse of waste material. Furthermore, six objectives were specified by the waste reduction framework plan (WRFP, 1998): (1) extending the useful life of the strategic landfills; (2) minimizing the amount of waste to be disposed; (3) helping to conserve the earth's non-renewable resources; (4) increasing the waste recycling rate; (5) minimizing the costs of collection,

treatment and disposal of waste; and (6) improving institutional arrangements (WRFP, 1998).

According to WRFP (1998), for the reduction of construction material wastage to be achieved, one of the specific targets is to reduce waste to the maximum level of 84 percent. The extent of organizational resources using the descriptive statistics found that the means for the organizational resources conceptualized in this study as transformational leadership, organizational learning and staff training are; transformational leadership=3.46, with a standard deviation of 1.02, organizational learning with the mean score of 3.48,standard deviation 1.02 ,staff training(Mean=3.54,standard deviation 1.08, indicating that the respondents' level of organizational resources is high, and this suggested that organizational resources are significantly related to the construction waste management.

5.2.4 Moderating Effect of Government policy on the Relationship between Organizational Structure and Construction Waste Management (Objective 4)

In the assessment of the relationships between the Selected State Government Policy Measurements and Sustainable Development, Tam *et al*. (2007) indicated that the, existing waste control ordinances (government policy) allow for skewed distribution of commitments and responsibilities of controlling construction waste among project stakeholders. In this study, the government policy is the policy, rules, regulation and action programmes which guide the conduct, functions and operation of construction waste management. It is conceptualized as construction waste management policy, and used as a moderating variable. The moderation effect of government policy on the

relationship between organizational structure and construction waste management, of construction organization suggested that government policy moderates the relationship between organizational structure and construction waste management, CWM.

In answering the fourth research question, one research hypothesis was formulated and tested using the PLS path modelling. Hypothesis H4 of this study states that Government policy significantly moderates the relationship between organizational structure and construction waste management. As expected, the finding provides support for the hypothesis. In this study it is found that the implementation of waste reduction policy and the control of land to prevent illegal waste dumping in Nigeria are among the factors that enhance the moderating effect of government policy on the relationship between organizational structure and construction waste management in Abuja, Nigeria.

This is consistent with the study of Tojo et al. (2006), that the level of cohesiveness, policy instruments can be categorized as mandatory, voluntary and negotiated agreement. Administrative instruments cover various measures concerning the fulfilment of certain tasks, for example, the achievement of a certain recycling rate, elimination of the use of certain substances and prohibition of landfilling. Once mandated via legislation, the target entities need to achieve certain tasks or refrain from doing certain things, in accordance with what is demanded in the legislation. Unless an exemption is granted, the target parties have no choice but to obey. WRAP (2013) stated that the UK Government reported that recycling and other positive waste operations are best encouraged rather

than punished, therefore, it supported a number of trial schemes to test out the rewards and recognition, which is more effective for the construction waste management practice.

5.2.5 Moderating Effect of Government Policy on the Relationship between Organizational Resources and Construction Waste Management (Objective 5)

In considering the moderating effect of government policy on the relationship between organizational resources and construction waste management, this study discovers further that government policy moderates the relationship between organizational resources and construction waste management, CWM.

In answering the fifth research question, one research hypothesis was formulated and tested using the PLS path modelling. Hypothesis H5 of this study states that Government policy significantly moderates the relationship between organizational resources and construction waste management. As expected, the finding provides support for the hypothesis. In this study it is found that the implementation of informative instruments, training instrument and other waste management charges by the government to the Nigerian construction organizations are among the factors that facilitate the enhancement of the moderating effect of government policy (construction waste management policy/instruments) on the relationship between organizational resources and construction waste management in Nigeria, which is in line with the study of Caballe, Juan, &Xhafa (2008) who found that organizational learning is an interesting factor for the creation of knowledge and also it plays a vital role in the development of the effectiveness of an organization. In essence, this can be realized by the transformation of knowledge and the technical ideas that will lead to competence in construction waste management, policies,

procedure, business and services, on the basis of interaction among diverse technologies, knowledge, and the processes of internal characteristics of the organization (Guadamillas *et. al*., 2008). Similarly, the process of organizational learning includes the acquisition of information and the distribution of such to the stakeholders of an organization and the easy understanding and interpretation of such to be transformed and developed into organizations intangible resources (David and Skerlavaj, 2009).

Speck and Markovic (2001) distinguished the waste management policies into five categories, including charges and taxes, deposit refund systems, tradable liability/ permits, the enforcement incentives (i.e., performance bonds, non-compliance fines) and other subsidies (Tojo *et al.,* 2006). Tojo further emphasized on the resource instruments such as waste disposal, landfill tax, recycling credit scheme, subsidies for taxation of quarry products, "pay-as-you-throw" approach and deposit-refund systems.

Hence, Oosterhuis et al. (2009) exemplified that in the Netherlands, resource instruments were implemented as waste taxes, waste collection taxes, taxes on raw materials & products, deposit-refund schemes and subsidies & fiscal incentives. Eunomia et al. (2009) stated further that a number of economic instruments for construction waste management was summarized, namely product charges, user charges, taxes, credits/ transferable allowances, deposits-refund schemes, non-compliance fees, performance bonds, liability payments and subsidies. With respect to the construction waste management, landfill levy, tax on aggregate and incentives have been seen to affect the construction waste. In particular, landfill taxes in EU countries were investigated and compared to explore the potential use of landfill taxes (Fischer *et al*. 2012).

Informative instruments (referred as “moral suasion”) concern with the collection and provision of learning and are used to influence people’s behaviour and attitude towards construction waste management’s job performance. The underlying philosophy rests in better behaviour with better information and understanding. Typical training instruments are eco-labelling scheme, green shopping guide, marking of products & components, information campaigns to residents and information provision to treatment facilities and organization.

5.3 Implications of the Study

There are implications for practice in the present study. Firstly, the research findings suggested that there is an undeniable propensity for the adoption of government support, setting of goals, monitoring and evaluations, collection and suitable storage for recycling waste. Hence, the avoidance of damages by proper handling of materials, efficient and appropriate use of materials and the minimization of the use of non-renewable materials employed among the construction organizations in Nigeria are high. Additionally, formalization, centralization transformational leadership style, government policy for construction waste management significantly influences their efficiency and effectiveness.

This implies that efficiency among construction organizations in Nigeria can be enhanced when chief executives, managers and other stakeholders put into consideration these efficiency factors seriously. In implementing the findings of this research, the

government should encourage organizational structure and resources that promote proper waste management among construction organizations in Abuja, Nigeria.

To foster efficiency and effectiveness in construction waste management of the construction organizations, formalization and centralization should prevail. Construction organizations have to be very dynamic, committed, and leaders need to demonstrate their efficiency, freedom of uniqueness, commitment to efficient and effective construction waste management. Hypothesis 1 (H1) of this study states that, organizational structure (ORGS) is significantly related to construction waste management (CWM) with (β = -0.25, t = 7.09, p< 0.01) at 10% significance level.

The finding provides support for the hypothesis, as managers of the construction waste management organization tend to have chosen a mechanistic structure to improve the capability and efficiency of the organization. Hypothesis H2 states that organizational resources (ORGR) are significantly related to construction waste management (CWM) with (β = -0.48, t = 10.16, p < 0.01) at 10% significant level.

The finding provides support for the hypothesis. This is because of the clarity of the leaders, motivation of the employees, strong commitment to learning, promotion of open mindedness, training, support and benefit were considered by the construction organizations in Nigeria further leading to an effective performance of the organizations.

Hypothesis H3 states that government policy (GP) is significantly related to construction waste management (CWM) with (β = -0.23, t = 5.42, p < 0.01) at 10% significant level.The finding provides support for the hypothesis.

This is as a result of the implementation of waste reduction policy and the control of land to prevent illegal waste dumping in Nigeria further leading to an effective performance of the organization. Hypothesis H4 states that Government policy significantly moderates the relationship between organizational structure and construction waste management with the (β = -0.08, t = 2.61, p < 0.01) at 10% significant level. The finding provides a weaker support for the hypothesis. This is as a result of the implementation of waste reduction policy and the control of land to prevent illegal waste dumping in Nigeria as the factors that enhance the moderating effect of government policy on the relationship between organizational structure and construction waste management in Nigeria. Hypothesis H5 states that Government policy significantly moderates the relationship between organizational resources and construction waste management with (β = 0.39, t =1. 66, p < 0.05) at 5% significant level which provides a stronger support. The finding provides support for the hypothesis.

Government policy moderate the relationship between organizational resources and construction waste management contributed high to this study at 5% significant level than the construction organization. This is also the result of the implementation of informative instruments, training instruments and other waste management charges by the government to the Abuja, Nigerian construction organizations as the factors that facilitate

the enhancement of the moderating effect of government policy (construction waste management policy/instruments) on the relationship between organizational resources and construction waste management in Abuja, Nigeria.

Top management should continuously guide and motivate organization employees for better job performance, promote learning culture, be open minded, and provide focus in frequent staff training and learning. Creating policies by the government and enforcement of strict compliance for the control of land to avoid illegal waste dumping and waste reduction method and policies on construction waste management and intense support for the incentives among the construction organizations in Abuja, Nigeria ensure that efficient and effective construction waste management can be materialised.

The academic implication of this study is classified into three dimensions factors influencing construction waste management in the context of construction organizations, research model for this study, and extending the resource base theory to suit construction organizations. Most previous researchers did not address organizational factors; therefore, the present study makes an effort to fill the research gap.

The framework for examining the moderating effect on the relationship between organizational factors and construction waste management will provide a direction for future studies. Furthermore, the study of construction organizations will represent a yardstick for providing a means of assessing the construction waste management organizations.

The model developed in the study will strive to determine the importance of the moderating effect of government policy influencing the relationship between organizational factors and construction waste management organizations. Particularly, ten factors were assembled to develop five hypotheses based on the research model of construction waste management organization that leads to the development of efficiency and effectiveness. This model will offer future researchers with the framework needed to investigate other part of construction waste management among construction organizations and also complement the existing literature.

Theoretically, the study assessed and test the model developed for organizational factors with the aim of utilizing the dependent variable (construction waste management).The research study can provide policy makers and private organizations an instrument to assess how external factor such as government policy (construction waste management policy) could affect adoption of a good management system. Underpinned by the resource-based theory, this study provided empirical evidence for bridging the knowledge gap with regards to measuring and organized construction waste management among construction organizations in Nigeria.

In practice, identifying the level of Nigerian construction waste management among construction organizations will be a yardstick for benchmarking. In addition, the present framework, perhaps, will offer the right drive for changing the current inactivity towards better construction waste management practice among construction organizations in Nigeria.

The result of this study will practically help stakeholders (i.e. Agencies, both governmental and non-governmental organizations) in policy-making and in making appropriate decisions in regard of the efficiency and effectiveness of the construction waste management practice. These will help the managers in understanding the importance of an efficient, effective and integrated waste management practice.

5.4 Contributions to Knowledge

This study has made a number of contributions to; 1) The framework of this study is a contribution to knowledge because it complement the literature, 2) Extending the Resource Based View (RBV) to Construction Waste Management and 3) Each of the five objectives and hypotheses achieved in this study is a contribution in itself, 4) Extent of organizational structure, resources' and government policy found in this study are all contribution to waste management practice.

Some previous studies had focused on the adoption of construction waste management, thereby examining construction waste management from different perspectives in different contexts and countries. (examples are Lawson (2001) in the UK; Yates (2013) in the United States; Poon *et al*. (2007) in Hong Kong; Ling and Nyuyen (2011); Arif et al. (2012) and Osmani (2013) in India; Yuan & Shen (2010) in China; and Yean &Ling (2013) in Vietnam, Liu, Wang, and Lin (2012) among others, but the extent to which organizational factors influence the implementation of construction waste management among construction organizations in Abuja, Nigeria has yet to receive considerable attention.

The study assesses the moderating effect of government policy on the relationship between organizational factors and construction waste management among construction organizations in Nigeria, thereby, the notion was refuted that in terms of efficiency and effectiveness, the construction waste management organizations are generally lagging behind (Hanssell *et al*., 2003). The present study has succeeded in positioning the construction waste management organizations in Nigeria, as far as the organizational efficiency is concerned.

The definition of construction waste management provided in this study captures the adoption of waste reduction, waste reuse, waste recycling and waste disposal and also the planning, organizing, implementing, control monitoring and evaluating to achieve maximum efficiency and effectiveness. Thus, perhaps the definition suits the context of the construction waste management organization.

Based on the result of the path coefficient of organizational structure and construct, this study identifies organizational resources and construction waste management as highly correlated. The two dimensions (formalization and centralization) were classified as one broad dimension that exhibits organizational behaviour towards efficiency and effectiveness.

Secondly, the present study focuses on the relationship between organizational resources and construction waste management. While most studies in construction waste management focused on the dynamic model, Yuan (2011) sustainability in construction

waste management Papargyropoucou *et al. (*2011), waste management plan Olatunji (2008), sustainable construction waste management strategy, the role of government in construction waste management practice Mou & Ka-yan (2008) among others, this study investigates the effect of government policy that moderates the relationship between organizational factors and construction waste management among construction organizations.

Similar to previous studies, the current study finds that organizational structure and resources are all significantly and strongly related to construction waste management. The study shows that all factors leave a significant impact on construction waste management efficiency in the construction organizations. Additionally, government policy has a moderating effect on the relationship of both organizational structure and organizational resources and construction waste management in Nigeria. Perhaps, new understanding has been added by these results to the present organizational adoption theory.

5.5 Limitation of the Study and Suggestion for Future Research

A number of limitations have been identified in the course of conducting this research. They are as follows.

Firstly, based on the findings in the previous studies, a cross-sectional study was employed in the present study considering the period of six months for the data collection. This is as a result of the type of information deemed necessary and sufficient

by using the cross-sectional data collection method. This result is not adversely affected in any way by this method, relying on the cross-sectional method, has been found in some previous studies to be successful. However, at different points in time, efficiency behaviour could have been able to be captured by the longitudinal method.

Secondly, the survey method was relied upon by the current study, due to the complex nature of the construction waste management construct. Nevertheless, in this field, it might be beneficial to conduct personal interviews by future researchers to complement the information obtained through the survey method. This study's response rate is 53.7% compared to other studies which are considered high. However, by using both the qualitative and quantitative methods of collecting data, it may have a positive effect in increasing the response rate, and it may be possible that the respondents who will participate in the interview /survey would be able to give an improved response and demonstrate a clear understanding of the research.

Thirdly, in this study, the measurement of the construction waste management of the construction organizations in Nigeria relies on one respondent only. The respondents are the managers of the construction organizations because they are also responsible for the organizations' decision-making. Although the manager is agreed by most scholars as the most prominent in efficient adoption (Jantan *et al*., 2003), capturing the summary measure from multiple respondents would be better instead of having a single respondent, as argued by other authors. Definitely, considering the employees in future study is highly recommended, as more value will be added to the understanding of efficient construction waste management.

Next, in this study all the results shows that the R^2 variance explained is 81% of the data as shown in the structural equation model PLS measurement model result. Therefore, the framework for this study could not be able to capture 19% of the unexplained variance. Given the fact that the quantitative method of analysis and collection have been carried out in the present study, in seeking for new variables that may influence the construction waste management efficiency, a case study or qualitative method should be adopted in future research.

5.6 Conclusion

Some research gaps have been identified in this study that has five research questions, five objectives of the research, and five developed hypotheses:

First of all, the study of the relationship between organizational structure and construction waste management among construction organizations in Nigeria, has received little attention. Secondly, most researches on the Nigerian construction organizations have examined construction waste management not from the organizational factors' point of view. Thirdly, scholars in the construction organization concentrate less on the relationship between government policy and construction waste management in the construction organizations in Nigeria.

Also, the moderating role of government policy on the relationship between organizational structure and construction waste management has not been given due attention. Finally, previous studies have focused on the moderating role of the

government policy in other fields of studies, but not in respect to organizational resources and construction waste management among construction organizations in Nigeria.

The five research gaps identified have been successfully filled by this study. Firstly, the relationship between organizational structure and construction waste management among construction organizations in Nigeria has been established. Secondly, the construction waste management from a multi-dimensional approach has been examined in this study. Thirdly, the relationship between government policy and construction waste management among construction organizations in Nigeria has been determined and next, the moderating role of the government policy on the relationship between organizational structure and construction waste management among construction organizations in Nigeria has been determined. Lastly, the moderating effect of the government policy on the relationship between organizational resources and construction waste management among construction organizations in Nigeria has also been determined.

The answers to the five research questions asked earlier have been provided in this study. Also met are all the five research objectives. Additionally, as has been hypothesized earlier, all the five hypotheses tested have all been supported.

This study establishes that the high level formalization and centralization has a significant relationship and positive impact on the construction waste management of construction organizations in Abuja, Nigeria, so this answers the first research question. Therefore, to enhance the construction waste management among the construction organizations, this type of structure should be practised.

For the second research question, this study finds that organizational resources have a significant relationship and give a positive impact on the construction waste management of construction organizations in Abuja, Nigeria. The relationship between the government policy and construction waste management among construction organizations in Nigeria is significant and has a positive impact. Additionally, Government policy strengthens the positive relationship between organizational structure and construction waste management among construction organizations in Nigeria. Regarding the last research question, government policy strengthens the positive relationship between organizational resources and construction waste management among construction organizations in Nigeria.

The five formulated hypotheses in this study, all examine the relationships between organizational structure, resources and construction waste management, the effect of government policy which moderates the relationship between organizational structure, resources and construction waste management among construction organizations and they are all supported.

5.7 Recommendations

Based on this study, it is recommended that:

1) Specific legislation governing the handling and disposal of construction wastes should be introduced by the government and followed by a strict monitoring to ensure compliance; hence, it will enhance both the efficiency and effectiveness in the construction waste management practice among construction organizations in Nigeria.

2) The government should set up incentive schemes to reward organizations which embrace the construction waste management practice efficiently and effectively with a holistic understanding of the structure.

3) The Construction Waste Management in Nigeria should be everybody's concern in the construction organization and the government (i.e., all stakeholders). One single governmental agency cannot cope effectively with the volume of the construction waste generated in Nigerian construction sites.

4) The decentralization of authority should be encouraged among, and within, the construction organizations.

5) Transformational leadership should be well practiced to encourage the lower staff in achieving the best in adopting the construction waste management practice among the construction organizations in Nigeria.

6) Training and re-training of staff as part of human resource development in the construction organization must be ensured to achieve a more efficient and effective construction waste management practice in Nigeria's construction organizations.

7) There should be a division of labour to better enhance the staff performance on the job in relation to the perfection on the efficiency and effectiveness in the construction waste management among the construction organizations in Nigeria.

8) Agencies and organizations responsible for the construction waste management must be sufficiently supported by allocating adequate funding and infrastructural improvements to enable them to perform effectively and successfully.

9) Efforts exerted towards the use of scientific techniques to develop appropriate technologies should be geared for dealing with construction waste management, such as

where wastes from one activity become the input of raw materials for another activity (i.e., recycling). Landfill sites should be designed and operated in accordance with the World Health Organization standards.

In summary, this study has abided by, and met, all the relevant requirements of originality of a thesis (Hart, 1998). Firstly, this study has not been done before and is naturally an empirically- based work. Secondly, the ideas and practice have been well acknowledged, but this study carries a new interpretation as well. Thirdly, new evidence has been introduced by this study to nurture the idea about the construction waste management in construction organizations in Nigeria. Fourthly, the RVB theory has been extended to the construction waste management. On a positive note, the organizational structure, resources, government policy and construction waste management have all been examined in a single study.

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APPENDIX 1

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Dear Respondent,

ACADEMIC REASERCH QUESTIONNAIRE

I am a PhD. student in the above University, currently conducting research title "The effect of Government Policy on the relationship between Organizational Factors and Construction Waste Management in Abuja, Nigeria". I would appreciate it if you will assist the researcher by providing objective and sincere answer to all questions as there is no right or wrong answer. All information provided will be treated as private and confidential. It will be solely used for academic purposes.

Thanks,
Yours sincerely,

Nasidi Yusuf
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University Utara Malaysia (UUM),
06010 Sintok, Kedah, Malaysia
Tel: (+234) 8037033778/ +601136853468
E-mail: nasidiyusuf@yahoo.com

Section 1: ORGANIZATIONAL SRUCTURE

In this section, the researcher is interested in your assessment about organizational structure, which consist of Formalization, Centralization and Specialization.

Formalization

Please circle the number that best describe your organization using the Likert scale below. Where:

1= Strongly Disagree; 2 = Disagree; 3 =Neutral ; 4 =Agree ; 5 =Strongly Agree

S/N	Items	SD	D	N	A	SA
FOR01	In our organization, I feel that I am my own boss in most Matters	1	2	3	4	5
FOR02	In our organization, a staff can make decisions without Checking with any other person.	1	2	3	4	5
FOR03	In our organization, employees are allowed to do as they please	1	2	3	4	5
FOR04	In our organization, most employees make their own rules on the job	1	2	3	4	5
FOR05	In our organization, how work is done is up to the person doing the work	1	2	3	4	5
FOR06	In our organization, employees are constantly being checked on for violating rules	1	2	3	4	5
FOR07	In our organization, employees feel as though they are constantly being monitored to see that they obey all the rules	1	2	3	4	5

Centralization

S/N	Items	SD	D	N	SA	A
CEN01	In our organization, there can be little action taken until a supervisor approves a decision.	1	2	3	4	5
CEN02	In our organization, small matters have to be referred to top management.	1	2	3	4	5
CEN03	In our organization, i have to ask my boss before I do almost anything	1	2	3	4	5
CEN04	In our organization, any decision I make has to have my boss' approval	1	2	3	4	5
CEN05		1	2	3	4	5

Specialization

S/N	Items	SD	D	N	SA	A
SPE01	In our organization, Job specialization makes my work easier	1	2	3	4	5
SPE02	In our organization, Job specialization makes	1	2	3	4	5

	my job Performance better					
SPE03	In our organization, Job Specialization makes my job faster	1	2	3	4	5
SPE04	In our organization, any decision I make has to have my boss' approval	1	2	3	4	5
SPE05	In our organization, am fully satisfied with my present area of specialization	1	2	3	4	5

Section 2: ORGANIZATIONAL RESOURCES

In this section, the researcher is interested in your assessment about organizational structure, which consists of Transformational leadership, Organizational learning and Staff training.

Please circle the number that best describe your organization using the likert scale below:

Transformational leadership

1= Strongly Disagree; 2 = Disagree; 3 =Neutral; 4 =Agree; 5 =Strongly Agree

S/N	Items	SD	D	N	SA	A
TRL01	In our organization, the management is always on lookout for new opportunities for the organization.	1	2	3	4	5
TRL02	In our organization, the management has a clear view of its final goals	1	2	3	4	5
TRL03	In our organization, the management succeeds in motivating the rest of the company employees	1	2	3	4	5
TRL04	In our organization, the management always acts as the organizational leading force	1	2	3	4	5
TRL05	Our organization has leaders who are capable of motivating the employees on their job	1	2	3	4	5
TRL06	Our organization has leaders who are capable of guiding the employees in their jobs	1	2	3	4	5

Organizational learning

S/N	Items	SD	D	N	SA	A
OGL01	Our organization promotes a learning culture	1	2	3	4	5
OGL02	Our organization has a strong commitment to learning	1	2	3	4	5
OGL03	Our organization promotes open-mindedness	1	2	3	4	5
OGL04	Members of the company management team act as learning agent for our firm	1	2	3	4	5
OGL05	Our organization proactively questions long-held way routines	1	2	3	4	5

OGL06	Our shared vision provides a focus for learning	1	2	3	4	5

Staff Training

S/N	Items	SD	D	N	SA	A
ST01	Our organization has training frequently	1	2	3	4	5
ST02	Our organization has access to training support	1	2	3	4	5
ST03	Our organization has job related benefit of training	1	2	3	4	5
ST04	Our organization has Personnel related benefit of training	1	2	3	4	5
ST05		1	2	3	4	5

Section 3: GOVERNMENT POLICY

In this section, the researcher is interested in your assessment about government policy. Please circle the number that best describe your organization using the likert scale below:
1= Strongly Disagree; 2 = Disagree; 3 =Neutral; 4 =Agree; 5 =Strongly Agree

S/N	Items	SD	D	N	SA	A
GP01	Government provides on-site sorting facilities for construction waste management organizations	1	2	3	4	5
GP02	Government is implementing waste reduction Regulations	1	2	3	4	5
GP03	Government agencies implementing recycling scheme for construction waste management organizations	1	2	3	4	5
GP04	Government introduces Legislative controls on construction waste management	1	2	3	4	5
GP05	Government Agencies implement an environmental management system	1	2	3	4	5
GP06	Government Controls landfill areas in Abuja	1	2	3	4	5
GP07	Government introduced a framework plan for construction waste management	1	2	3	4	5

Section 4: CONSTRUCTION WASTE MANAGEMENT

In this section, the researcher is interested in your assessment about the construction waste management, which consist of Waste reduction, Waste reuse, Waste recycling and Waste disposal.

Waste reduction

Please circle the number that best describe your organization using the likert scale below.
Where:

1= Strongly Disagree; 2 = Disagree; 3 =Neutral; 4 =Agree; 5 =Strongly Agree

S/N	Items	SD	D	N	SA	A
WRED01	In our organization, we avoid damage by handling and storing materials properly	1	2	3	4	5
WRED02	In our organization, we avoid mixing recyclables and non-recyclable waste	1	2	3	4	5
WRED03	In our organization, we Use materials efficiently and use less of them	1	2	3	4	5
WRED04	In our organization, we estimate as accurately as possible; more accurate = less of them	1	2	3	4	5
WRED05	In our organization, we reduce the use of non-recyclable materials	1	2	3	4	5
WRED06	In our organization we choose strong materials and exploit structural advantages	1	2	3	4	5

Waste reuse

S/N	Items	SD	D	N	SA	A
WREU01	Our organization uses salvaged materials from other jobs	1	2	3	4	5
WREU02	Our organization reuses job site materials such as concrete and others	1	2	3	4	5
WREU03	Our organization uses a central area for cutting and storage of scraps for reuse	1	2	3	4	5
WREU04	Our organization allows for local scavenging, if not a site safety issue	1	2	3	4	5
WREU05	Our organization, donate or sell reusable items from the job	1	2	3	4	5
WREU06	Our organization uses methods for construction, temporary structures that allow for reuse, such as screws rather than nails	1	2	3	4	5

Waste recycling

S/N	Items	SD	D	N	SA	A
WREC01	Our organization Management Support waste recycling	1	2	3	4	5
WREC02	Our organization Set Goals for recycling waste recycling	1	2	3	4	5
WREC03	Our organization is Finding Markets for recycled waste	1	2	3	4	5
WREC04	Our organization does Collection and Suitable Storage of Recyclables	1	2	3	4	5
WREC05	Our organization encourages education and	1	2	3	4	5

	Motivation for waste recycling					
WREC06	Our organization does Monitoring and Evaluation of waste Recycling	1	2	3	4	5

Waste disposal/ landfill

S/N	Items	SD	D	N	SA	A
WD01	Our organization favours landfill as a disposal option	1	2	3	4	5
WD02	Our organization intends to decrease the amount of waste going to landfill as a disposal	1	2	3	4	5
WD03	Our organization encourages other waste management option	1	2	3	4	5
WD04	Government regulation discourages waste to landfill disposal	1	2	3	4	5
WD05		1	2	3	4	5

SECTION 5: DEMOGRAPHIC INFORMATION

Please check/select the most appropriate option that BEST describes your situation.

1. Category of your organization:
   a) Category A ( )
   b) Category B ( )
   c) Category C ( )
   d) Category D ( )
2. Your designation_____
3. Your age_____
4. Marital status
   a) Single ( )
   b) Married ( )
   c) Other ( )
5. Gender
   a) Male ( )
   b) Female ( )
6. Highest education level
   a) HND/ Degree ( )
   b) PGD/ Master ( )
   c) PhD ( )
   d) Other_____
7. How old is your organisation _____