UNIVERSITY OF NAIROBI

SCHOOL OF THE ARTS AND DESIGN

A PROJECT PAPER REPORT COMPILED BY

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APPLICATION OF RECYCLED MATERIALS IN DESIGNING RECREATIONAL FACILITIES:

Case Study of Sheebeen Bar and Restaurant, Nairobi

BY

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Project Paper submitted in partial fulfillment of the requirement for the Bachelor of Arts in Design Degree to the School of the Arts and Design,
University of Nairobi

8th February 2013

Declaration

I, Bundi Marita Hesborn declare that this research paper is my original work and has not been presented for the award of any degree in any other university

Signature ……

Date ……

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Signature ……

Date ……

Dedication

This paper is dedicated to my Late father Joseph Bundi and my loving mother, Hellene Moraa. May the good Lord shower thy soul with blessing wherever you go mum, for I can neither pay nor thank you enough for the love and care you have given me this far. We miss you dad!

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My heartfelt appreciation go to the Almighty God above for the compassionate love, strength and the will of encouragement that he has given me this far all through my course work and through this study.

I express my sincere gratitude to my late father, Joseph Bundi for the strong academic background that the built in me. It's through this that I have come this far all my visions and aspirations are carried unto him and to my loving mother for ensuring that my father's dream for me lived on despite the challenges that we had as a family. To my brother-in-law, Tom Makori for thanks for your constant moral and financial support, I surely would not have come this far without your hand. May the Father above shower thy family with blessings abundantly. I cannot forget to thank my brother Peter for the love and encouragement to make it in life.

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ABSTRACT

This research is aimed at studying how the application of recycled materials in design can be absorbed effectively and efficiently into the design of sustainable recreational spaces in: Interior Architecture, Furniture Design, Exhibition and Display and Landscape Design. The researcher will look into the ability of design to solve environmental challenges through recycling at the same meeting demand for functional products in recreational space resulting into a 'win win' situations.

The researcher will aim at investigating how the different designers have venture into sustainability through different themes with major emphasis being on recycling for develop product that safeguard the environment and at the same time meet functionality. The researcher will therefore review literal publication and productions from renowned designers and authors to develop a scope on what has already been done and what has not. A field study will be conducted by the researcher to determine materials currently preferred in designing such space, reasons to these preferences and the impacts resulting from the use of such material. This will be aimed at establishing the need. Based on the facts obtained from the field, the researcher will then analysis the data draw conclusions and finally draft recommendations towards developing sustainable recreational spaces through recycling. In this case reference will be to the Sheebeen Bar and Restaurant, Upper Hill, Nairobi.

The research will be segmented into five main chapters: chapter one will contain the introduction and background, problem statement, objectives, research questions, significance and scope of study. Chapter two will be a critical analysis of theoretical literature on recycling and how it has contributed to interior design. The researcher will also carry an analytical review aimed at identifying gaps to be filled to the existing knowledge. Chapter three will outline Research Design the Methodology used by the researcher. Chapter four will carry the site analysis, presentation and interpretation of findings while chapter five will be summary of the findings, and recommendations on the four major areas of interior design.

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INTRODUCTION OF THE STUDY

Introduction

In an age of mass production when everything must be planned and designed, design has become the most powerful tool with which man shapes his tools and environments (and, by extension, society and himself). This demands high social and moral responsibility from the designer. It also demands greater understanding of the people by those who practice design and more insight into the design process by the public. Not a single volume on the responsibility of the designer, no book on design that considers the public in this way, has ever been published anywhere. Design must become an innovative, highly creative, cross- disciplinary tool responsive to the true needs of men. It must be more research-oriented, and we must stop defiling the earth itself with poorly-designed objects and structures. (Papanek, 2005) Product, Industrial and interior design are the most significant design electives that are directly related to products of products for humanity. The field of interior design is packaged into: Interior architecture, landscaping, furniture Design and Exhibition and Display.

Interior Architecture is the specific features of a building's interior. It can also be the initial design and plan for use, the later redesign to accommodate a changed purpose, or a significantly revised design for adaptive reuse of the building shell. The latter is often part of sustainable architecture practices, conserving resources through "recycling" a structure by adaptive redesign. Generally referred to as the spatial art of environmental design, form and practice, interior architecture is the process through which the interiors of buildings are designed, concerned with all aspects of the human uses of structural spaces. (Wikipedia, 2012)

Landscaping refers to any activity that modifies the visible features of an area of land, including: living elements, such as flora or fauna; or what is commonly referred to as gardening, the art and craft of growing plants with a goal of creating a beautiful environment within the landscape. natural elements such as landforms, terrain shape and elevation, or bodies of water; human elements such as structures, buildings, fences or other material objects created and/or installed by humans; and abstract elements such as the weather and lighting conditions. Landscaping is both science and art, and requires good observation and design skills. A good landscaper understands the elements of nature

and construction and blends them accordingly. Among the most sustainable landscaping solutions include; Recycling of products, such as glass, rubber from tires and other materials to create landscape products such as paving stones, mulch and other materials. (Loehrlein M. , 2009)

Furniture Design refers to the design of movable objects intended to support various human activities such as seating and sleeping. Furniture is also used to hold objects at a convenient height for work (as horizontal surfaces above the ground), or to store things. Furniture can be a product of design and is considered a form of decorative art. In addition to furniture's functional role, it can serve a symbolic or religious purpose. It can be made from many materials, including metal, plastic, and wood. Furniture can be made using a variety of woodworking joints which often reflect the local culture. Design considerations can include using recycled materials in the manufacturing process and using products that can be disassembled and recycled after their useful life. Sustainable furniture design strives to create a closed-loop cycle in which materials and products are perpetually recycled so as to avoid disposal in landfills. The Think Chair by Steelcase is a recent example of sustainable furniture design. (McDonough, 2002)

An exhibition, in the most general sense, is an organized presentation and display of a selection of items. In practice, exhibitions usually occur within museums, galleries and exhibition halls, and World's Fairs. Exhibitions include whatever as in major art museums and small art galleries; interpretive exhibitions, as at natural history museums and history museums, for example; and commercial exhibitions, or trade fairs. To display refers to the art of to exhibiting ostentatiously before the view. (Merriam-Webste, 2013). Exhibition and display in interior design helps communicate the necessary information to users such as direction, function and even entertainment from technological devices such as television screens.

In a broad spectrum, interior design has always been packaged in theories/philosophies and principles that can be reflected in all the fields inclusively; graphic, product, fashion and illustration design. In modern day interior design the principles have become hard to ignore if one has to meet client needs and at the same time structure environmental

friendly products. Some of the principles include: Universal Design, Eco-Design, and User-Centered Design.

Interior design is not just about the looks of a building's interior. Well, it is but it also plays the key role in its functionality because even the largest house can lack space if having a poor interior design, while a tiny apartment can be transformed into a posh residence with enough space for just about everything with the right design and the use of fitted furniture and contemporary lighting Yes, interior design is much more important than it may seem at a first glance and can be easily compared with the importance of architecture, at least when it comes to interior. Therefore, hiring an interior designer is more than just a good idea if building a new house or remodeling/renovating the existing one. (apartmentherapy.com, 2012)

Background of the Study

In Kenya interior design is developing at an extremely high rate and it impacts cannot go unnoticed. Its influences rang from office design, residential spaces, public utilities and amenities, shopping mall, restaurants bars and grills. The major areas experiencing the impacts include Nairobi, Mombasa, Kisumu and other major towns across the country. Design just like art is a signature. Every designer working on a client need is bound to come up with concepts completely different from hi/her colleague working on the same project as his. This is normally attributed to where on draws his inspiration from and the ability to create which actually the quality that makes art and design diverse. In coming up with the concepts designers however follow conventional rules, considering theories philosophies and principles of design. Although a designer might decide to center his design on one principle, the others are bound to come up for a good and efficient design. A designer designing an eco-friendly restaurant has to include the principle of universal design to make it accessible to all.

In the interior design of restaurants and bars designers take into consideration the target population and the client requirements in order to satisfy the need and avoid creating further problems. "When designing designers should be careful enough to solve the real problem minus creating two other problems…" (Prof. Odoch Pidoh). This has lead to the diversification. This comes as a result of diversity of material used in the design. In

designing the Tribe Hotel the interior designers took into consideration materials that are normally considered classy and trendy giving the site a feeling of aesthetical value and moods associated with the elites. Some designers have also ventured into cultural settings giving their designed spaces a feeling of identity e.g. the Traitoria and Habesha restaurants at the heart of the CBD in Nairobi.

As different cultural trends continue to influence trends in interior design, designers have learned to modify the trends into modernized concepts satisfying the general philosophies and principles of design. These developments have however not failed to register environmental concerns in terms of the material used and the sustainability of the outcomes. For the purpose of this study, sustainability through recycling of materials for interior design will be of major focus therefore. Sustainability is not only a matter of national but of global concern. Agenda 7 of the millennium development goals targets integrating the principles of sustainable development into country policies and programs and reverse the loss of environmental resources. (United Nations, 2010)Very few interior designers in the industry today have tried to practice this trend of utilizing recycled materials such as glass metal, wood, tiles and other locally available materials. However in proposing such materials designers should always consider accessibility, energy consumed during the processing of such material and the expenses involved as some could proof more costly than acquiring new ones. Recycling helps clean up the environment and reduce the threat of depletion of resources.

Recycling of materials is identified as one of Nairobi's key environmental issues and is therefore the focus of this study. The research is interested in finding out to what extent solutions along these lines can be applied in the case study through recovery and reuse of waste materials in developing sustainable restaurants bars and grills and what are the limitations and the future potential of such undertaking. This issue will be addressed with the intention of adding to the body of literature on recovery and re-use of waste materials, and of documenting local initiatives which are often overlooked in the struggle to achieve economic independence. The greater part of waste stems from economic obsolesces of materials. Even though the wastes and by products may be obsolete, the potential opportunities of the waste may be satisfactory if considered individually. Those involved in the interior design should begin to understand that a “useless” piece of steel or timber

need not produce materials for disposal only. Most of these waste materials do not have a negative value, so they can be disposed of advantageously. With the costs of interior décor materials rising at alarming rates, re-use of reclaimed waste cannot be taken lightly (Njuguna, 1990)Hence the basis of this project.

Case Study Profile

The Upper-Hill food court is an amalgam of the Sheebeen Bar and the fast food restaurant that carries the name Upper-Hill Food court, the site also a car wash behind the bar. All these have only one access road, the main entrance into the premise. The premise is located in Upper-Hill, off Hospital along Menengai Road; to the west it faces the newly constructed Regional World Bank headquarters.

Problem Statement

Upper-Hill Food Court and Sheebeen Bar have not adequately applied recycled materials in their designs. The area generally requires a major overhaul in interior architecture, furniture design, exhibition and display and landscaping. Among other related problematic aspects include a rebranding of the bar and restaurant to give it a sense of uniformity, harmony and unity of identity. Currently there is a conflict of color between the restaurant, bar and the car wash an indication that they could be different investments in one environment.

Objective of Study

General Objective of Study

To study how recycled materials can be applied in interior design of recreational facilities such as bars and restaurants towards achieving sustainability and environmental conservation.

Specific Objectives

1. To investigate the sustainability of materials used in the design of Sheebeen bar and Restaurant.

2. To establish the impacts of the materials used in the design of: interior architecture, landscaping, furniture design and exhibition and display of Sheebeen bar and Restaurant to the user and the environment.

3. To propose the most effective and efficient waste materials that can be recycled and reused in interior architecture, landscaping, furniture design and exhibition and display for Sheebeen bar and Restaurant.

Significance of the Study

The aim of this project is to be able to propose the most appropriate ways through which sustainability can be achieved in designing structures and environments for bars, grills and restaurants

Limitations of the Study

1. Time is a limiting factor due to the extensiveness of the scope of study

2. Financial limitations as some respondents might demand to be paid before undertaking the interview

3. Limitation to data and information gathering from secondary sources regarding bars and grills

Scope of the Study

Concept

This study will concentrate on the significance of practicing sustainable design through recycling of material in designing for bars and grills with special emphasis to; the interior architecture, landscaping, furniture design and exhibition and display

Content

This study will rely on both primary and secondary sources of information. All the materials deemed effective and efficient, conclusions and recommendations will be used towards the design of sustainable structures and environments for small market enterprises.

Geographical Aspect

The research process will be entirely based in Nairobi, with the case study being Sheebeen bar and Restaurant, Upper Hill.

LITERATURE REVIEW

Introduction

The research will review past theoretical literature ranging from; books, journal articles, periodicals, conference proceedings, reports, web articles, art, live interviews, film patents and other miscellaneous cases. The researcher will make a critical analysis to identify the gaps in the existing knowledge that are to be filled. Lastly the researcher will then summarize the review and develop a conceptual framework.

Sustainability

Sustainability refers to the capacity to endure through renewal, maintenance, and sustenance, or nourishment, in contrast to durability, the capacity to endure through unchanging resistance to change. For humans in social systems or ecosystems, sustainability is the long-term maintenance of responsibility, which has environmental, economic, and social dimensions, and encompasses the concept of stewardships the responsible management of resource uses. In my review I would therefore look into suitability in terms of: recycling, use of raw materials that are environmental friendly and locally available to prevent excessive energy consumption in industrial processing and import.

Sustainable design is an approach to design based on natural systems functioning, what Ian McHarg aptly titled in his book, Design with Nature. The considerable energy in nature can provide enough to power a sustainable future if we listen and learn from it. Design that use the available site energies are approaching sustainability. These designs connect everything and are the ecological model. (McHarg, 1969) Environmental concern has made its way into almost every aspect of our lives today. The field of interior design is one of them. The world is in dire need of sustainable systems as the growing crisis of haphazard heaps of solid wastes continues to grow. Over the years the growing concerns have led to convening of several conferences by global, regional and local authorities in trying to alleviate the crisis. The centre for sustainable design has built world class knowledge and expertise of sustainable innovation and product sustainability. The centre

researches, develops and disseminates understanding of present and future sustainability impacts and solutions related to innovation, products, technologies, service and systems through projects, training, events, networks and information. (University for the Creative Arts, 1995)

Designing sustainable structures and environments in terms of; their interior architecture, landscaping, exhibition and display and furniture design is therefore of significant value not only to them but also to their clients utilizing the facilities and the government. The utilization of recycled materials comes handy as it is the cheapest process of obtaining raw materials favoring the entrepreneurs who are classified as low income earners. Lack of access to credit is almost universally indicated as a key problem for small scale entrepreneurs. This affects technology choice by limiting the number of alternatives that can be considered. Many may therefore use an inappropriate technology it's the only one they can afford. In cases where credit is available the entrepreneurs lack freedom of choice because the lending conditions may force the purchase of heavy immovable equipment that can serve as collateral. Financial challenges remain a major challenge facing SMEs in Kenya (Wanjohi and Mugure, 2008)

According to Lori Baird we don't have to be victims of the planned obsolescence. There are a lot of ways to get the most out almost every item our lives. All it takes is a little bit of creativity…" utilization of waste material in interior design processes such as furniture design, soft furnishing and acoustics therefore supports the principle of sustainability as it works in line with environmental conservation and reduces excessive consumption on raw materials. (Baird, 2007)

The principle of *design for disassembly*, (DFD) is viewed as view of utility beyond the use phase predicted and it requires post-use considerations such as insisting on the use of reusable materials and considerations of obsolescence of parts of entire systems. Building in design must therefore be sufficiently flexible to accommodate a variety of adaptive reuse scenarios. For the long term, recycling can be made more effective by the design of products for greater use of disassembly and recycling this requires the development of suitable product analysis tools to enable design teams to evaluate the ease of disassembly

and recycling of alternative product concepts during the early stages of design. (Daniel Vallero, 2008)

The book sustainable design is a description of a transition from the exclusive concern for form making to the art and science of place making. It induces a call for the design professions to take the next steps in a transformation of the human prospects towards a future that's is sustainable and sustaining of the best in human life, on that is lived in partnership not domination. "The first rule of making any place is that it should not impair some other place. (Williams, 2007) Williams advise that we must commit to designing sustainably that is, designing within the limits of our natural resources and natural laws. Some choices are readily available to us, for example, developing renewable sources, finding alternatives to scarce and diminishing resources and use less more efficiently and wisely. This means designing ways to achieve a higher quality of life for the present and future by designing an "unplugged" life that functions well without exploitation of nonrenewable resources and increase capacities for present and future generations.

Recycling in Design

Recycling and reuse of locally available material, most of which do not require industrial processing or importation, is a key ingredient in energy conservation which is an important way of fighting against global climate change towards achieving a sustainable future. The reuse of materials and buildings is a serious resource issue. Design for reuse involves the consideration of materials and jointing techniques so as to enable reuse and replacement of components. The components have to be worth reusing to enable market for re-used goods to develop and easy enough to re-use to make it profitable to do so favoring the modular construction such as the use of lime mortar which enable bricks to be reused whereas cement mortar is too hard making it hard for re-use and cost ineffective. (Halliday S. , 2008)

Whereas the reuse of components might not be possible, building using recycled materials has become a matter of current attention. Anything can be recycled but the ease, value and toxicity issues are also important. The potential for recycling can be significantly reduced if components are coated, laminated or connected in some way that

makes its acquisition cost ineffective. It is therefore imperative that materials be given careful attention during the initial design stages so as to achieve significant success for the 5Rs. Renowned poet, Robert Frost while appearing on political TV show '*meet the press'* insisted that any discussion on sustainable and modern design requires an exhaustive study of how raw materials are chosen, shaped, installed and appreciated overtime. (Fische, 2010)

William Carpenter explains that with little imagination and a little effort, found objects can become architecture, while diverting valuable resources from landfills and incinerators. By using recycled materials, energy benefits can be reaped immediately in the reduction of green house gases. Examples of materials captured Include; recaptured gypsum wallboards, plastics and resins, recycled paper bricks, postconsumer waste polymer sheeting, concrete pavers and tiles from larger concrete cutouts, tires etc. salvage yards are also becoming sources for essential items such as windows, doors and other fixtures. William therefore urges designer and architects to always be creative to think of many ways to reuse as many materials as possible. (William J. Carpenter, 2009)

The stock effect by MEErP Consultation Forum, demonstrates that even if 100% of a product was to be recycled at the end-of-life, the recycled material derived from this process would be insufficient for the today's market demand. Hence, the stock effect illustrates the need to secure end of life recycling of products, i.e. product recyclability, in order to limit the use of virgin material to satisfy the future market demand. Hence, contrary to Mr. Kemna's statement, the stock effect demonstrates the need to improve the methodology to embrace product recyclability. (European alluminium association, The European Steel Association, European Association of Metals, 2012)

The Polyethylene Terephthalate Recycling project article indicates that currently, there is considerable concern about materials "running out," and renewed intent in conserving natural resources and increasing recycling. Also as landfill space runs out, recycling becomes increasingly attractive. This project concerns the recycling of polyethylene terephthalate (PET) bottles, typically used in the soda and bottle water industries.
Designing sustainable furniture through recycling as opposed to the other interior design electives is practiced in almost all parts of the world. Designers like Hugo Franca design

contemporary furniture from logs abandoned by loggers in the Amazon basin of Brazil (Franca, 2008) His pieces are available in exhibition galleries across America and Europe. Materials that are normally recycled for furniture design include; wood, metal, old parachutes, tents old tires and fabric leftovers from textile designers and tailors (ecobles, 2008)The materials however should be considered in relation to the environment they will be situated e.g. furniture for outdoor spaces cannot be designed from fabrics or wood as this are bound to be destroyed during heavy rains.

Sustainable interior architecture practices conserving resources through "recycling" a structure by adaptive redesign. Generally referred to as the spatial art of environmental design, form and practice, interior architecture is the process through which the interiors of buildings are designed, concerned with all aspects of the human uses of structural spaces. Materials such as recycled glass and aluminum are considered suitable for reuse in partitioning. Lamp holders and other aesthetics can also be designed from recycled material such as old books, bottle tops and broken bulbs (Pambaboma, 2012) Exhibition and display techniques should also take into consideration materials such as aluminum scrapes, steel waste ply woods and MDF boards made with environmentally-friendly binding agents and scrap wood fibers that are a waste by-product of the lumber industry. (Nomadic Display Corporate, 2012)

Sustainable landscaping encompasses variety of practices that have developed in response to environmental issues. These practices are used in every phase of landscaping, including design, construction, implementation and management of residential and commercial landscapes. Use of sustainably harvested wood, composite wood products for decking and other landscape projects, as well as use of plastic lumber; Recycling of products, such as glass, rubber from tires and other materials to create landscape products such as paving stones, mulch and other materials (Loehrlein M. , Sustainable Landscaping, 2009-2012)

Exemplars in Design

Several designers have coined into the concept of recycling and sustainability as a whole across the world. Their efforts have however not gained the expected global appraisal due the preferential switch to more contemporary themes and aesthetics. It's true that majority of products realized from recycling lack that touch aesthetic beauty as compared to those associated with contemporary themes. Karim Rashid in his manifesto hints that today's design is not about solving problems, but about a rigorous beautification of our built environments and every business should be concerned with beauty. (Rashid, 2012). Champions of sustainability and environmental awareness have however not failed to recognize designers who have stuck to the concept of recycling.

In Africa South African product designer, Heath Nash, is best known for turning waste materials into covetable designs. Heath Nash is a designer and maker from Cape Town. After majoring in sculpture at UCT, Heath started using the paper-skills developed there to make lights, eventually leading to the exploration of local craft materials and techniques – wire, binding, recycled materials. This led to a range he calls 'other people's rubbish' made from old used plastic bottles. In recent years, Nash has exhibited worldwide, including Tokyo, Milan, London, Vienna, New York, Los Angeles, Helsinki and Stockholm. He was the South African Elle Decoration designer and lighting designer of the year in 2005/6, and won the British Council title of 'South African Creative Entrepreneur of the Year' in 2006/7. Nash is a graduate of the University of Cape Town with a degree in Fine Arts. (Artistaday.com, 2007-2013). Heath Nash's products could easily be classified into product design, their utilization and application takes effect in interior design and therefore instrumental to the theme. Critics have described the designer as one concerned with exploring the often unrecognized beauty in everyday objects and materials, notably plastic waste.

Figure 1: Lamps from recycled materials

Source: inspirationgreen.com 2013

Brazilian contemporary designer Hugo Franca has propelled art of reclaiming materials for designing of different furniture structures. New York, NY…R Gallery, in collaboration with curator Nessia Pope, brings Brazil to Franklin Street with this exceptional collection of over twenty pieces by Hugo França (1954).Comprised both of furniture and objects, the collection showcases França's reverential use of raw Brazilian hardwoods to create striking masterpieces in grandiose scale. Hugo França has an unparalleled talent for seeing forms for his designs in the natural, untamed landscape. He approaches each design as an adventure. As he travels in search of a trunk or a root to reincarnate as a unique bench, lounge, table or sculpture, he draws from his deep knowledge of the land and understanding about traditional means of survival and design learned from his time spent living amongst native Indian tribes. Any designer therefore should always understand the type of material and its originality before utilization. (Franca, 2008)

Figure 2: Hugo Franca wood cuffs and rings

Source: designwire.interiordesign.net 2012

Working exclusively with reclaimed wood, França creates exquisite one-of-a-kind designs that highlight the beauty and sensuality of these natural forms. His extremely labor-intensive works are primarily carved from the Pequi tree, a gigantic oleaginous tree, which averages 148 feet (45 meters) in height and 10 feet (3 meters) in diameter. França hand-carves each piece he designs, sometimes opening grooves in the wood, other times refining it to rediscover curves that highlight the tree's organic forms. Classified as a 20th century designer, he has had profound influence on even the 21st century design as environmental activists continue to advocate for more sustainable design. His designs are also evident on tropical themes and country side inspired designs. (Franca, 2008)

Figure 3: Hugo Franca, the Story of the Tree

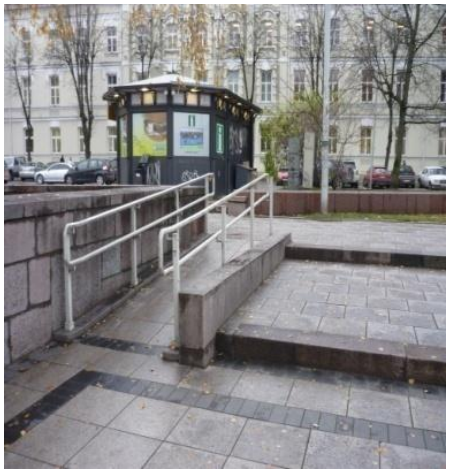
Source: http://www.r20thcentury.com 2012

Several designers have facilitated the complete realization of the design theories philosophies and principles. This has come about through inculcating them into their works and emphasis. In America, architect Ronald L. Mace ensured the inculcation of universal design in ever form of architecture and interior design processes. Together with his friend Selwyn Goldsmith designed environments suitable for all. Selwyn designed the dropped curb that could enable disabled people on wheel chairs access storey buildings with easy. (Center ForUniversal Design, 2012) Alvar Aalto, a furniture designer also coined in by designing the famous iconic stool that has no restriction to body sizes and can be stacked in case of transportation as opposed to the rustic African stool that are eco-friendly but cannot be stacked. (apartmentherapy.com, 2012)

Figure 4: The iconic stools60

Source: www.apartmentherapy.com 2012

Figure 5: The dropped curb



Source: www.edublogs.com 2012

Under eco-design, Frank Lloyd Wright an American architect, interior designer, writer and educator, designed more than 1,000 structures and completed 500 works. Wright believed in designing structures which were in harmony with humanity and its environment, a philosophy he called organic architecture. This philosophy was best exemplified by his design for Fallingwater (1935), which has been called "the best all-time work of American architecture. Wright also designed many of the interior elements of his buildings, such as the furniture and stained glass. He also designed the triangular furniture and layout that portrays minimalism (Wikipedia, 2012)

Figure 6: Furniture layout by Frank Wright

Source: Furniturefashion.com 2012

Under User Centered Design, Miers Van Der Rohe, a Germany American architect designed the design-sledge-base chair that inspired the 7ergonomic chair that prevents stress related injuries and ensure correct sitting postures. This principle was also coined by American furniture designer Herman Miller who designed the Aeron Office Chair that has a permanent place in the New York Museum of modern art. The chair is anthropometrically inclusive, takes into consideration, thermal testing, pressure, mappings determining weight and heat distribution (Herman Miller, Inc, 2012)

Figure 7: The Aeron office chair

Source: www.hermanmiller.com 2012

The future of modern sustainable design, aesthetics and material choices can only be limited by our imagination. As modern designers we should always be eager to explore, be open minded and study all materials in the environment that might be perceived as waste. More research is also necessary in ascertaining the significance of material recycling as opposed to new materials and on what possible measure should be put in place to encourage designers to practice the norm and convinces the community of its efficiency. Victor Papanek, in his book *Design For the Real World,* wrote, " Much recent design has satisfied only evanescent wants and desires, while the genuine needs of man have often been neglected by the designer." (Papanek, 2005)

A sustainable landscape is more than the conscious arrangement of outdoor space for human enjoyment and satisfaction. The landscape should use minimal water, fertilizers, pesticides, labor and building materials. Creating a sustainable landscape means working towards a thoughtful balance between resources used both in construction and maintenance and results gained. Traditionally sustainable are evaluated in terms of; the environmental benefits of the landscape, mulches used to maintain soil fertility and earthworm activity, plant selected to reduce the need for pruning spraying and fertilizing, plant placement to reduce competition when mature and enhance complementation, soil erosion prevention, surface run off handling, whether the landscape creates a better environment for people and attract beneficial wildlife. (McNeilan, 2002)

Different materials can be recycled in designing sustainable landscapes. Materials such as: *Bricks;* Salvaged bricks can be used on projects of any size for patios, walkways, and edging, and to give a landscape an aged look. Used bricks and factory seconds can be crushed and reused for mulch or pathways. Salvaged brick is available from used building materials. However salvaging old brick can sometimes be time consuming and hectic.

*Wood***;** In addition to using salvaged lumber, salvaged wood in a more natural state can be used to create artful landscapes. Tree branches from pruning can become trellis or twig furniture, and salvaged logs can be used to construct a retaining wall, or simply placed in the landscape to create habitat for beneficial creatures like lizards.

Irrigation Pipe and Fittings; Scraps of new irrigation pipe and fittings should be kept for reuse on other jobs. Also, when removing irrigation pipes and parts from a project, those that are in good condition should be kept for reuse on other projects (be sure to obtain your clients' consent before installing used irrigation materials). A designer should always try to minimize your use of new polyvinyl chloride (PVC) irrigation products by keeping the mainline as short as possible, then using poly tubing, because of the hazards associated with PVC production.

Glass; Recycled glass is melted and formed into translucent pavers and tiles with up to 100% recycled content. Glass pavers can be installed like any other pavers, or combined with traditional stone or concrete products for a beautiful effect. Recycled glass tiles can be used in many applications, such as surrounding a reflecting pool or fountain. Tumbled Glass; Glass bottles are broken into pieces and tumbled to smooth away the sharp edges, resulting in a versatile material. Tumbled glass provides a decorative accent when used in pots and water features, or to line a pathway or patio. Other salvaged materials such as porcelain and terra cotta can also be tumbled and used in a similar way. (Alameda County Waste Management Authority & Alameda County Source Reduction and Recycling Board, 2009)

Plastic Lumber; Plastic lumber is a fairly new technology, is widely accepted, and does have standards set for testing and performance. It is typically made from recycled milk jugs, plastic wrap, and other sources of high density polyethylene (HDPE), but can also be made from other types of plastic, such as polyethylene, polypropylene, and polyvinylchloride. Standards were developed and implemented in 1977 by the American Society for Testing and Materials (ASTM). However, testing is expensive, and only a few companies have completed the testing process and now meet the new standards. Therefore, structural characteristics vary among manufacturers and the buyer must research products before committing to a final purchase. Plastic lumber is commonly used in decks and railing; parks and playgrounds; picnic tables; Benefits include lack of splintering, no need for toxic preservatives, attractive appearance, choice of colors, durability, reduces landfill waste, saves trees. Millions of tires are disposed of every year. Some are sent to landfills, where they do not readily decompose readily and thus occupy a lot of space.

Figure 8: Used tire landfill

Source**: http://thesustainablelandscape.com 2012**

Crushed concrete and Asphalt; Crushed concrete can be used as fill, to provide drainage in a swale or French drain, and is sometimes used to protect bank sides. Concrete can also be recycled into concrete aggregates, but embedded reinforcing rods and other items must be removed first. The quality of recycled aggregates depends on the quality of the recycled material used. In addition to steel, it may also be contaminated with asphalt, sand, clay, chlorides, glass, gypsum board, sealants, plaster, wood, and roofing materials. Asphalt can be reused on location or removed and stockpiled for use in other areas, such as driveways. (Loehrlein M. , Sustainable Landscaping, 2009-2012)

Rapidly renewable materials, such as bamboo and wool, can replace themselves within a 10-year growing cycle through agriculture or forestry. Products made from rapidly renewable sources are becoming more widely available for many interior applications, offering the environmental benefit of decreasing demands on non-renewable materials. Reduction of agricultural waste is a further benefit of some renewable materials. Materials, such as wheat straw that might commonly be burned or used as animal bedding, are being used for interior products, saving energy and reducing pollution. (Leadership in Energy and Environmental Design)LEED awards credit for meeting a threshold of rapidly renewable material use. Some of these materials include: Wheat straw Corn stalks Polylactide (PLA) (made from corn starch) Cork Bamboo Sunflower seed hulls Soybeans Wool Linen Silk Ramie Linseed oil Quick-release vegetable oils. These materials are used in many ways including: Flooring — cork, bamboo, and linoleum made from linseed oil. Fabrics and carpets made from wool or PLA.

Particleboards and medium-density fiberboards (MDFs) made with wheat straw are used in cabinetry, furniture, and millwork, case goods and flooring underlayment. Bio-composite panels made with soybeans and sunflower seed hulls can be used for interior finish applications, such as paneling, counters and cabinets. (Tristan Roberts and Allyson Wendt, 2006)

Recycled wood: Reusing wood from old buildings, demolished barns or old shipping crates can save money, preserve trees and add character to decorative projects. Leftover construction lumber and wood removed from the demolition of a building may be in good enough shape to reuse for studs or structural beams. Old barn boards make rich and interesting wooden floors. Wooden pallets and smaller construction scraps are good sources of wood for small projects. (Cutlip, 2012) The process of recycling wood is as follows:

Step 1: Inspect the wood for warping, rotting, and insect or water damage. Hold one end of each stud or long board at eye level and look down the length of the board to see warping and twisting. Gently poke any discolored areas with a screwdriver to make sure the wood is solid and not rotting or waterlogged. Discard any wood that is too warped for your project, is soft or has black mold on it. Step 2: Remove all nails. Place a nail puller around the head of the nail, or slide the tines on the back end of the hammer under the head of the nail. Use leverage to work the nail out of the wood. Step 3: Measure the length of boards and studs and sort into same-length piles so you will be able to grab the appropriate lengths as you are building. Step 4: Saw your wood into the proper lengths and sizes for your project. Step 5: Sand any wood that will be seen or that will be used for a decorative finish, such as a table or wood floor.

Recycled wood is used in the sustainable design of furniture and exhibition facilities such as drinks shelves and book cases. In Nairobi, Umati Creations, a firm that specializes in furniture making and interior outfitters has ventured into designing furniture from reclaimed wood from telephone and electric poles and abandoned pallet stacks used in container handling facilities.

Figure 9: Book shelf

Source: http://www.facebook.com 2012

Figure 10: Wall hanging

Source: http://www.facebook.com 2012

The use of recycled wood is not new in interior architecture. Several designers have venture into using reclaimed wood for the design of feature such as ceilings and wall finishes creating tropical moods in interiors. This ranges from residential apartments to hotel rooms and other recreational facilities the concept has generated unique design and through fusion with contemporary themes the Aesthetics have been hard to ignore. (Mcardle, 2013)

Figure 11: Recycled wood in interior Architecture

Source: http://pinterest.com 2012

The Design Process on Recycling Wood

Case study: Hugo Franca's design process

Hugo França was an employee at a computer company in Sao Paulo until he resigned his job and moved to northeast Brazil, where he spent 15 years learning the mysteries of working with wood. He was not originally a designer but being an engineer he might have at one point studied the due design process, although he did not apply it conventionally.

França designs these impressive pieces of furniture from logs that have been burned out of left behind by lodgers or natural weather phenomena. How does he find them? Every 45 days, he goes back to his studio in Bahia and walks the jungle with local farmers and indigenous people, who guide him to abandoned trunks or sell him old canoes. Mr. França also buys abandoned canoes from the Pataxó Indians that he converts into elegant chairs, some big enough for at least two.

Identifying the need; In his pursuit of the right wood, Mr. França drives for miles in his red Fiat or by motorcycle over bumpy dirt roads. He and his two assistants camp out in sleeping bags with provisions of salted meats, waking before dawn and trekking hours through tangled vegetation with machetes and bug repellent. In search of materials, Franca and his assistants experience limitations such as; falling branches, they must contend with the animals such as: bats, poisonous snakes and scorpions. Mr. França's work is limited partly because there is only so much old-growth pequi the primary wood he uses still to be salvaged from the era of deforestation.

Inspiration: There is a history of woodworking and a legacy of important 20th century design present in França's work. The balance of raw and more intricately carved areas in a single piece suggest Alexandre Noll and George Nakashima. The influence of Brazilian designer Jose Zanine is present as well, tying him to the rich and largely undiscovered design history in Brazil.

Sketching; Mr. França doesn't know how to draft or sketch, he said. He uses chalk to draw on the trees, assessing what they might become. He might look at a five-foot-wide stump and decide to invert it and scoop it out, creating a sofa with holes and pits. Other ideas emerge when the trunks are dug out of the ground.

Working exclusively with fallen trees and canoes he purchases from the Pataxó Indians along the Amazon, França creates exquisite one-of-a-kind designs that highlight the beauty and sensuality of these natural materials. His extremely labor-intensive works are primarily carved from the wood of the Pequi tree, a gigantic oleaginous tree, which averages 45 meters (approximately 148 feet) in height and 2 meters
in girth. The high oil content of the Pequi wood makes it useless to industry. França gives the felled trees a second life with his unique vision.

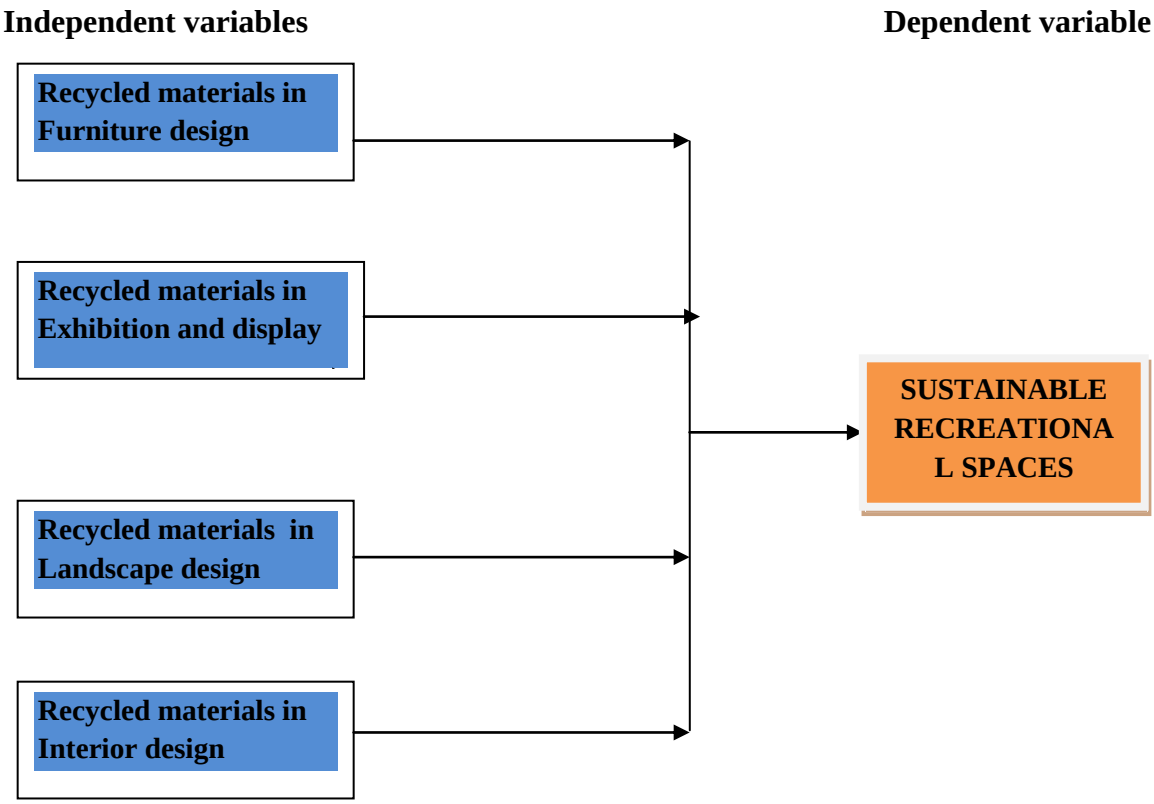
França shapes each piece he designs, sometimes opening grooves in the wood to expose features that the material is unable to express on its own, other times carving it down to rediscover curves that highlight the tree's natural organic forms. Because of the staggering scale of the raw material, he begins production on-site, marking the wood in chalk and working with his small team to make preliminary cuts with chainsaws. Once the piece is reduced enough to be moved, França transports it to his atelier in São Paulo where he refines the design.

Summary

The concept of sustainability has been in existent for a lont time and its imapcts are evident globally in the world of design. However designer and architect have neglected the art of developing recycling in design venturing into other aspects such as ecodesign and universal design. The Karim rashid Manifesto advocates for beauty of forms as contemporary themes dominate. Recycling has therefore been left for product designers and in many a times regarded as an art in the jua kali sector. However recent developments and advocacy from organisations such as the United Nations have fostered and enhanced recycling in design and the future looks bright.

It's therefore clear that numerous gaps pertaining recycling and the challenges involved in material acquisition, reclamation procedures and how the material can blend in with other themes such as contemporary and the fast growing and changing design trends warrant further investigation to fill in the gaps. To add unto the existing knowledge, there is need to bridge the gap in the challenges facing recycling in the Kenya and Africa in general, the impacts of technology and industrial development on recycling and on how to enhance the quality of products designed from recycled materials.

Conceptual Framework



Source: Author, 2012

RESEARCH DESIGN AND METHODOLOGY

Introduction

The research design is the plan, structure and strategy of investigation that is conceived so as to obtain answers the research questions formulated. It represents the complete program/scheme of the research (Kerlinger, 1986). The research design in this study will aide in conceptualizing the operation plan to be undertaken in the various procedure and tasks required to complete the study and ensure adequacy of the procedure in obtaining valid, objective and accurate findings. This is called the function of variance.

Data Collection

This study will be entirely qualitative. The researcher, will therefore only use qualitative as methods of data collection. The major methods of data collection will be utilized simultaneously in obtaining the required data. In the study secondary data will be gathered from sources such as conference proceedings, books, periodicals and research by other scholars order to obtain first hand information primary sources will also be relevant in this study. These will be administered through interviewing respondents and observations (Kumar, 2005) the interview process will be based on unstructured interview to allow room for formulation of more questions, seek clarity on unclear responses. As opposed to questionnaires where the respondents will need to take their time to fill and return, interviews can allow the answer as they continue with their other engagements.

Observation: observation will be the most appropriate method of data collection as it will enable the acquisition of accurate information required to draw up conclusions. The respondents might lack the necessary information about the case study condition or fail to provide the objective information about the research. To prevent loss of information or distortion before analysis the study will also include photography although some respondents might feel uncomfortable or exhibit behavioral changes.

To ascertain the actual size of the case study the researcher will take measurements of the key features of interest in the premise. The researcher will use the standard tape measurement that will be represented in mm for efficient site analysis in the subsequent chapters. Measurements will also be significant in developing the final proposal. The

researcher will also take photographs of the case such as in furniture, landscape, exhibition and display and interior architecture. The photos will be significant in analyzing the site in chapter five of the research paper.

Population and Sampling

This is the process of selecting a sample from the population under study. This is defined as a segment of the population selected for investigation. The methods of obtaining might be based on probability or non-probability approaches. (Bryman, 2004) In this research, the probability sample will be the most applicable method to give each unit of the population a known chance of being selected. This will also keep the sampling error at minimum. However since the research is greatly qualitative without any quantifications, sampling will have little significance as the main aim of the study is to explore, describe phenomenon in relation to sustainability. Finding will therefore be collected to 'saturation point' (Kumar, 2005) Diversification will however range from customers, business owners, and local authorities such as NEMA and other environmental awareness authorities. However to obtain the actual sample 30, random sampling will be used. The sample will include: 5 waiters, 1 manager, 1 cleaner, 2 chefs, 1 security guard and 20 customers comprising of 10 gentlemen and 10 ladies No persons under the age of 18 will be sampled.

Data Analysis

Much of the raw data will be analyzed in verbatim responses but should be accordingly analyzed. Data analysis tends to be an ongoing and iterative (nonlinear) process in qualitative research. The term used to describe this process is interim analysis. Interim analysis continues until the process or topic the researcher is interested in is understood (Patton, 1990) data acquired through interviews will be analyzed through a designed Daily Interview Analysis the objective of the DIA is to assemble and interpret the information that was collected. In other words, at the end of every day of interviewing, it is essential to review the notes and to write a report that summarizes and interprets the information obtained. Data obtained through observation such as photographs and maps can also be analyzed through the same process. Studying the images and drawing conclusion or writing commentaries is also analysis.

Data Presentation

This will be a representation of the findings obtained from the actual research, conclusion and transferability of the findings and the appendices. (Public Health Action Support Team (PHAST), 2011) The overall representation will be narrative. Diagrammatic representations will also be inevitable in representing illustrations. The researcher will significantly rely on photographic data accompanied with appropriate explanations on the actual nature of the study.

SITE ANALYSIS, PRESENTATION AND INTERPRETATION OF FINDINGS

Introduction

From research, Sheebeen's overall design and layout has not been done sustainably and the application of recycled materials is not evident in furniture design, exhibition and display, interior architecture and landscaping design. There is no clear theme in the design of the bar and restaurant leading to undesirable contrasts in material choice and color. This ignorance has lead to development of an environment that is unsustainable and denies clients value of their money, physical and psychological comfort. The preference for cheap materials has lead to utilization of non-environmental friendly materials indicating how some designers could be major contributors of environmental degradation in the name of magnifying their profit margins through cost reduction. The lack of an appropriate theme in the design of the premise has created a lack of identity and coordination implementation of concepts.

Analysis of the case Study (pictorial and theoretical)

Location

Sheebeen bar and restaurant is located along Menengai Road, Upper Hill Nairobi. Geographically it lies along longitude 36.811446 and latitude -1.300275. The premise can be accesses through taking Menengai Road from Hospital Road. The structure was initially a residential facility that was converted into a bar and restaurant hence does not meet the conventional standard of bar and restaurants design. The original residential plan was retained maybe to avoid the extra costs that would have been incurred in the redesign process.

Figure 12: Google map image of Sheebeen

Source: Google Maps

Landscaping

The main entrance serves as the major entrance to the bar, restaurant and car wash. This is evident from the shared billboard at the main entrance.

Figure 13: Main Entrance

Source: Author 2012

Figure 14: Shared boards

Source: Author 2012

Despite being located in a posh suburb of Nairobi the bar and restaurant lack proper organization and orientation in terms of interior design. Its landscape is rough touch with loose rock pebbles being the access road finish material. The flower pots initially used by the previous occupant were retained hence have over the years undergone the process of wear and tear creating unsightly sceneries in the external dining areas. Pavements and the

concrete slabs have developed crack harboring algae and harmful microorganisms especially during rainy seasons

Figure 15: Reused flower pot

Source: Author 2012

Figure 16: Rough terrain

Source: Author 2012

The loose pebbles not only pose a danger but also make litter collection difficult for cleaners hence some shaded leaves from the trees are left to rot away on the landscape. The concrete slabs have also grown old developing huge cracks that harbor dirt and unnecessary algae during rainy seasons. Sewerage disposal is also a hindrance to a pleasant landscape. Towards the western end of the landscape the sewerage flows in open drainages posing a health hazard.

The outdoor furniture is composed of benches that lack physical comfort and aesthetics. Designed from local softwood timber the furniture faces a problem of decay due to exposure to rain. The gazebos are designed from old tent fabrics giving the landscape a lack of value. These gives a user the feeling of an umbrella as it's just a metal pole and an umbrella shaped tent fabric at the top.

Figure 17: Exterior furniture with gazebo

Source: Author 2012

Figure 18: Exterior dining space

Source: Author 2012

The Sheebeen's landscape lacks a clearly demarcated parking bay hence some patrons end up parking precariously blocking the drive way to the garage. Some of the flower beds and boarders are unattended to making the environment bush. This situation is worsened by the open sewer drainage that runs along the flower beds.

Figure 19: Open sewer drainage

Source: Author 2012

Figure 20: Unattended flower beds

Source: Author 2012

Interior Architecture

On the aspect of interior architecture and human development, Sheebeen bar and restaurant has utilized common material that are not recycled but industrially manufactured. Most of the materials utilized are imported. The gypsum ceiling appears to be falling off even amid the bar counter. Lack of attention to lighting and acoustics has lead to creation of dark shadows in the lounge areas of the bar. However some accessories such as the lamps have been designed from recycled materials such as old sacks and used plastic materials

Figure 21: Ageing ceiling with cracks

Source: Author 2012

Figure 22: Lounge area

Source: Author 2012

The concrete floor has been painted by Lead Oxide paint that poses a health hazard to users in the premise. The painted layer not only poses a health hazard but is also problematic in terms of maintenance and cleaning. The paint a water repellant and there cleaners have to use excess detergent so as to maintain the hygiene. The unsustainable characteristic of this type of flooring is evident as it has to be repainted over and over. The floor has also worn out especially in the dining area that is characterized by potholes all over. In the lounge area the floor has faded over time creating undesirable patches.

Figure 23: PbO painted floor in the lounge

Source: Author 2012

Figure 24: Potholes along the slabs

Source: Author 2012

In the kitchen area the space is not sustainable enough for operational. Despite the wastage of space in the next room adjacent to the kitchen area equipment have been squeezed through leading to lack of operational space. The materials used in designing the kitchen include: ceramic tiles imported from China on floors and wall finishes, Aluminum metal is used to design sinks and utensil racks, Formica laminates on the shelves and compartments to cover the exposed wood parts. Much of the materials used are synthetic non-biodegradable and cannot be recycled. No recycled materials have been used.

Figure 25: Kitchen area shelves

Source: Author 2012

Figure 26: kitchen area shelves

Source: Author 2012

Furniture

Sheebeen has different types of furniture including bar stools, tables, dining chairs the counter and the exhibition stand. The bar stools that to a great extent look like raised normal dining chairs are designed from local timber and cushion material from synthetic fabric. Their sitting spans are so high that some clients especially ladies experience difficulties in reaching the seat. All the furniture in the dining area is designed from polyvinyl material that is not eco-friendly. Although wrought iron has been used to design the bar stools the cushion materials are designed from synthetic leather. No recycled materials have been used in the design of the furniture. The seats also lack an element of aesthetics in them. Lack of a proper finishing touch in the lounge chairs gives the room a feeling of an unfinished space.

Figure 27: PVC dining furniture

Source: Author 2012

Figure 28: Wrought iron bar stools

Source: Author 2012

The premise also contains other restaurant furniture such as counter tops designed from locally available wood; the display stand in the bar also is entirely designed from cypress wood. Kitchen cabinets also are constructed by softwoods which have been laminated by synthetic Formica.

Figure 29: Wooden displays stand

Source: Author 2012

Figure 30: Laminated kitchen cabinet

Source: Author 2012

Exhibition and Display

Exhibition and display problems are identified right from the mini-billboard at the main entrance. Although constructed from recycled metal, the different services have been registered in different names creating a branding and identification problem. This has lead to the used of more colors than could have been used hence creating a color jam as they colors compete for dominance. Upper Hill Food Court contains navy blue and jungle green; Sheebeen bar contains yellow, red, black and orange while the car wash contains accounts for black and some white. Along the drive way is another poster directing motorists to the car wash.

Figure 31: Sheebeen's main Billboard

Source: Author 2012

Figure 32: Laminated kitchen cabinet

Source: Author 2012

The premise lacks notice boards hence posters are stuck by glue directly on the walls. This leaves creating unsightly smudges on the wall when they are plucked off. This has made the managements incur repainting expenses over short periods of time eating into profit margins. the bar counter's wooden texture has also been ruined by the careless pasting of posters and pictorial advertisements that end up sticking permanently. The lack of an appropriate eye level demarcation has lead to placing of some posters and utilities such as the television high above normal eye level hence strenuous for viewers.

Figure 33: Smudges on walls

Source: Author 2012

Figure 34: Framed documents and screen

Source: Author 2012

The lack of proper lighting has made some rooms very dim hence some features cannot be seen clearly such as directional signs. Some posters are abusive such as those in the washrooms. This portrays the negatives associated with excessive drinking. The black outline is shaped into the male sexual reproductive organs hence offensive as this is a public place.

Figure 35: Poster along the washrooms

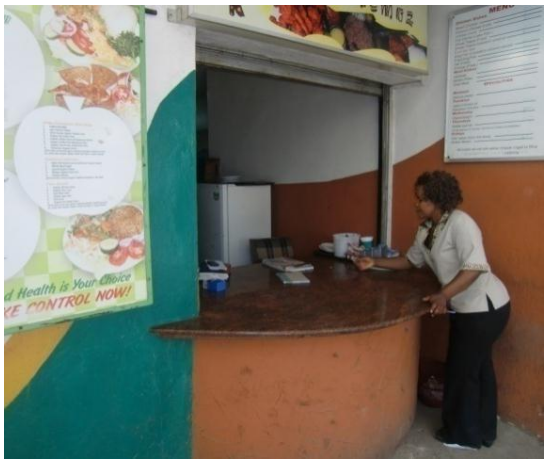
Source: Author 2012

In the bar, drinks are displayed on the main display stand with some others kept in the branded fridges placed beneath the display stand. The dark painted display stand absorbs much of the light hence some of the drinks on display cannot be identified by clients. The scene is not eye catching to customers. In the kitchen area the numerous dishes offered are displayed on posters placed in Perspex window frames reinforced by aluminum bars

Figure 36: Drinks on display

Source: Author 2012

Figure 37: Menu displays



Source: Author 2012

Storage is however a problem as foods such as blended juice varieties are stored in reused 5 Litre plastic jerry cans placed under the kitchen serving counter. This is attributed to lack of space enough to display them to clients. Some other food varieties such as kales

tomatoes and onions are kept in polythene bags. This is not only unhealthy but also make it decay faster than is should leading to unimaginable loses. Dents and cracks on the counters make cleaning difficult and harbor disease causing microorganisms and insects.

Figure 38: Juice containers beneath kitchen counters

Source: Author 2012

Presentation of Findings (as per the research objective)

Introduction

From the research, the application of recycled materials in the design of recreational utilities such as bars and restaurants has still not been effectively adopted in Kenya as it should be. Recycling has been globally advocated as a major building block towards achieving environmental sustainability but few designers and investors are willing to adopt it. Majority have opted for industrially manufactured raw materials and cheap processed imports majorly from China all in the name of contemporary commercial design.

Materials used

The alternative approach undertaken by designer and investors as outlined above is evident in the design of Sheebt5een bar and restaurant in interior architecture, furniture design, exhibition and display and landscaping. Most of the materials used in interior architecture especially in the kitchen include: synthetic tile evidenced by their crackle effect and permeability although they are covered with slip. The tiles are among the Chinese imports into Kenya. Synthetic Formica and wood finishes have also been used to laminate exposed wood parts. These materials are industrially manufactured and are non bio-degradable hence are not sustainable to utilize. The cheap imports from china hinder the use of locally available materials such as marble and quartzite rocks.

The softwoods use to design the furniture were preferred as opposed to mature hardwoods that the investor deemed expensive to acquire. The problem of deforestation is rampant in Kenya as caused by overspread immature logging accelerated by the increasing demand for cheaply acquired timber. Some of the furniture in the dining area is designed from PVC material whose manufacture is greatly linked to the emission of chlorofluorocarbons into the environment leading to global warming. The material is also non-biodegradable. The chairs, designed to meet the principle of universal design fails out on sustainability though. However as compared to other locally designed environmental friendly chairs the chairs are stackable hence easy transportation and cleaners can have enough space when cleaning spaces. The chairs are also light. The bar stools designed from recycled wrought iron is a good step though. However an alternative cushion material would work well with the theme.

In exhibition and display lack of proper facilities has made the environment very unsustainable. Pasting of notices and other advertisements directly on the walls creates unsightly patches on the walls hence they have to be repainted over and over again. Use of different materials and different colors for the bar, restaurants and car wash is unsustainable as it’s wastage of materials. The sexually offensive posters are unethical. The screens are higher than the normal eye level and hence clients go through a strenuous process when watching. If not observed the stress can lead to repetitive stress injuries to clients or withdrawal of enjoying such facility. The poor lighting and acoustic that

borrows from domestic lighting makes some sections unnecessarily dark hence some posters and information appear hidden.

The poor sewerage drainage system has had profound effects on the general landscape through the unsightly sceneries created by the open drainage. The open sewerage has become a breeding ground for disease causing organisms and microorganisms. The loose rock pebbles making up the drive ways have caused injuries and the dust generated under them is poses healthy challenges to occupants.

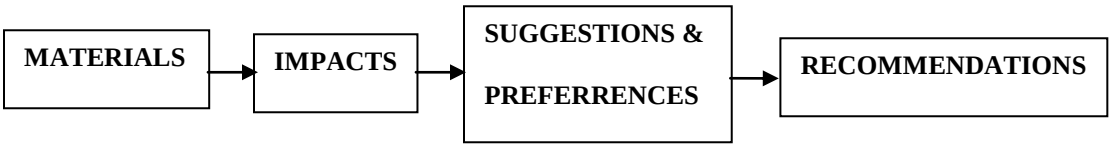
SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

Introduction

In relation to the research questions, the researcher summarized the findings so as to develop an appropriate conclusion and recommendations. All data is based on the fact finding done by the researcher through observation and oral interviews to staff members and clients in the case study. As stated earlier, the researcher had limited time with some of the respondents such as waitresses who had attended to clients from time to time. The same was also experienced with some clients who had busy time schedules as most of the clients are on white collar jobs in the neighboring government parastatals and other organizations in the corporate sector such as KASNEB, Equity and the World Bank.

The interview guides were structured in a way that would best answer the research question so as to develop efficient recommendations towards summarizing the research as indicated in the figure below.

Figure 39: Flow chart



Source: Author 2012

Summary of Findings

The researcher identified that quite a variety of unsustainable materials have been utilized in design due to their much enhanced availability caused by industrial developments in the 21st century. Advocated by the concept of consumerism and obsolescence investors have tended to move away from the utilization of locally available, recyclable and recycled materials all in the name of contemporary design.

Some of the most harmful and unrecyclable materials include: artificial fibre boards used in partitioning and flooring, the artificial ceramic tiles that not only pose environmental and economic threats but also cannot be replaced upon as they can only be utilized ones.

The dominant use of immature timber from the local forests also poses a danger. This trend was based upon the belief that furniture from recycled wood may look old and unfashionable hence the fresh timber preference.

Majority of the customer respondents interviewed by the researcher were working class in the age bracket of between 25-45 years with majority being graduates. The research therefore revealed that there was need to provide environments that move their moods from the office environments and relax their minds from the overworked conditions. The researcher also discovered although the space available in the landscape was limited majority preferred to dine outside in then few gazebos available.

The findings from the research provided a concern on aesthetics especially in this case where users were young professionals. Due to the rising competitions investors have to capitalize on proper and unique design that also emphasizes aesthetics, functionality and sustainability. Sociological considerations such as personal space, privacy comfort and access to recreational facilities are also factors that cannot be ignored. Comfort of the user is key in modern day design. The researcher discovered that ignorance on some aspects of design had had serious implications such as lose of some customers to other restaurants such as Visa Place.

Conclusions

There is a dire need for a design revamp of the premise as advocated by the respondents. The existing design and the choice of materials are unsatisfactory and unsustainable to users and the environment at large. There is a limitation on the strengths and Opportunities through the participatory SWOT analysis conducted by the researcher. The demand for a more sustainable interior architecture, furniture, exhibition and display and landscaping is the only solution towards keeping the premise environmental friendly and at the same time be able to withstand the rising completion from the neighboring restaurants. Aesthetic beauty is also significant and should be the point of focus so as to attract the young professionals who happen to be the majority clientele. The choice of the concept of recycling based design was encouraged overwhelmingly by the respondents. The researcher discovered that there was need for design to be an agent of the recycling activism as it is a better tool of enhancing aesthetics, functionality and contemporary themes into the forms developed from recycled materials. The researcher

could therefore proceed to recommending appropriate concepts and material that could be recycled in the design process towards the realization of the title.

Recommendations

Interior architecture

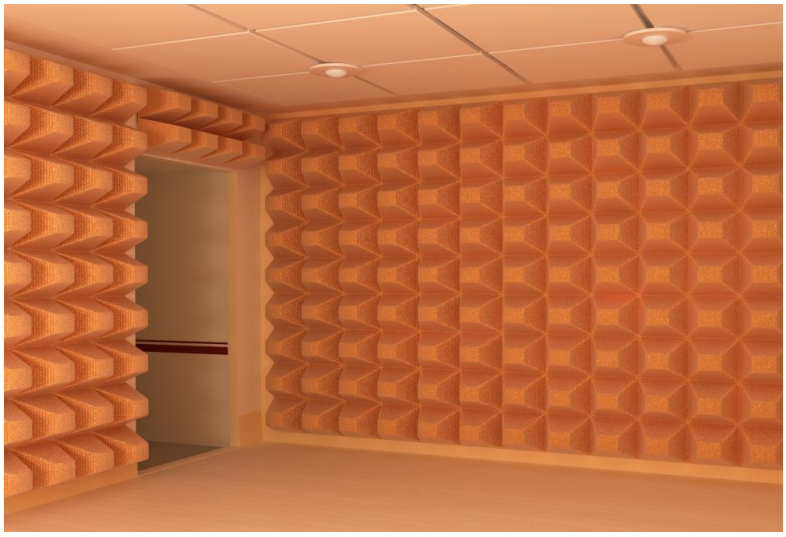
Lighting and acoustics: this is the focal point of interior architecture and theme had to be as evident as possible. For sound proofing properties the Echo Eliminator is a high performance acoustical material made from recycled cotton. This product is ideal for noise control applications. Echo Eliminator can be used as an acoustic wall panel or hanging baffle. Common applications are school gyms, classrooms, lunch rooms and any application where a high performance noise control product is needed. Echo Eliminator is eligible for LEED™ credits, Class A fire rated and 100% recyclable. Its advantages include: Class A – Non-Flammable, Lightweight, Easy to Install (Adhesively Applied) Impact Resistant, Durable, Low Cost, High Light Reflectance, High Performance Acoustical Absorption, easy relocation. The eliminators come in a variety of colors allowing clients select their favorite schemes

Figure 40: Echo Eliminator samples

Source: www.acousticalsurfaces.com 2013

Other sound proofing materials available locally include old egg trays that can be aligned creatively attaining sound proof qualities and tactile textural beauty.

Figure 41: Sound proof walls by egg trays



Source: www.wisegeek.org

For lighting, wine and colored beer bottles can be used to create ambient environments and also create therapeutic illuminations in the bar counter and interior lounges. These areas do not necessarily have to be allocated too much lighting but warmer illusion lights

Figure 42: Fantasy lamps from recycled wine bottles

Source: http://weburbanist.com 2013

Recycled Wood Ceilings from Nail barn wood to your ceilings produces genuine country flavor. With or without weathered paint, rugged antique wood has a rich texture and color that cannot be mimicked. Pallet wood can be found for free in almost any large shopping center. Removing nails and staples may make it labor intensive, but it gives a similar feel to barn wood and is much easier to find. Use old stockade fence pickets with the ends cut off for another source of easy-to-find and generally free wood for your ceiling. As with hanging metal, be sure to locate the joists and screw into them for the best results.

Figure 43: Sample ceiling from recycled wood

Source: www.woodtrac.com 2013

As opposed to the MDF boards used in designing the kitchen cabinets, recycled timber should be used to enhance their sustainability and significantly reduce environmental and health concerns to the kitchen staff and other users. These have however to be combine with sustainable stone or marble tiles for the table tops as laminates are unsustainable. Natural stone for example should be considered as it offers a broad spectrum of colors ranging from light grey through brown to blue, with deposits of snails and shells making every stone absolutely unique. Stones come in all shapes and guises smooth or rough, rugged or modern, warm or cold to lend architecture a distinctive character. The diversity of natural stone is revealed in the vast design scope it offers in terms of colors, textures And surface finishes which can be crafted by hand or machine. The natural stone can also be used in flooring activities both exteriorly and interiors. Tiles from stained glass are however the best recycled material for such placement.

The choice of color will also be significant as color psychology plays a significant role in Color has an incredible effect on mood, perception, and likes and dislikes. It's programmed into the human mind. The reptilian mind is the part that is programmed to survive. It's what makes one instinctively know that fire is bad, that red is danger, and that green is comforting. Humans developed over millions of years and color is a big part of our perception. It's why orange is often used to make products that are high priced look more inviting because psychologically it makes them seem more affordable. And it's why red is the most prominent color in fast food logos –red stimulates appetite. And it's why one will have trouble eating food that is blue. The researcher therefore proposes a combination of orange and some shades of red and other colors that are relevant to dining places.

Figure 44: Recycled glass countertops

Source: www.kitchendesignr.com 2013

Furniture Design

Currently, the Kenyan market if filled with materials that can be recycled in furniture design as opposed to the utilization of unsustainable materials. Wrought iron is one example although its recycling process includes rigorous industrial processing and therefore tedious as compared to wood. Recycled rubber can also be used in designing exterior furniture as it does experience degradation from environmental factors such as rain.

Figure 45: Recycled rubber furniture

Source: www.daily-dose-of-art.com 2013

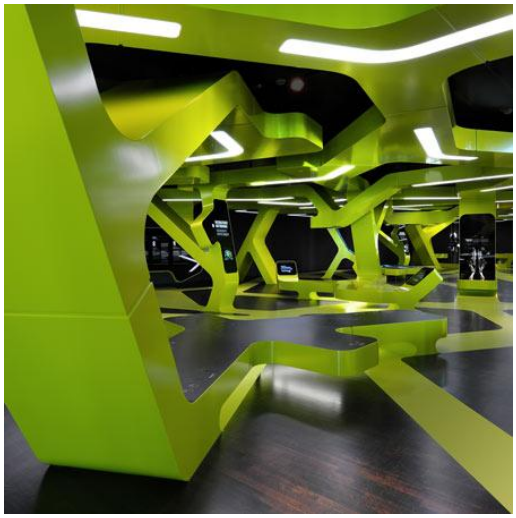
For interior furniture other materials such as recycled fabrics, wool and canvas can be used with a contemporary touch to achieve aesthetics. Some fashion designers such as Nike Kondakis have ventured into using old parachutes to develop fashion trends and the researcher deduced that the concept can also be adopted into soft furnishing in interior design.

Exhibition and Display

To solve the problem of pasting notices directly on the walls, there should be a centrally placed notice board that blends in with the elements in the space and color. Reclaimed wood is the best framing material for this. Other feature such as menus can be done in illuminated and reflective materials that do not have to consume excessive energy. Signages have also to be erected at strategic points that lie at the eye level ranges to avoid strain. Abusive posters and signages should be completely eliminated from the design.

Visibility in the drinks on display also depends on the lighting and therefore the two should blend harmoniously. The display stand should de designed from recycled materials that can be modified to stand out and be aesthetically appealing.

Figure 46: Display stand from recycled glass



Source: www.dezeen.com 2013

A combination of recycled glass and reclaimed wood will work well for this environments and yield interesting results. Hardwoods will offer the much needed stability and tropical moods while the glass provides the light reflect ability and luster.

Art pieces from recycled materials such as collages and mosaics should also be acquired and displayed on the walls to avoid long stretches of empty and plain walls. The materials could be waste materials gathered from the same landscape hence keeping it clean and the interiors aesthetic with art.

Landscape Architecture

There is need to develop a waste management plan in the landscape to restore its sanctity. Majority of the clientele prefer dining from the exterior space and so the need to emphasize on its efficient design, sustainability and aesthetics. The walkways and drive ways are to be designed by naturally available materials such as natural stone. Recycled stone and bricks however provide color varieties for landscape design especially for walkways and boarders.

Figure 47: recycled clay bricks

Source: www.green-rooms.biz 2013

Due to the preference to outside catering the researcher should therefore develop enough and sustainable structures on the landscape to provide enough space for users. The available dining space covered with canvas should therefore be opened up to merge with the landscape. As opposed to the polythene roof cover a more sustainable material should be used such as recycled rubber roof shingles that are an innovative roofing material that save money and the environment. Made from recycled tires, the shingles are durable, dependable, and more eco-friendly than ordinary wood or slate. This can also be used to design the gazebos roofs.

Figure 48: Shingles from recycled tires

Source: http://greenbuildingelements.com 2013

To enhance shades the researcher proposes that the available mature trees be retained as they also enhance the scenic beauty of the environment. To minimize cost expenses, native and locally available plant and grass varieties will be used in the lawns. Landscaping with native wildflowers and grasses improves the environment. Natural landscaping brings a taste of wilderness to urban, suburban, and corporate settings by attracting a variety of birds, butterflies and other animals. Once established native plants do not need fertilizers, herbicides, and pesticides or watering, thus benefiting the environment and reducing maintenance costs. Gardeners and admirers enjoy the variety of colors, shapes, and seasonal beauty of these plants. The researcher also proposes the uses of climbers on the concrete wall to enhance the aesthetic beauty and harbor wildlife. Climbers come in a variety of colored flowers and species hence will provide color to the scenery.

Figure 49: Shrub Varieties

Source: http://www.quick-growing-trees.com 2013

Shrubs provide boarder lines and demarcations on the landscape as opposed to unsustainable constructions. Native landscaping practices can help improve air quality on a local regional and global level. Locally, smog (ground level ozone) and air toxics can be drastically reduced by the virtual elimination of the need for lawn maintenance equipment (lawn mowers, weed edges, leaf blowers, etc.) which is fueled by gasoline, electricity or batteries.

Blending universal design with recycling landmarks such as rails that aid the disabled should be introduced in the design. The landmarks should be design from recycled hardwoods conjoined with wrought iron or nay other recycled metals well coated to avoid rusting. Recycled plastic can also be used in the event of preventing rusting as its cheaper that metal.

Figure 50: wrought metal and wood rail

Source: http://www.woodplasticcompositepanel.com 2013

Suggestion for Further Study

It's therefore clear that numerous gaps pertaining recycling and the challenges involved in material acquisition, reclamation procedures and how the material can blend in with other themes such as contemporary and the fast growing and changing design trends warrant further investigation to fill in the gaps. To add unto the existing knowledge, the following gaps need to be filled:

1. There is need to carry out a research on the challenges facing recycling in the Kenya and Africa in general
2. A study on the impacts of technology and industrial development on recycling should be conducted.
3. A research on how to enhance the quality of products designed from recycled materials.

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Appendix

UNIVERSITY OF NAIROBI

SCHOOL OF THE ARTS AND DESIGN

INTERVIEW GUIDE

SECTION A: MANAGEMENT

1. What are your views on the current materials and general design of the restaurant?
2. How often does the management undertake renovations in the premise?
3. What factors influence the choice of materials use in the time to time redesigning and renovation processes?
4. What health and environmental impacts are arising from the current condition and materials used in design?
5. Why does the car wash, bar and restaurant contain different brand identities and color schemes?
6. Would you like to have the premise redesigned and rebranded with a general different theme? If yes,
    - Specify the areas that you would like to have redesigned
    - Name the features that you would like to have introduced
    - What feature and components would you like to retain their original design and Why?
7. What are some of the design solutions in your own opinion can be utilized in improving the general design of the premise?

SECTION B: KITCHEN STAFF

1. What are your views on the current state of the kitchen, dining areas and the landscape in terms of materials and general design?
2. What are some of the areas and materials that you would like to be changed or redesigned to enhance activity and sustainability?
3. What are some of the challenges/impacts and dissatisfactions arising from the current design and materials used? How have these material affected the environment?
4. In your opinion what are your suggestions towards enhancing an efficient and sustainable working environment design?
5. What are your views on recycling based design?

SECTION C: WAITERS AND WAITRESSES

1. What are your views on the current state and design of the premise and its landscape?
2. Which areas and materials do you normally experience difficulties/ challenges with during your day to day chores? How have these material affected the environment?
3. What design related concerns are normally raised by customers?
4. Which areas would you like to be redesigned and why?
5. In your opinion what are your suggestions towards enhancing an efficient and sustainable working environment design?
6. What are your views on recycling based design?

SECTION D: CUSTOMERS

1. What are your views on the current design and state of the premise and its landscape?
2. Where do you normally like to dine from mostly and why? The interior or exterior space?
3. What challenges and dissatisfactions do you normally encounter from some of the materials used and facilities in the design? How have these material affected the environment?
4. What facilities/ areas would you like to have redesigned and enhanced
5. In your opinion what are your suggestions towards enhancing an efficient and sustainable working environment design?
6. What are your views on recycling based design?