

**TITLE: MANAGING THE DISPOSAL OF
INFECTIOUS AND HAZARDOUS WASTE IN
PUBLIC HEALTH CENTRES.**

Conceptual Research Paper

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ABSTRACT

Purpose of the paper: Entrepreneurship and Business Management are the main engines of successful businesses and successful economies. The purpose of this paper is to discuss the relationship between entrepreneurship, business management and how it fits in Sustainable Development Goals. Its focus is to assess the health care waste management practices in Public Health Centres and the effects it has on the community and the environment. We will assess the management and disposal of medical waste from these centres. The study will also evaluate the possibilities of the involvement of entrepreneurs in the management and disposal of medical waste. It will analyse the impact of Infectious and Hazardous Medical Waste produced in the course of health care activities. Understanding business management and sustainability is a measurement that a business can make towards its future success.

Design/methodology/approach: The researcher used qualitative gathering data techniques. It is important to note that, the analysis in qualitative field research is an ongoing process and therefore the researcher may use any of the methods in qualitative research method depending on the situation. Secondary data collected mostly through literature reviews showed that entrepreneurs in developing countries are resilient; however, most of these businesses do not go beyond the first generation. This can be attributed to the fact that most of them lack innovation and management skills necessary to move the businesses forward. They are also constrained by so many technological changes that are taking place every day.

Findings: The findings revealed that entrepreneurship and business management are linked. A business will only thrive and be sustained if good business management principles are used. Innovation and sustainable development in developing countries are fundamental to any form of an enterprise. A combination of the characteristics of entrepreneurs like recognizing and taking advantage of opportunities and having powerful imaginative ideas for the business coupled with innovation holds the key to organisational sustainability in this period of rapid change and nonlinear dynamics.

Originality/value: This paper will benefit a lot of us especially those with an entrepreneurial mind. To the community, they will be aware of the dangers of disposing of waste in unacceptable manner. This research paper will add value to the existing body of knowledge in terms of academics and practical aspects. It will also add value to the existing body of academicians, researchers and the business men and women around the globe. Entrepreneurship will be seen as tool for innovation and it brings about the realisation about environmental changes that must be managed for any business to be a success.

Key words:

Entrepreneurship, Sustainable Development, Innovation, Management, Change, Technology

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1.0. Introduction

Entrepreneurship is the process of assembling necessary factors of production consisting of human, physical and information resources and doing so in an effective manner. It puts people together in particular ways and combine them with capital and ideas to create a new product or produce an existing one at a lower competitive cost. Entrepreneurs, driven by an intense commitment and determined perseverance, work very hard. They are optimists who see the cup as half full rather than half empty and burn with the competitive desire to excel. An entrepreneur should be among those who respond to the question that they were among those who initiated a business idea, started and established the business. Such people, even if they leave the business early, are usually responsible for the conception of the basic product, hiring the initial team, and obtaining at least some early financing. An entrepreneur is one who manages and assumes the risks of a business or enterprise, making him willing to make loss in order to make profit in the end. To be an entrepreneur, one must possess basic knowledge about a number of business areas. He must show commitment, determination, and perseverance.

In recent years attention has been given to the role of entrepreneurship and business development. Many politicians believe that entrepreneurship has an impact on the growth of the Gross Domestic Product and employment and also on sustainable development in developing nations and the world at large. It also has an impact on the implementation of innovation. We have high, and an unacceptable level of unemployment caused by cost cutting operations in most business organizations. Here in Zambia, our own president, Edgar Lungu (2015) during his speech in parliament alluded to the fact that as a nation, we need to be adaptive, innovative and determined to change the way we do things. In this regard, the theme for his address was, 'embracing a transformational culture for a smart Zambia now'. He argued that to attain this transformation, we need to change the way we think, behave and do things, he said. He also said that Zambians deserve the very best

and that we are determined to ensure that this is achieved. Our transformational culture should, therefore, start with each and every one of us getting involved. In this transformation, we must leave the past behind and embrace positive attitudes in all our endeavours. We must transform ourselves by: Embracing innovation and entrepreneurship. Adopting a new paradigm to resolving our current and future challenges; Embracing technology to simplify and quicken provision of services; Re-aligning our institutions where necessary to make them more responsive to the needs of the nation; Being patriotic and putting the nation before our personal interests; Promoting cost effective operations in government to eliminate waste and abuse of public resources; Embracing high aspirations and the courage to achieve them with a strong sense of vision and mission; Promoting and maintaining a clean, healthy and safe living and working environment; Transitioning towards a green economy; Fostering win-win partnerships within and outside the country to achieve national development and fulfil the needs of our people; Creating smart institutions and smart budgeting that promote a whole-of-government approach to public service delivery.

As a nation, poor waste generation and poor management in health care institutions has negatively affected the health status of individual, families, the communities and the environment as a whole. Generation of any form of waste is part of our everyday life and any form of waste which is not properly managed can result in the transmission of communicable diseases such as cholera, typhoid and hepatitis B. It can also contaminate the ground through leakages into the underground water. A need, therefore, exists to dispose of waste in best practicable and environmentally sound methods. This therefore calls for the entrepreneur to be innovative and manage the businesses in this sector if we are to attain Sustainable Development Goals. This work therefore looks at the role of entrepreneurship and business management in developing countries. It will help in broadening and deepening

global understanding of the various factors influencing development, and advancing appropriate solutions to development challenges and in attaining the Sustainable Development Goals.

1.1. Entrepreneurship and Business Management

This paper links entrepreneurship and business management to sustainable development. This will be done by investigating the relationship between entrepreneurship, business management and sustainable development goals for developing nations. Hebert and Link (1989), shows many different roles of the entrepreneur and these are distinguished as follows: The first role is that of a 'new entry' and the second role is that of 'newness'. The entrepreneur is the founder of a new business; he creates, organises and operates a new business firm, whether or not there is anything innovative in those acts. Secondly entrepreneurship plays a more general innovative role in economic life: - the entrepreneur as the innovator. To start as an entrepreneur, both willingness and opportunity are essential. Opportunity depends on starting capital, entrepreneurial ability and the environment. Van Praag regards willingness to start as an entrepreneur as 'dependent on both individual preferences for the special features and entrepreneurship as well as the alternative available options and their perceived attractiveness'. Lumpkin Dess (1996) integrated the reign of new and established marked mewing aspect of entrepreneurship and says new entry can be accomplished by entry. He says new entry is the act of launching a business. It involves ensuring the steady working of businesses and maximising profits. It also involves getting our market share and gaining a competitive advantage and getting global before it gets to you. We actually see from the above definitions that an entrepreneur must initiate the act of starting a business and he must be innovative by bringing in technology to manage and sustain his business well.

An entrepreneur cannot succeed in business if he cannot manage his business well. He needs to organise his business in such a way that systems are put in place so that the business can be managed properly. Businesses management involves wide range of items and

these may include marketing management. To manage the business in terms of marketing, an entrepreneur must design an integrated marketing plan were the variables, like demography, social, economic, political and competitive factors are related to the product of the firm. Business management also involves the managing of operations by designing and utilizing the physical resources of the firm to maximise the operational capabilities of the company. This may include job design, process design, product design and job standards. Financial management is another aspect of business management. All these will be possible if detailed financial plans, cash budgets are put in place. Most entrepreneurs are not able to manage their business because they don't have the technical know-how of managing their business. They complain of lack of capital when in the actual fact with proper business plan, they are able to obtain additional funds in form of current assets, bank loans, equity investment, venture capital or angel investing.

1.2. Sustainable Development Goals

The concept of the SDGs was born at the United Nations Conference on Sustainable Development, Rio+20, in 2012. The objective was to produce a set of universally applicable goals that balances the three dimensions of sustainable development: environmental, social, and economic. The Global Goals replace the Millennium Development Goals (MDGs), which in September 2000 rallied the world around a common 15-year agenda to tackle the indignity of poverty.

The MDGs established measurable, universally-agreed objectives for eradicating extreme poverty and hunger, preventing deadly but treatable disease, and expanding educational opportunities to all children, among other development imperatives.

The MDGs drove progress in several important areas:

- Income poverty
- Access to improved sources of water
- Primary school enrolment
- Child mortality

With the job unfinished for millions of people we need to go the last mile on ending hunger,

achieving full gender equality, improving health services and getting every child into school. Now we must shift the world onto a sustainable path. The Global Goals aim to do just that, with 2030 as the target date. This new development agenda applies to all countries, promotes peaceful and inclusive societies, creates better jobs and tackles the environmental challenges of our time particularly climate change. The Global Goals must finish the job that the MDGs started, and leave no one behind. The Sustainable Development Goals look at 17 goals which must be achieved and these are:-

1. No poverty;
2. Zero hunger;
3. Good health and well-being;
4. Quality education;
5. Gender equality;
6. Clean water and sanitation;
7. Affordable and clean energy;
8. Decent work and economic growth;
9. Industry, innovation, and infrastructure;
10. Reduce inequality;
11. Sustainable cities and communities;
12. Responsible consumption and production;
13. Climate action;
14. Life under water;
15. Life on land;
16. Peace, justice, and strong institutions;
- and
17. Partnership for the goals.

When we look at the above list of SDGs, we see that goal number 3 focuses on health and well-being. As long as there is no proper management of medical waste, we cannot even talk about good health and a good environment. Good health starts from how the hospitals are being managed in terms of waste, people and the environment at large. Kumar S, (2016) with his analysis of the SDGs adds on to say that to ensure a healthy lives and promote well-being for all at all ages" - is wider-ranging compared to the health goals in MDGs that were limited to child and maternal mortality and communicable diseases.

The SDGs also look at the clean water and sanitation. How can we achieve clean water and sanitation if our waste is being dumped near rivers? It can also be observed that the

SDGs talk about the need of industry, innovation, and infrastructure development. Innovation can only be brought about by someone who has an entrepreneurial mind. There is therefore a need to allow the entrepreneur to use his innovative mind by using some of the tools and equipment that can be used for sustainable development. There is also the need for caring for water that we use, this is because their life under water and there is life on land. Both can be equally affected if we don't take care of the environment in which we live and we continue to pollute our water through indiscriminate disposal of waste.

2.0. Purpose/objectives paper

The purpose of this study is to assess the health care waste management practices in Public Health Centres and the effects it has on the community and the environment. We also wish to assess the equipment being used in the management and disposal of medical waste. The study will also evaluate the possibilities of the private sector involvement in the management and disposal of medical waste. It will analyse the impact of Infectious and Hazardous Medical Waste produced in the course of health care activities. Most medical wastes, carry a greater potential for causing infections, injuries in human beings and the environment than any other form of waste. Inadequate equipment and inappropriate management of medical waste is likely to have serious public effects and hence deleterious effects on the environment. The research will therefore not cover the technical and medical aspects of medical centres but will suggest viable and internationally acceptable standards of managing and disposing of medical waste. It will also make recommendations to allow the involvement of the private sector with capacity in the management of medical waste.

3.0. Florence Nightingales Environmental Theoretical Framework

Florence Nightingale (1992) is the author of the Environmental Theoretical Model that will guide this study. According to Florence Nightingale Environmental Theoretical Model (1992), nursing contributes to the ability of the person to maintain and restore health directly or indirectly through managing the

environment. Nightingale (1992) stated that nursing ought to signify the proper use of fresh air, light, warmth, cleanliness, quiet, and the proper selection and administration of diet. She also stated that nursing has to put the patient in the best condition for nature to act upon him.

Nightingale's most effective approach and strategy were to be able to improve the health conditions of the patients. She focused on the clean and good condition of the environment. She believed that good sanitation had a great impact to a person's health. As a result, she had advocated for health promotion and disease prevention through building decent housing project. In addition she also made an effort to create clean water supplies for the communities; for she knew many deaths were caused by water and airborne diseases. She believed that there were 5 essential elements in hospital practice that include; pure air, pure water, good drainage, cleanliness and light. Her theory deals with the importance of clean environment and everything that people need in order to live in a healthy way.

Since our study focuses on the management of waste generated from health care facilities, Nightingale's view of health and the environment fits in well with our topic of study and her work simply explains why this research problem understudy exists. It also helps the researcher to focus specifically on hazardous and infectious medical waste. Her environmental theory of sanitation had greatly influenced and developed the roles of nurses worldwide. When we look at pure air as an element in her theoretical framework, we see that today poor air quality is still a health-related concern as can be seen from the incinerators in most health care institutions. The incinerators are simply hot chambers and therefore release harmful substances like dioxins and furans into the atmosphere. The health care institutions cannot afford or use state of the art equipment to filter the air before it is released into the atmosphere.

Water was another area of concern to her, in our study we see that our water source from the rivers like the Kafue River here in Kitwe possess a great challenge. The Kafue river is near Uchi dumpsite one of the main

dumpsites here in Kitwe. This possesses a great risk to the environment and the water we use because, according to Allan and Mbewe (2003) a communal dumpsite in Kitwe called Uchi is near the Kafue River which is the main source for domestic water supply for Kitwe residents. The site operation interferes with natural and ground water systems because it provides a suitable conduit for leachates to percolate and thus pose a potential danger to both drinking water source and the scavenging community. Another point on water is that they are inadequate supplies of water at Kitwe Central Hospital. The patients or their relatives are made to fetch water from the surrounding environment. How can a big hospital like that run without water?

Good drainage and cleanness was another area of her great concern. Today waste is littered everywhere and also because we do not use engineered landfills we find that they are no drainages and as a result there is no proper disposal of our waste. Cleanness must be given its priority if our lives and the environment at large can be preserved.

There is therefore an increasing need to attend to the safety of our water supply, air and general health especially as the number and types of contaminants often found in water, air, waste have continued increasing. In the current health setting in Zambia, very few medical personnel have given a sharp eye to how the waste they generate is actually disposed of. They simply are pressured to focus on the work surrounding them, and the numerous administrative and documentation tasks they must complete.

4.0. Research Design/ Methods/ Approaches

This study was conducted in the province of the Copperbelt of Zambia; the population was all public health institutions. The Sample pollution studied was government hospitals. I purposively selected the following as my sample size:

Kitwe Central Hospital: It is the largest health institution in Kitwe and the largest producer of health related waste

Buchi Health Centre: provides first level care and is a very busy institution and produces significant amounts of waste.

Ndeke Health Centre: Provides primary health care and also produces significant amounts of waste.

The targeted sample size was to be 100 respondents. This will be 10 management members and 20 members of staff and 70 members of the public. There are two types of methods of research methods which are mostly used in the collection of data; these are identified as following: quantitative and qualitative methods (Ghauri et al., 1995). The quantitative methods consist in the systematic empirical studies which involve quantifying through the assistance of mathematics and statistics (Bryman and Bell, 2007). Data is collected and transformed into numbers which are empirically tested to see if a relationship can be found in order to be able to draw conclusions from the results gained. Qualitative methods often refer to case studies where the collection of information can be received from a few studying objects (Bryman and Bell, 2007). It also gives understanding of information collected in natural settings. In this study the researcher used qualitative research method. Under qualitative technique, the researcher used the following methods:

- conversation
- observation
- Social networking.
- Interview

This is because it was difficult to get empirical data which could have been quantified. As mentioned earlier data was collected using observations, discussion, interview and literature reviews.

5.0. Results Finding

Literature was useful for understanding the topic for this conceptual paper. The literature enabled me to answer the research questions. Following the study, it must be noted that the problems associated with waste generation and waste disposal are enormous. Most of it is disposed of indiscriminately.

Finding 1

There are low levels of knowledge and awareness of related infections, especially during disposal. If left unattended would affect the people and the environment adversely. Therefore, the entrepreneur can play an important role in ensuring that this waste is disposed of in engineered landfills and proper incinerators are used to burn the infectious and hazardous waste. These landfills will be properly lined must meet very stringent standards to protect public health and the environment. They must also be properly secured to minimize unauthorized access by scavengers. Hazardous and infectious wastes will be fully treated to significantly reduce toxicity and mobility prior to any land disposal. Landfills intended for hazardous wastes will be engineered with dual liners and related containment systems to protect the land and groundwater. The private sector can take a leading role in ensuring that this is done efficiently and effectively. It must also be noted that, financing of health care facilities through the MOH managed basket funding system cannot immediately provide the needed injection of capital finance required to procure and install reliable equipment for effective management and final disposal. Thus, external financing through MOH for acquisition of sustainable technology for health-care waste disposal would be most favourable. The participation of the private sector in management of hazardous waste should be encouraged because private sector would usually have the necessary technical expertise and equipment which the municipalities may lack. The researcher, therefore recommends that local entrepreneurs, in partnership with municipal local authorities be allowed to be involved in the proper management of infectious and hazardous waste.

Therefore, the private sectors who are the local entrepreneurs must acquire land and put up engineered landfills and incinerator with excess capacity to service the city of Kitwe and the neighbouring towns. This should be encouraged and strongly supported by ZEMA and the government at large. The entrepreneur must first apply the 'polluter pays' principle for longer term sustenance of these ventures. Payment by hospital and clinic both public and

private that do not have proper incinerators can be a source of revenue for the local entrepreneurs.

Figure 1 Incinerator at Sinozam Hospital and a drum being used as incinerator in Monze



Figure 3: Incinerator at Kitwe Central Hospital

Incineration is a preferred disposal method in which solid organic wastes are subjected to combustion so as to convert them into residue and gaseous products. Therefore, such infectious hazardous waste requires to be burned at very high temperatures using state of the art incinerators. However, being in a country that is stressed by resources, use of incinerators as shown in the pictures above that operate mainly on expensive fuel has not been very efficient. The incinerators above show pictures from Sinozam and hospital and Mulenga and Monze Clinic. It also shows the incinerator at Kitwe Central hospital.

Finding 3

It was further found that, most of the medical wastes deserve incineration, most of the health centres' incinerators were dysfunctional at the time of this research. Hazardous waste incinerators must have high-technology devices, carefully designed, controlled and maintained to assure the safe destruction of all hazardous organic constituents in the waste and also to ensure the proper treatment and safe disposal of any residues.

6.0. Discussion and Implications of Findings

Literature was useful for understanding the topic for this conceptual paper. The literature enabled the researcher to answer the research questions. Following the study, it must be noted that the problems associated with waste generation and waste disposal are enormous and this is because most of it is disposed of indiscriminately.



Figure 2: Incinerator at Mulenga Clinic in Kitwe

Discussion of Finding 1:

There are low levels of knowledge and awareness of related infections, especially during disposal. If left unattended would affect the people and the environment adversely. Therefore, the entrepreneur can play an important role in ensuring that this waste is disposed of in engineered landfills and proper incinerators are used to burn the infectious and hazardous waste. These landfills will be properly lined must meet very stringent standards to protect public health and the environment. They must also be properly secured to minimize unauthorized access by scavengers. Hazardous and infectious wastes will be fully treated to significantly reduce toxicity and mobility prior to any land disposal. Landfills intended for hazardous wastes will be engineered with dual liners and related containment systems to protect the land and groundwater. The private sector can take a leading role in ensuring that this is done efficiently and effectively.

It must also be noted that, financing of health care facilities through the MOH managed basket funding system cannot immediately provide the needed injection of capital finance required to procure and install reliable equipment for effective management and final disposal. Thus, external financing through MOH for acquisition of sustainable technology for health-care waste disposal would be most favourable. The participation of the private sector in management of hazardous waste should be encouraged because private sector would usually have the necessary technical expertise and equipment which the municipals may lack. The participation of these entrepreneurs in health-care waste is currently being hampered by non-availability of affordable financing on the local market. The researcher, therefore recommend that local entrepreneurs, in partnership with municipal local authorities be allowed to be involved in the proper management of infectious and hazardous waste.

Therefore, the private sector local entrepreneurs must acquire land and put up

engineered landfills and incinerator with excess capacity to service the city of Kitwe and the neighbouring towns. This should be encouraged and strongly supported by ZEMA and the government at large. The entrepreneur must first applying the 'polluter pays' principle for longer term sustenance of these ventures. Payment by hospital and clinic both public and private that do not have proper incinerators can be a source of revenue for the local entrepreneurs.

Discussion of Finding 2

Incineration is a preferred disposal method in which solid organic wastes are subjected to combustion so as to convert them into residue and gaseous products. Therefore, such infectious hazardous waste requires to be burned at very high temperatures using state of the art incinerators. However, being in a country that is stressed by resources, use of incinerators as shown in the pictures above that operate mainly on expensive fuel has not been very efficient.

Discussion of Finding 3

It was further found that, most of the medical wastes deserve incineration, most of the health centres incinerators were dysfunctional at the time of this research. Hazardous waste incinerators must have high-technology devices, carefully designed, controlled and maintained to assure the safe destruction of all hazardous organic constituents in the waste and also to ensure the proper treatment and safe disposal of any residues. I also recommend the use of the Hazardous Waste Management Regulations Statutory Instrument No. 125 of 2001 provide for the control of hazardous waste so that the waste is managed in an environmentally sound manner through waste prevention, reduction, recycling, incineration and land filling. Below is a concept drawing of a state of the Art

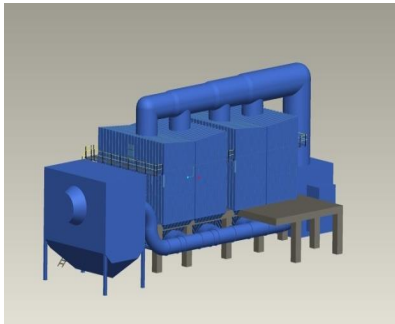
Incinerator.

7.0. Conclusion

In conclusion, this research wishes to recommend that best practices with regard to handling and disposing of infectious and hazardous waste and incinerator ashes be replicated in our healthcare centres especially

here in Kitwe and elsewhere throughout the country. This will enable us to attain the sustainable development goals that have been stipulated so that we can reduce on unnecessary disease burdens that have affected us. This will in turn bring about sustainable development and we will live in a clean environment and hence improve our life expectancy. A summation of these activities is likely to constitute a good starting point to ensuring a city with a safe and protected natural environment, in which people may live a

healthy and productive life. In order to determine the magnitude and severity of the medical waste disposal challenges in Kitwe it is recommended that the Ministry of Health (through the KDHMT and ZEMA) do detailed city-wide follow-up study of waste disposal practices at all the healthcare centres in the city. The sustainable development goals should be a guide to managing our lives and the environment.



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