TITLE: **MODELLING HEALTHCARE FINANCING IN KENYA**

[THE GREEN PATH MODEL - GPM]

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DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the Research contains no material previously published or written by another person except where due reference is made in the Research Paper itself.

…….. [*Name of Candidate*]

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This Research Paper has been submitted for examination with my approval as the Supervisor.

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ABSTRACT

This study involves modelling healthcare financing in Kenya. The 2001 Abuja Declaration that requires governments to allocate at least fifteen percent (15%) of their total budgets to health and the universal $60 health per capita target are used as benchmarks in this study.

The proposed model that is used for modelling healthcare financing in Kenya is the Green Path Model (GPM). GPM consists of a six-staged path that involves identification of health financing gaps at both National and County level, issuing of a Social Impact Bond, SIB, a conceptual shift to the Circular Economy, CE framework and refocusing on repayment of the social investors. At the final stage, the surplus amount generated from the Circular Economy's green initiatives is channelled to the Green Fund – pool of funds in a Green Bank thus filling up the health financing deficits. This study found out that as at now, Kenya has neither allocated at least 15% of its total budget to health nor met the universal $60 health per capita target both at National and County Level.

Key words: Abuja Declaration, health per capita, Circular Economy, Social Impact Bond and Green Bank.

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CHAPTER 1: INTRODUCTION

1.1. Background of the Study.

1.1.1. Definition and brief description of key concepts.

Health financing[1] refers to the "function of a health system concerned with the mobilization, accumulation and allocation of money to cover the health needs of the people, individually and collectively, in the health system. The purpose of health financing is to make funding available, as well as to set the right financial incentives to providers, to ensure that all individuals have access to effective public health and personal healthcare" (WHO, 2000).

Health system refers to the set of interrelated elements (environment, education, labour conditions, etc.) having as objective the transformation of some sanitary resources (inputs) into a health status (final output) through the production of healthcare services (intermediate output). **Health market** refers to the interaction between providers and consumers of healthcare services (and insurers). **Health Economics** refers to allocation of resources within the health system in the economy, as well as the functioning of the healthcare markets (Giralt, 2008). **Circular Economy (CE)** is a general term covering activities that reduce, reuse, and recycle materials (referred to as the 3R approach) in production, distribution and, consumption processes (The World Bank, 2009).

A **national healthcare delivery system** is a set of healthcare schemes that operates in a single country. A healthcare scheme is a body that organizes the delivery and financing of healthcare services for defined population subgroups such as contributors and their dependants. Healthcare financing schemes have a certain financial structure, which is mapped in accounts and statistics. Their financial structure is the consequence of the interactions between care providers, patients, financiers, and other agents that define processes and set standards in the healthcare market, notably, the state (Cichon, et al., 1999).

Technical efficiency (also denoted as cost- efficiency) is defined in the health sector as the physical relation between inputs (labour, capital and equipment) and outputs (number of consultations or hospital discharges). Taking hospital discharges (health sector activity) as a measure of output, a technically efficient position is achieved when the maximum possible measure of discharges is attained from the set of inputs (European Commission and the Economic Policy Committee (AWG), 2010).

[1] Health financing has been defined based on The World Health Report 2000 – health systems: Improving performance. World Health Organization, Geneva, 2000 [http://www.who.int/whr/2000].

Effectiveness refers to the extent to which the health system shows an acceptable level of the chosen objectives (i.e. an evaluation of its outcomes) relative to its inputs (European Commission and the Economic Policy Committee (AWG), 2010).

Total health expenditures imply the sum of private spending on health, government health budgets, and other sources of financing such as social health insurance, personal healthcare, collective health services and the operation of health systems, plus capital investment (World Health Organization, 2009). **Universal Coverage** refers to a case where nearly all people have access to good quality needed services without facing catastrophic financial expenses.

Innovative financing refers to finance mechanisms that might mobilize, govern, or distribute funds beyond traditional donor-country Official Development Assistance (ODA)-Developed countries' pledges (Bensoussan, Ruparell, & Taliento, 2013).

1.1.2. Main developments in healthcare financing.

Innovative financing mechanisms are key components in resource mobilization for global health and are of particular importance with regard to the attainment of the objectives set by major donors and stakeholders, notably as they pertained to the Millennium Development Goals (MDGs) for 2015. Therefore, their main role is to fill the existing financial gap in order to reach the MDGs (Gargasson & Salome, 2010).

According to the article titled 'Laying The Foundation for A Robust Healthcare System in Kenya,' (2014),[2] the key messages of the review offered suggestions for increasing efficiency and equity to create a more robust health system which included: increasing public funding to the health sector, particularly for primary healthcare; reducing reliance on out-of-pocket payments and moving towards pre-payment financing mechanisms and finally; mainstreaming, integrating and harmonizing donor support.

Notably, it was clearly stated that devolution provided a unique opportunity in addressing long standing inefficiencies as well as inequalities. These were captured under the following: county governments having an opportunity to address historical inequalities in access to health

[2] 'Laying The Foundation for A Robust Healthcare System in Kenya' - KENYA PUBLIC EXPENDITURE REVIEW, Volume II, December 2014. This policy note was prepared by a team led by Jane Kiringai and had a core team authors comprising Jane Chuma, Catherine Ngumbau, Laban Maiyo, Isabel Waiyaki, and Thomas Hart.

services; creating appropriate incentives for health staff and equipping health facilities with adequate Essential Medicines and Medical Supplies (EMMS) needed to provide quality care; counties could benefit from effectively sharing resources (networked hospitals) rather than new investments (building new hospitals) and finally; adopting cost effective preventive care interventions to improve delivery service was also critical. Clearly, all these call for a spectacular look at innovative financing mechanisms.

An ideal and properly functional national healthcare delivery system is one that has efficient and effective delivery services and financing mechanisms, properly laid out guidelines, policies, rules and regulations aimed at full utilization of available resources. At the same time, it should equally aim at maximizing output in form of provision of health services to the wider population, addressing current disease cycles, trends and patterns and putting in place an efficient, working National Health Research unit. All these are the tacit ingredients of an efficacious health delivery system desired by any nation in the world, be it developed or developing.

This study aims at modelling healthcare financing in Kenya by relying heavily on the case studies, modelling approaches and principles captured by (Cichon, et al., 1999) in the anchor research book '*Modelling healthcare financing: A compendium of quantitative techniques for healthcare financing.'* The study aims at investigating the potential of using an innovative healthcare financing mechanism model for the Kenyan health system that is in line with the complementarity structure - a key prerequisite in the universal Healthcare funding policies of most countries.

1.2. Statement of research problem.

An ideal and properly constituted health financing system[3] is characterized by the following: its objectives and actions revolve around raising sufficient funds for health; improvement of financial risk protection and coverage for the vulnerable; improvement in the efficiency of resource utilization and improved financial transparency and management at operational levels. There is need for a proper financial structure that is a consequence of the interactions between providers, patients, financiers and other agents that define processes and set standards in the health industry (Opwora, Kabare, Molyneux, & Goodman, 2010).

The Ministry of Health budget allocation for Kenya's FY 2014/15 was Ksh. 47.4 billion, constituting 4% of the national budget, compared to 3.4% in FY 2013/2014. The Ksh. 47.4 billion budget allocation included government and development partners' contribution for one year. Notably, development partners accounted for 57.1% of the total development budget in FY 2014/15 compared with 59.8% in FY 2013/14 (HEALTH POLICY PROJECT, 2015). Despite the fact that the contribution of Development partners declined by 2.7%, such reliance on external funds poses a danger (*development partners' withdrawal risk*- only if such unpredictable events turn out to be reality) to Kenya's healthcare financing system hence the urgent need to rethink about possible innovative approaches to help widen the scope of internal financing of our healthcare system.

Therefore, there is need to rethink the healthcare financing approaches in Kenya under the innovative financing mechanisms framework. This will greatly help in starting to tap into potential internal sources of financing our health sector that could help in widening the scope of internal financing of our healthcare system.

[3] Description of an ideal and properly constituted health financing system according to the Toolkit on monitoring health systems strengthening by World Health Organization in June 2008 under the article titled 'HEALTH SYSTEMS FINANCING.'

1.3. Research objectives.

Overall objective

To propose an innovative financing model that can be relied upon in scaling up internal healthcare financing in Kenya.

Sub-objective

To determine if there is need to refocus the Circular Economy lens to innovative healthcare financing in Kenya.

1.4. Research questions.

Can the proposed innovative financing model be relied upon in scaling up internal healthcare financing in Kenya?

Is there need to refocus the Circular Economy lens to innovative healthcare financing in Kenya?

1.5. Significance of research.

Academic significance.

The empirical findings of this research will contribute immensely to the body of knowledge available. Based on the nature of the findings, a proper and precise conclusion can be drawn on whether there is need for an innovative financing mechanism tool to aid in complementing internal healthcare financing in Kenya as per the stated objectives.

Policy significance.

The research involves modelling healthcare financing in Kenya so as to inform policy makers on one of the potential innovative financing mechanism in their objectives of ensuring universal health coverage, efficiency and effectiveness in healthcare financing and generally in healthcare delivery systems. The approach used here follows the complementarity approach – a key prerequisite in the universal healthcare funding policies in most countries.

Modelling healthcare financing guides health policy makers on allocation of resources, choosing the most appropriate funding/financing structure, policy deliberation, redefining targets as necessary, providing appropriate guidance to establish baselines, carrying out sound technical analysis and, capacity strengthening. Critically analysing and articulating a problem can yield highly innovative solutions. Additionally, organizations that ask better questions and define their problems with more rigor can create strategic advantage and unlock truly ground-breaking innovation. Asking better questions delivers better results (Spradlin, 2012).

CHAPTER 2: LITERATURE REVIEW

2.1. Introduction

The literature review is structured into sections to ease the comparison, with theoretical literature in the first section, empirical literature in the second section, the literature gap following thereafter and finally the conceptual framework. The empirical literature has subsections constituting the global literature, developing countries literature, local literature and Circular Economy empirical literature.

2.2. Theoretical literature

2.2.1. Healthcare financing policy making framework

Healthcare systems are currently a prominent focus for national leaders and policy makers in most countries in the world today. Clearly, this shows the concerns about the availability of essential health services for the population, as well as the efficiency and costs of current health systems in delivering those services. Essentially, the degree of importance of this issue in any particular country is directly related to the size of the healthcare system relative to the national economy (Cichon, et al., 1999).

Studies of policy issues revealed that nearly all decisions of policy makers regarding national health systems must be based on the quantitative aspects of the options available, and the impact of any decisions taken. A quantitative description of the current health system and projection of the impact of changes to the system through new policy initiatives is also critical to reform thus deserves attention. The ability to quantitatively describe health systems as well as creating a range of "what if" scenarios to aid in carrying out scenario analysis based on new directions for those systems is increasingly important in all countries (Cichon, et al., 1999).

Quantitative tools are needed for sound resource allocation and financial governance of health systems in Kenya and the world at large. Quantitative tools are of two types: *descriptive tools* and *analytical tools.* Descriptive tools are standard instruments for sound governance, and consist of financial reporting and controls in the form of accounts and statistics. Analytical tools allow policy makers to perform *status quo mapping*, which is used to assess the financial development of existing systems, under the assumption that present regulatory or managerial frameworks are maintained. Status quo mapping can also be relied upon as a useful facet in determining whether modifications are necessary in benefit of financial provisions. This is done in a manner similar to setting the value of the technical provisions for social insurance, where the technical provisions should be equal to the sum of the best estimate and the risk margin.

Analytical tools are also used to perform *simulations* of the financial impact of proposed changes in the policies and parameters of the system, in the form of "what if" scenarios and projections (Cichon, et al., 1999).

The analytical tools needed to perform projections consist of *models,* which are mathematical formulations of healthcare financing systems. Models are pragmatic tools of governance. They provide information with which to make informed decisions about the current system, or about options of the future. Notably, models do not make health policy decisions, they only provide the important data and intelligence information necessary for decision making process. The need for change to improve existing health systems and adjust to new circumstances has resulted in countries from all economic strata and spheres needing to use modelling to make their health systems relevant and sustainable both today and in the future. Quantitative modelling is therefore, an important tool to make these changes, yet it is greatly misunderstood and underutilized in most countries faced with critical decisions about their health systems (Cichon, et al., 1999).

Studies of the current Kenyan Health System Management process revealed that there is established the Kenya Master Health Facility List – KMHFL[4] which aids in locating facilities within the Master Facility List. One can locate facilities through two options: either by Search or through the onsite Geo-locator. Furthermore, one can rate a Facility's services. Community Health Units (CHUs) can be viewed and there are options for Community Health Detail View or equally providing feedback on a Community Health Unit. This clearly shows that health modellers can rely on both the quantitative and qualitative data from KMHFL's platform and database to model different scenarios using big data analytics to predict the future under different scenarios using mathematical techniques. The modelling results can then be relied upon by health policymakers in creating informed policies as per the arguments postulated by Cichon, et al., (1999).

2.2.2. Healthcare financing pricing framework

Cichon, et al., (1999) argued that since the mid-1970s and the economic crises of the 1980s and 1990s, evidenced in the dramatic reductions in GDP growth rates, the emphasis in most countries shifted from expanding services and improving quality to attempting simply to maintain the level of existing services. They further argued that the sustainability and cost

[4] KMHFL - Kenya Master Health Facility List has a Facility Geolocator that visualizes administrative units (counties, constituencies, wards) and their facilities and Community Health Units. Users can also rate a facility's services.

containment efforts of health systems have become the major challenges, and financing is a critical element in meeting these challenges. Their argument is directly linked to the current Kenyan health system, more so, with regards to its financing and cost containment which come with a price owing to the ever increasing population and changes in its demographic patterns.

Moreover, Cichon, et al., (1999) argue that the emphasis in healthcare financing today has shifted to cost containment through efficiency gains in existing systems, while finding effective mechanisms for funding the overall health system in a long-term, sustainable fashion. According to them, for less affluent countries of the world, the pressure to reform their health systems and financing mechanisms has become even more acute.

2.2.3. Healthcare financing economic environment

Demand for health services arguably continues to rise. While some of the increase might be attributable to population growth and changing disease patterns, demand has also been created through such factors as new technologies to diagnose and cure illnesses. It is argued that these technologies are generally costlier than existing ones, and often represent only a slight marginal benefit in terms of health outcomes relative to increased costs. For instance, in Kenya, the relatively higher cost of treating cancer through chemotherapy justifies this argument. While consumers demonstrate a considerable tolerance for rising healthcare prices, collectively financed healthcare systems are increasingly sensitive to the rising costs of healthcare (Cichon, et al., 1999).

The ultimate consequence of unrestricted cost increases might be a rationing mechanism for the distribution of health services. Arguably, simply allowing the healthcare market and prices to perform this rationing function creates ethical concerns and provokes debate about equity of the system (Cichon, et al., 1999). This ongoing debate in most national systems reflects the fact that interactions between three key factors are not fully understood: the objective *need* for health goods and services, the *demand* for those goods and services, and the development of benefit *entitlements* under the healthcare financing system. The relationship between the use or consumption of health services and health outcomes is also not well understood, especially since stochastic[5] biological processes make this relationship difficult to determine. Thus, according to Cichon, et al., (1999), uncertainty is a major characteristic of the health sector in this world full of sporadic events and spontaneity.

[5] Stochastic implies random events indexed or pegged on time.

2.2.4. Healthcare financing efficiency and effectiveness

In order to provide affordable, accessible and effective health services to those of the population in real need, arguably, resources must be targeted at the most cost-effective interventions. This is accomplished primarily through the effective and efficient use of existing resources, through such means as utilization and cost control. For the healthcare delivery system to be financially sustainable, sound resource allocation, financial governance, and monitoring of health outcomes which form the principle components of a proper health check-up criteria are necessary, regardless of whether the system is primarily public, private or mixed (Cichon, et al., 1999).

According to Cichon, et al., (1999), the ultimate objective of all financial modelling in healthcare is to support policies to improve the effectiveness or efficiency of national healthcare delivery systems. Improving *effectiveness* of the national delivery system is reminiscent with achieving health gains. Enhanced *efficiency* is achieving these gains at the lowest possible cost, or maximizing the output for a given level of inputs. While efficiency objective might be pursued singularly by governments in financial distress, the effectiveness objective should never be pursued in isolation from the political, economic and demographic environment in which the system operates. All national social policies, and hence all national health policies, operate under financial, fiscal and political constraints. Financial resources are always limited, and political constraints might include preferences for certain types of healthcare delivery or financing systems which cannot always be explained according to efficiency or the effectiveness criteria.

Cichon, et al., (1999) argued that some countries in Central Europe, for instance, maintain expensive forms of social insurance systems, despite evidence from other European countries that a national health service would still achieve the same or similar health outcomes at a lower level of spending. This is clearly a political choice determined by an implicit political negotiation process between the general public, the government and healthcare providers. Within its financial, fiscal and political constraints, however, every healthcare system should operate at the highest possible level of efficiency. Ideally, it should achieve the greatest possible health gains given these constraints. Monitoring the efficiency of a large financial transfer system, such as a healthcare system, requires costing – cost units, cost centres and departments, clearly defining the costing processes. Costing too requires modelling.

2.2.5. Healthcare financing studies on modelling processes

Health policy design and the modelling process according to Cichon, et al., (1999), involves a closer look at the clear mandates of models. According to their arguments, question (s) that models answer need to be clearly formulated. Financial models answer "how much" questions (HMQs), but these can only be asked if the subject of analysis is clearly defined. One policy option for analysis could be to take no action – the objective of this policy would be to maintain the current state of affairs in which case the model would simply map the status quo – *status quo mapping process.* Alternatively, another option could be to formulate a new health policy objective, with a defined strategic approach for implementation. This would require a different modelling approach. Thus, before the modelling process can begin, the goals of national health policy and a strategy for their implementation must be determined, within the given set of constraints. The nature and design of the model is determined by the health policy to be pursued, including its goals and strategies.

Cichon, et al., (1999) argued that with regards to model limitations and the learning process, models only provide a mapping of observed reality. Due to the complexity of the subject, a complete image of the characteristics and the behaviour of the modelling object will not be achieved. Financial models are usually particularly weak in mapping unprecedented events, such as sudden technology shifts or a rapid fall in the number of contributors and taxpayers due to a sudden economic downturn. Ideally, all models are prone to error, a fact that needs to be recognized and built into modelling procedures. A model is not a crystal ball; it does not predict the future. Rather, models *project* a possible future state on the basis of observations and assumptions on future conditions.

The modelling process and choices made based on it will only be as good as the precision of the model and quality of the data. This is so because data is often sparse, inaccurate or incomplete – or all of these – models must be refined over time, as the quality and availability of data improves. As models are refined and improved, the confidence placed in the results of the modelling process increase as well (Cichon, et al., 1999).

According to Cichon, et al., (1999), with regards to the economics and economic environment of the health sector, they argue that healthcare goods and services are exchanged on the healthcare market. There is ample reason to believe that the market is distorted by a variety of factors, most importantly by the asymmetry of information between consumers and providers and by the need to insure against potentially substantial healthcare costs. These distortions are

discussed extensively in the literature of the field. Third-party payment systems, together with inevitably under-informed consumers, lead to a market situation in which providers of care have a dominant influence on the volume and structure of demand. The individual need for services is also uncertain, and possibly difficult to predict. Demand is only an approximate function of need; it also depends on the availability and affordability of services.

As a result, uncertainty and the provider dominance are important characteristics of the healthcare market, and are of utmost importance for the modeller. An understanding of these concepts is crucial in order to understand the dynamics of expenditure on the healthcare market. As for Cichon, et al., (1999), expenditure is the financing system's objective of service. If the modeller does not understand expenditure dynamics, they argue that we can safely assume that the model will not adequately reflect these relationships. Such a model would be unlikely to be able to project national or scheme health expenditure in a meaningful way. They further argue that the most important aspect for the modeller regarding health expenditure is that it is highly *income elastic.* It is obviously easy to persuade consumers with incomes increasing in real terms to spend more and more on healthcare. This microeconomic relationship obviously aggregates into a macroeconomic relationship.

The International Labour Office and the International Social Security Association came together in UK to produce a series of monographs[6] on the qualitative analysis of national social protection schemes. Arguably, the first publication in the series dealt with modelling in healthcare finance. The publication suggested that any country or region's healthcare system could be modelled to a number of levels of detail. The concept of national health accounts was described. The accounts have four components which include: Global cost – How much is spent on healthcare? Functional breakdown – What kinds of healthcare are provided? Provider characteristics – Who are the major providers of care? Finally, we look at Financing sources – What are the major sources of funds? (Modelling in healthcare finance, 2016)

It is argued that principally, it is the gap between true global cost and financing sources which bedevilled the UK national health service since its inception. The National Health System problem worsened the as the gap widened, with the global cost being controlled by rationing (Modelling in healthcare finance, 2016).

[6] A monograph is a detailed and documented treatise on a particular subject

Healthcare provided by a country is a subset of the total social care provided, and actions within healthcare would have an impact on other aspects of social care. The construction of the various health statistics offer were placed within the modelling context. Each country would have its own data flow. The monographs actually set out to explain the modelling process from first principles, looking at all aspects of the modelling process, including calculation techniques, the use of models in policymaking and decisions, quoting examples from the world. Modelling relies on a detailed database being available to the modeller. The absence of credible data is a frequent problem in healthcare, and the methods of plugging the data are outlined (Modelling in healthcare finance, 2016).

Just like Cichon, et al., 1999, the Publication on Modelling in healthcare finance, 2016 also highlighted the fact that all of the models were developed in response to specific questions posed by policymakers, primarily of the 'how much?' variety. The models thus played a real role in national planning. The publication on Modelling in healthcare finance, 2016 which was aimed at health system and financing practitioners had four additional briefs covering the basic concepts of: health economics; accounting and financial management; the mathematics of private health insurance; and the econometric techniques for modelling.

According to the Institute and Faculty of Actuaries (IFoA), 2016, the Health and Care practice area is active in member-led research currently having one of the working parties working on cancer modelling – to develop projections of the likely future financial burden of cancer in England and Wales, covering both direct and indirect costs (Health and Care : Research Working Parties, 2016). The aforementioned current market research advocates for innovative healthcare financing to be invoked so as to aid in realization of tremendous cost reduction in healthcare finance.

2.2.6. Healthcare financing arrangements

An important distinction must be made between the financing and delivery of health services. Services might be provided in both the public and private sectors. Thus, it is possible that services would be financed by the public sector, but provided by the private sector (Cichon, et al., 1999).

However, with respect to financing sources and population coverage, only a few types of healthcare schemes are typically dominant components of national healthcare systems. *National Health Service* systems are characterized by public tax financing, a mix of public and private delivery, full or almost full scope (range of benefits) and universal coverage of the

population. *Social insurance schemes* combine public contribution financing, public and/or private delivery, usually a full benefit range and less than full population coverage. On the other side, *Private insurance schemes* in many countries combine partial population coverage, less than full scope, private financing and private delivery. A private insurance subsystem or scheme, however, may also operate alongside a dominant public sector scheme (Cichon, et al., 1999).

Health services may be financed through public or private expenditure (Cichon, et al., 1999). Traditionally, the primary source of financing for the health sector in many countries has been the government, although other sources of financing have more recently increased in importance. Where health services are paid for with taxes or compulsory insurance (through individual and/or employer contributions), they are counted as public expenditure. Private expenditure includes payments by individuals and employers which are generally voluntary, with the rare exception of mandatory healthcare savings schemes (such as the Medisave system in Singapore).

Funding for recurrent operating and long-term development costs for health services may come from any of the three primary sources: Public sources of financing - Direct government contributions to finance the provision of health services, through national or local budgets; Social health insurance, sponsored by the government (may be mandatory); Community financing schemes for health services; Private sources of financing - Direct payment by patients (fee-for-service or other household expenditure); Private, voluntary health insurance (indirect individual and employer payments); Employer-based health insurance; Payments by community and other voluntary local organizations that finance health services; Healthcare savings schemes, in which individuals save a stipulated amount each month to cover healthcare costs in case of need; Mutuals or cooperative-based insurance schemes and External financing: Donor monies for health services (institutional aid, foreign aid or development loans).

Giralt, (2008) defines a healthcare market as the interaction between providers and consumers of healthcare services (and insures). Just like Cichon, et al., (1999), Giralt, (2008) insists that the organization of healthcare market is a crucial element of analysis of the healthcare system.

Giralt, (2008) described Health economics in the context of *descriptive studies* which pay attention to long tradition thus tend to be conservative in nature and *analytic studies* which pay considerable attention to relatively recent health systems. He gives special reference to US efforts to extend coverage beyond *Medicaid* and *Medicare* by Clinton and the Obama

administration in expounding on his arguments regarding analytic studies. Arguably, according to Giralt, (2008), restructuring healthcare systems via stimulating competition and incentives (principals, agents, payment systems, insurance, risk, etc.) while taking into account the characteristics of the healthcare systems is the way forward. Unlike Giralt, (2008), Cichon, et al, (1999) base their arguments on quantitative tools needed for sound allocation and financial governance of health systems. They paid emphasis to descriptive tools as standard instruments for sound governance which consisted of financial reporting and controls in the form of accounts and statistics. Analytical tools according to them allow for policy makers to perform status quo mapping.

Giralt, (2008) classifies the structure of the healthcare system into three main models as captured. The *reimbursement model* in which includes both Public providers' version where emphasis is on France and private providers' version as was the case in UK and the patient advances payment and this is reimbursed (partially or totally) by third party payers. Under the *contract model*, link between providers and third party payers is captured and patients choose providers among in-plan providers. Lastly, the *integrated model* which explains the integration of providers and third party payers is captured. Third party payers' contract physicians and own hospitals.

Giralt, (2008) goes a step further and captures market of hospital services, entry barriers, level of concentration, economies of scale, regulation, supplier-induced demand, competitiveness, cost and quality in the market of physician services which cumulatively determine the process of modelling healthcare financing in a given national health delivery system.

2.3. Empirical Literature

Modelling healthcare financing for a particular national health delivery system indeed requires an in-depth analysis of different factors and components that either directly or indirectly related to sources of funding, principles and policies that have been put in place and current dynamics in the health industry.

The Paris Declaration on Aid Effectiveness, (2005) addressed five key pillars of Partner commitments which included the following: *ownership* – partner countries exercise effective leadership over their development policies, and strategies and co-ordinate development actions, *alignment* – donors base their overall support on partner countries' national development strategies, institutions and procedures, *harmonisation* - donor's actions are more harmonised,

transparent and collectively effective, *managing for results* – managing resources and improving decision-making for results and *mutual accountability* – donors and partners are accountable for development results. The indicators of progress were to be measured nationally and monitored internationally (OECD, 2009).

The Accra Agenda for Action, (2008) which brought together ministers of developing and donor countries responsible for promoting development and Heads of multilateral and bilateral development institutions endorsed the following statement in Accra, Ghana, on 4th September 2008 to accelerate and deepen implementation of the Paris Declaration (2 March 2005): commitment to eradicating poverty and promoting peace and prosperity by building stronger, more effective partnerships that enable developing countries to realise their development goals, recognizing progress in poverty eradication and access of safe drinking water in most parts of the world, achievement of Millennium Development Goals (MDGs) and accelerating the pace of Change by leading the way, united in a common objective: unlocking the full potential of aid in achieving lasting development results. Strengthening country ownership over development was key and also broadening country-level policy dialogue on development (OECD, 2009).

2.3.1. Developed Countries empirical literature

The Financing Healthcare in the European Union Report, (2009) analysed a number of health financing-related reforms in the following areas: Generating more revenue by maximizing the collection of publicly generated funds – for instance, by lifting the ceiling on social insurance contributions and/or by centralizing responsibility for collection of taxes and social insurance contributions; changing the mix of contribution mechanisms – for example, by increasing reliance on social insurance contributions, central tax or local tax or by expanding private finance through private health insurance and cost sharing; addressing fragmented pooling by lowering the number of pools and, in some cases, creating a single, national pool; restricting or expanding entitlement to public coverage and/or attempting to define benefits (often through the use of Health Technology Assessment (HTA); and moving from passive reimbursement of providers to active purchasing of health services – for example, by separating purchasing from provision, by introducing strategic resource allocation or competition among purchasers and/or by reforming provider payment (Thomson, Foubister, & Mossialos, 2009). These arguments reinforce Giralt, (2008) postulations on the reimbursement model.

Thomson, Foubister, & Mossialos, (2009) argue that the reforms can be divided into three groups: those likely to enhance sustainability, those likely to jeopardize sustainability and those with uncertain implications for sustainability.

Reforms likely to enhance sustainability include: greater use of central taxes to supplement social insurance contributions (to ensure sufficient revenue); strengthening and enforcing the collection of funds (to ensure sufficient revenue); enhancing pooling by lowering the number of pools or creating a single, national pool (to ensure that resources are matched to needs); strategic resource allocation based on risk-adjusted capitation (to ensure that resources are matched to needs); greater use of HTA in reimbursement decisions and defining benefits (to ensure value for money); and reform of provider payment linking payment to performance, in terms of quality and health outcomes (to ensure value for money and to ensure that resources are matched to needs) (Thomson, Foubister, & Mossialos, 2009).

Reforms with uncertain outcomes for sustainability include: increased reliance on local tax (may undermine efforts to match resources to needs and ensure value for money); competition among purchasers (may undermine efforts to match resources to needs and ensure value for money); provider payment in primary care (unless carefully designed, may not succeed in matching resources to needs or ensuring value for money); using Diagnosis-Related Groups (DRGs) to pay hospitals (unless carefully designed, may not succeed in matching resources to needs or ensuring value for money) (Thomson, Foubister, & Mossialos, 2009).

Reforms likely to jeopardize sustainability include: increasing reliance on social insurance contributions (unlikely to ensure sufficient revenue in future); expanding private health insurance (unlikely to ensure sufficient revenue or value for money, or to match resources to needs; some forms may put pressure on publicly raised revenue and/or undermine strategic resource allocation); introducing Medical Savings Accounts (MSAs) (unlikely to ensure sufficient revenue or value for money, or to match resources to needs); and expanding cost sharing and/or poor design of cost sharing policy (unlikely to ensure sufficient revenue or value for money; likely to have an adverse effect on health outcomes) (Thomson, Foubister, & Mossialos, 2009).

Thomson, Foubister, & Mossialos, (2009) argue that public finance is superior to private finance given the need to secure sustainability without undermining values, such as equity in finance or equity of access to healthcare. Furthermore, they said that their argument is also based on efficiency grounds. Publicly generated finance contributes to efficiency and equity

by providing protection from financial risk and by detaching payment from risk of ill health. It also ensures that resources are allocated on the basis of need, which is on the basis of where they can do the best, rather than on the basis of ability to pay. In contrast, private contribution mechanisms involve limited or no pooling of risks and usually link payments to risk of ill health and ability to pay. Public finance is also superior in its ability to ensure value for money through strategic purchasing and reduced administrative costs which they argue, is central to securing economic and fiscal sustainability.

However, public finance is not without its problems. Arguably, where social insurance contributions dominate, there are likely to be concerns about the high costs of labour and the difficulty of generating sufficient revenue as informal economies and self-employment grow, and as a population ageing leads to shifts in dependency ratios. Concerns may also focus on generating sufficient revenue where capacity to enforce tax and contribution collection is weak. Prudential fatigue – the reluctance of certain groups to pay collectively for social goods and to subsidize the costs of care for others – may exacerbate resistance to paying higher taxes or contributions. However, these problems can be addressed, for instance, by broadening the revenue base to capture income not based on employment; by investing in efforts to strengthen public sector capacity; and by making the social and economic case for collective financing (Thomson, Foubister, & Mossialos, 2009). This shades some light on opportunities available especially with regards to innovative financing mechanisms that can be employed in healthcare financing.

In determining an optimal method for financing healthcare, Thomson, Foubister, & Mossialos, (2009) argue that we might have to ask what type of financing system is best placed to adjust to changing priorities – a key facet most policy makers rely on. According to them, in recent years there has been increased demand for some types of health services, notably mental healthcare, long-term care and chronic illness care. Demand for these services, and for integrated forms of delivering care is likely to grow as population's age which is similar to both Cichon, et al., (1999) and Giralt, (2008) arguments on demand for health services in the health economics framework. The type of financing system best able to respond to shifts in demand is one with the ability to enhance pooling, coordinate and direct strategic resource allocation, match resources to need, shape the nature of supply and create incentives to enhance provider responsiveness. They suggested that systems based on public finance stand a much greater chance of rising to this challenge than alternatives such as private health insurance (Thomson, Foubister, & Mossialos, 2009).

2.3.2. Developing Countries empirical literature

The State of Health financing in the African Region Report, (2013) gave an overview of the health financing situation, heath services accessibility, health expenditures and evaluation studies in the member states of the WHO African Region. It presented the key factors that determine a country's performance in health financing and provided a solid basis for monitoring and evaluating progress. (WHO, 2013).

Several African countries have recently implemented successful health financing reforms. For instance, Ghana moved from out-of-pocket payments to the use of prepaid and pooled funds; Botswana was looking at policy options for creating efficiencies that would help sustain its achievements and prepare for future challenges. Rwanda implemented a national health financing mechanism that covered the vast majority of the population and has been a key element in increasing access to health services. Many other Africa countries are looking for innovative ways to improve funding for health (WHO, 2013).

For countries in which health systems financing has been improving and for countries with more acute need for reforms and action, there is need to constantly track health financing progress in order to adapt to changing situations and implement reforms and actions that keep them on the right track to achieve the health financing goal that will support the objective of universal health coverage (WHO, 2013).

The State of Health financing in the African Region Report, (2013) showed that despite progress in most countries, the Member States of WHO African Region are still on average far from achieving their health financing goals to meet the Abuja targets of allocating 15% of government budgets to health and reducing the share of out-of-pocket expenditure in total health expenditure. For instance, in 20 out of 45 countries out-of-pocket expenditures are still higher than 40% of the total health expenditure and in 22 countries the level of total health expenditure does not reach even the very minimal target of US$ 44. This cross-country analysis demonstrates that on average the health financing systems in Africa are not sufficiently funded and do not ensure sustainable progression and equity in the way funds are collected and pooled (WHO, 2013).

In the light of the cross-country observations in Africa, there is a great need to increase investment in health and to focus on the way health systems are financed. Countries would also need to translate this general message into an in-depth, in-country situation analysis that is relevant to their context and policy aims. The analysis would serve to provide a solid evidence

basis for developing a health financing system. Apparently, there are no blueprints and every country will need to find its own mix of actions and reforms that would move it towards the health financing target and ultimately the goal of universal health coverage, taking into account the evidence and information produced. Arguably, this calls for every country to develop a health financing strategy that is based on evidence and that takes into account its constraints and opportunities (WHO, 2013).

The State of Health financing in the African Region Report, (2013) is similar to Cichon, et al., (1999) arguments with regard to healthcare financing policy making framework and also in matters to do with healthcare financing efficiency and effectiveness. It too, superficially addresses the issue to do with countries looking for innovative ways to improve funding for health just in line with Thomson, Foubister, & Mossialos, (2009) arguments on opportunities available especially with regards to innovative financing mechanisms that can be employed in healthcare financing.

2.3.3. Local empirical literature

Opwora, Kabare, Molyneux, and Goodman, (2010) study on *'Direct facility funding as a response to user fee reduction: implementation and perceived impact among Kenyan health centres and dispensaries'* revealed that an innovative system of Direct Facility Funding (DFF) of government health centres and dispensaries had been piloted in Coast province, Kenya, to address the negative effects of reducing user fees. DFF was perceived to have a highly positive impact through funding support staff, outreach activities, renovations, patient referrals and increasing health facility committee activity, which in turn was perceived to have improved health worker motivation, utilization and quality of care. The main challenge associated with the scheme were confusion over DFF operations, the continued overcharging of user fees, and very limited understanding of DFF among the broader community. Relatively small increases in funding managed at the peripheral level may have a significant impact on performance, but must be accomplished by comprehensive training and documentation; strong emphasis on community engagement; and insistence on user fee adherence (Opwora, Kabare, Molyneux, & Goodman, 2010).

Chuma & Okungu, (2011) study titled *'Viewing the Kenyan health system through an equity lens: implications for universal coverage,'* argued that Equity and universal coverage dominate policy debates worldwide. Health financing approaches are central to universal coverage. They argued that the way funds are collected, pooled and used to purchase or provide services should

be carefully considered to ensure that population needs are addressed under a universal health system.

Social Health Protection Network Study titled "*Options for Kenya's health financing system: A P4H Policy Brief,'* May 2014 which was mainly based on Bultman, Jan (2014): *'Health Financing Strategy Development – Options for Reform and Choices to be made,'* advocated for the nine basic reform recommendations (Social Health Protection Network, 2014).

The 2014/2015 National and County Health Budget Report's analysis and findings of national health budget allocations revealed that the Ministry of Health Budget allocation for FY 2014/15 was Ksh. 47.4 billion, constituting 4% of the national budget, compared to 3.4% in FY 2013/14. The Ksh. 47.4 billion budget allocation included government and development partners' contributions for the year. Overall, the Ministry of Health FY 2014/15 allocations increased by 34% from what was reported in FY 2013/14. Development partners accounted for 57.1% of the total development budget in FY 2014/15 compared with 59.8% in FY 2013/14. Clearly this raises concerns on rethinking about innovative ways of increasing internal healthcare financing in Kenya.

2.4. Circular Economy Empirical Literature

2.4.1. Brief Overview of the Circular Economy

A circular economy is one that is restorative and regenerative by design, and which aims to keep products, components and materials at their highest utility and value at all times, distinguishing between technical and biological cycles (Ellen MacArthur Foundation, 2009)

At least seven schools of thought have emerged with regards to the topic of the Circular Economy (CE). CE concept has deep-rooted origins and cannot be traced back to one single date or author. Its practical applications to modern economic systems and industrial processes, however, have gained momentum since the late 1970s, led by a small number of academics, thought-leaders and businesses.

The generic concept has been defined and developed by the following Schools of Thought: *Cradle to Cradle* (Michael Braungart & Bill McDonough) – focus is on design for effectiveness in terms of products with positive impact and reducing the negative impacts of commerce through efficiency, *Performance Economy* (Walter Stahel & Genevieve Reday) – 'The Potential for substituting manpower for energy.' It pursues four main goals: product-life extension, long-life goods, reconditioning activities, and waste prevention, *Biomimicry* (Janine Benyus) – a new discipline that studies nature's best ideas then imitates these designs and

processes to solve human problems, *Industrial Ecology* – the study of material and energy flows through Industrial systems, *Natural Capitalism* – describes a global economy in which business and environmental interests overlap, the interdependencies that exists between the production and use of human-made capital and flows of natural capital are recognized, *Blue Economy (*Gunter Pauli*)* – 'using the resources available in cascading systems, (…) the waste of one product becomes the input to create a new cash flow,' and *Regenerative Design School of Thought* (John T. Lyle) – started developing ideas on regenerative design that could be applied to all systems, i.e., beyond agriculture, for which the concept of regeneration had already been formulated earlier (Ellen MacArthur Foundation, 2009).

Based on findings from the World Bank (2009), supported studies and lessons learned from on-going government programs, special attention needs to be given to the following four topics: *improving the effectiveness and efficiency of CE policies through a balanced mix of policy instruments; enhancing industry and community participation; building capacity for CE implementation;* and *clarifying the role of government and strengthening governance* (The World Bank, 2009).

According to the World Bank (2009) recommendations, in light of the opportunity provided by the CE Promotion Law, the government needs to consider rebalancing the current mix of policy instruments for promoting CE by reviewing the following actions: *Pursue legislative harmonization* – the government needs to pay particular attention to ensure that the CE Promotion Law is carefully integrated into the existing legal and administrative framework and measures at both the national and local levels to ensure their objectives are in line with that of the CE Promotion Law regarding resource use efficiency and pollution. The other three actions include: *Balancing the mix of policies and enhancing the role of market-based instruments; Adjusting resource prices to reflect their scarcity value* – the government can ensure that resource prices and taxes fully reflect the scarcity value of the resource and the environmental externalities of production and consumption; and finally *increasing the use of cost-benefits analysis in decision making* – there is significant potential in using full cost/benefit analysis to include the economic benefits that are sometimes neglected in standard financial analyses (The World Bank, 2009).

In light of World Bank's 2009 recommendation on *increasing the compliance and participation of industrial sectors through implementing Extended Producer Responsibility (EPR),* the government can consider the introduction of deposit-refund schemes for batteries

and other products containing hazardous chemicals, as well as consumer electronics (e.g. cell phones, TV sets, computers) that can be broken down into their component materials (plastic, glass, toxic metals) and recycled or disposed of safely as a first step towards the implementation of EPR mechanisms. Arguably, this program would encourage consumers to return the products to designated recycling stations and avoid them being treated as waste. Also, *broadening community and NGO Participation* so as to increase awareness of the meaning and potential benefits of CE among all stakeholders is pivotal (The World Bank, 2009).

Ken Webster argues that our linear 'take-make and dispose' economy is a 19th century heritage adrift in the 21st century reality. The time is right to move towards a *circular economy* – a regenerative model based around feedback-rich flows allied to new circular economy business models. The economic advantage lies in designing our waste, enabling access over ownership, using materials in cascading systems and radical resource productivity with the prospect of rebuilding capital and resilience. Despite a circular economy having consequences for employment, education, money and finance, it induces a shift in public policy and taxation (Webster, 2015).

The circular economy aims at eradication of waste - not just from manufacturing processes, but systematically, throughout the life cycles and uses of products and their components. Tight component and product cycles of use and reuse, aided by product design, help define the concept of a circular economy and distinguish it from the linear take-make-dispose economy, which wastes large amounts of embedded materials, energy, and labour (Zils, 2014). Zils further uses four scenarios in which circular-economy principles are applied: *status quo scenario, refurbishment scenario, recycling scenario* and, *additional sales scenario.* In a circular economy, the goal for durable components, such as metals and most plastics, is to reuse or upgrade them for other productive applications through as many cycles as possible. This approach contrasts sharply with the linear mind-set embedded in most of today's industrial operations.

Concrete and game-changing steps have to be taken for us to achieve the future we want anchored in the Sustainable Development goals-SDGs. The New Plastics Economy aims to set an initial direction and contribute to the evidence base by synthesising information from across many dispersed sources. It assesses the benefits and drawbacks of plastic packaging today, and makes the case for rethinking the current plastics economy. It lays out the ambitions and

benefits of the New Plastics Economy – a system aiming to achieve drastically better economic and environmental outcomes (MacArthur, Waughray, & Stuchtey, 2016).

According to the World Economic Forum (2016), accelerating Circular Economy transformation could unlock global GDP growth of estimated $4.5 trillion by 2030. The World Economic Forum's Accelerating the Circular Economy (ACE) is a global initiative that offers a unique public-private platform to drive action in the circular economy and natural resource security space. It is bringing together leaders from business, government, international organisations, civil society and academia – multispectral inclusivity, to collaborate in developing and scaling up systemic solutions for a circular economy by encouraging new business models, supported by new financing, new technologies and new public policies. Notably, the programme is run in collaboration with Accenture and builds on the successful work done in partnership with the Ellen MacArthur Foundation over the past three years on Project Mainstream (World Economic Forum, 2016).

2.4.2. Case Study of the Circular Economy

According to a Bio Research by Deloitte produced for the European Commission (DG ENV), 2014, under the framework of the Environmental Compliance Assistance Programme (ECAP) for SMEs, 99.8% of Europe's Private companies were found to be SMEs, accounting for greater than 2/3 of employment in the EU 27. The topic of interest was *'How to become a green SME in a circular economy.'* Under this study, a circular economy is described as a system in which production, consumption and trade are designed to minimize the net extraction of key resources such as fossil fuels, raw materials, water, land, environment and pollutants along with diminishing negative environmental and health impacts.

The three main questions that are addressed in this case include: *What can you do on your own? What can you do with your business partners? What has the European Union done for you?*

2.4.2.1. Improving what is under your control – Turning into a resource efficient SME.

The study revealed that prices of raw materials have been consistently increasing for the period between 2000 – 2010. Metal prices increased by 170% while rubber prices increased by 260%. The implication was companies increasingly had trouble sourcing for raw materials at affordable prices. Thus, there was need to think about the following: *improving processes, improving design* and *improving supply chains.*

Improving processes involved mapping the process based on: What natural resources does one use? How much does one need? Where could improvements be made? This implied *Material Flow Analysis (MFA).* MFA implies visualizing material flows and losses in all processes.

Improving design heavily relies on MFA by reducing material, energy and consumption, going beyond the existing processes and redesigning products in systems. This calls for the *Principle of Eco-design.* Eco-design expands the focus beyond materials and considers environmental impacts throughout the product's life cycle such as CO_2 emissions, soil and water pollution, acidification, hazardous waste based on life cycle analysis – what will become of your product once it leaves the factory or shop. Eco-design enhances product's reusability or recyclability at the end of a product's life such as the laptop project funded by the ZeroWIN research unit that can be 70% reusable or recyclable.

Improving supply chains implies less material and more benefits to both the environment and for one's bottom line. Better supply involves identification of the weakest points within the supply chain. Better supply implies a look at the substitutes or other sources of supply such as from recycling; buying recycled plastics or recycled papers instead of buying virgin plastics or virgin papers; using renewable energy instead of using fossil fuels. Apparently, there is ongoing research to find synthetic substitutes for rare minerals that rely on natural elements.

Generally, changes depend on one's operations. There is no one-size-fits-all solution. Reliance is on proven sources in improving supply which implies buying products verified by third party *ecolabels,* using green products that fit one's needs. The *EU Ecolabel* covers more than 30 product groups including detergents, floor coverings, lubricants, paper products and more.

2.4.2.2. Towards circular economy thinking – opening up to business partners

It was assumed that one is a fully resource efficient SME if there is few resource consumption, has environmental-friendly designs and produce easy-to-recycle products. A circular economy thus, is all about being open to new business opportunities. This is addressed under the following: *Industrial Ecology/ Industrial Symbiosis, Reverse logistics* and the *functional economy.*

Industrial ecology/industrial symbiosis implies turning your neighbours into business partners. The main aim is saving energy and resources by transforming one company's waste into another's resource – output becomes input in a different part of the ecosystem thus having a broader and cleaner industrial ecosystem and industrial parks.

Reverse logistics means turning products you sell into resources you recover. Business does not stop when the product is sold because there exists a profitable opportunity in the resources of the products sold. These can be recovered and recycled into resources for products sold such as taking bottles from customers. Reverse logistics is primarily founded on the basis of contracts and deposits. The reintegration of products back into the supply chain is key. For complex products and small businesses, reverse logistics works best through pooling of resources via a shared organisation that collects and recycles on your behalf or equally through partnering with similar manufacturers. The main goal of reverse logistics lies in one's products becoming raw materials of another company rather than being wasted. Central under the reverse logistics framework is the *Principle of Extended Producer Responsibility (EPR)* where you are responsible for products you place on the market at the end of their life, including packaging, electric & electronic equipment, batteries etcetera. Under EPR, you have to either take back the products you sell yourself or join an organisation which takes care of waste collection and recycling.

Functional economy means turning your business model from *'for sale'* to *'for rent.'* Ideally, you do not sell your product but instead, you rent or lease it to the end users/customers. This advances producer's /manufacturer's business rapport with end users/customers, creates room for enhanced product cycle analytics and established communication structures. Renting products implies keeping them as property, radically changing product designs, and quality of products. Long-term rentals and subscriptions can also provide a steadier stream of income.

2.4.2.3. What are developed countries doing in the Circular Economy?

The aim of the circular economy is to minimize the net uptake of resources and their associated/related negative environmental impacts. Thus, SMEs have a crucial role to play in achieving the key objectives of the circular economy. The concept of the circular economy is rapidly rising on political agendas.

In July 2014, the European Commission produced the General plan targeting SMEs in a green economy. Overall objective of the Green Action Plan is to enable SMEs to turn environmental challenges into business opportunities by advocating for green entrepreneurship and access to the market for green economies. These provide an enabling environment for green businesses.

To help support programmes so as to achieve higher environmental performance, there are established support programmes and umbrella organisations such as the Enterprise Europe Network (EEN) as an umbrella organisation. EEN has close to 600 member organizations

consisting of the following: Chambers of Commerce of industry, Technology Centres, Universities and Development Agencies.

2.5. Literature Gap

Most studies previously done insist on both the efficiency and effectiveness of health financing systems employed in different countries. Some studies elucidate[7] the different models used to finance health systems as captured in Table I below but very few point out on the essence of a policy shift and rethinking the next frontier[8] of innovative health financing.

Most studies peripherally mention without giving conclusive evidence and justifiable examples of potential innovative financing mechanisms such as the circular economy concept that can be used in improving both efficiency and effectiveness of healthcare financing systems that is in line with effective utilization, universal coverage and health policy reforms of related systems.

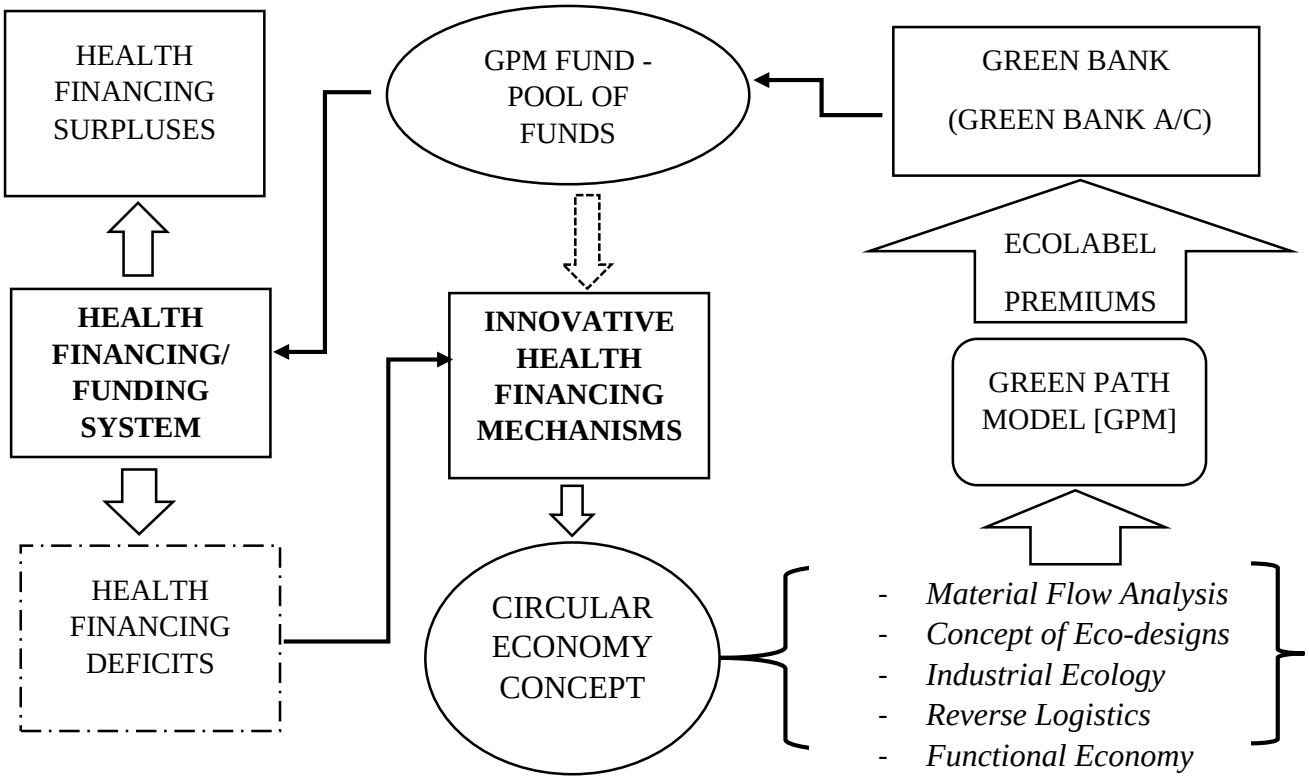
The gap that results in the information asymmetry and superficial explanation of innovative financing mechanisms based on previous studies conducted lacked the comprehensiveness to draw reasonable conclusions.

Table 1: *Major Healthcare Financing Models.*

Model	**Revenue Source**	**Groups Covered**	**Pooling Organization**	**Care Provision**
National Health Service	General revenues	Entire Population	Central Government	Public providers
Social Health Insurance	Payroll taxes	Specific groups	Semi-autonomous organizations	Own, Public, or private facilities
Community-based Health Insurance	Private voluntary contributions	Contributing members	Non-profit plans	NGOs or Private facilities
Voluntary Health Insurance	Private voluntary contributions	Contributing members	For – and Non-profit insurance organizations	Private and public facilities
Out-of-Pocket Payments (including public user fees)	Individual payments to providers		None	Public and private facilities (public facilities)

[7] Elucidate implies making it clear and more comprehensible or understandable.
[8] Frontier in this context implies an undeveloped field of study; a topic inviting research and development.

2.6. Conceptual Framework



CHAPTER 3: METHODOLOGY

3.1. Introduction.

This chapter describes the procedures and methods which are employed in the study; research design, population and sampling, sources of data, data collection procedures, and data analysis techniques.

3.2. Research Design

The data for the study is quantitative in nature and the analytical model used is the proposed Green Path Model. This makes the research to be correlational in nature. The research being conducted is explanatory in nature since it explains the healthcare financing situation in Kenya.

In addition, the study is longitudinal in nature since the data for the population analysis is gathered for a period of ten years, the GDP data and forecasts cover a period of seven years from 2014 up to 2020 and data for the Counties population covers a period of ten years from 1999 up to 2009 as per the Kenya County Fact sheets.

3.3. Population and Sampling

The target population for the study included all the forty-seven (47) Kenyan Counties in Kenya and the Ministry of Health of Kenya (MoH). The counties' health records, budgets and populations as per the Kenya County Fact Sheets, Commission on Revenue Allocation (CRA), June 2013, Second Edition are obtained and analysed. Data is also obtained from the Kenya National Bureau of Statistics (KNBS) data source, Central Bank of Kenya (CBK) data source, data from the Office of the Controller of Budget, Annual County Governments Budget and the 2016/2017 Programme Based Budget of the National Government of Kenya for the year ending 30th June, 2017 Report.

All the 47 countries are grouped into eight regions based on the defunct Kenya's Provincial Administrative Division Structure for ease of analysis.

3.4. Sources of data.

Because of the nature of the research, the data to be used is secondary; it constitutes National and County Health Budget Analysis Reports, data from Ministry of Health Kenya, data from the World Bank's Global Health Observatory (GHO) data repository, data from Kenyan County treasuries, data from the Kenya County Fact Sheets, Commission on Revenue Allocation (CRA), Ministry of Health, Kenya, 2014/15 National and County Health Budget Analysis Report, July 2015, data from the Office of the Controller of Budget in Kenya, Annual County Governments Budgets, 2016/2017 Programme Based Budget of the National

Government of Kenya for the year ending 30th June, 2017, data Central Bank of Kenya (CBK) & the National Treasury Kenya, IMF's World Economic Outlook data, International Comparison Program data and the World Health Organization (WHO) Health data.

3.4. Data and data Collection procedures

The main data collected is as follows: data of the Global Budget – Capital & Current of the Expenditure by Vote and Programmes of the Ministry of Health Kenya for FY 2016/17 from the 2016/2017 Programme Based Budget of the National Government of Kenya for the year ending 30th June, 2017. Data of the 47 Counties' Annual local revenue target for FY 2014/15, 1st Quarter – 4th Quarter Local Revenue plus the Total Revenue and percentage of Local Revenue against Annual Local Revenue Target is collected from the Ministry of Health, Kenya, 2014/15 National and County Health Budget Analysis Report, July 2015.

Data of the 47 Counties population for the period 8/24/1999 – 8/24/2009 is obtained from the Kenya County Fact Sheets, Commission on Revenue Allocation (CRA), June 2013, Second Edition. Data on forecast for Kenyan shilling exchange rate per United States Dollar (USD) is obtained from Tradingeconomic.com as per the Sunday, October 30, 2016 forecasts. Gross Domestic Product (GDP) data is obtained from International Monetary Fund (IMF) World Economic Outlook (WEO), April 2016 which was last updated on Wednesday, May 25, 2016 and also from World Bank: Global Economic Prospects. Data of Kenya's health financing is obtained from World Bank's Global Health Observatory (GHO) data repository. Data on the Revenue and Expenditure of Kenya for the period September 1999 – July 2016 from the National Treasury, Kenya as at Friday 30, September 2016 and data of the monthly exchange rates of Kenya Shillings (Ksh.) per one United States Dollar (USD) is obtained from Central Bank of Kenya.

3.5. Data analysis techniques and presentation

The proposed Green Path Model – GPM is used to analyse the quantitative data collected. This is in view of fulfilling the set study objectives: to propose an innovative financing model that can be relied upon in scaling up internal healthcare financing in Kenya and secondly, to determine if there is need to refocus the Circular Economy - CE lens to innovative healthcare financing in Kenya.

Since the research is primarily built on the optimistic assumption that both the Kenyan Government through the Ministry of Health and the respective 47 County Health departments need to scale up their internal healthcare financing, the proposed model analyses the case for

Kenya on the basis of budget allocation and the respective National and County health per capita basis to ascertain if the two correspond to universal and regional set targets – the benchmarks.

The Green Path Model as any other model is driven by some specific input variables which yield certain outputs. To carry out a proper analysis, the approach used in the analysis process first analyses the Kenya health financing situation at the national level before investigating the same at the county level.

In the Green Path Model, at the National Level, selecting a specific Financial Year (FY) as the input variable from the drop-down list within the model yields the specific FY's data of the following components as outputs:

i. The Programme Codes and Titles for the Programme Based Ministry of Health of Kenya budget,
ii. Total Voted Health Expenditure, ($TVHE_{FYi}$),
iii. Total Voted Expenditure for Kenya, (TVE_{FYi}),
iv. Total Health Expenditure Allocation as a percentage (%) of the Total Voted Expenditure for Kenya, ($THEA_{FYi}$),
v. Recommended Total Budget Allocation on Health as per the Abuja Declaration of 2001, (RTBAH), which is set at 15% in the Model,
vi. Percentage (%) Gap Analysis, PGA_{FYi}, (difference) between RTBAH and $THEA_{FYi}$,
vii. Total Voted Health Expenditure Deficit ($TVHED_{FYi}$),
viii. Total Population as per the Compound Annual Growth Rate, CAGR Model Projections for the period 2016 – 2020
ix. Kenya's Health Per Capita, (HPC_{FYi}) for FY 2014/15 – FY 2020/21 in both Ksh. and USD.

- **Equations used in the computation of the Green Path Model output components at the National Level.**

Equation 1*:Calculation of the Total Health Expenditure Allocation as a percentage (%) of the Total Voted Expenditure for Kenya, THEA for a given Financial Year:*

$$\textbf{Total Health Expenditure Allocation, } THEA_{FYi} = \frac{Total\ Voted\ Health\ Expenditure\ (TVHE)}{Total\ Voted\ Expenditure\ for\ Kenya\ (TVE)}\ (\%)$$

Equation 2*:Calculation of the Percentage (%) Gap Analysis, PGA, (difference) between the Recommended Total Budget Allocation on Health as Per the Abuja Declaration of 2001, (RTBAH) set at 15% in the GPM and the Total Health Expenditure Allocation as a percentage (%) of the Total Voted Expenditure for Kenya, THEA:*

PGA_{FYi} = RTBAH (15%) – $THEA_{FYi}$ (%).

Where:

PGA_{FYi} is the Percentage Gap Analysis (PGA) (difference from RTBAH) for Financial Year i,

$THEA_{FYi}$ is the Total Health Expenditure Allocation as a percentage of the Total Voted Expenditure for Kenya for Financial Year i.

Equation 3*: Calculation of the Total Voted Health Expenditure Deficit, $TVHED_{FYi}$:*

$TVHED_{FYi}$ = PGA_{FYi} * TVE_{FYi}

Where:

$TVHED_{FYi}$ is the Total Voted Health Expenditure Deficit for Financial Year i and,

TVE_{FYi} is the Total Voted Expenditure for Financial Year i.

Equation 4*: Calculation of the Compound Annual Growth Rate, CAGR:*

Compound Annual Growth Rate, CAGR = $\left(\frac{Ending\ Value}{Beginning\ Value}\right)^{\frac{1}{\#\ of\ years}} - 1$

Where:

# of years is the number of years.

Equation 5*: Calculation of the Health Per Capita, HPC:*

Health Per Capita, HPC_{FYi} = $\frac{Total\ Voted\ Health\ Expenditure, TVHE}{Total\ Population\ as\ per\ the\ CAGR\ Model\ Projections\ at\ time\ t}$

The model is referred to as the Green Path Model because it consists of a 6 -staged path, each stage either having a model input or model output. GPM's 6-staged path is made up of the following steps:

Step 1:

This involves determining the **National Green Fund Target, NGFT – the first model input, I_1**, which is basically the Total Voted Health Expenditure Deficit for a given Financial Year, $TVHED_{FYi}$ which needs to be raised for the country to be in position to allocate the exact Recommended Total Budget Allocation on Health, RTBAH (15%).

Step 2:

Raising the National Green Fund Target, NGFT calls for issuing a **Social Impact Bond, SIB** whose **Bond Value – the second model input, I_2** is equivalent to the value of the NGFT**.** Social Impact Bonds (SIBs) work like 'pay-for-success projects, representing one component of the rapidly growing field of innovative finance, aimed at helping state and local governments fund critical social programs through a combination of government initiation, private investment, and non-profit implementation (The Rockefeller Foundation, 2016). In the Social impact bond model, the private sector works with the governments and philanthropies to fund critical prevention focused social programs that help address the world's most pressing problems. In the Public-Private Partnership (PPP), investors are only repaid if and when improved social outcomes are achieved. Social impact bonds have the potential to open up new funding sources for prevention-oriented programs that deliver measurable social benefits, saving tax payer funds in the process.

Once we have found the Bond Value of the Social Impact Bond, what follows is finding the **Face Value of the Bond, F – the third model input, I_3.** This is solved using the following formula:

$$\textbf{\textit{The Social Impact Bond Value}} = \frac{F}{(1+r)^t}$$

Where;

F = implied face value of the Social Impact Bond, SIB

r = implied rate or yield of the Social Impact Bond

t = implied time to maturity of the Social Impact Bond, SIB

For GPM, the Social Impact Bond, SIB is priced while assuming that it imitates the Zero-coupon bond pricing characteristics. A zero coupon bond (pure discount/ discount bond) does

not pay coupon payments but instead pays one lump sum at maturity. The amount paid at maturity is referred to as the face value. The original price of the zero coupon bond is discounted to present.

The **rate or yield, r – the fourth model input, I_4** is computed based on the pricing factors captured in **Table 2** below.

***Table 2**: Computation of the rate or yield, r of the Social Impact Bond:*

Pricing Factor	**Percentage (%)**
Internal Rate of Return of the SIB, IRR_{SIB}	
Outcome Payer Risk Factor, OPR_{SIB}	
Implementation Risk Factor, IR_{SIB}	
Modelization & Outcome Risk Factor, $M\&OR_{SIB}$	
Service Provider Risk Factor, SPR_{SIB}	
Rate/Yield, r	

The **Time to maturity, t – the fifth model input, I_5** is computed by matching this with the time interval between previous and next elections time period in Kenya.

Step 3:

Once the Social Impact Bond has been issued, social investors together with charitable organizations and other market participants jointly contribute towards raising the amount equivalent to the Bond value. The Sum of the Face Value of the Bond, and the National Green Fund Target – basically the Total Voted Health Expenditure Deficit for Financial Year i, $TVHED_{FYi}$ gives us the **Amount to be generated for the concept of the Circular Economy, CE - the first model output, O_1**.

The Amount to be generated from the concept of the Circular Economy is as a result of fully exploiting the power of the five basic components of the Circular Economy, CE which include: *Material Flow Analysis (MFA)* – reducing material, energy and water consumption by going beyond existing processes and redesigning products in systems through use of eco-designs and proper materials' life cycle analysis, *Industrial Ecology / Industrial symbiosis* – turning neighbours into business partners and saving energy and resources by transforming one company's waste into another's resource – one company's waste becomes raw material for

another company, *Reverse Logistics* – turning products you sell into resources you recover and, *Functional economy* – turning your business model from 'for sale' to 'for rent'.

The working of this concept is a process designed to have products generated from the five Circular Economy Processes under the CE framework, bearing ***Ecolabels*.** These Ecolabels attract a set premium as **Contribution per Certified Ecolabelled unit – the sixth model input, I_6.** The concept of premiums used here is similar to the one used by Fairtrade International where the Fairtrade Premium is additional income which comes from the sale of Fairtrade Certified Products and which is used for investment in the social and economic development of workers, their families and the community (beneficiaries) (Fairtrade International, 2014).

Once the Contribution per Certified Ecolabelled unit have been set, next is calculating the **Total number of Ecolabelled units – the second model output, O_2** from the CE framework.

***Equation 6**: Computing the Total number of Ecolabelled products generated from the Circular Economy, CE Concept:*

Total number of Ecolabelled products

$$= \frac{\textbf{Total Amount Generated from Circular Economy,CE Concept}}{\textbf{Contribution or Premium per Certified Ecolabelled product}}$$

Ideally, part of the amount generated from the Circular Economy, CE Concept is redirected towards **Repayment of Social Impact Bond, SIB Investors – the third model output, O_3** while the rest is channelled to the **National Green Path Model – GPM – Fund in a Green Bank – the fourth and final model output, O_4.** The National GPM Fund is a pool of all funds remaining after repaying the Social Impact Bond investors and this amount is equivalent to the National Green Fund Target, NGFT.

***Equation 7**: Computing the Amount repaid to Social Impact Investors:*

Repayment to Social Impact Bond, SIB Investors = Amount Generated from Circular Economy, CE Concept *less (-)* National GPM Fund

This cycle tends to be repetitive in nature based on the redistributive and regenerative aspects of the Circular Economy, CE thus from the sixth model output which is stage six in the path, the cycle moves back to stage one where a new National Green Fund Target, NGFT for the next Financial Year is set and the cycle continues hence the name Green Path Model.

The Microsoft Excel Worksheet User Interface of the Green Path Model for the National Level analysis is shown in ***Figure 1*** below.

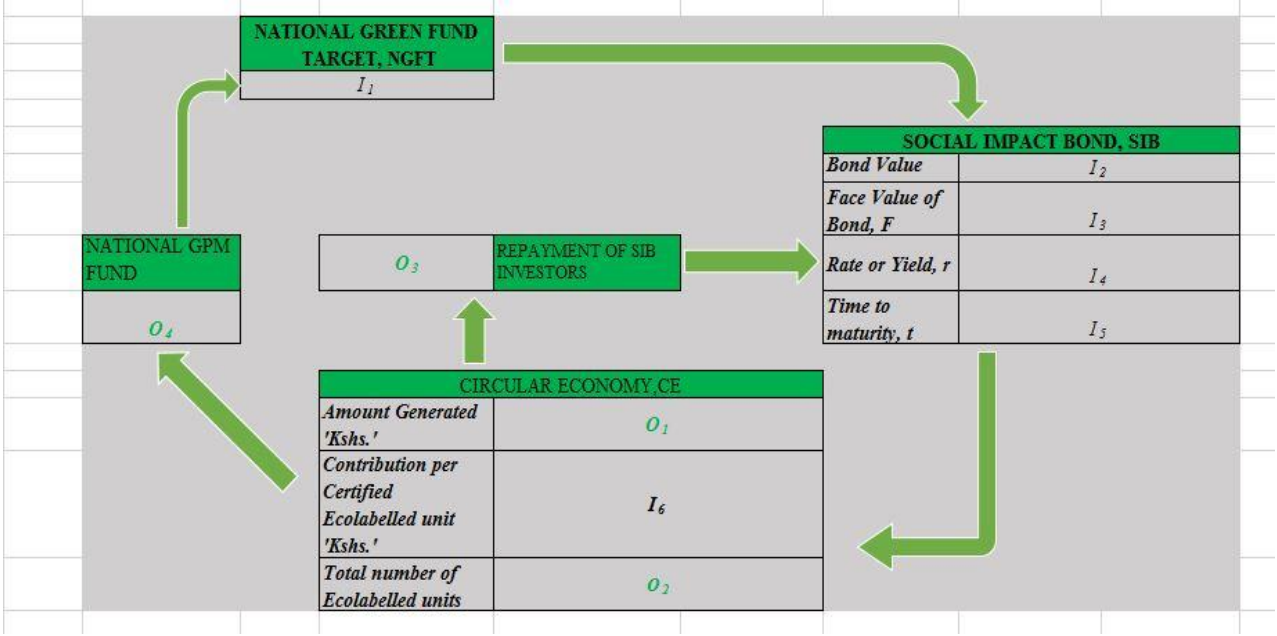


Figure 1*: The Microsoft Excel 2016 User Interface (UI) of the Green Path Model (GPM) for National Level Analysis.*

Similarly, the Microsoft Excel Worksheet User Interface of the Green Path Model for the County Level analysis is shown in ***Figure 2*** below.

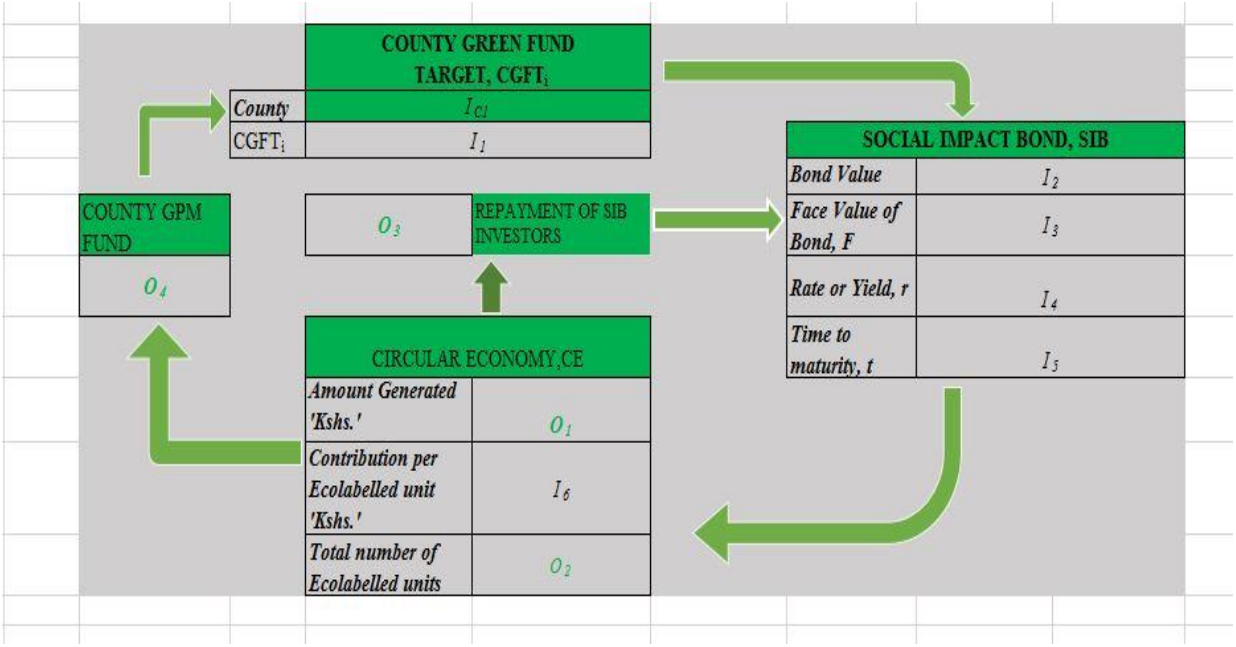


Figure 2: *The Microsoft Excel 2016 User Interface of the Green Path Model (GPM) for County Level Analysis*

3.6. Summary of the chapter

In Summary, the County Level Analysis follows the same six-stage path similar to the National Level Analysis approach, the National Green Fund Target, NGFT is now replaced with the **County Green Fund Target, $CGFT_i$** where i stands for county i among the 47 counties in Kenya which is selected from the drop-down list in the Green Path Model and the first Input component, $\mathbf{I_{Ci}}$ represents the County Green Fund Target for the selected County i, $CGFT_i$ in the model.

Secondly, as opposed to the National Green Fund Target, NGFT, which is equivalent to the Total Voted Health Expenditure Deficit for Financial Year i, $TVHED_{FYi,}$ the County Green Fund Target for County i, $CGFT_i$ does not only include the Total County Health Budget Deficit for County i, $TCHBD_i$ but it also includes the Amount of Local Revenue Deficit in Relation to the Annual Local Revenue Target for County i, in Financial Year n, $CLRD_{FYn.}$

***Equation 8**: Computation of the County Green Fund Target, $CGFT_i$:*

County Green Fund Target for County i = Total County Health Budget Deficit for County i, $TCHBD_i$ + Amount of Local Revenue Deficit in Relation to the Annual Local Revenue Target for County i, in Financial Year n, $CLRD_{FYn.}$

CHAPTER 4: RESULTS AND ANALYSIS

4.1. Introduction.

This chapter presents the results of the study according to the data analysis. The Regional data analysis of all the 47 counties grouped into 8 regions based on Kenya's defunct Provincial Administrative units. The Programme Codes and Titles for the Programme Based Ministry of Health of Kenya Budget is also presented, Total Voted Health Expenditure, ($TVHE_{FYi}$), Total Voted Expenditure for Kenya, (TVE_{FYi}), Total Health Expenditure Allocation as a percentage (%) of the Total Voted Expenditure for Kenya, ($THEA_{FYi}$), Recommended Total Budget Allocation on Health as per the Abuja Declaration of 2001, (RTBAH), which is set at 15% in the Model, Percentage (%) Gap Analysis, PGA_{FYi}, (difference) between RTBAH and $THEA_{FYi}$, Total Voted Health Expenditure Deficit ($TVHED_{FYi}$), Total population as per the Compound Annual Growth Rate, CAGR Model Projections for the period 2016 – 2020 and Kenya's health Per capita, (HPC_{FYi}) for FY 2014/15 – FY 2020/21 in both Ksh. And USD are also presented.

The chapter also presents part of the summary statistics and interpretation of the results.

4.2. Model Results from the Green Path Model (GPM)

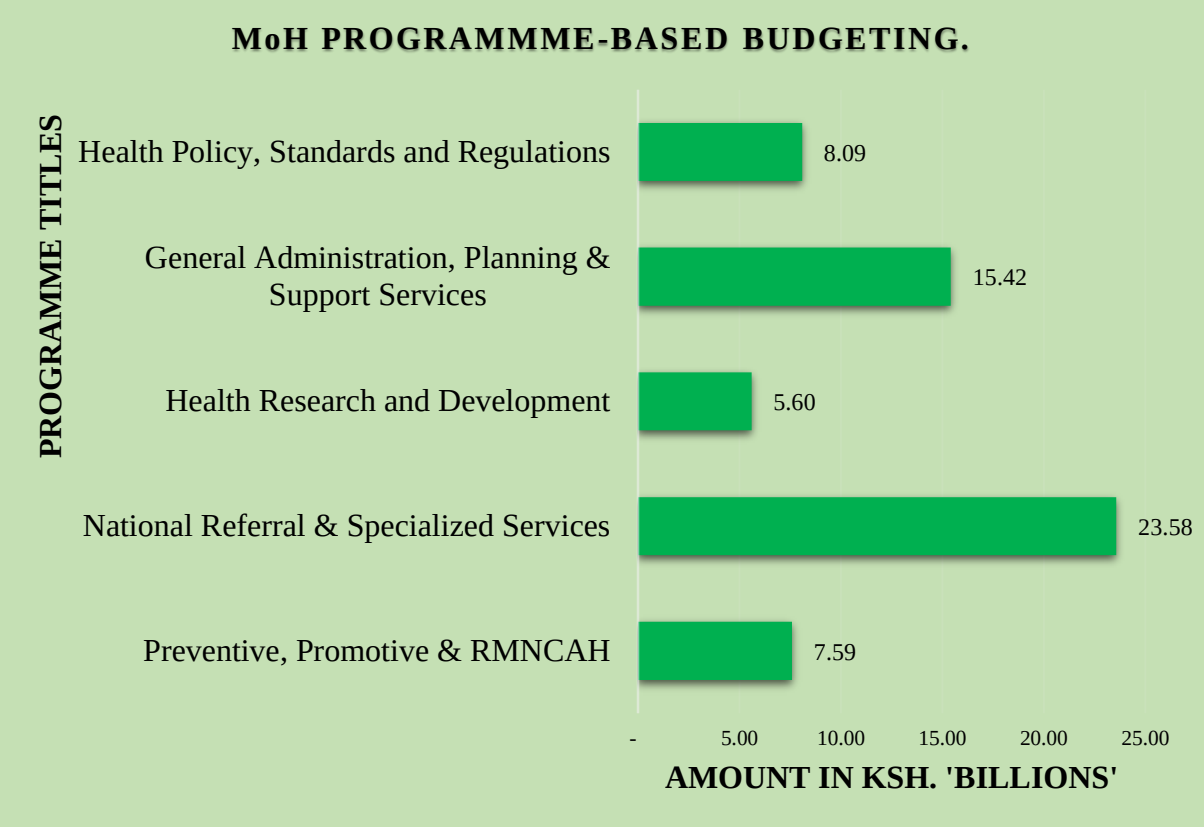
All the 47 seven counties are grouped into eight regions for ease of analysis based on the defunct Kenya's Provincial Administrative Division Structure as captured in ***Table 3*** below.

__Table 3__:Kenya's forty-seven (47) counties classified into eight (8) major regions based on the defunct Provincial Administrative Division Structure

Region	No. of Counties	Counties.
Central	5	Kiambu, Kirinyanga, Murang'a, Nyandarua & Nyeri
Coast	6	Kilifi, Kwale, Lamu, Mombasa, Taita Taveta & Tana River
Eastern	8	Embu, Isiolo, Kitui, Machakos, Makueni, Marsabit, Meru & Tharaka Nithi
Nairobi	1	Nairobi City
North Eastern	3	Garissa, Mandera & Wajir
Nyanza	6	Homa Bay, Kisii, Kisumu, Migori, Nyamira & Siaya
Rift Valley	14	Baringo, Bomet, Elgeyo Marakwet, Kajiado, Kericho, Laikipia, Nakuru, Nandi, Narok, Samburu, Trans Nzoia, Turkana, Uasin Gishu & West Pokot
Western	4	Bungoma, Busia, Kakamega & Vihiga
TOTAL	**47**	

Grouping the counties into 8 regions revealed that the former Rift Valley Province currently holds 14 counties having the highest number of counties in Kenya (14), followed by Eastern currently holds 8, Coast & Nyanza each having 6 counties, Central with 5, Western with 4, North Eastern with 3 and Nairobi with the least (1), all summing up to 47.

Table 4: *Summary of Expenditure by Vote & Programmes (Amount in Ksh.) for the Ministry of Health of Kenya for FY 2016/17 – GLOBAL BUDGET – CAPITAL & CURRENT.*



Source: *2016/2017 PROGRAMME BASED BUDGETING OF THE NATIONAL GIVERNMENT OF KENYA FOR THE YEAR ENDING 30TH JUNE, 2017.*

From ***Table 4*** above, based on programmes run by Ministry of Health, National Referral & Specialized Services was allocated the highest amount of the budget for FY 2016/17 (Ksh. 23.6 Billion) while Health Research and Development got the least allocation of the budget (Ksh. 5.6 Billion). With the new disease cycles, upsurge of lifestyle diseases and need for more guided Research to be carried out, Kenya's Ministry of Health clearly needs to scale up and allocate more funds towards Health Research and Development hence the need for more healthcare funding, a situation which the proposed model (GPM) provides part of the solution.

***Table 5**: Analysis of the Health Budgeting Process in Kenya at the National Level for FY 2016/17*

TOTAL VOTED HEALTH EXPENDITURE, $TVHE_{FY\ 2016/17}$	*Ksh. 60.27 B*
TOTAL VOTED EXPENDITURE FOR KENYA $TVE_{FY\ 2016/17}$	*Ksh. 1667.69 B*
TOTAL HEALTH EXPENDITURE ALLOCATION AS A PERCENTAGE (%) OF TOTAL VOTED EXPENDITURE FOR KENYA, $THEA_{FY\ 2016/17}$	*3.59%*
RECOMMENDED TOTAL BUDGET ALLOCATION ON HEALTH AS PER THE ABUJA DECLARATION, $RTBAH_{FY\ 2016/17}$	*15.00%*
PERCENTAGE (%) GAP ANALYSIS, $PGA_{FY\ 2016/17}$	*11.41%*
TOTAL VOTED HEALTH EXPENDITURE DEFICIT, $TVHED_{FY\ 2016/17}$ $TVHED_{FY\ 2016/17} = PGA_{FY\ 2016/17} * TVE_{FY\ 2016/17}$	*Ksh. 191.38B (NGFT)*
TOTAL POPULATION AS PER THE CAGR MODEL PROJECTIONS FOR 2016	*48,890,815*

The study relies on two (2) optimistic assumptions that health financing deficits could arise from two possible scenarios namely:

I. The government both at National or County level failing to allocate at least 15 % of the total budget to health and,
II. The government both National and County level spending less than $60 health per capita on its citizens thus being unable to ensure universal access to Essential Medical and Medicines Services (EMMS).

To test the validity of the above optimistic assumptions, the analysis of the Ministry of Health of Kenya 2016/2017 Programme Based Budget of the National Government of Kenya for the year ending 30th June, 2017 revealed that total health expenditure allocation as a percentage of total voted health expenditure for Kenya for FY 2016/17 stands at **3.59%** which is less by **11.41%** (**Ksh. 191.38 billion),** in the event that Kenya decided to allocate at least 15% of its total voted expenditure for FY 2016/17 on health treating all factors being constant. Therefore,

as per the Green Path Model, Kenya's National Green Fund Target, NGFT Stands at **Ksh. 191.38 billion** as per the FY 2016/17 programme based budgeting.

As for the Health Per Capita, Kenya's FY 2016/17 National health per capita stood at **Ksh. 1,233** thus being less the universal **$60 (Ksh. 5930.307** health per capita by **Ksh. 4697.31.**

$$\mathbf{HPC_{FY\ 2016/17}} = \frac{60,262,930,022}{48,890,815} = \boldsymbol{1232.60228 \approx Ksh.\ 1233.}$$

- The Exchange rate, USD to KSHS. as per the adjusted rates captured in ***Table 7*** in the **APENDIX** Section is **Ksh. 98.83845 per 1 USD,** thus;

$$\mathbf{HPC_{FY\ 2016/17}} = \frac{1233}{98.83845} = \mathbf{\$12.475}$$

Therefore, from Kenya's Ministry of Health Expenditure by Votes and Programmes Budget (Programme-Based Budget) alone, there is need to scale up internal healthcare financing in a bid to raise the **$12.475** Health Per Capita to the **$60** target so as to ensure universal access of Essential Medical and Medicines Services (EMMS) in Kenya by covering the **$47.525** target deficit all factors held constant.

Refocusing the Circular Economy, CE lens to innovative healthcare financing in Kenya calls for having a target of funds that ought to be raised to enable Kenya meet Abuja Declaration and equally attain the **$60** health per capita target for universal access of EMMS for its citizens. Therefore, ***Ksh. 191.38 billion*** that currently stands as the funding gap (health financing deficit) of **11.41%** strictly in the context of effectively and efficiently allocating **15%** of Kenya's total voted expenditure for FY 2016/17 is taken as the **National Green Funds Target, NGFT** in the Green Path Model, GPM.

The proposed approach to fund the National Green Funds Target, NGFT is through issuing Social Impact Bond (SIB) so as to raise money equivalent to that target within a specified period of time.

Therefore, to raise the *National Green Fund Target, NGFT* = **Ksh. 191. 38 billion**

The Social Impact Bond Value = $\frac{NGFT*(1+r)^t}{(1+r)^t}$, *where* $NGFT * (1 + r)^t$ represents the implied face value of the Social Impact Bond, F.

r = ***9.00%*** *as captured in the* ***APPENDIX Section*** *in* ***Table 7.***

*F = 191.38 *(*$1 + 0.09)^5$ = ***Ksh. 294.47 billion***

$$Social\ Impact\ Bond\ Value = \frac{294,466,754,143}{(1+0.09)^5} = \textbf{Ksh. 191.38 billion}$$

The time to maturity is matched with the 5-year time interval between previous and next elections time period in Kenya. This is in a way factoring the concept of Political regime having as protection of the nation's health as one of their key objectives and political promise.

The amount to be generated from the Circular Economy, CE Concept = (191.38 +294.47)

$$= \textbf{Ksh. 485.85 billion.}$$

$$The\ Total\ number\ of\ Ecolabelled\ Products\ to\ be\ produced = \frac{485,849,939,881}{2}$$

$$= \textbf{242, 924, 969,941}$$

Thus, *The Repayment to Social Impact Bond Investors will be* ***Ksh. 294.47 billion*** and the amount that flows to the National GPM Fund will be ***Ksh. 191.38 billion*** as shown in the figure below.

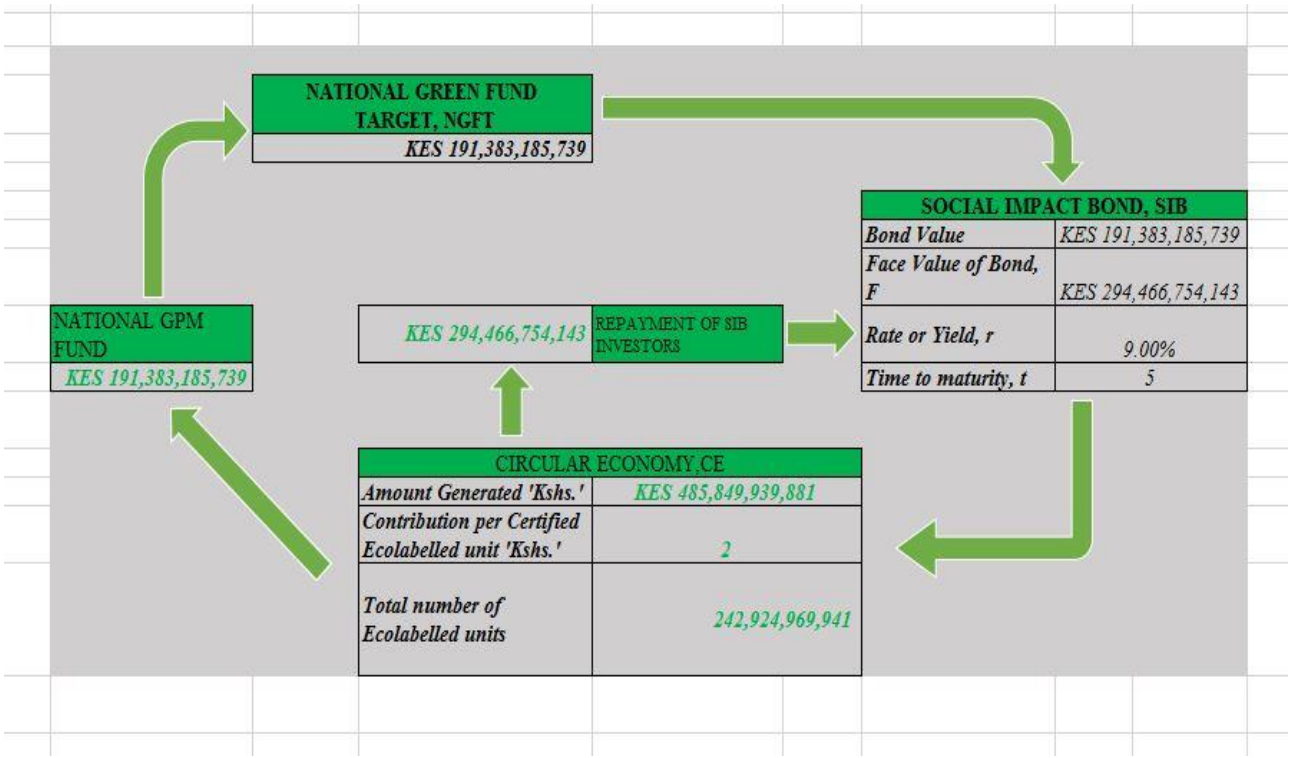


Figure 3: *The functionality of the Green Path Model (GPM) at National Level.*

At the County level, ***figure 4*** below captures the functionality of the proposed Green Path Model using **Nakuru County** as one of the selected counties.

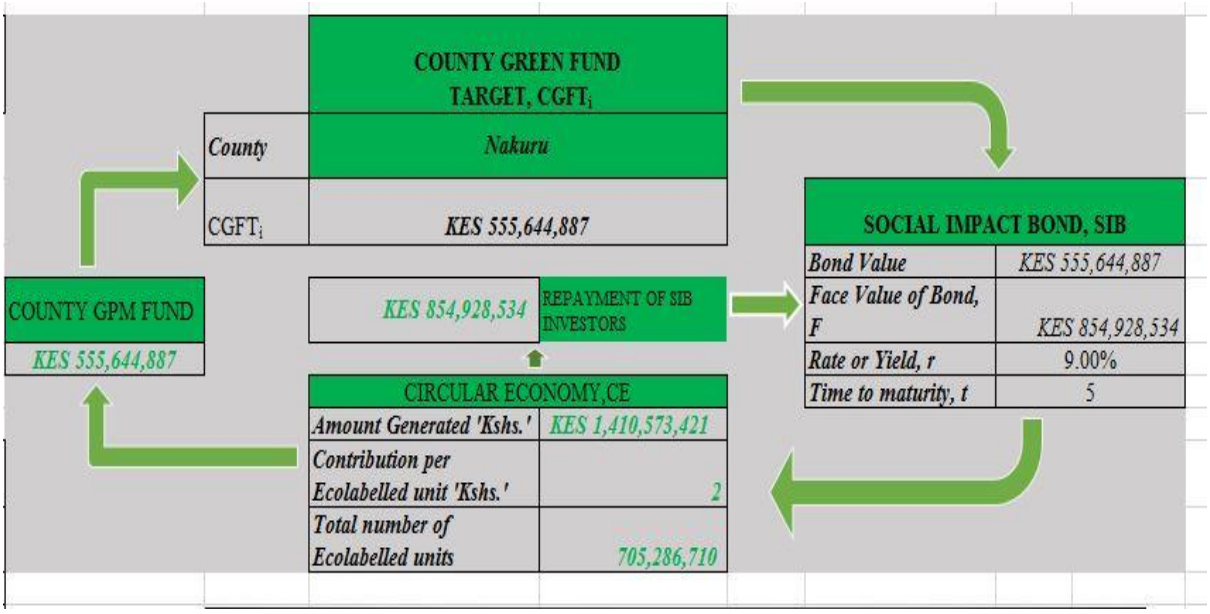


***Figure 4**: The Functionality of the Green Path Model at the County Level.*

ANNUAL COUNTY GOVERNMENTS BUDGET ANALYSIS FOR FY 2014/15			
	Description	**Amount in Billions (Ksh.)**	**Comments**
1	Direct Transfer to respective County Revenue Funds (CRF) Accounts	228.53	The transfers comprised of the equitable share of revenue raised nationally of Ksh. 226.66 billion and Ksh. 1.87 billion as conditional grant to Level 5 Hospitals
2	Amount raised by Counties from Local Sources	33.85	
3	Amount received by Counties as DANIDA grant to the Health Sector	0.73365	
4	Counties' Actual Cash Balance b/f for FY 2013/14	41.67	
5	**Total amount available to the Counties for FY 2014/15**	304.78	

***Table 6**: Annual County Governments Budget Analysis for FY 2014/15.*

Table 6 above captures the Annual County Governments Budget Analysis for FY 2014/15. The study revealed that the Ksh. 733.65 Million which is a conditional Grant from the DANIDA – Denmark's development cooperation comes with fixed Authority to Incur Expenditures (AIEs) thus the end beneficiaries have to readjust their respective health budgets and allocations as per the donor's prerequisites to their own detriment. Apparently, Level II Health facilities – Dispensaries and Model Health centres are entitled to Ksh. 110,000 per year while Level III Health facilities – Health Centres are entitled to Ksh. 450,000 per annual from the DANIDA Funds. This cuts across all the 47 counties in Kenya.

	Description	**Amount in Billions (Ksh.)**
1	Local Revenue raised during FY 2014/15	33.85
2	Total Annual Local Revenue target for FY 2014/15	50.38
3	Amount accessed by County Governments from the County Revenue Fund (CRF) during FY 2014/15	262.3
4	Total Amount spent by Counties in FY 2014/15	258

Table 7: *Analysis of the funds flow at County Level.*

The Local Revenue raised during FY 2014/15 was **Ksh 33.85 billion.** However, this amount was only 67.2% of the Total Annual Local Revenue target of **Ksh. 50.38 billion.** For counties which had at least allocated 15% of their Total County budgets to health, still the remaining **Ksh. 16. 53 billion** (32.8%) that needs to be collected to reach the set target can be collected through the Green Path Model because the $CGFT_i$ captures both the Local Revenue Target Deficit for the respective county and its $TCHBD_i$. This is done primarily for purposes of the county scaling up its total budget allocation to health above the 15% and also as a positive move towards attaining the $60 universal health per capita target through this medium.

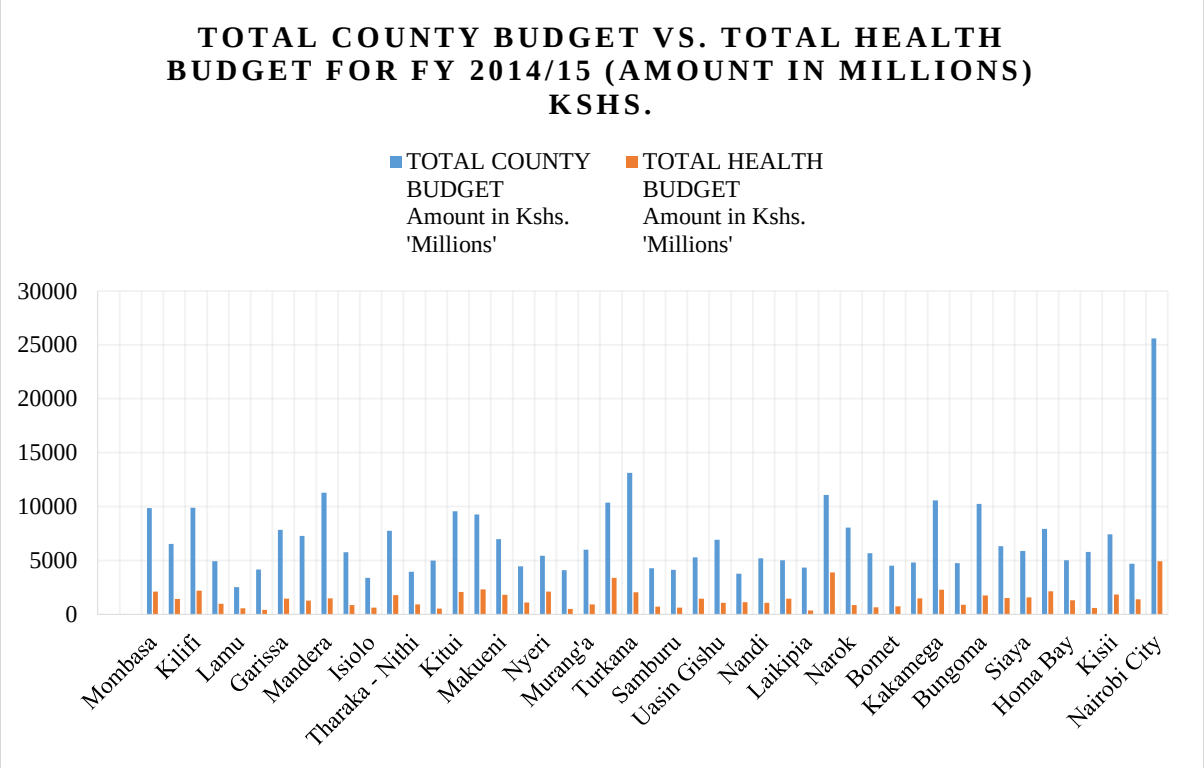


***Figure 5**: Total County Budget Vs. Total County Health Budget for FY 2014/15 (Amount in Millions) Ksh.*

For the FY 2015/2016, Nairobi County takes the lead in terms of Total County Budget (Kshs. 25588.82 Million). However, it only allocated Ksh. 4921.66 Million (19.23%) out of the Total County Budget to health. Nyeri County had the highest Percentage of Total County Budget allocation on Health of 38.64% (Ksh. 2104 million). Laikipia County had the least percentage of Total County Budget allocation on health which was 8.04% (Kshs 348 Million). This is captured in ***Figure 8*** below.

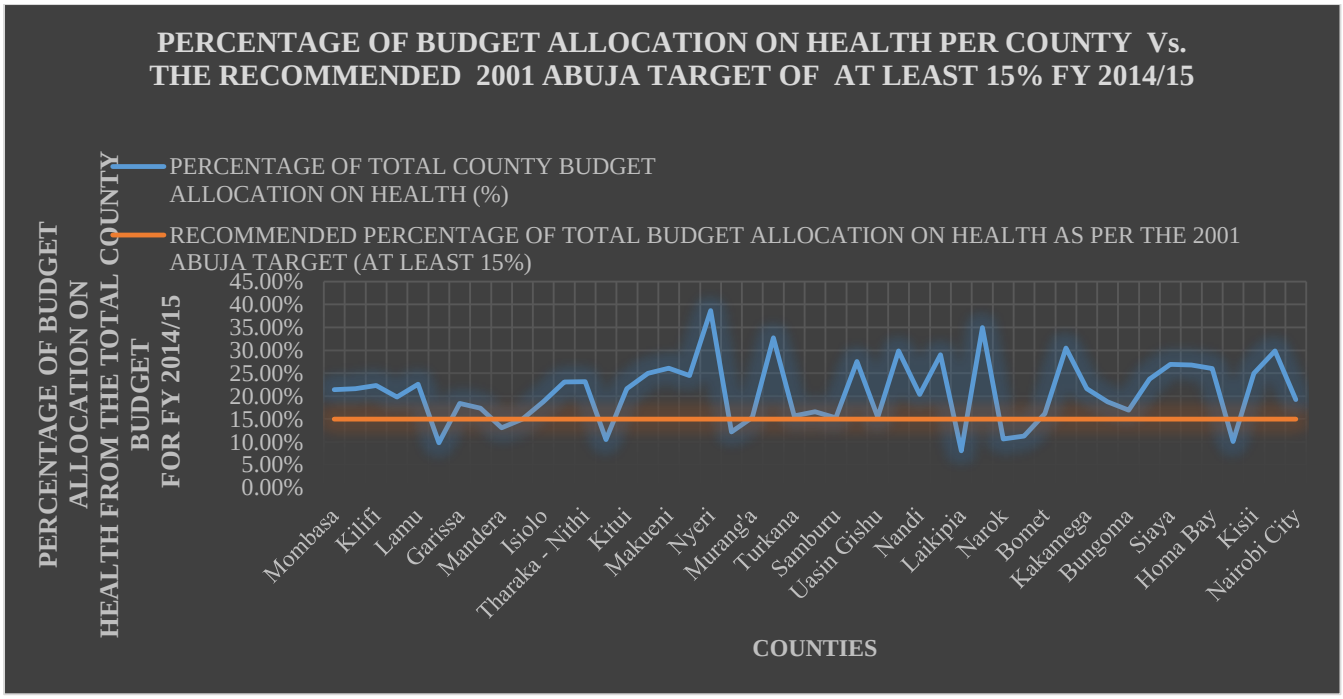


***Figure 6**: Percentage of Budget Allocation on Health Per County Vs. the Recommended 2001 Abuja Target of Allocating at least 15% of the total budget on health for FY 2014/15.*

Among the counties that could not allocate at least 15% of their total county budgets to health include the following: Marsabit 14. 99% (Ksh. 862 Million), Mandera 13.05% (Ksh. 1,472), Kirinyaga 12.19% (Ksh 500 Million), Kajiado 11.23% (Ksh. 637), Narok 10.64% (Ksh. 855), Embu 10.49% (Ksh. 523), Migori 10.11% (Ksh. 587), Taita Taveta 9.80% (Ksh. 407 Million) and Laikipia County 8.04% (Ksh. 348 Million).

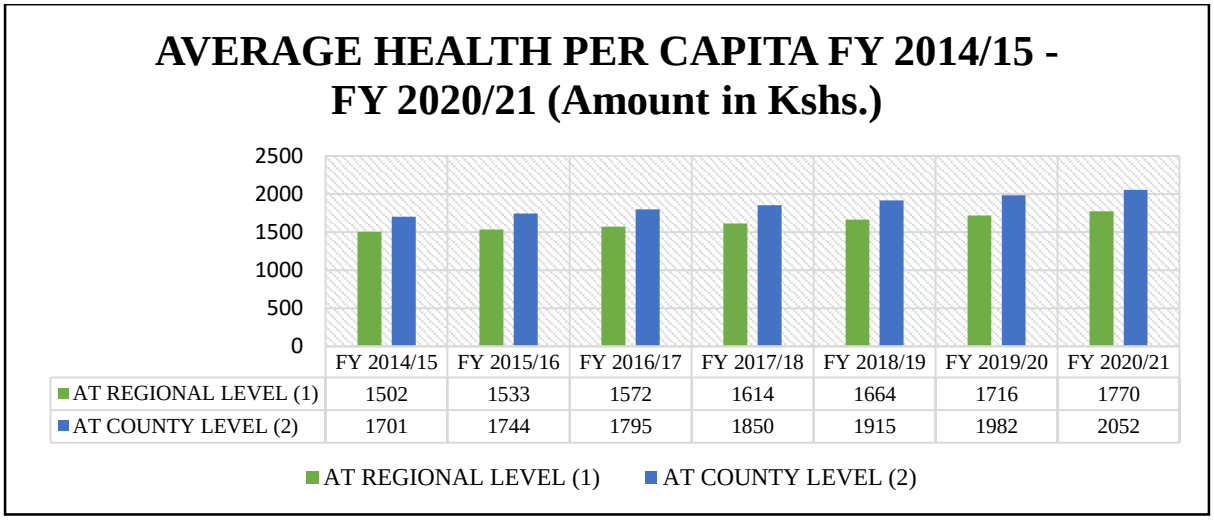


***Figure 7**: Analysis of Average Health Per Capita both at Regional Level and at County Level FY 2014/15 - FY 2020/21*

Figure 9 shows that there has been some marginal increase in terms of Average Health per capita at County Level when compared with the previous defunct Provincial Administrative Division Structure. This implies that devolution in deed has come along with positive gains.

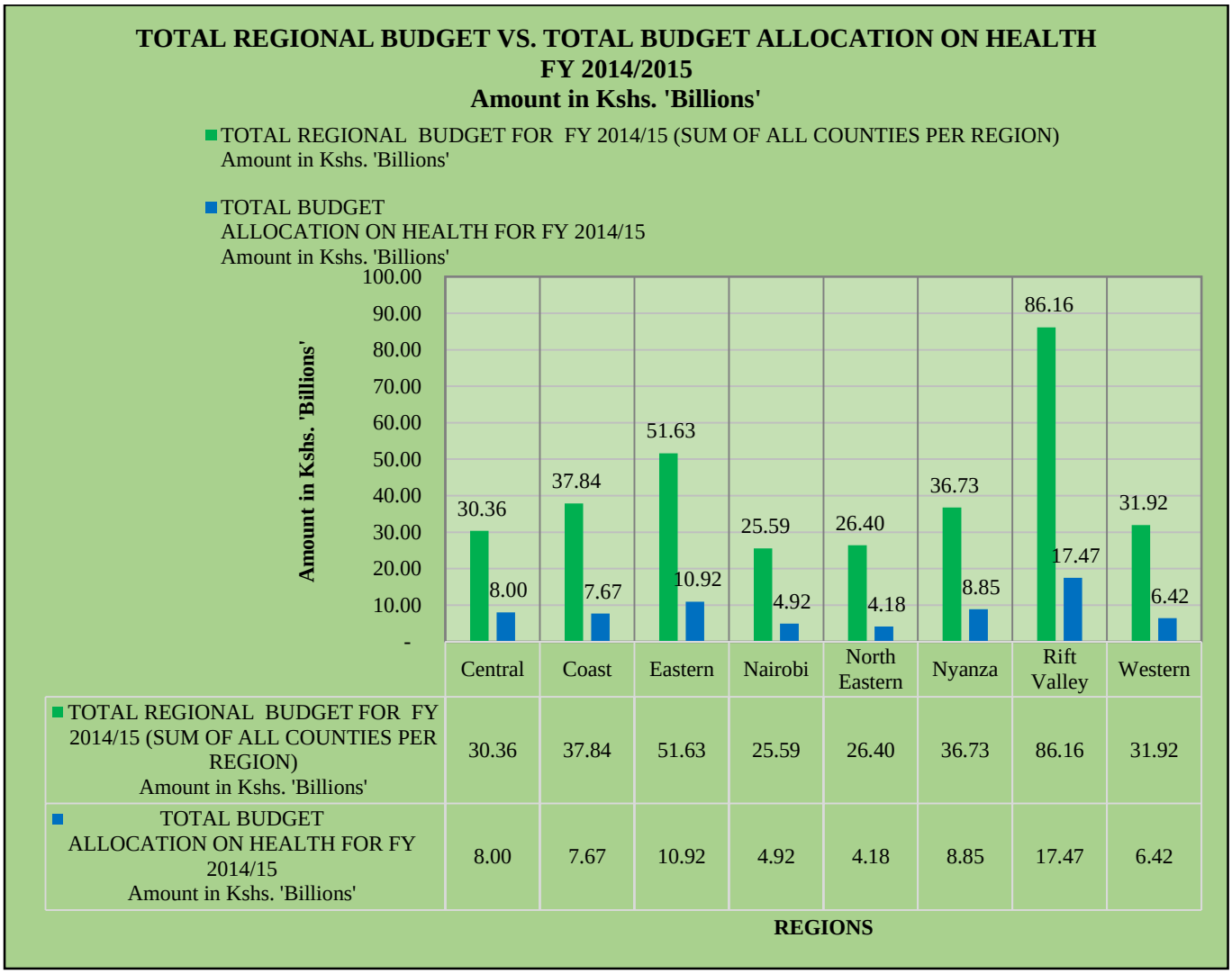


Figure 8*: Total Regional Budget Vs. Total Regional Budget Allocation on Health for FY 2014/15*

The former Rift Valley Province has the highest Total Regional Budget of Ksh. 86.16 billion and also has the highest Total Regional Budget on Health for FY 2014/15 of Ksh. 17.47 billion when all its 14 Counties are grouped together. Similarly, the former Nairobi Province which is now Nairobi City County has the least Total Regional Budget Ksh. 25.59 billion and also the least Total Regional Budget Allocation on Health for FY 2014/15 of Ksh. 4.92 billion.

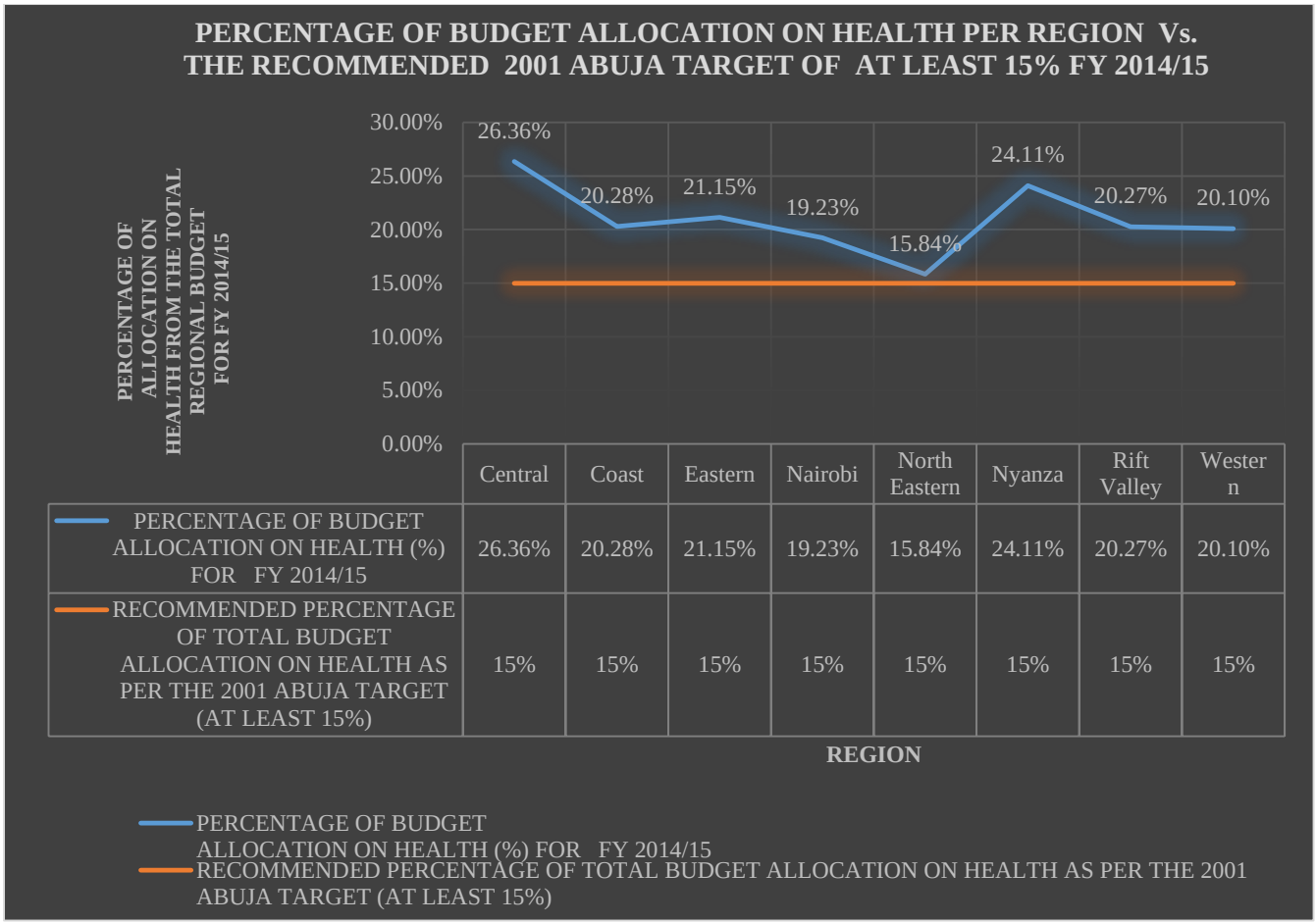


***Figure 9**: Percentage of Budget Allocation on Health Per Region Vs. the Recommended 2001 Abuja Target of Allocating at least 15% of the Budget to health for FY 2014/15*

Figure 11 shows that on average, all the 8 regions generally allocated more than 15% of their total regional budget on health. This is a simplistic assumption because it factors in the aspect of pooling together of resources and better health policy frameworks as per the groupings which in actual sense could partly be the case or to some extend may not be the case at all.

Devolution on the other side looks at the situation of complying with the Abuja Declaration on a per county basis (single county analysis) as opposed to the regional outlook of health orientation with regards to the Abuja Declaration. The regional outlook thus tends to give narrow insights in terms of the health situation readjusting to the Abuja Declaration whereas the County outlook gives wider insights regarding the same.

The summary statistics for the analysis of health at both the Regional level and at county level is presented in ***Table 6*** below. This data covers the period between FY 2014/15 – FY 2020/21. The average health capita for FY 2014/15 – FY 2020/21 is used as a baseline for the analysis because this data is representative of Kenya as a whole.

The summary statistics captures the following: the mean, median, variance, standard deviation, correlation coefficient of regional and county level, r and the correlation of determination of the regional and county level, r^2. The statistical correlations show that the regional level and county level Average health per capita are strongly correlated as indicated by r. This implies that counties have not fully readjusted from some of the past regional health policy framework that signal there is need to refocus and realign individual county interest with current health needs as opposed to embracing status quo demands. However, the difference of Ksh. 27.81 between the Average health per capita at regional level and that at county level can be explained in terms of aggregation overestimations and in some cases underestimation.

SUMMARY STATISTICS		
FINANCIAL YEAR (FY)	**AVERAGE HEALTH PER CAPITA FY 2014/15 -FY 2020/21 (Amount in Ksh.)**	
	AT REGIONAL LEVEL (1)	**AT COUNTY LEVEL (2)**
FY 2014/15	*1502*	*1701*
FY 2015/16	*1533*	*1744*
FY 2016/17	*1572*	*1795*
FY 2017/18	*1614*	*1850*
FY 2018/19	*1664*	*1915*
FY 2019/20	*1716*	*1982*
FY 2020/21	*1770*	*2052*
MEAN	*1624*	*1863*
MEDIAN	*1614*	*1850*
VARIANCE	*8166.67*	*13965.83*
STANDARD DEVIATION	*90.37*	*118.18*
r	*0.999972*	
r^2	*0.999944*	

***Table 8**: Summary Statistics of Regional Level and County Level Health Analysis in Kenya.*

CHAPTER 5: DISCUSSIONS

5.1. Introduction

This chapter will discuss the findings in relation to the objectives of the study and the linkages with other empirical findings in the literature review section.

The main objective of the study is to propose an innovative financing model that can be relied upon in scaling up internal healthcare financing in Kenya. The sub-objective is to determine if there is need to refocus the Circular Economy, CE lens to innovative healthcare financing in Kenya.

5.2. Interpretation of Results

Average health per capita at both regional level and county level is used to compute the summary statistics of the study because both collectively give the average Kenyan Heath Per Capita for FY 2014/15 – FY 2020/21.

Health Per Capita, HPC_{FYi} for the respective Financial Years starting from FY 2014/15 – FY 2020/21 is calculated using ***Equation 5***. The components of HPC_{FYi} are Total Health Expenditure for the respective Financial Year under consideration and the Total Population as per the Compound Annual Growth Rate, CAGR Model Projections for the respective Financial Year.

The Total Health Expenditure, THE for FY 2014/15 for each county is the only known variable, therefore, to project the Total Health Expenditures from FY 2015/16 – FY 2020/21, we use an optimistic assumption that their growth is directly proportional to the Gross Domestic Product, GDP Forecasts as per the IMF Real GDP Growth rates (%) forecasts captured in ***Table 8*** in the ***APPENDIX Section*** for the respective Financial Years**.** Likewise, since the only available population data is the decennial census data capturing the period between 1999 – 2009, the CAGR rate for this time period is computed using ***Equation 4*** taking the 2009 population as the ending value and 1999 as the beginning value and the number of years is ten (10) for each county. Thus the CAGR rate for each and every county is determined and using the respective counties' 2009 population as the baseline, the projected populations from 2010 – 2020 are computed using the optimistic assumption that they will grow as per the calculated CAGRs. The data from the projections is used in the Green Path Model to also compute the respective Regional Heath Per Capita for the period of interest (FY 2014/15 – FY 2020/21.

The summary statistics show that on average, for the period of interest covering FY 2014/15 – FY 2020/21, the mean for the average health per capita is Ksh. 1624 compared to the average

health per capita at county level of Ksh. 1863. Also, the median for the average health per capita is Ksh. 1614 and Ksh. 1850 at the regional and county level respectively. The trend is similar when the standard deviations for the average health per capita are computed standing at Ksh. 90.37 and Ksh. 118.18 at the regional and county level respectively. However, if we were to fit this data for the average health per capita at both regional and county level for the period covering FY 2014/15 – FY 2020/21 as per the Green Path Model (GPM), the *linear correlation coefficient* (*Pearson product moment correlation coefficient), r* shows that there is a strong positive correlation of *0.999972* between average health per capita at regional level and county level within this time period. This implies that an increase in the county level average health per capita results in an increase in the regional level average health per capita. The *correlation of determination,* r^2, which is useful because it gives the proportion of the variance (fluctuation) of one variable that is predictable from the other variable was *0.99944* for the average regional level and county level average health per capita for the period of interest (FY 2014/15 – FY 2020/21. This implies that approximately 100% of the total variation in average regional level health per capita is explained by the linear relationship between average health per capita at county level and regional level.

5.3. Policy implication

From the study, using the 2001 Abuja Declaration of governments allocating at least 15% of their budgets on health and the universal $60 health per capita target as our benchmarks, the study found out that based on the data for FY 2014/15 alone, ten Counties (Marsabit, Mandera, Kirinyaga, Kajiado, Narok, Embu, Migori, Taita Taveta and Laikipia) did allocate at least 15% of their FY 2014/15 budgets on healthcare at the county level. Also, the study found that the average health per capita at county level for FY 2014/15 alone stood at Ksh. 1701 based on the amount allocated to health by all counties in Kenya as per their budgets. The FY 2014/15 average health per capita at county level of Ksh. 1701 is equivalent to $19.31 when converted to USD. Clearly, this is less by $40.69 from the universal target of $60.

From the study, health policy makers clearly need to reconsider and plan to use the Green Path Model (GPM) in policy deliberation, redefining targets where necessary, providing appropriate guidelines to establish baselines, carrying out sound technical analysis and, capacity strengthening. This is simply because, GPM through its 6-staged path is able to capture the current health financing deficits in relation to the 2001 Abuja Declaration of allocating at least 15% of the total budget on health at both National Level (National Green Fund Target, NHGFT) and County level (County Green Fund Target, $CGFT_i$). Next, GPM proposes the way

forward to meet this deficit by raising funds through issuing a Social Impact Bond (SIB). Furthermore, GPM computes the Bond Value by equating it to the respective health financing deficits (at both national and county level), the implied Face value of the SIB is also computed based on the set implied rate or yield, r of the SIB and the implied time to maturity of the SIB, treating the SIB as a zero -coupon bond. Next it Proposes the third stage of refocusing the lens to The Circular Economy Concept, CE where the Amount to be generated is the sum total of the SIB's Face value and the health financing deficit being raised (Either NGFT or $CGFT_i$), the Concept of Ecolabelled Products is also captured under CE and GPM is able to inform health policy makers the appropriate premium to charge on the Certified ecolabelled products and also, how many ecolabelled products need to be produced from the CE Concept to be able to offset the implied Face value of the SIB and raise the funds channelled to the GPM Fund at both national and county level after which the 6-staged path starts again because of its repetitive nature.

5.4. Limitations of the Study

The limitations of this study include the following:

- The two optimistic assumptions used to compute the national and county level health financing deficits which form NGFT and $CGFT_i$ respectively based on the 2001 Abuja Declaration of allocating at least 15% of the total budget to health and using the universal $60 target of health per capita could not stand the test of time as they are likely to fall victims of subsequent changes as part of health policy reforms.
- Population projections from 2010 -2020 were computed using the Compound Annual Growth Rate, CAGR which tends to be a simplistic assumption because several other factors that affect population growth such as climate change, age distribution, nutrition, lifestyle habits, systems in place among others are not captured by CAGR.
- Assuming that the Total Health Expenditure at both national and county level grows as per the real Gross Domestic Product forecasts of the subsequent Financial Years/ Periods is an optimistic assumption which in reality could not be the case because of different Health Expenditure programmes and subsequent health policy reforms.

5.5. Conclusions and Recommendations.

5.5.1. Conclusions.

In conclusion, according to this study's statement of research problem, an ideal and properly constituted health financing system is characterized by the following: its objectives and actions revolve around raising sufficient funds for health; improvement of financial risk protection and coverage of the vulnerable; improvement in the efficiency of resource utilization and improved financial transparency and management at operational level. However, according to this study's data analysis and findings, Kenya failed to meet the 2001 Abuja Declaration of allocating at least 15% of its FY 2016/17 Programme Based Budget to Health at national level and also, it could not meet the minimum universal $60 health per capita target as per the analysis. A similar case was revealed from the study's analysis at the county level. Therefore, in line with this study's objectives, Kenya needs to reconsider relying on innovative healthcare financing means to scale up its internal healthcare financing through such models as the proposed Green Path Model – GPM. Finally, there is need to refocus the Circular Economy, CE lens to innovative healthcare financing in Kenya as per the proposed model analysis and findings.

5.5.2. Recommendations and areas of further research.

Based on the conclusions, the following recommendations can be made:

1. Kenya as a country has the Vision 2030 as one of the development agenda, to achieve this, Kenya needs to reconsider having a well-funded and efficient health system that creates an enabling environment for human capital and contribution. In order to achieve this, Kenya needs to reconsider tapping into innovative healthcare financing techniques that will in deed scale up internal healthcare financing such as the proposed Green Path Model – GPM.
2. GPM development is not an end in itself as captured in this study, further developments to the model could include development of the formula of sharing, allocation and distribution of funds in a need-basis framework to health facilities at both National level and county level through use of such means as the Revenue Allocation Formula captured in ***Equation 9*** and the proposed Indexation formula captured in ***Equation 10*** in the ***APPENDIX*.**
3. Lastly, the Kenyan government and all the 47 County governments should consider innovative healthcare financing for Development. Such innovative healthcare financing techniques could include: levy and tax proposals (solidarity levy on domestic airline tickets, financial transactional levy), introduction of Special County Level Social Impact Bonds, scaling up micro level subscription services for all citizens just to mention but a few.

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APPENDIX.

Equation 9: *Revenue Allocation Formula for Counties in Kenya:*

$$\mathbf{Ca_i = P_i + PV_i + A_i + BS_i + FR_i}$$

Where:

Ca = Revenue allocated to county,

i = 1, 2…,47,

P_i = Revenue allocated to a county on the basis of population parameter,

PV_i = Revenue allocated to a county on the basis of poverty gap parameter,

A_i = Revenue allocated to a county on the basis of land area

BS_i = Revenue allocated to a county on the basis of the basic equal share parameter. This is shared equally among the 47 counties,

FR_i = Revenue allocated to a given county on the basis of fiscal responsibility, this is shared equally among the 47 counties.

Table 9: *Revenue sharing criteria for FY 2012/13 - 2014/15 as compared to 2015/16 - 2017/18.*

FIRST FORMULA 2012/2013 - 2014/2015		SECOND FORMULA 2015/2016 – 2017/2018	
PARAMETER	**WEIGHT (%)**	**PARAMETER**	**WEIGHT (%)**
Population	45	Population	45
Basic Equal Share	25	Basic Equal Share	25
Poverty	20	Poverty	18
Land Area	8	Land Area	8
Fiscal Responsibility	2	Personnel Emoluments	2
		Development Factor	1
		Fiscal Responsibility	1
Total	**100**		**100**

Source: CRA

	Kenya		
Years	**GDP, current prices, billion $US**	**GDP, current PPP dollars, billion.**	**Real GDP Growth, %**
2014	60.9	133	5.3
2015	61.4	141.9	5.6
2016	64.7	151.8	6
2017	69.1	163.4	6.1
2018	75	177.4	6.5
2019	81.3	193	6.5
2020	88	209.8	6.5

***Table 10**:Kenyan Real GDP Growth, %*

***Source:** IMF World Economic Outlook (WEO), April 2016*

Key Rates					
Central Bank Rate	*10.00%*	*20/09/2016*	Internal Rate of Return, IRR	5.00%	**EXCHANGE RATES, USD TO KSHS.**
Inter-Bank Rate	*4.80%*	*28/10/2016*	Outcome Payer risk	1.00%	**YEAR** / **United States dollar**
CBK Discount Window	*16.00%*	*20/09/2016*	Implementation risk	1.00%	2014 / 88.07533
91-Day T-Bill	*8.03%*	*31/10/2016*	Modelization& Outcome risk	1.00%	2015 / 98.69675
REPO	*6.00%*	*21/10/2016*	Service Provider risk	1.00%	2016 / 98.83845
Inflation Rate	*6.26%*	*August,2016*	**Rate/ Yield, r**	9.00%	2017 / 101.27289
Lending Rate	*18.10%*	*July,2016*			2018 / 103.22045
Savings Rate	*1.67%*	*July,2016*			2019 / 104.19423
Deposit Rate	*6.64%*	*July,2016*			2020 / 105.16801
KBRR	*8.90%*	*25/07/2016*			

***Table 11:** Key Rates for Kenya (2016)*

***Source*:** Central Bank of Kenya (CBK). As at November 1st, 2016 & *www.Tradingeconomics.com The Forecast for - Kenyan Shilling - was last predicted on Sunday, October 30, 2016.*

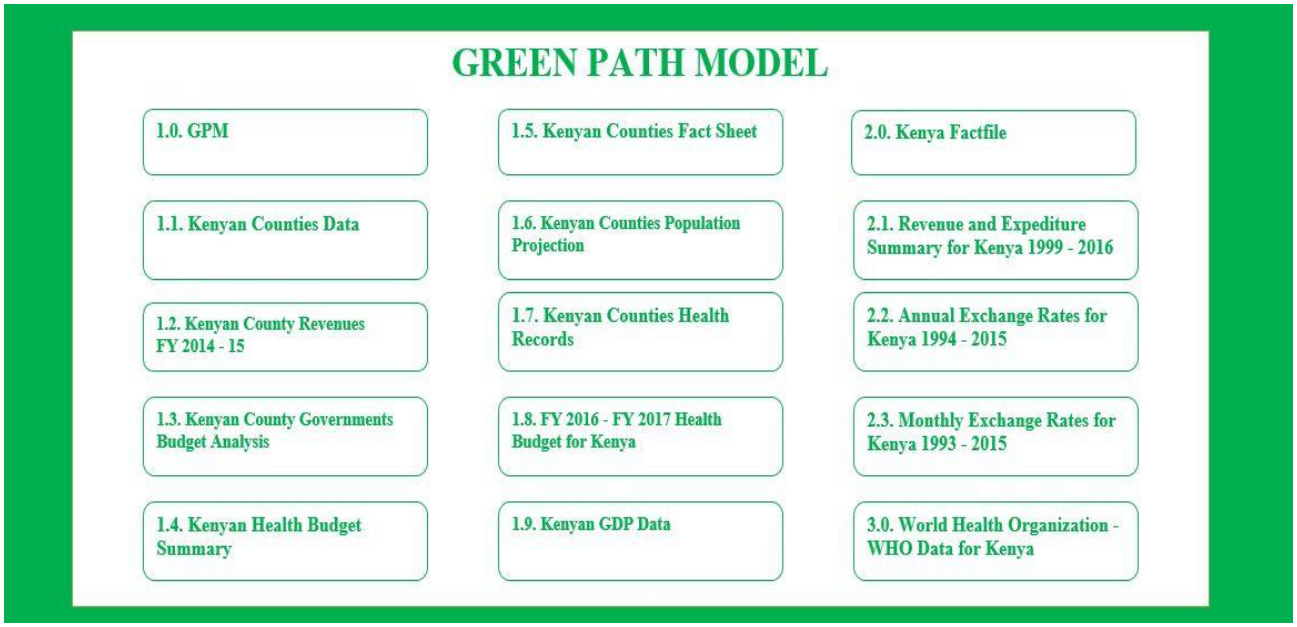

***Figure 10**: The Green Path Model (GPM) Interface in Microsoft Excel 2016*

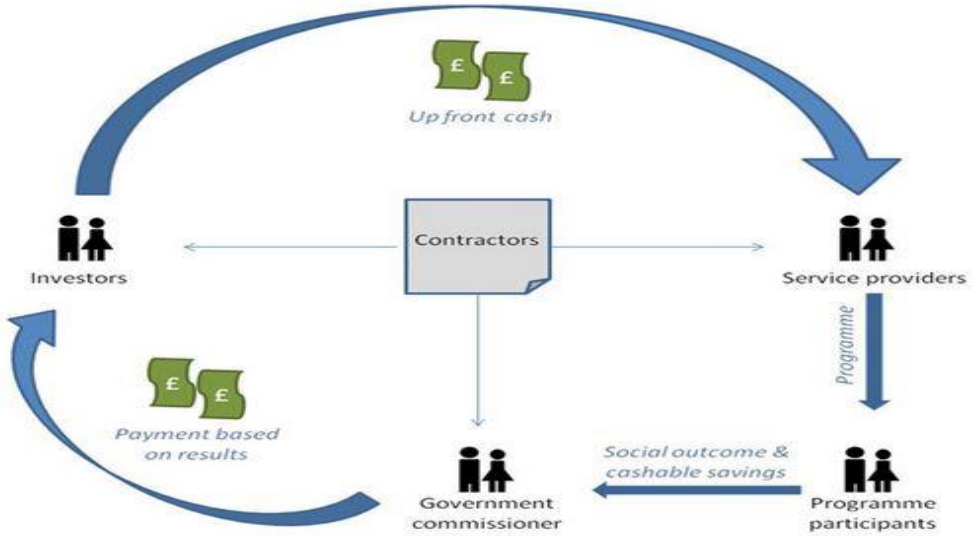

***Figure 11**: How Social Impact Bonds (SIBs)/ "Pay - for-Success Projects" work.*

***Equation 10**: Proposed Indexation Formula:*

The proposed County Contribution Index, CCI:

$$CCI = \sum_{i=1}^{n} \frac{ICCI}{n}$$

Where; CCI = County Contribution Index for Kenya (Weighted for all the 47 Counties in Kenya), ICCI = Individual County Contribution Index and n = 47.