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Conceptual framework for carbon footprinting in the South African banking sector

Abstract

The rationale of embarking on this study is based on banks being at the center of all economic activities and mainly in charge of screening and funding economically viable enterprises. Although, deemed lesser polluters, banks are the "padling power" behind heavy carbon emitting activities through their lending and investment business. This study embarks on conceptualizing how banks in South Africa are putting systems in place to quantify and benchmark carbon emissions that cause climate change. A content analysis of the carbon footprint reports, sustainability reports and public literature on the banks activities is used in developing this Conceptual Carbon Footprinting Framework. A carbon footprint benchmark case is constructed using the leading banks in carbon disclosure performance index (CDPI) and carbon disclosure leadership index (CDLI) that are featured in the Global 500 Carbon Disclosure Project (CDP). The conceptualized benchmark model is used as a checklist to analyze the carbon footprint process models of South African banks. The major finding for this study is that both the CDP Global 500 banks and the South African Banks have an improved internal carbon footprinting system that is based on the GHG protocol whilst the measuring of carbon emissions in their external systems (products, services, lending and investment portfolios) is shallow or nonexistent. Premised on this finding, a conceptual framework that is holistic of both internal and external banking systems is recommended in order to have a holistic approach in measuring the carbon emissions that come from banking activities with national, international climate policies and environmental regulations being taken into consideration.

Keywords: carbon footprint framework, carbon emissions, South Africa, bank operations.
JEL Classification: Q56.

Introduction

Climate change is a phenomenon that has changed the structure and operations of banking institutions worldwide through the review of how business operations are impacting the natural environment. Bouma et al. (2001) advocated for the need to analyze the impact of the banking institutions' internal and external operations on the natural environment. Currently banking institutions are mainly focusing on their internal operations' contribution to climate change whilst neglecting the indirect effects to the environment. A close observation reveals that banks in their internal operations are cleaner and free from radical amounts of greenhouse gas (GHG) (herein carbon) emissions. However in their external operations and activities the carbon emissions caused are estimated to be far larger than the ones generated by internal operations. In a study by the World Development Movement (2013), it was found that the Royal Bank of Scotland had its measured carbon emissions from lending to energy intensive companies being 1,200 times more than its internally generated emissions.

Internal operations impact refers to the work inputs that are used to generate and execute their business activities and products on the environment. These include, employees, business travel by air, rail and road, electricity, paper use, renting and owning of office space or buildings, ancillary equipment and other fringe resources. External operations impact entail how the banking products and services indirectly affect the natural environment (water, air, land, biodiversity, etc.) when used by the banking customers. However, to understand this state of things, there is need to set a backdrop of climate change and how carbon emissions exacerbate its state.

Solomon et al. (2009) indicate that anthropogenic activities have caused the emission of large amounts of carbon dioxide – a key GHG – which has the strongest concentration in the atmosphere. Even if humanity stops emitting carbon dioxide today, the climate damage remain irreversible for the next 1,000 years. Labatt et al. (2011) assert that Svante Arrhenius (1896) is the originator of the idea that the increases in the volume of the carbon dioxide in the atmosphere was caused by the burning of fossil fuels like coal and wood in the factories during the industrial revolution of the 1880s. This in turn changed the atmospheric composition of gases and increased the heat levels of the earth's surface temperature leading to global warming that result in climate change.

Scientific evidence has evolved since the times of the earliest studies on climate change. The Intergovernmental Panel on Climate Change (IPCC) was formed by the United Nations in 1988 to spearhead research in climate change. Three working groups were formed: one tasked to assess the available scientific information on climate change, another to assess the socio-economic impacts of climate change and, the third group was tasked to formulate climate change response strategies. The IPCC Scientific Assessment of 1990 indicated that there is a gradual increase of GHGs (mainly carbon dioxide (CO_2) chlorofluorocarbons (CFCs), methane (CH_4) and nitro-oxide (NO_2)) caused by human activities.

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More so the modelling studies indicated the doubling of the earth's surface temperature being attributed to accelerating carbon dioxide levels. The IPCC further identified climate change issues that are relevant to the financial services sector and indicated how important banks are in giving credit with the insurance industry being a risk manager of these loan assets indirectly and directly.

Labatt and White (2011) depict a dual responsibility posed on the financial services sector by climate change. The first is the ability to assess and deal with negative impacts of climate change on both their clients (external operations) and their own business (internal operations). The second is provision of products and services that aid the mitigation of economic-induced risk caused by climate change. Sahoo and Nayak (2008) indicate banking activities as less harmful on the environment compared to their customers' activities. Banks are indirectly responsible for their clients' activities that cause climate change through financing and investing. Eventually, there should be an obligation for banks to measure the impact of their services and products to the environment.

The Ceres and Riskmetrics Group (2009) survey indicated that 10 out of the 12 respondents of African Financial Institutions had risk management systems addressing environmental issues. However, there was an inadequate articulation of risks that emanated from climate change. One of the major recommendations to financial institutions from the survey was the need for financial institutions to quantify carbon emissions caused by their financing and investment activities. This is the main focus of this paper. The research problem stems from the view that banks still; have limited knowledge, understanding and tools for measuring carbon emissions and offsetting in order to mitigate climate change and related risks. Needless to indicate that significant progress has been made by most banks in innovating green products aimed at reducing carbon emissions. The gap this paper addresses is a need for thoroughness and standardization in ensuring that reduced carbon emissions are effectively measured, validated and verified for offsetting purposes. The research problem resides in recesses and debates of carbon emissions reduction measurement, validation and verification for offsetting. The main question being asked therefore is: how best can South African and other banks measure both internal and external carbon emissions? Thus a general framework is conceptualized using the South African banks.

The main aim of this research is to contribute to the limited literature with regards to the measurement of carbon emissions by the South African banking operations (both internal and external activities). Given the difficulty in measuring every source of carbon emissions from bank operations, the conceptual model will attempt to structuralize the possible framework to be adopted in measuring the total carbon emissions of banking institutions. The research is motivated by the assertions of environmental NGOs who are castigating the lack of proper systems by banks to measure and monitor carbon emissions.

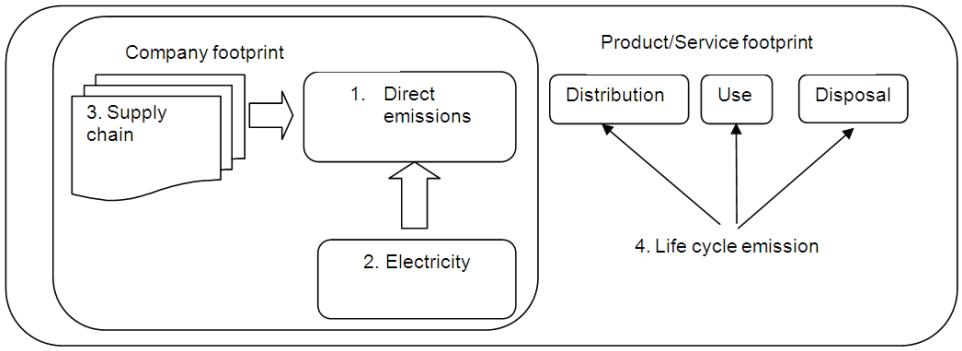
1. Literature review

There is not much literature to the best of our knowledge that expressly address issues pertaining to the measurement of carbon emissions of banking products and services. However, concept notes and surveys cover the aspects of how banks exacerbate emission of GHG through their lending and investment activities. This literature section is arranged in the following sub-sections: the concept of carbon footprinting; product carbon footprint standards; GHG Protocol (Corporate Standard) and ISO 14064 series; environmental NGOs on banking and carbon emissions; methodologies for addressing financial emissions; and the banking operations model. Each of the sub-section will now be addressed in turn and in detail in the following paragraphs.

1.1. Concept of carbon footprinting. Weidmann (2009) indicates that the origins of the term carbon footprint cannot be exactly fixated within the literature. However, it has ancestry in the field of ecological footprint formulated in the 1990's from the work of Wackernagel and Rees (1996). Weidmann insists that the concept has been made more prominent by the media and the public with the academics having to play catch up. Wright et al. (2011) assert that the rising threat of climate change poses the need for adequate measures of its impacts, management and mitigation. The authors further highlight the rise in carbon footprinting processes by both public and private institutions as a harbinger for standardizing the whole carbon footprinting process. Kane (2010, p. 51) defines 'carbon footprint' as the total amount of persistent GHG associated with a person, an organisation, a country or a product'. However, this definition does not capture the whole scientific process of carbon footprinting. Plassman et al. (2010, p. 393) define carbon footprinting scientifically as, "estimate of the total amount of GHGs emitted during the life cycle of goods and service, that is, from the extraction of raw materials, production, transportation, storage and use to waste disposal".

In Figure 1, the generic process of carbon footprinting is adopted from Kane (2008) and shows three sources of carbon emissions within the organization and the fourth source of carbon emissions that emanate from the life cycle of the products or services

of an organization. It is clear therefore that carbon footprinting comes in three forms: company (organizational), projects and products footprints. The company carbon footprint is derived firstly from the direct emissions, secondly the supply chain of the company and thirdly from the company's electricity usage (indirect scope 2 emissions) as indicated in Figure 1. Then fourthly firm's products or services will contribute to the firm's carbon emissions through the distribution of the products/services, the use of the products/services and the disposal of the product or consummation of the service. Andrews (2009) classifies the methods that companies use to measure carbon emissions into corporate and product carbon footprint. In Andrews' explanation two things stand out: (1) the corporate carbon footprint methods identify the regulatory and financial risks that GHG emissions pose to business and (2) product carbon footprint provide information to customers of a business on how much GHG emissions the company's product or products or services release when being used.



Source: Adopted from Kane (2008).

Fig. 1. Scope of carbon footprints

Bhatia (2008) indicates that the GHG Protocol: Corporate Standard is the most widely used international accounting tool for government and business leaders to understand, quantify, and manage energy use and GHG emissions. Details pertaining to product carbon footprint standards are discussed further in the next sub-section.

1.2. Product carbon footprint standards. There are several standards that have been developed in order to have a transparent and consistent reporting of GHG emissions for products. Weidema et al. (2008) argues that the development of these product based carbon footprint standards has been driven more through awareness initiatives by national governmental organizations, companies and private initiatives than research. The three main product carbon footprint standards commonly applied worldwide are: (1) the PAS2050, GHG Protocol and ISO 14607 (Soode et al., 2013). The PS2050 is a creation of the British Standards Institute (BSI) and was implemented in 2008 with revisions in 2011. The GHG Protocol product standard is a brainchild from the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD). The ISO14067 was created by the International Standards Organization (ISO) and insists on the requirements and guidelines for quantifying and communicating the carbon footprint of products. All the three standards provide requirements and guidelines on doing a carbon footprint study. The processes involve life cycle assessment issues (LCA) which include goal and scope definition, data collection strategies and reporting. All the three methods also build on the existing life cycle assessment methods from ISO14040 and ISO14044.

1.3. GHG Protocol (Corporate Standard) and ISO 14064 series. The GHG Protocol defines three scopes (also referred to as GHG emissions categories) to be used when measuring, validating and verifying corporate GHGs. Scope 1 carbon emissions are direct emissions from equipment and processes owned or directly controlled by the company. Scope 2 refers to indirect emissions that are energy related and emanating manly from electricity or steam purchased from third parties. Scope 3 emissions are also indirect and other emissions sources of GHG emissions related to a company's activities, but from sources not owned or controlled by the company. Scope 3 emissions mainly include upstream emissions from suppliers and raw materials industry and downstream emissions from customers that result from the use of the company's product, or even employee travel (WRI/WBCSD, 2008).

The GHG Protocol has four separate but linked standards and these include the corporate accounting and reporting standards (corporate standard), project accounting protocol and guidelines, corporate value chain (scope 3) accounting and reporting standard and the last one product life cycle accounting and reporting standard (WRI and WBCSD, 2004). The GHG protocol corporate standard is a set of guidelines for

companies and other organizations in drawing up their GHG emissions inventory. It entails the accounting and reporting process of the six GHGs covered by the Kyoto Protocol[1] namely: CO_2, CH_4, N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF_6) (Houghton et al., 1992; Houghton et al., 2001). The main objectives of the GHG protocol corporate standard is to provide an aid to the compilation of a company's GHG inventory in a true and fair manner, to simplify and reduce the costs of compiling a GHG inventory, to provide information to the formulation of effective strategies in managing and reducing GHG emissions and to increase consistency and transparency in GHG accounting and reporting among various companies (WRI and WBCSD, 2004).

In addition to the GHG Protocol, there is a series of ISO14064 standards for carbon footprinting, validation and verification. This is regardless of whether the footprint is for organizations, products or projects. The architecture for the ISO14064 series includes the following (ISO, 2006):

- ISO 14064-1: Design and develop organizational GHG inventories (leading to the production of an GHG inventory documentation and reports).
- ISO 14064-2: Design an dimplement GHG projects (leading to the production of an GHG project documentation and reports).
- ISO 14064-3: GHG validation and verification (resulting in validation and verification statements).

Sundin and Raganathan (2002) indicate the GHG Protocol as a voluntary international standard for accounting and reporting on GHG emissions. It presents the carbon risks and reduction efforts in a transparent and solid manner. To this end, the GHG Protocol ensures the comparing of GHG inventories of similar and different businesses. However, we need to narrow and look into current research and issues of carbon footprinting of companies in the banking and financial sector.

1.4. Environmental NGOs on banking and carbon emissions. There is literature available by Environmental NGOs (Non-Governmental Organizations) who are analyzing how the major banks are not putting concerted and meaningful effort to curb the growth of carbon emissions. The prominent Environmental NGOs engaged in this research include: Banktrack, Rainforest Action Network and Carbon Tracker. The main argument from these Environmental NGOs is that there is lack of transparency and willingness from global banking institutions to disclose financed emissions. In a study by Banktrack and Rainforest Action Network (2012), it emerged that major US banks committed more than $100 billion to green financing initiatives, yet failed to measure how these initiatives reduced carbon emissions in their product portfolios. The two NGOs further asserted a growing trend of banks financing carbon-intensive companies amidst an outcry to reduce the global collective carbon footprint. The study identified banks as being central to the transition to a low carbon and green growth economy. To this end, banks are identified as feasible instruments and vehicle to reduce carbon footprints of their financing portfolios.

Banktrack and Rainforest Action Network (2012) are more focused on criticising the financing of coal projects by banks especially in the USA. Coal is still one of the leading sources of carbon emissions there today. They indicate that the top five worst coal financing banks are the Bank of America, J.P Morgan Chase, Citi Bank, Morgan Stanley and Wells Fargo. They extracted their information from Bloomberg data of each bank's number of transaction with mountaintop removal (MTR) and coal burning utility companies from 2010 to 2012. More so, these banks own a number of coal fired power plants themselves, making them direct huge carbon emitters. The two Environmental NGOs came up with a coal finance report which grades and ranks the banking institutions on their mountaintop removal (MTR) and coal-fired power plant (CFPP) policies with an "A" to "F" criterion. An "A" in the grading represents the bank(s) that is/are doing well in having less bond and loan underwriting of MTR and CFFP transactions whilst an "F" rating represents bank(s) with more bond and loan underwriting of MTR and CFFP transactions. Most of the banks researched on were below a "C" in their grading which meant that there is still continued financing of coal projects by the big banks in the USA.

Another study done by Rainforest Action Network (2008) on Canadian Banks was to ascertain their amount of funding in fossil fuels; the total carbon emissions resulting from each bank's financing of fossil fuels; carbon footprint of an individual cheque account held for each bank in the sample; and the amount invested in clean, renewable energy alternatives by the Canadian Banks. The main findings of the research indicated that more than 99% of their overall carbon footprint comes from the fossil fuels production they finance whilst their internal operations represent less than one percent (1%) of their total carbon footprint.

[1] The Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) is an international agreement linked to the United Nations Framework Convention on Climate Change, which *commits* its Parties by setting internationally binding emission reduction targets. The UNFCCC is an environmental treaty with the goal of preventing "dangerous" anthropogenic (i.e., human-induced) interference of the climate systemhttp://unfccc.int/kyoto_protocol/items/2830.php.

1.5. Methodologies for assessing financed emissions. Neilsen et al. (2009) point out that accounting and measuring of financed emissions is a new activity for the financial institutions. As such there are no standard carbon footprinting methods accepted for quantifying financed emissions. In their study they analyzed the current methodologies being used by banks to measure their carbon footprints. It should be noted here that the process of measuring financed emissions concentrates on the measuring of emissions derived from financing activities of a bank's client. It is different from the carbon foot printing exercise which is more company specific. Table 1 summarizes comprehensively the different methodologies studied by Neislen et al.

Table 1. Overview of financed emission methodologies

Organization	Financial institutions involved	Name of methodology	Year of development	Objectives of the methodologies
Trucost	185 different funds compared (in 2007)	Trucost Carbon Footprint Ranking of UK Investment Funds 2007	2007	*Comparison and ranking* of the carbon footprint of investment funds.
Profundo	Dutch Banks compared (ABN AMRO Bank, ASN Bank, Fortis Group, ING Group, Rabobank Group, Triodos Bank)	Investing in Climate Change; Dutch Banks compared 2007	2007	*Comparison and ranking* of financed climate emissions of banks based on loan, equity portfolio's and project finance.
Platform	Royal Bank of Scotland (RBS)	The Oil and Gas Bank; RBS and the financing of climate change	2007	*Comparison and ranking* of financed emissions based on project finance of one bank.
Utopies	GroupeCaisse D'epargne	FOE Utopies + study Sustainable Development Labelling of Banking Products	2008	*Provide a climate label for consumer banking products, and* providing risk assessment.
CenSA	Highlands and Islands Enterprise (HIE)	The Carbon Footprint and Climate Footprint of Highlands and Islands Enterprise 2007/08	2008	*Climate impact assessment* by determining the carbon footprint of all financed activities of the Highlands and Islands Enterprise development bank.
OPIC	Overseas Private Investment Corporation (*OPIC*)	*OPIC* (Overseas Private Investment Corporation)	2007	*Climate impact assessment* by determining the carbon footprint attributable to projects to which the Overseas Private Investment Corporation (*OPIC*) is financially committed.
Ecofys	Rabobank	Rabobank Group: Balance Sheet carbon footprint methodology	2008	Proportional share of emissions as result of credit lending to business customers.

Source: Adapted from Neilsen et al. (2009, p. 3).

1.6. The banking operations model. It is difficult to construct a holistic banking operations model that can cover and encompass the wide and array of current banking activities, products and services. It is deemed essential for this study to have a generic view of a bank's operating model in order to understand the sources of carbon emissions for banks. Milma and Hjalmarsson (2002) synthesize the inputs and outputs of a bank in two views: (1) the production approach and (2) asset or intermediation approach. With the *production view*, inputs are defined in terms of labour, machines and materials being used by banks to produce a variety of deposit and loan accounts. In the *asset view*, banks are seen as intermediation institutions of financial services than creators of loan and deposit accounts. Thus it can be deduced from this assertion by Milma and Hjalmarsson that the main inputs of the banks processes is capital and labour with outputs being loans and investments. The difference in these two views is that the production view unit of measure is in quantity terms whilst the asset view is in value terms. They are detailed discussions and contestations into the inputs and outputs of bank processes which we will not consider for this paper in detail in terms of identifying the sources of carbon emissions for a bank.

Van Hoose (2010) identifies from an empirical view three main common methods being used to identify outputs and inputs of banking operations or processes and these are summarised in Table 2.

Table 2. Methods of identifying a bank's input and outputs

Method and description	Input	Output
Asset method	*Financial inputs:* ◆ Bank deposits ◆ Purchased funds ◆ Other liabilities *Real resources* ◆ Labor ◆ Capital	Bank assets

Table 2 (cont.). Methods of identifying a bank's input and outputs

Method and description	Input	Output
Value-added method classifies inputs and outputs based on the banking functions connected to production of non-interest income banking services by labor or physical capital expenditure	♦ Labor ♦ Physical capital ♦ Purchased funds	♦ Loans classified as commercial and Industrial loans, instalment loan, real estate loans ♦ Transactions deposit ♦ Retail savings ♦ Time deposits
User cost method is defined as net effective cost of holding one unit of services per time period which is equal to holding the asset during a current period minus the asset's discount net revenue in the following period	Bank balance sheet items with items with positive user costs – savings and time deposits and purchased funds along with: ♦ Labor ♦ Raw materials ♦ Physical capital	Bank balance sheets with items with negative user costs that includes all categories of loans and transaction deposits

Source: Authors (based on Van Hoose 2010, pp. 27-28).

Interlinks seem to exist among the three methods in terms of similar inputs and outputs but being variant here and there as indicated in Table 2. A suggestion by Van Hoose (2010) to summarize the inputs and outputs of a bank clears this repetitive show of inputs and outputs by regrouping and summarizing the methods under two views of *asset production process* and *provision of service* (Figure 2).

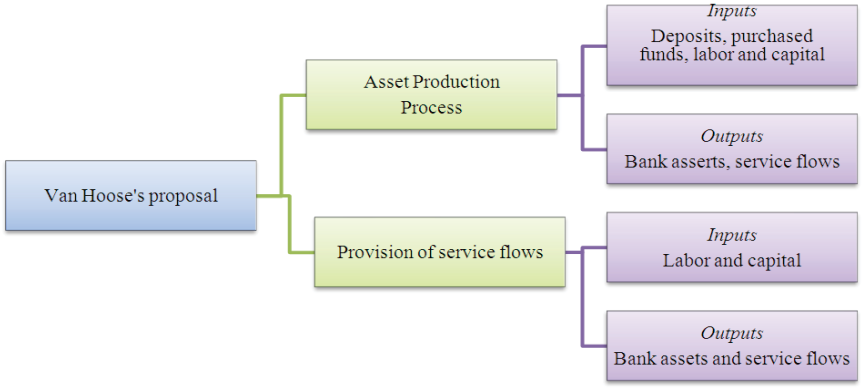


Fig. 2. Van Hoose's asset production and service flows provision

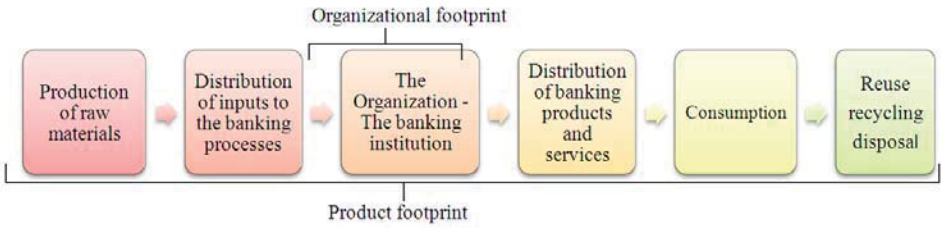
Kane (2008) indicates that the measuring of carbon emissions is important at the business level for various reasons. The main reason is to ensure that a benchmark is set for the current emissions in order to establish the amount of carbon emissions to be reduced. The other reasons include: (1) identifying major sources of carbon emissions for a firm; (2) identifying business activities that lead to quicker carbon emissions reductions; and (3) making a statement of intent to internal and external stakeholders that climate change is core to the operations of the business.

Based on the foregone, we tried to establish the knowledge and understanding of current carbon footprinting methods in theory and practice by banks. Furthermore, the outputs and inputs of a bank were clearly shown. However, there is need to contextualise theories that explain carbon footprinting within the lens of climate change (including low carbon and inclusive economy). The reviewed literature also spelt out a good background in embarking on a methodological way of collecting and assessing data that would aid the achievement of the research objective.

2. Methodology of the study

A desktop research was conducted. It borrowed insights from an exploratory study that involved content analysis of sustainability and annual reports of South African banks (website publications of Annual and Sustainability Reports by Banks). The methodology permitted us to use information and data relevant to formulate a conceptual framework for carbon footprinting bank operations. From the literature, we were informed of the need to measure financed emissions (external operations) by banks. Measuring of carbon emissions from internal operations of banks seem to have been standardized and well developed. Therefore, a comparative approach to assess standards being used by banks in South Africa to measure their carbon emissions from internal operations was made in order to verify the extent of carbon footprinting in that sector. Although issues of validation and verification exist, the scope of the study was mainly the measuring of carbon emissions. In attempting to come up with a comprehensive conceptual framework for measuring the carbon emissions from the South African banks internal and external opera-

framework for measuring the carbon emissions from the South African banks internal and external operations, the two different types of carbon footprinting models as proposed by Carbon Trust (2009) were used. These are organizational carbon footprint and product carbon footprint and are used as a foundation for the carbon footprint framework for South African banks as illustrated in Figure 3.

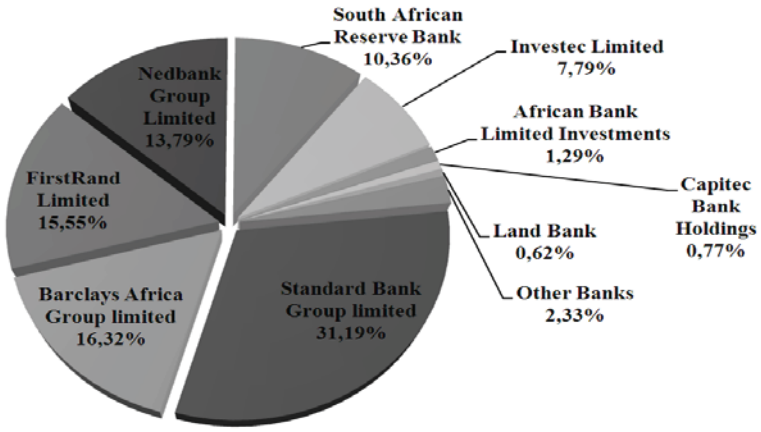


Source: Carbon Trust (2009).

Fig. 3. The different boundaries of organizational and product footprints

The sampling method was based on banks with the largest asset values in South Africa. Assets are a good measure of the productivity of a bank (Favero and Luca, 1995; Fixler and Zeischang, 1999; Thakor and Boot, 2008; Andries et al, 2013), given that the aim of the research is to develop a more robust way of measuring financed emissions. Using the Bureau van Dijk Bankscope database, the banks with highest share of total assets in the South African banking sector were extracted and are presented in Figure 4.

Using the Bureau van Dijk Bankscope data it emerged that Standard Bank, ABSA Bank, Nedbank and FNB Bank had a combined 76.84% of the total assets of the South African banking sector. Thus on this basis, the sample comprises of 9 banking institutions with 7 banks being commercial banks who operate wholesale, retail, corporate and investment business units and the other two institutions, i.e., Industrial Development Corporation of South Africa and Development Bank of Southern Africa being development banks. This sample is believed to bring out the required generic conceptual framework for carbon footprinting for banks in South Africa. This is against the backdrop of having selected banks that are dominant in the banking market and have their banking products and service largely used in the market as well.



Source: Authors (based on the Bureau van Dijk: Bank Scope, 2013).

Fig. 4. Market share of South African banks by asset size

The next process involved determining what type of data to collect and how it is relevant to carbon footprinting a South African bank. The starting point was to establish a benchmark or models of banks in terms of carbon footprinting in the world. The Carbon Disclosure Project provided such a required benchmark through its annual regional and global survey of the banks that are leading in disclosing their carbon emissions and emissions reduction effort The sample of banks (Table 3) that were used to benchmark the South African Banks Carbon footprinting process was taken from the banks surveyed in the CDP Global 500 report. Banks that were leading in carbon disclosure leadership index (CDPLI) scores, carbon disclosure performance index (CDPI) scores and have achieved the highest carbon disclosure score from the Carbon Disclosure Project (CDP) from the years 2010 to 2012 were chosen as benchmarks or models. Scoring methodologies being used by the CDP for scoring institutions that participate in their initiative were found to be credible given the process of assessing and verifying data by the CDP. The CDP data is verified

by a consortium of experts in carbon accounting and GHG Inventory measurements such as the Bureau Veritas, Lloyd's Register Quality Assurance, PricewaterhouseCoopers, SGS and T Ü V NORD. More so, all these organisations are accredited in internationally recognised standards which include the ISO or ISAE (International Standards for Assurance Engagements) standards and are accredited to perform certification under numerous climate schemes such as the EU ETS (European Emissions Trading Scheme) and Western Climate Initiative.

The scoring methodology of the CDP is done using the company responses supplied to CDP by participating companies (CDP Global 500 Report, 2013). Therefore a high carbon disclosure score would indicate a detailed and factual response. Such a response entails clear consideration of business-specific risks. The responses of these sample banks were accessed from the CDP website to ascertain the relevant things that the banks submitted and the irrelevant items that banks did not submit in order to formulate a framework to build upon a bank carbon footprint model.

Table 3. Sample of the banks used to construct the carbon footprint model

Year of being the best in CDLI and CDPI	2010	2011	2012	CDP score
Banks				
National Australia Bank	√			93
Royal Bank of Scotland Group	√			93
Bank of America		√		97
Westpac banking		√		96
Allianz Group			√	97
UBS			√	97
Wells Fargo Group			√	95
Bank of Montreal			√	91
Duetsche Bank			√	90
Mizuho Financial Group			√	85

Source: Authors (based on CDP Global 500 report, 2010, 2011, 2012).

The nine banks that featured in the CDP Global 500 report were chosen to formulate a carbon footprint model or benchmark for South African banks. The process of constructing a carbon footprint benchmark/model involved collecting information from the sustainability reports and CDP survey responses of the nine banks based on the generic format presented in Figure 2. Broadly the information was collected using four thematic areas being created to collect the data which were the following: (1) carbon footprinting on bank internal operations; (2) carbon footprinting of financed emissions; (3) product or service carbon footprinting; and (4) methods or standards used to measure, report and verify GHG emissions. Having set the sampling methods, as well as the data and data collection methods; the next section discusses the results, data analysis and findings from this work.

3. Results and discussions

The carbon footprint quantitative data variables oremissions sources for the benchmark/model banks are presented in Table 4. The data variables show the dominant aspects of carbon footprinting by the banks who are deemed more sustainable according to the CDP Global 500 scores. In Table 5 the authors present the dominant emissions sources that are found in the benchmark (model) banks as per GHG Protocol scopes 1, 2 and 3. In Table 6, the four thematic areas (qualitative aspects of carbon footprinting by the banks) that were used for content analysis are presented and they show that banks in general are concentrating more on carbon footprinting their internal operations than the external operations. As an example, the operational organizational boundaries approach for carbon foot printing is more prominent among nine of the banks except for the Bank of Montreal which uses the financial approach.

Table 4. Emission sources by quantitative variables (banks with high CDP scores)

Energy sources	Business travel	Waste	Paper usage
1. Electricity consumption (Kwh): ♦ Data centres ♦ Heating ♦ Cooling 2. Natural gas (GJ)/(Kwh) 3. Energy from primary fuel sources:	Business air travel (km): ♦ International travel ♦ Domestic travel Or ♦ Short haul air travel ♦ Medium haul travel ♦ Long haul travel ♦ Hotel stay (nights)	Waste to landfill Waste recycled	Paper used Paper recycled

Table 4 (cont.). Emission sources by quantitative variables (banks with high CDP scores)

Energy sources	Business travel	Waste	Paper usage
♦ Diesel generator (kL) ♦ Kerosene (kL) ♦ Light oil (kL) ♦ Heavy Oil (kL) ♦ LPG (kL/kg/tons) ♦ Gas (m^3) 4. Energy from renewable sources	Business fleet travel (km): ♦ Company owned/leased vehicles ♦ Hotel stay (nights) ♦ Taxis Employee commuting/work travel: ♦ Public rail system ♦ Public bus system ♦ Employee personal car		

Source: Authors.

Table 6 presents the main aspects of carbon footprinting a bank, and this can be termed as the 'carbon foot print master checklist'. However, it lacks some aspects discussed in literature in which the banks are measuring and disclosing carbon emissions. Therefore, Table 6 is a refining of the GHG protocol standard of measuring carbon emissions which includes financed carbon emissions and product or service carbon footprint as added quantitative aspects under scope 3.

Table 5. GHG emissions sources for banks – as per banks with highest CDP score (2012)

Scope 1 – Direct GHG emissions	Scope 2 – Indirect GHG emissions	Scope 3 – Other indirect GHG emissions
1. Natural gas consumption 2. Stationary energy: ♦ Diesel – generator ♦ Kerosene ♦ Petrol ♦ LPG ♦ Gas 3. Building based refrigerants – HVAC and refrigerators (HFCs) 4. Business Travel – work use vehicle fleet 5. Work use vehicle fleet – air conditioning refrigerant	1. Electricity purchased 2. Steam 3. Heating 4. Cooling	1. Business travel: ♦ air travel ♦ road travel (taxis, car hire/ rented vehicles, hotel stays) 2. Employee commuting: ♦ public rail systems ♦ public bus systems 3. Waste: ♦ landfill 4. Energy use from leased/rented property: ♦ electricity ♦ stationary energy 5. Paper usage 6. Product / Service usage embedded emissions 7. Financed emissions

Source: Authors (based on GHG Protocol, 2004).

Table 6. Qualitative carbon footprinting aspects of global banks

Bank	Approach/Strategy of carbon footprinting	Aspects covered in Carbon footprinting Internal operations	Aspects covered in carbon footprinting external operations	Standard of reporting GHG performance and verification of GHGs
National Australia Bank	GHG Protocol, emissions come from: (1) building occupancy (2) equipment use (3) business travel (4) waste disposal to landfill GHG measured by operation control boundary	Detailed scope 1, scope 2 and scope 3 as per GHG Protocol	None	♦ KPMG Carbon Nuetral Assurance (Corporate) – External validation ♦ Australian Carbon Inventory as per the National Greenhouse and Energy Reporting National mandatory reporting ♦ GHG protocol ector ise
Royal Bank of Scotland	Both internal measurement of GHG and GHG to lending in their structured finance lending to the power and oil & gas industry (1) Paper use (2) Waste (3) Business travel (4) Energy use in building GHG measured by operation control boundary	Fairly detailed GHG Protocol (scope 1, 2 & 3)	Publish an industry analysis of their lending to the energy sector since 2009 (total oil and gas exposure (£ m)	♦ Deloitte Assured their carbon footprint data using the ISAE3000 assurance standard orporate *External validation* ♦ GHG protocol ector ise
Bank of America	Both internal measurement of GHG and GHG measurement of utility portfolio lendings thru carbon intensity	Fairly detailed GHG Protocol (scope 1, 2 & 3) – Supply chain management of GHG – Supplier has to be a CDP participant	Utility Portfolio Emissions – measuring the the carbon intensity of the utility companies that they lend to	US Green Building Council's LEED (leadership in Energy and Environmental Design) Volume program for operations and maintenance certification ndustry – ise verification

Table 6 (cont.). Qualitative carbon footprinting aspects of global banks

Bank	Approach/Strategy of carbon footprinting	Aspects covered in carbon footprinting internal operations	Aspects covered in carbon footprinting external operations	Standard of reporting GHG performance and verification of GHGs
Westpac Banking	Operational control	Detailed GHG Protocol (scope 1, 2 & 3)	None	♦ Emissions Data verified by CEMARS scheme by Deloitte (Corporate – external validation) ♦ Australian Greenhouse Challenge Plus methodologies, National Greenhouse and Energy reporting system (National – mandatory reporting)
UBS	GHG Protocol	Fairly detailed GHG Protocol (scope 1, 2 & 3) – Responsible Supply Chain Management (RSCM) framework Evaluation of energy efficiency and carbon emissions are included in the environmental performance part of the RSCM background checks	2013, UBS are participating in an industry-wide initiative to develop accounting metrics (which do not yet exist) for CO_2 emissions associated with lending and investments	♦ ISO 14064-1, The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition), (Sector-wise) ♦ Defra Voluntary Reporting Guidelines/Société Générale de Surveillance (SGS), ISO-14064-Verification (Corporate – external validation)
Wells Fargo	Operation control – GHG Protocol	Fairly detailed GHG Protocol (scope 1, 2 & 3)	None	♦ U.S. Green Building Council's LEED, ISO14064-3 ♦ Verified against the principles of ISO 14064-1 and The Climate Registry General Reporting Protocol (Corporate – external validation)
Bank of Montreal	Financial Control – GHG Protocol	Fairly detailed GHG Protocol (scope 1, 2 & 3)		♦ The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition) ISO 14064-1 and ISO- 14064-3 (Corporate – external validation) ♦ US Green Building Council LEED certified BuildingInternational Standard (Industry – wise verification) ♦ International Auditing and Assurance Standards Board (ISAE 3000) (Sector-wise)
Duetsche Bank	Operational control – GHG Protocol	Fairly detailed GHG Protocol (scope 1, 2 & 3)	None	ERM Certification and Verification Services (ERM CVS) was commissioned by Deutsche Bank AG to provide independent limited assurance on its global greenhouse gas (GHG) information ♦ (Corporate – external validation)
Mizuho Financial Group	Operational control – GHG Protocol	Fairly detailed GHG Protocol (scope 1, 2 & 3)	Project Finance graded on the basis of carbon emissions	♦ Tokyo Metropolitan Government – "The Tokyo Cap–and–Trade Program" (for large facilities) and "The Tokyo CO_2 Emissions Reporting Program" (for small and medium scale facilities) with the revision of "Tokyo Metropolitan Basic Environment Ordinance" in July 2008 (National – mandatory reporting) ♦ "The Saitama Prefecture Global Warming Strategy Promotion Ordinance" ♦ GHG Protocol (National – mandatory reporting)

From Table 6, we further observe that only four banks have a system in place to measure their financed emissions and to a lesser extent carbon footprint their products. However, Mizuho Financial Group may be singled out as having an extensive explanation on how they measure carbon emissions of the entire project finance business they underwrite. The measuring of financed emissions is more biased to investments and project finance. Most banks that are into retail and wholesale banking have no financed emissions and product carbon footprinting mechanisms in place. Given the foregone, it emerges that South African banks may be lagging behind in terms of disclosing financed emissions and carbon footprinting their products. However, Nedbank has an array of green retail and corporate products, although there is no proper measurement of carbon emissions embed or reduced when used. For most of South African banks, the carbon footprinting of internal operations is adequate and done to a large extent in similar fashion to the global banks. However, the similar trend of not measuring financed emissions and product or service emission is evident even with the South African banks. From Table 7 it is revealed that the South African banks to a large extent also apply the GHG Protocol

method of measuring carbon emissions. Figure 5 gives a synthesized view of the GHG inventory items of the South African banks should consider in carbon footprinting their operations.

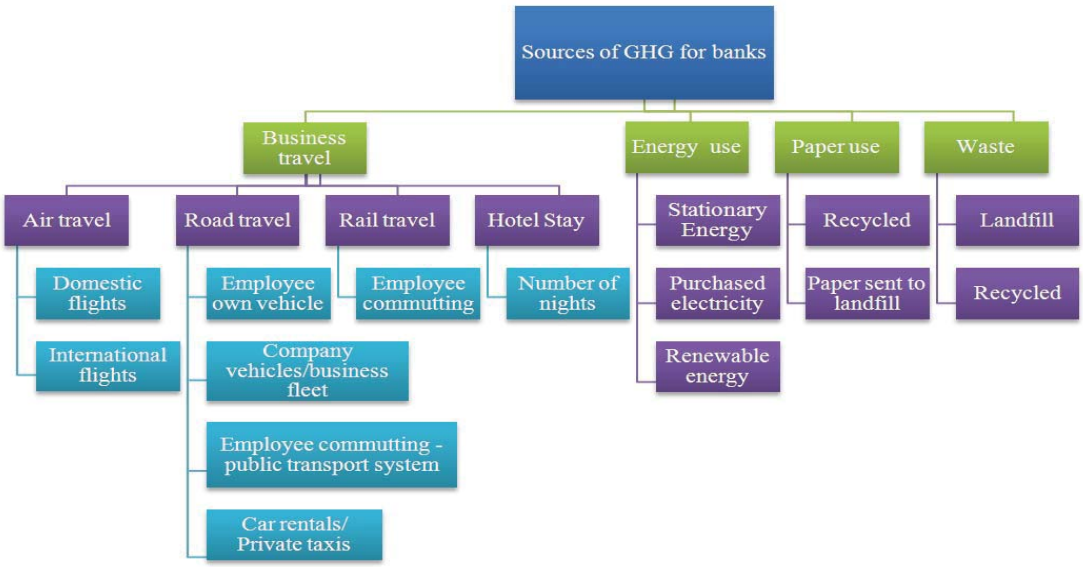


Fig. 5. Generic GHG inventory for a bank – based on South African banks data

It can be evidenced from Tables 8 and 9 that most South African banks are using the GHG Protocol to carbon footprint their activities and have a fairly detailed carbon footprint of their internal operations. It is a matter of concern to note the lack of proper carbon footprinting by the development banks, IDC and DBSA, both of their internal and external operations. Development banks fund huge infrastructural projects which require proper environmental impact analysis and climate change impact analysis. However, about four banks (Nedbank, Standard Bank, African Bank Investments Limited and Capitec Bank limited have detailed GHG Protocol carbon footprints.

Table 7. Qualitative aspects of carbon footprinting by South African banks

Bank	Approach/Strategy of carbon footprinting	Aspects covered in Carbon footprinting Internal operations	Aspects covered in carbon footprinting external operations	Standard of Reporting GHG performance and verification of GHGs
Standard Bank Group limited	GHG Protocol – operation approach	Detailed GHG Protocol (scope 1, 2 and 3)	Carbon footprint measurement tool for our customers who operate vehicle fleets – ECO2 Fleet tool	Internal Environmental Management System. GRI reporting – Verification using GHG Protocol – External Auditor
Barclays Group Africa – formerly ABSA Group	GHG Protocol – operation approach	Fairly detailed GHG Protocol (scope 1, 2 and 3) – though not all group operations are covered – issues in properly collecting operations data (electricity reading, paper usage, energy usage)	None	Verification using GHG Protocol – External Auditor
Nedbank Group Limited	GHG Protocol – operational control – excluded some data for scope 1 and 3 – which is currently unavailable – excludes emissions from operating and servicing ATMs, Self Service terminals, point-of-sale device located away from premises, branches and in remote locations	Detailed GHG Protocol (scope 1,2 and 3) plus greening the supply chain	Have wide array of retail, wholesale and institutional investment and deposit products that are channelled toward financing green projects. However product carbon footprinting is not done.	Verification using GHG Protocol – External Auditor GRI G3 reporting
Firstrand Bank Limited	GHG Protocol – operation approach	Fairly detailed GHG Protocol (scope 1, 2 and 3)	None	GHG Protocol – KPMG audited – External Auditor
Investec Limited	GHG Protocol – operation approach	Fairly detailed GHG Protocol (scope 1,2 and 3)	None	Environmental management system compliant with King III in South Africa and ISO14001:2004. International Standard on Assurance Engagements 3000 (Revised)

Table 7 (cont.). Qualitative aspects of carbon footprinting by South African banks

Bank	Approach/Strategy of carbon footprinting	Aspects covered in carbon footprinting internal operations	Aspects covered in carbon footprinting external operations	Standard of reporting GHG performance and verification of GHGs
Industrial Development Corporation of South Africa (IDC)	Not clear – Only do for the Head Office in Sandton	Sparsely detailed – not clearly stated if GHG – Protocol is used	None	Not clear
African Bank Investments Limited (ABIL)	GHG Protocol – operation approach	Detailed GHG Protocol (scope 1, 2 and 3) plus Greening the supply chain	None	Account Ability AA1000AS (revised, 2008), GRI (Global Reporting Initiative) G3.1 guidelines, King III Reporting guidelines
Development Bank of Southern Africa (DBSA)	Not clear	Not provided	None	-
Capitec Bank holdings limited	GHG Protocol – operation approach	Detailed GHG Protocol (scope 1, 2 and 3)	None	*Verification using GHG Protocol – External Auditor GRI G3 reporting*

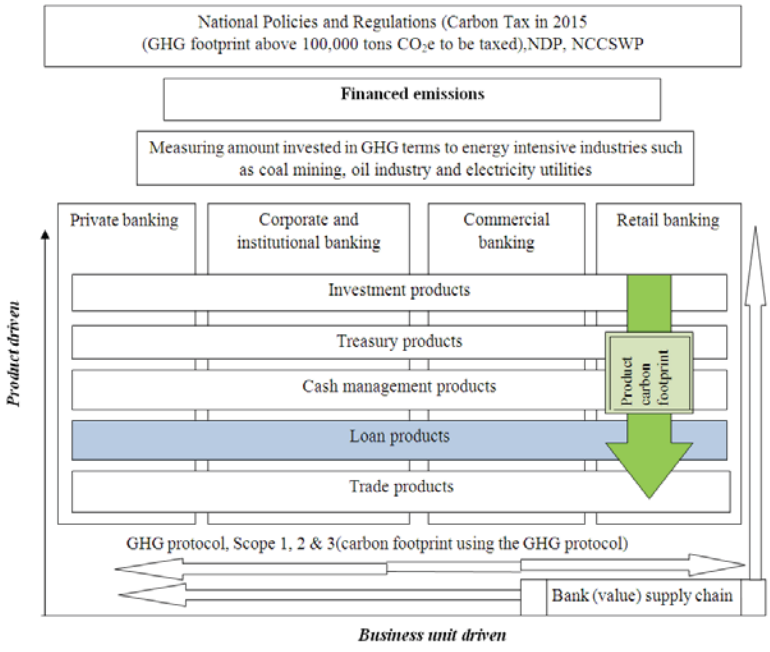
Table 8. GHG protocol quantitative aspects in carbon footprinting – South African banks

Bank	Standard Bank South Africa	Barclays Africa Group	First rand group	Nedbank Group	Investec	IDC	ABIL	DBSA	Capitec Bank
Scope 1: Direct GHG[1] emissions from: ($tC0_2e$)	9.198.00	15.626.00	8.398.00	847.55	1.174.00	613.30	20.468.00	-	145.61
(Fuel used in equipment owned or controlled by us (eg generators))	642.00	-	390.00	203.96	-	6.70	41.00	-	1.37
Business Fleet Vehicles	8.556.00	-	8.008.00	56.53	-	51.50	17.892.00	-	81.74
Jet Fuel		-		-	-	179.60		-	-
Air-conditioning and refrigeration gas refills		-		587.06	-	375.50	2.535.00	-	62.50
Scope 2: Indirect GHG[1] emissions from ($tC0_2e$)	363.916.00	316.407.0	257.172.00	164.803.52	40.698.0	5.774.50	39.044.00	-	22.971.00
Purchased electricity – SA	363.916.00	-	257.172.00	154.022.54	-	5.774.50	39.044.00	-	22.971.00
Purchased electricity – Non SA		-		10.780.98	-	-		-	-
Scope 3: Other indirect emissions from: ($tC0_2e$)	38.975.00	18.876.00	19.992.00	60.658.73	13.858.0	-	13.938.00	-	5.077.46
Business travel in commercial airlines	13.868.00	-	6.003.00	7.606.11	-	-	485.00	-	962.43
Business travel in rental cars	186.00	-	8.087.00	504.36	-	-	54.00	-	45.50
Business travel in employee owned cars		-	-	7.788.30	-	-	604.00	-	2.020.24
Employee commuting		-	-	41.248.00	-	-	10.656.00	-	-
Paper consumption	10.217.00	-	2.729.00	3.511.96	-	-		-	402.38
Electricity (transmitted and distributed)	14.704.00	-	-	-	-	-		-	-
Transportation and distribution		-	-	-	-	-	1.760.00	-	-
Product distribution (cash in-transit)		-	-	-	-	-		-	1.646.91
Waste		-	-	-	-	-	379.00	-	-
Refrigerants		-	3.173.00	-	-	-		-	-
Total GHG ($tC0_2e$)	412.089.00	350.909.0	285.562.00	226.309.80	55.730.0	6.387.80	73.450.00	-	28.194.07

It can be observed from Table 4 through to Table 8 that South African banks have the same approach of carbon footprinting similar to the banks with high CDP scores. The cause of this similarity might be the use of the GHG Protocol formats to carbon footprint their banking activities. Similarly, there is little or no evidence from both the banks with high CDP scores and the South African banks on carbon footprinting of their external operations. The external operations, which are termed financed carbon emissions and product carbon footprint remain a weakly reported area. From the literature, it has been identified that banks are not carbon footprinting their products or services and financed emissions through investments (long and short term), lending and savings products (see for example, Cogan, 2008; Bray et al., 2007; World Development Movement, 2012; Kolk et al., 2008, Busch et al., 2007). One of the major results of this study is that banks mainly have detailed carbon footprints of their internal operations rather than their external operations. The CDP reports further confirm this.

5. Proposed conceptual framework for carbon footprinting in South African banks

Given the foregone, we present in Figure 6 the desired conceptual framework of carbon footprinting of banking operations. This conceptual framework is based on the content analysis and exploratory survey done on both the international banks with high CDP scores and of the South African banks. The schematic view in Figure 6 presents a widened scope of how the South African banks can carbon footprint their operations. Particularly there is need to broaden the sources of carbon emissions in the scope 3 of GHG protocol by South African banks. Further, for the external operations, there is need to put systems in place to measure the financed emissions and carbon footprint bank services and products. Our proposed conceptual framework is also grounded in the carbon footprinting requirement framework that is emerging within-the country as informed by the olicy and regulatory framework. The following keypolicy pronouncements will be briefly discussed tosupport the proposed framework: National Climate Change Strategy White Paper (2011), National Devel-pment Plan (2012) and the proposal for the CarbonTax Policy (2013). In the National Development Policy (NDP) one of the strategies proposed in ensuring a low carbon economy is to quantify the carbon emissions in every infrastructural investment decision as an environmental assessment procedure government-wise. More so, each economic sector will have a carbon emissions budget, guided by given mitigation quantitative emissions objectives (National Planning Commission, 2011). The suggested carbon pricing mechanisms in National Climate Change Strategy White Paper (NCCSWP) have been incorporated in the NDP and by 2015 the carbon pricing mechanism of carbon tax will be implemented. The Carbon Tax Policy paper has currently been opened for review and it takes a cue from the NCCSWP in making carbon tax the most effective mitigation tool for GHG emissions in South Africa (National Treasury, 2013). These three national policies confirm the implementation of the carbon tax as a policy for controlling GHG through proper set up structures and systems to quantify emissions in each economic sector. This has a bearing to the South African bank's investment and lending portfolios which have large concentrations of mining and natural resources based industries.



Source: Authors (2013).

Fig. 6. Conceptual framework for carbon footprinting in South African banks

As deliberated upon earlier, there is a need for the South African banks to work within the national policy and regulatory framework addressing climate change initiatives intended for the corporate sector. It is inevitable that in the near future there are regulations that will be put in place by the South Africa government to ensure that the country show its seriousness in networking into the low carbon global economy. Therefore in the schematic view in Figure 6, the emphasis has been put on the carbon tax that is to be introduced in South Africa in 2015 as a driver to push the corporate and industrial sectors to measure and manage their emissions. It has to be observed that the bank supply chain runs across its functional or segmented business units as well as its product range. Thus in carbon footprinting the banks should take cognisance of the product or service components as well as the bank's business segments

(units) that are liable to carbon emissions to properly measure their carbon emissions. The schematic view in Figure 6 enables a holistic measuring of a bank's sources of emissions both in its internal operations and external operations through finding the sources in its business units and its products and services.

6. Implications of the study

There are a couple of issues that need to be considered when implementing the proposed conceptual framework for carbon footprinting by the South African banks. The banks need to research more on how to quantify carbon from services in a scientific way. More so, robust data collection system should be put in place so that accurate information is given in terms of electricity usage, fuel use, distance travelled (kilometres), waste (amount recycled and amount sent to landfill), paper usage and lastly the amount of investment and lending that caused carbon emissions. Measuring carbon emissions should inform the process of managing the reduction of carbon emissions. Hence there is a need to research more on carbon emissions reduction systems that can be used by banks in the country. Furthermore, it will be inevitable that South African banks link their carbon emissions to the expenses incurred in reducing those carbon emissions. Therefore, there will be a need to study the links between carbon emissions and the financial state of banks. Furthermore, there is a need to properly measure the unit amount of each investment and lending done by a bank in causing carbon emissions. On the other hand, it will be expedient to be cognisant of the need to balance economic growth with the achievement of a low carbon economy. In way, carbonfootprinting the financed emissions will assist the navigation of any country's economy on the trajectory path to a low carbon economy.

Conclusions

Stemming from the problem of South African banksbeing mostly internally focussed in measuring their ar bon emissions, the study has managed to present a desirable strategy of how these banks can measure both their internal and external operations' carbon emissions. Various methods of measuring carbon emissions were reviewed and it seems the most widely used method is the GHG Protocol. This method has a limited scope for measuring carbon emissions financed by banks which in this study are termed external operations. Through a methodology of forming a model or benchmark for carbon footprinting in banks, the study has managed to gauge the state of carbon footprinting in the South African banking sector. The benchmark was made from leading global banks featured in CDP Global 500 report based on their carbon disclosure score. From the benchmark or model, it could be seen that globally, banks focused mainly on carbon footprinting their internal operations and there is limited scope of accounting the carbon emissions caused by their lending and investments. The trend was the same with South African Banks. In the course of reviewing literature, it emerged that various methods have been devised and these pertain mostly to quantifying the carbon emissions to lending done to energy intensive industries. GHG protocol is also working on a financial sector tailored tool that banks can use to measure the carbon investments from their investments. Though internal operations of banks have small amounts of carbon emissions, their investments and lending (external operations) have huge amounts of carbon emissions emanating from energy intensive industries. It can be observed from the study that the financial sector has a huge risk from climate change than ever determined before. This calls for banks to widen their scope of measuring carbon emissions caused by their investments, lending and services or products.

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