EBS ADVISORY

ESG | RISK | STRATEGY | COMMUNICATIONS | IMPACT

Impact Modelling Services:

Quantifying your TOTAL return on Equity

EBS are pioneering impact modelling in African investment for the following benefits to our clients:

1

Protecting the downside:
Exogenous sustainability issues will dominate the global stage within the current and foreseeable future. Therefore, we believe that any critical business decision that does not take ESG and sustainability factors into account, will expose the business to increased risk and loss of value generating opportunities. Impact models provide insight into how ESG and sustainability factors influence the strategy and financial health of assets and portfolios.

2

Telling a credible & positive story:
As the only institutional investor class which is taking a view on the SME sector in emerging markets, private equity investors are at the cutting edge of job creation, skills development and diversification of the tax base. The majority of private equity fund money coming into Africa comes from developmental partners, developmental banks and impact-oriented family offices and high net worth individuals. Whereas fund managers have excellent teams and tools to express their commercial returns, they haven't even started the journey of beginning to tell a very positive story of the social and societal impact as a result of their investments.

Our Approach

Almost all the impact reporting that currently takes place from emerging markets, especially Africa, focuses on outcomes and not impact:

Theme	Output		Outcome (Example of an Impact)		Contribution to Project P&L or Balance Sheet or Carry to give ROI (Return on Impact)
Gender issues	Number of women employed	MODEL	Improved family planning, as a result of women being able to purchase contraceptives directly from their own banks accounts, with the pills being delivered to the workplace	MODEL	Improved female labour productivity as a result of fewer dependents per female employee, lower maternity leave and better ROI on training
Job creation	Number of jobs created		Percentage change in disposable household income for a community within the labour catchment area for the project		Lower industrial action events as a result of greater purchasing power within the community

The relationship between the output – impact – ROI (return on impact) is most cost effectively determined through impact models. At EBS, we have two approaches to developing these models:

1

Our models can be purpose-built: During the initial client engagement we identify the exact reason and purpose for the model. And from our stakeholder engagement exercises, we understand the empiric relationships between outcome and impact.

2

Leveraging purpose-built software, we can deliver the same results more efficiently and cost effectively. Therefore, our modellers are proficient in developing solutions using a number of established programs including Crystal Ball, @Risk and Statistica. One of the key benefits of using established modelling software is that the testing and integrity of the software has already been undertaken, thereby reducing the time and cost of developing a solution.

Type of Model	Types of Model Outputs	Output examples
Socio-economic	• Impact on local economy • Predicting number of jobs to be created • Assessing the improvements in household disposable income	• Local economic impact and development (LM3) • Impact on national economy (non-CGE) • Basic CGE (up to 12 industries) • Impact of regulation and policy • Microeconomic (industry level) impacts and changes • Supply / demand analysis for new investments • SROI • Progress out of poverty
Financial	• To what extent will investing in ESG initiatives enhance our exit valuation for a portfolio company? • Can we shift our rate of return by leveraging the sustainability agenda? • How can a focus on ESG improve asset performance and ultimately drive value? • How do we measure economic return as opposed to accounting return?	• NPV • VAR • IRR / MIRR • CFROI • Options pricing • Portfolio models
Scenario Planning	• What are the key ESG considerations that will influence future value and to what extent should they be monitored and measured? • Are there any exogenous factors, that we are currently unaware of, that can significantly impact value creation? • Does it make sense to change our asset holding period in order to maximise our economic return? • How can playing games (game theory) unlock future value?	• Options modelling / exit timing • Cost of scenario • Market sizing • Ecosystem valuations and influences
Process model for optimisation	• Optimisation of a production process from, for example, a conversion of energy source or raw materials supplier • If we engage more with our labour, how much will our labour productivity increase?	• Work flow studies • Feasibility studies for process modifications • Life Cycle Assessment models for input substitution or procurement options
Portfolio	• Can we improve the risk / return relationship by considering a more optimal portfolio? • Are we holding assets in a portfolio that are destroying value? • Should we add a fundamentally different asset to our portfolio in order to reduce our risk per unit of return?	• Optimal portfolio • Asset allocation • Portfolio return on ESG investment
Statistical	• How can we use our current information and data to forecast future performance? • Is the data we collect accurate, reliable and relevant, such that we can use it for decision-making purposes? • Are there any significant outliers that are providing hidden messages to opportunities or risks?	• Predictive forecasting (including seasonality and trend) • Risk / opportunity identification • Time series analysis • Research methodology design

Quality Control:

Our results are credible and defendable if the following conditions are met:

1 The model is mapped and constructed accurately. At EBS, we check for errors in our assumptions in relationships, formulae or omissions in key variables by mapping architecture of the model:

a. Testing the relationships in the model, and
b. Calibrating the model.

2 We run diagnostic assessments of our models, which test for errors in formulae and broken links.

3 We benchmark our results against at least 3 well-known and independently tested models which we approximate as closely as possible to the system we are trying to model. Examples used by EBS staff include Oracle Crystal Ball, Statistica @Risk and JMP.

4 We obtain external peer reviews from subject-matter experts of 20+ years' experience.

Hence, our clients can be confident in our results to a level of accuracy determined by your budget and the accuracy of the data inputs. Engaging with all four quality controls as per the above, we are confident with our results.

Ensuring the Quality of Data

In our experience, we do not trust most of the raw data we receive. As part of our services, we therefore check the integrity of the data against a set of statistical tools, including:

- ✓ Data distribution,
- ✓ Trend Analysis, and
- ✓ Normalising and standardising data, especially where the underlying assumptions regarding the data has changed in the past.

Our Methodology / Approach

Step 1	Set the strategic hypothesis and questions that need to be answered.
Step 2	Understand which questions, if any, can only be answered through the development of a model (financial, economic, process, etc).
Step 3	Clearly define the scope and boundaries of the model (models must address specific questions). Note: A common mistake is to get overly invested in the model whereby one starts to use the model as an "oracle". The model must only be used to achieve the stated purpose.
Step 4	Design the model architecture and approach, the mechanism of action, the variables and data required and the interaction and relationships between the variables.
Step 5	Understand the data required to be collected, the data type, sources and boundaries.
Step 6	Collect and test the data. Ensure the data is relevant, reliable, accurate, credible and usable. Test the data for anomalies, outliers and inconsistencies.
Step 7	Build and test the model. Test the model to ensure it is working the way it is designed to work.
Step 8	Calibrate the model. Run the model to identify any errors and fix where necessary.
Step 9	Generate results. Run the model with the actual and cleansed data.
Step 10	Develop conclusions from the results.

Types of Applications to ESG

Ecosystem Valuation Tools, such an INVEST:

- Loss of biodiversity on and around agricultural property and its impact on yield
- Financial impact of climate change on an outgrower scheme for an agricultural processing company
- Financial risk (value at risk) of significant environmental changes due to climate change

Socio-Economic:

- Local economic impact from investments
- Calculating the social return on investment
- Modelling impacts to progress out of poverty of a defined community, such as a labour sourcing area
- Assessing community impacts under different scenarios – including option pricing

Resource Efficiency modelling:

- Life Cycle Assessment: modelling the environmental and social impact of changes to process or product design (for example, the carbon impact of different types of packaging choices)
- Correlation between management interventions in working conditions (such as health and safety, HIV counselling and testing, staff engagement programs, etc) and labour productivity

Case Study: Detecting Errors in Excel

We developed a financial valuation model to test and assess the impact on a listed company's operations, if the energy fuel type was changed from conventional energy to alternative sources. During the insight development phase we detected that the results were materially different from the expected outcome (a few hundred million Rand). After performing a full model audit we confirmed that the model algorithms were correct and that the model was performing as designed, therefore we had to look for issues that were not inherent to the model itself.

Following a detailed assessment and the development of all algorithms from first principles, we identified that the issue was in fact an error in the coding of Excel itself. The built-in excel function for the calculation of present value annuities was set as annuity in advance for default as opposed to annuity in arrears. This was causing the model to calculate one month less revenue per period. By designing the model from first principles we overcame this issue and ensured that the model results were accurate and credible.

This information was provided to Microsoft to highlight the problem.

Previous Clients and Models

Client Sector	Opportunity	Model	Tools used
Energy (utilities, oil & gas, electricity)	Changing the energy mix from conventional thermal to include higher proportions of renewable energy	Built a stochastic model with over 200 variables to test different ranges of NPV and identify those variables that had the largest impact on value creation or destruction	Excel with VBA
Energy (utilities, oil & gas, electricity)	Assess the impact on an energy portfolio by adding renewable sources	Created a portfolio optimisation model using the efficiency frontier to understand which portfolio minimised levelised energy costs against the minimisation of CO2e emissions	@Risk
Insurance	Market entry assessment for a mobile-technology enhanced insurance product	Built basic level economic growth models for 27 African countries taking into account over 50 socio-economic factors that could influence adoption of technology and product	Excel with VBA
Water utility	Understand the financial benefit of outsourcing production of burnt lime and mothballing the organisations kilns	Developed a deterministic model to assess three primary options 1) outsource all burnt lime production and mothball kilns, 2) Partially outsource burnt lime production and 3) Expand kiln operations to serve other markets	Excel
Petrochemicals, chemicals and industrial processes	Understand the implications of different carbon tax regimes with current processes	Developed a four scenario model with option pricing to understand under which particular future the company would have to change processes to offset the impacts of carbon taxes	Excel with VBA
Sustainability technology roadmap	Map out potential future technologies (renewable, energy efficient, disruptive) and the optimal starting time for research and development of new products	Mapped out 16 future scenarios and the likely technologies that would be required under each scenario. Assessed the future global cost of each scenario and the technologies that would be required to bring the world into a low carbon economy	Excel with VBA
Developmental finance	Understand the socio-economic and national impacts of developing a new industry in a country	We developed a basic CGE model that unpacked the current scenario and the implications of the current scenario on the GDP and BoP of the country. We then extended the model to take into account the new industry and assess the implications to improving the country's economic prospects	eViews and Excel with VBA
Property development and management	Understand if our client could isolate the key factors responsible for rent payment defaults and produce a pre-screening tool to reduce bad debts	Using customer information and payment history we developed a model that assessed the correlation and causality between customers' social characteristics and industry against payment levels, defaults and macro-economics	Statistica
Market segmentation	Leveraging more than 20 years of customer behaviour data to redefine the market segments	Traditional market segmentation is built around customer characteristics and demographics, such as age, gender, socio-economic status, etc. We used the data to understand market segmentation based on customer behaviour regardless of demographic variables	Self-organising maps and Excel with VBA

Join our Impact Modelling Circle

The middle class in Africa is the least researched but highest growth consumer market in the world. In order to enhance our ESG decision-making tools, EBS is building a database of non-financial information across the continent.

We collect data from each of our 300+ clients' portfolio companies and perform the following analysis on a quarterly basis:

- Socio-Economic Impact at a local (i.e. municipal) and national level.
- Progression out of Poverty impact for staff.
- Labour productivity analysis and Wage data, expressed as Return on Investment for Wages and Salaries.
- Environmental resilience data, such as weather-events and climate change data.

EBS intends to publish this research, which would be freely available to those clients that have assisted with data provision and collection, and also publish reports for sale in the general market. Such data will be provided in a format which allows benchmarking against ESG performance criteria per country and sector.

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