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Chapter

Social Impact Returns. Filling the Finance Gap with Data Value

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Abstract

Sustainability, regulation and environmental issues such as climate change and resource scarcity are emerging as key trends with decisive impact on company's Risk management, value creation and growth strategy. This combination represents one of the biggest opportunities to Society as a whole, including organizations, Governments and citizens. Typically, companies possess vast amounts of data, most of it unutilized. Many are now making investments in digital transformation, which generates even more data. The issue is how to generate social impact returns. The use of data and data analytics is centuries old, but with Artificial Intelligence (AI), Machine Learning (ML), jointly with other distributed ledger technologies (Blockchain, Cloud) that are advancing rapidly, there are major opportunities to capture value better, cheaper and faster. Speed is of the essence, and success depends on how fast organizations understand the need for non-financial risks management and respond to data-driven intelligence by reallocating resources to accomplish what needs to be done more efficiently. The reason for impact returns is understanding the benefit as a common value, not exclusive to companies, but it also has to distribute value among individuals, communities, and why not, to contribute to regenerate our planet based on a new economy.

Keywords: Social Impact Return, Sustainability, Risk Management, Data Science, Quantitative Modeling, Competitive Intelligence, ESG, Advanced Analytics, Profit Enhancement

1. Introduction

The future is already here. Several new players have already begun to understand the state-of-the-art Sustainability, while others are still in its infancy. There are new tools and techniques to respond to data-driven needs constantly appearing, and at the same time the demand for environmental, social and governance compliance is racing ahead.

The idea of sustainability dates back to the Industrial Revolution, early 20th century, when two opposing factions emerged within the environmental movement: the conservationists and the preservationists. The conservationists focused on the proper use of nature, whereas the preservationists sought the protection of nature from use. In the 1970s sustainable development was a key theme of the United Nations Conference, where the concept was coined to suggest that it was possible to achieve economic growth and industrialization without environmental damage. In the last decades the concept was further refined as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' [1].

In essence, the problem today to be addressed has three main elements: 1) unsustainability of current social lifestyles; 2) new regulation on non-financial reporting; 3) introduction of alternative means of payment to exchange transactions.

According to recent studies unsustainability of consumption and production poses a major social problem. If the population reaches 9.6 bn by 2050, we'll need 3 planets to sustain current lifestyles [2]. The proliferation of brands and parties that compete towards a market that is limited in resources induces fierce competition. This is no longer sustainable for customers, who must face increasing costs and prices, but also for small and medium businesses which end up running out of business. Beyond customers and companies there is even one more overarching and vulnerable affected target by environmental accelerated destruction: the community.

Envisioning a gap to evaluate performance and develop a responsible approach to business, the European Commission amended the law to require large companies to disclose certain information on the way they operate and manage social and environmental challenges [3, 4].

Increasing importance of non-financial performance requires large companies to measure and report such type of indicators, namely social and environmental impacts of their activities.

Tracking impact performance and alternative frameworks to shape a better future offer the potential of standardizing metrics and catalyzing value creation towards common goals.

The focus of rewards is no longer just economic and thus customers are increasingly demanding new ways to interact with companies in exchange of a promise for future service [5]. At this point operationalizing value capture from high impact data comes in. This is also known as Operationalized Data Monetization (ODM).

Data and data analytics are accelerating exponentially. According to one survey, 55% of IT leaders named data analytics as one of their main priorities in 2019. (Only security was ranked higher, at 57%). Additionally, 3 of the Top 13 Priorities for Executives and Board Members were related to Data [6] (**Figure 1**).

The rise of digital technologies is reshaping customers' habits and company strategies. And to stay competitive, enterprises – usually responding to suggested digital transformation strategies and "best-in-class" digital benchmarks – are racing to respond to these trends.

Jolted by the resounding success and sheer scale of the 21st century AI and ML-driven digital behemoths (such as Google, Amazon, Alibaba, Tencent, Alipay, Baidu, and dozens of fintech and insurtech startups), companies have plunged headlong into digital transformation [7–10] in the hope of stemming the long-term disruption to their businesses. However, the success rate of digital transformation has proved to be very low. According to recent studies [11, 12], more than 80 percent of analyzed companies have faced limitations in making successful digital changes to their business.

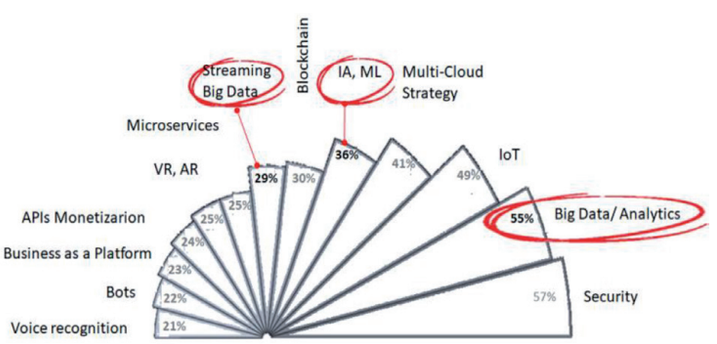

Figure 1.
Top technology investments for 2019. Source: MuleSoft.

Most of these companies have missed out on the high-impact value-creation opportunities because of a failure to differentiate between digital transformation and data value capture to generate social returns. Digital transformation, in addition to improving the customer journey, also produces quantities of internal and external data. Data value capture, on the other hand, is the use of data to create economic value and social returns. Survival and let alone sustainable growth require companies to reach the minimum high impact data levels; as of today, there is still a long way to go.

A framework to measure social impact filling the finance gap has been woven into this article. It demonstrates the range of opportunities that can be achieved by adopting data and Sustainable Development Goals (SDGs) as core strategy.

The increasing importance of sustainability for organizations is backed, not only by the fact that most corporate leaders are incorporating environmental, social, and governance (ESG) issues in their agenda but also sustainable funds more than doubled 2019 records, reaching over $51 billion in new investments, accounting for 25% of global new investments [13].

Executives and Leaders understand that taking responsibility for each of the sustainability pillars (economic, environment and social) implies accountability and impact on people, planet and profits; thus business performance and results.

Performance and results are mainstream measured and evaluated from the financial dimension; which is not comprehensive. This study aims to bridge that gap and raise awareness of the need to introduce the non-financial dimension. Such dimension can be easily understood in the current context of the COVID-19 pandemic situation; which has demonstrated that non-financial risks can pose further damage and in a more significant way than any of the precedent economic crisis.

Duality of models and frameworks is not yet a common practice but combination of quantitative and qualitative metrics is the path to superior and sustainable performance through continuous improvement. Filling the finance gap is challenging but undertaking a proper approach is also doable. And in this context is where technology as a facilitator is key to make it happen.

2. Social impact returns

2.1 Call to action. Solution is duality

The use of data and data analytics is centuries old. Developing technologies and tools together with decreasing data costs have eased that firms increasingly use data as support for decision making.

The cost of computation is roughly one hundred-millionth what it was in the 1970s. And the cost per megabyte of data storage has fallen from US$85,000 in 1956 to just $0.00002 today in constant dollars. Furthermore, connection speeds of hundreds of megabits per second now cost only tens of dollars per month [12, 14]. As a result, organizations have installed a myriad of systems – computers and software – to enhance their services, resulting in the capture and storage of enormous amounts of data, most of which remains underutilized [15].

It can be empirically and statistically observed that reliance on just quantitative (data based) models and attempting to exploit and understand all the data investing heavily in Data Lakes and Advanced Analytic tools does not work. The qualitative component, which includes counting on the right people and skills, is essential to enhance decision making.

Towards the end of the 16th century, insurance companies were formed on the basis of the monetization of shipping data [16–18]. Actuarial science applied to longevity and health are the backbone of the life and health insurance industries

and have been around for decades [16, 19]. The same is true for the linkage between weather forecasting and commodity trading [20, 21]. There are many other familiar examples where the true value is captured through the combination between quantitative and qualitative aspects. This is what we refer to as need for duality.

Duality is present in every aspect of our lives: humans are rational and emotional; animals have a physical and psychological component; customers are no longer just interested in products but also in user experience; major risks caused by extrinsic and non-business related causes may result even more harmful by those that can be measured by traditional economic KPIs. All in all, we are shifting from the "what" to the "how" and this can have a clear impact on profitability and performance.

Defining and quantifying Key Performance Indicators (KPI) and undertaking these as the basis for operating decisions must be done. But to succeed, beyond just quantitative data, there is a need to introduce a qualitative component to understand which is the minimum data required for high impact decisions (**Figure 2**).

2.2 Quanti- vs. quali?

The answer is both. There is no single vision for Sustainability nor one definition for social impact return. Many will link these concepts with Corporate Social Responsibility (CSR), others with environmental problems, and very few will get it right by understanding that it is simply "the act of generating measurable economic benefits from available data sources".

To illustrate the call for quanti- + quali- based models, let us take the financial sector. The need for such combined framework emerged and materialized with the reform of the Basel Accord (1988), relying on three pillars: capital adequacy requirements, centralized supervisory and market discipline [22, 23].

For the purpose of understanding the framework proposed, we can draw the following analogy:

- Quantitative level = > companies must provide data (KPIs) that comply with required thresholds.

- Qualitative level = > Data needs to be qualified, certified and understood under common and homogeneous supervisory criteria.

- Relationship and correlation of both = > results at one level (e.g. quantitative) impact and are interdependent with the other (e.g. qualitative) and vice versa. If no relationship is drawn between both and results at one level are not used to

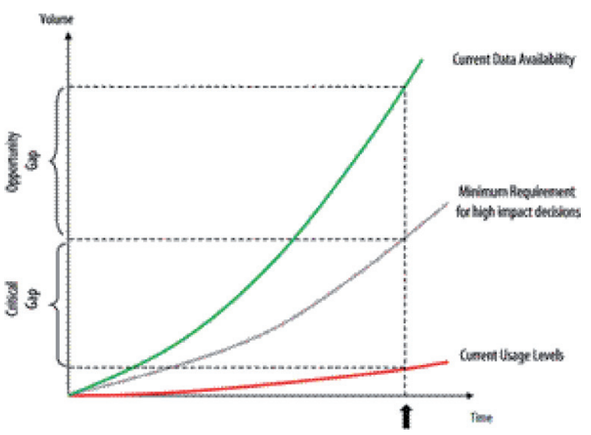

Figure 2.
The data intelligence gap. Source: The Gartner group, Essex.

feed back the complementary level, the ability to systematize a dynamic of continuous improvement and sustained profitable growth will be limited. This was precisely one of the core reasons for the amendment of Basel Accord [24, 25].

2.3 Non-financial risk management

The Non-Financial Reporting Directive (2014/95/EU) requires large public interest entities with over 500 employees (listed companies, banks, and insurance companies) to disclose certain non-financial information. As required by the Directive, the Commission has published Non-Binding Guidelines to help companies disclose relevant non-financial information in a more consistent and more comparable manner. However, to date it is unclear for companies how to comply with the Regulation and at the same time it is also unclear who/how to certify that companies are compliant with the Regulation.

How to respond to these challenges? In this regard we have developed a solution for non-financial reporting based on a dual model (quantitative + qualitative KPIs) that makes converge people, technology and social impact.

Social return can be measured by the value enterprises create by utilizing their data to develop and implement their products and services profitably while they contribute to attain the Sustainable Development Goals (2030 Agenda) [26]. To achieve this, companies will need to embark on a shift in organizational behavior, designed to opt for more sustainable ways of working that reduce enterprise complexity, excess of consumption and facilitate impact on society. This transformation entails converting insights into actions. It tackles the following key dimensions (**Figure 3**).

(1) Regulation.

Companies must report non- financial indicators. Such Regulation approved by the European Parliament implies that companies need to adapt and adequate their current reporting.

(2) Social.

Applicability and measurement of company data to contribute towards the Goals of the 2030 Agenda (17 SDGs) demands convergence between People, IT and Social Impact.

Sustainability entitles that companies' investment must generate returns which can be re-invested in producing further improvements. Returns materialize either increasing revenues, reducing costs or aiding in risk control.

Figure 3.
Key components to generate transformation within an organization (specific orientation towards social impact return). Source: Own elaboration.

(3) Standardization.

This dimension is key to avoid complexity and inefficiencies. It promotes co-opetition (collaborate + compete to develop the best) and increase of productivity.

Homogeneous metrics and user guidelines allow to join forces between companies with the potential to generate synergies and multiply social impact returns.

(4) Solution.

To deliver impact, the solution should cover three main objectives:

1. Realistic tool of KPIs measurement
2. Normalization of non-financial reporting
3. Contribution to SDGs

2.4 Diagnose. Bridging the gap

A successful build-up of the financial gap that is tied to social impact generation implies 2 key elements.

1. A thorough diagnose of the macro-context understanding the trends that are shaping the environment
2. Proper identification of key stakeholders

Analysis of the macro-environment unveils that five trends are emerging as those requiring attention from companies due to their impact on costs and profitability; and therefore sustainability (**Figure 4**).

1. The new Era of Return. Transitioning from the "What" to the "How". There is increasing demand for user experience, values, hyper-personalization …
2. New Technologies. IT has become a facilitator of business transformation and new ways of working.
3. Operationalization of Data value capture. Identify high-impact data that can generate a return on companies' investments is imperative.

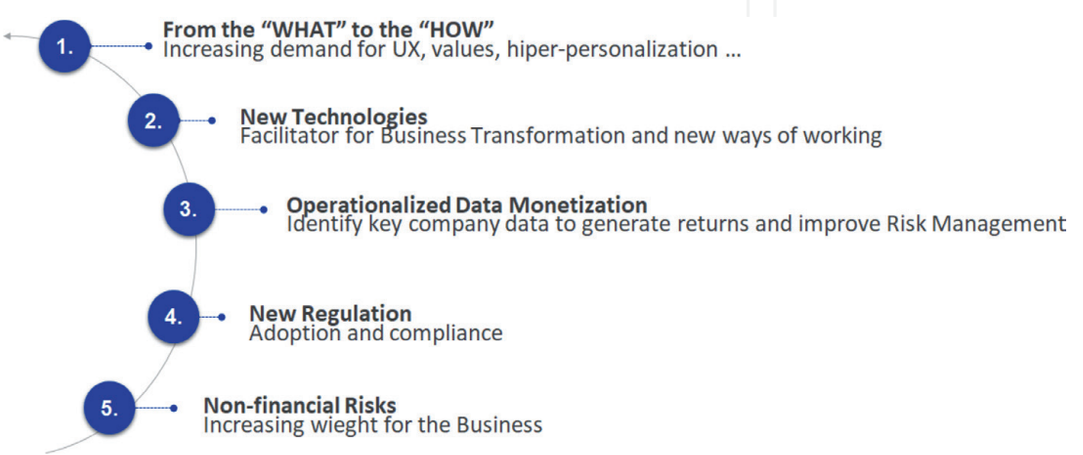

Figure 4.
Key trends with impact on sustainability.

4. New Regulation. Need to adopt and comply with the laws and emerging norms that are becoming stricter.

5. Non-financial risks. Their relevance for business and markets is gaining momentum.

Additionally, who are the parties that need to be part of the solution and what is the role in the overall ecosystem? (**Figure 5**).

We have identified three main categories:

1. Companies: that have the obligation to report

2. Administrations and Regulators: who must certify companies' compliance

3. People/Society: demand information and benefits

All these are part of a model ecosystem whose sustainability needs to be evaluated from different standpoints. First, responsible production; second it needs to rely on a sound supervision and governance model that brings trust, ownership and non-repudiation; third it must look for efficiency optimization; and fourth, continuous improvement needs to be at the core.

2.5 Use case

Many organizations now have analytics departments that can generate data-driven insights. But conversion of these insights into implementable actions is often painfully slow. To make it happen organizations need to interiorize a truly data-driven culture [27–30]. And to accomplish the transformation required, companies will have to take a far more radical approach – less of the old jargon and hierarchical behavior; more data-driven intelligence and a relentless focus on Agile-grounded speed of execution.

Companies subject to the European Regulation for non-financial reporting will undergo the following scenario:

Figure 5.
Identified key stakeholders.

1. Company X needs to report social impact indicators.

2. Employees/people should feel committed to contribute towards the company's sustainable development goals and continuous improvement of associated indicators.

3. The generation of indicators should be automated.

4. Evolution and visualization of performance should be available for society and rewards for accomplishing the goals and producing returns should be rewarded.

The building blocks that can be put together to approach this situation are presented in **Figure 6**.

1. Organizational context. Macro-level. Represents the quantitative dimension.

2. People. Micro-level. Touches upon the qualitative level that will feed back and complement the quantitative results.

3. Dashboard. Critical tool to monitor performance

4. Technology. Is the facilitator.

5. Data.

6. Gamification. To secure user engagement and the overall sustainability of the model.

HOW DOES IT WORK?

Figure 7 provides an overview of the overall process flow and how the relationships between the different components.

At organizational level, the company would need to select quantitative social impact metrics to be included on its report. Those KPIs should be preferably related to the accomplishment of SDGs and aligned with EU reporting standards in a format that can be processed and is interoperable with the Supervisory Board. Specifically, in the case of our solution we have selected html format enriched with

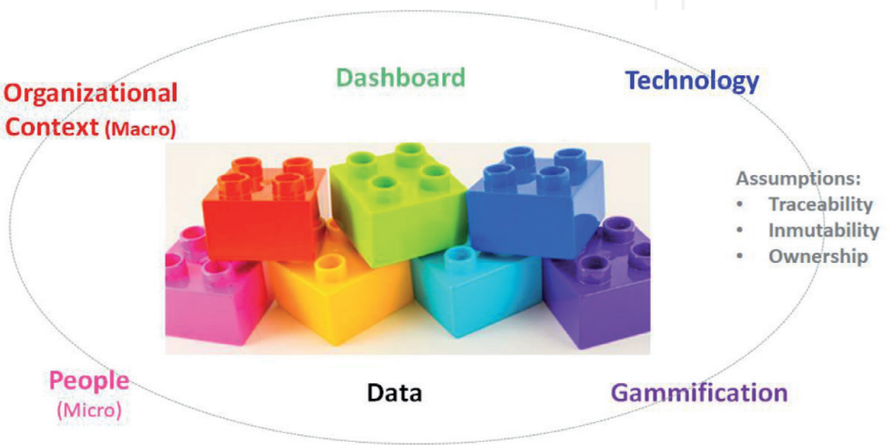

Figure 6.
Building blocks of the proposed approach.

Figure 7.
Process flow. Relationship between components.

XBRL tagged metrics, as an extension of the standard that is already used in financial reporting. The reason for this selection is to ease company's adoption of something they are already familiar with, while lowering barriers from the Supervisory Board to introduce new standards.

As we are in a Regulatory context the need for ownership, traceability and non-repudiation is imperative. Additionally, the technology must be able to address the three pillars of Basel II Accord (Data, Certification and Transparency). Considering its intrinsic characteristics, we opted for Blockchain to provision the Social Impact Reports. Blockchain, beyond its ability to prove trust and immutability of data, it provided another added value: current absence of a Regulatory Body that feels responsible for certifying social impact reports. In a traditional approach, this need would have reflected in additional resources and staff, which we have been able to optimize by means of technology.

As companies are complying with regulatory requirements, they need to receive something in exchange. In our model, we will reward companies with tokens for complying with the regulation. But beyond regulatory compliance we want to incentive companies' alliances to contribute towards the 2030 Agenda SDGs. For this purpose, in our model, companies will also receive rewards for meeting the United Nations' thresholds to attain the expected results.

Results will be accessible on a Dashboard to monitor performance and ensure transparency and fairness of the reporting. But there is something still missing to guarantee the sustainability of the model: people involvement; the qualitative dimensions that provides feedback to the overall model. Based on gamification and AI we generate user engagement to contribute to improve the indicators and benefit from the social impact returns. **Figure 7** shows the overall process flow and the relationships between the different components while **Table 1** shows the value proposition that the model brings for each of the stakeholders.

2.6 PoC: balancing policy measures vs. economic activity

The Challenge.

Find the balance between mitigating policy measures and maintaining economic activity.

The Climate Act calls for a 49% reduction in greenhouse gas emissions by 2030, compared to 1990 levels, and a 95% reduction by 2050. The National Climate Agreement contains agreements with the sectors on what they will do to help achieve these climate goals.

Stakeholder	Added Value
Companies	Solution for non-financial reporting Regulatory compliance Social reputation
Administration and Regulators	Standardization Ease certification Transparency
People	Rewards for contributing towards sustainability Social benefits

Table 1.
Value proposition.

Participating sectors.

Build environment, Electricity, Traffic and transport, and agriculture and land use.

Proposed indicators (**Tables 2** and **3**).

Methodology and approach.

Our proposed solution is inspired by duality and the concept of system of systems [31]. Duality is twofold and implies:

- Use of AI and ML techniques that can emulate the learning capability and at the same time work with complex and large datasets; without forgetting gamification to foster commitment and people involvement.

- From a data perspective, using a combination of privately held and public data to monitor the economic impact of climate change policies in a timely manner allowing agile and balanced policy adjustments.

KPI	Unit of measure
Direct GHG emissions from sources owned or controlled by the company (Scope 1)	Metric tons CO2e
Indirect GHG emissions from the generation of acquired and consumed electricity, steam, heat, or cooling (collectively referred to as "electricity") (Scope 2)	Metric tons CO2e
GHG absolute emissions target	Metric tons CO2e achieved or % reduction

Table 2.
Proposed Indicators for GHG (green house gas emissions).

KPI	Unit of measure
Total energy consumption and/or production from renewable and non-renewable sources	MWh
Energy efficiency target	Percentage
Renewable energy consumption and/or production target	% increase of the proportion of renewable energy consumed/ produced from base year

Table 3.
Proposed indicators for energy.

Due to its capability of learning complex structures in large datasets, deep learning has been applied to many problems in financial markets and sustainability, such as analysis and data modeling to design strategies for investment and trading, prediction of prices, identification of market trends and customer behavior and even maximizing profits and returns. There are even examples of applications of AI algorithms to analyze robotic behavior in Smart cities and to understand the impact of news and information on human decisions and arbitrage [32–45].

The quantitative & qualitative factors both reflect on the solution framework. Beyond the quantitative level based on pure mathematical methods, it incorporates human attributes and capabilities of neurons and human learning. Narrowed to practice, our methodology combines a semi-supervised learning method with Generative Adversarial Imitation (GAIL) and Recurrent Neural Networks (RNN). The figure below illustrates the operationalized framework (**Figure 8**).

The framework is structured into three parts: (1) environment, (2) RNN and (3) GAIL. The environment is a virtual place in which we emulate how the

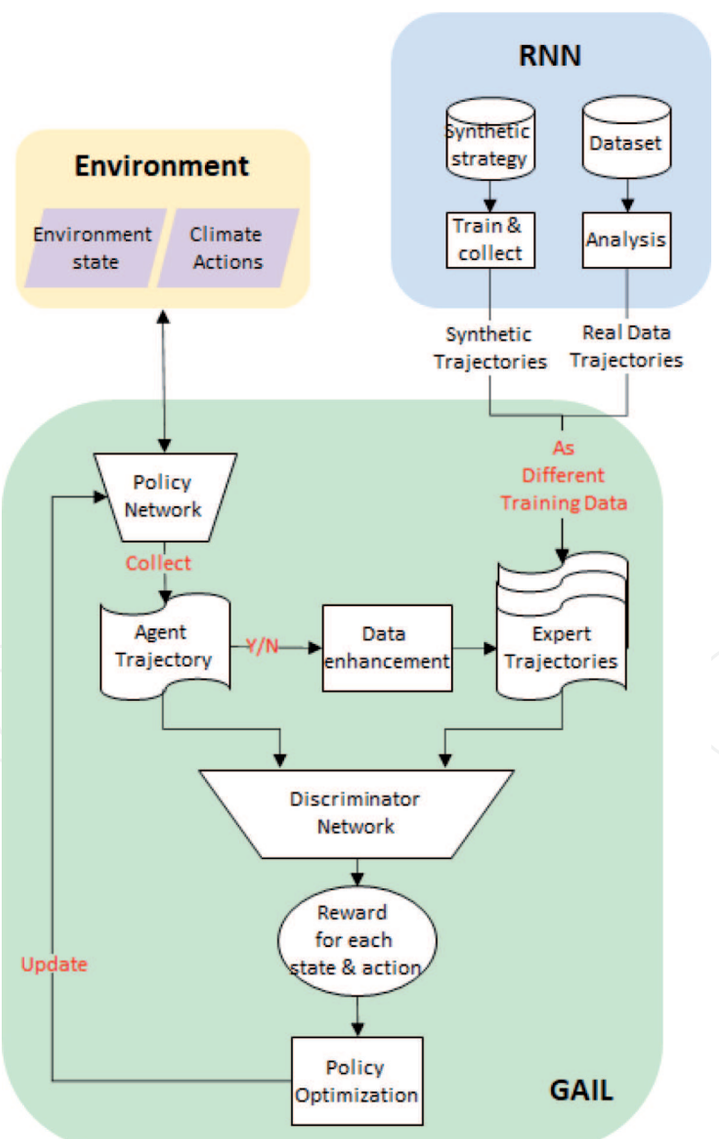

Figure 8.
Operationalized effective management framework to balance policy measures of climate change vs. economic activity.

environment is changing, the impact of climate change and the status of actions and initiatives, etc. Such emulation of the reality helps us practice and identify how Policies can influence and improve the economy. To simulate a realistic market, the environment provides its status (environment state) and the portfolio of climate actions (actions state). The RNN acts as an expert trajectory generator. It produces expert trajectories from raw data (in our problem, training data). Two types of data sources are used in our method: synthetic strategy and real monitored data. During the process of GAIL, we also provide data enhancement to overcome the defects in real data and at this stage we incorporate the gamification factor providing rewards for each state and action.

The actors where this PoC is framed play a crucial role due to their high sensitivity on such a matter as Sustainability and Climate Change, that can have a huge impact on people, the environment and the overarching economic system.

Due to the volatility of datasets, the information from the latest 6-months is generally outdated. Since we are combining privately held and public data to monitor the economic impact of climate change policies in a timely manner, these need to be aligned. Therefore, for the purpose of obtaining relevant results, our approach suggests taking week or few months timeframes, rather than many months or years.

Leveraging on Big Data.

The need to combine different types of data and imitate human learning to excel at decision making, demands putting Big Data at the core. It enables to analyze, extract information in a systematic way and deal with large and complex data sets that are too large or complex to be dealt with by traditional data-processing applications and software.

Privately held data is obtained from mobile phone data, internal company engagement surveys, NPS, satellite imaging, while Public data is sourced from National Statistics office, National banks, fiscal studies.

Based on Big Data platforms we are not only able to cope with data with many fields (columns), which offer greater statistical power, but also avoid leading to false discovery rates which are often associated to data with higher complexity (more attributes or columns).

Algorithm.

For the gamification module we applied the Loyalty Program Liabilities and Point Values algorithm

- We consider a timeframe of T + 1 periods, indexed by t Є {1, ..., T + 1}; a period corresponds to a fiscal period with T→ ∞
- Citizens acquire tokens by purchasing in cash or redeeming actions towards sustainability (bike miles, recycling plastic caps, ...)
- An equivalency between tokens q_t and monetary value p_t is established: $\theta t = p_t / q_t$ (θt =0,196€)
- Tokens are awarded at a fixed rate (λ)

Distributed Ledger Technologies – why are they important?

This PoC tackles the Regulatory environment which implies traceability, non-repudiation and ownership of the results. As of today, in the same way that there are clear responsible Institutions for Financial Reporting Supervision, there is no Organism in charge for non-financial reporting.

In absence of this figure, a solution is to rely on Technology: Blockchain. This technology not only provides the necessary principles of traceability, non-repudiation and ownership stated above, but also have proven to be the only alternative to deal with cases that need to combine Regulation and Economic factors.

In such sensitive context where information needs to be immutable, but at the same time there is no one institution responsible for ensuring this, our proposed solution is that each of the agents are responsible for their own information. All in all Blockchain, due to its intrinsic nature, will play the global role that is yet officially unassigned.

3. Results & discussion

The table below shows a simulation to estimate the social impact of the proposed model (**Table 4**).

With a correlation of 0.87 the model has proven potential to drive social impact returns at SME level, large corporations or country level. The key for the success of such framework is citizen adoption and engagement. All in all, since the model has been developed looking to universal global reporting standards (GRI) and traceability guaranteed by Distributed Ledger Technologies (DLT) it could be extended and tested Worldwide.

In this study, we examined the contribution of non-financial risks to society. When asking companies what is their social impact and the return of their sustainable investments, we often meet a silence. For the first time, with this model, a business that needs to answer this question the next time will be able to provide a quantitative metric. For instance, based on our calculations, a citizen living in a country of an advanced economy, assuming an adoption rate of 65% within a country, could contribute to reduce CHG emissions by 0,97 t during the next 10 years, which would mean that if all countries followed the same example, the objective set by the Climate Act (49% reduction of CHG emissions by 2030) would be feasible to achieve.

It's worth outlining that the backbone of this model is not only the maths and rationality behind, but also adoption and commitment towards a common specific goal. It is considered that for this model to work, a key prerequisite must be satisfied, namely having a joint/compatible goal or problem to solve materialized in a specific metric or KPI everyone understands (it is not enough that parties have their own individual goals and track them in a non-standard way).

It is hoped that this introduction to a new way to measure returns, complementary to traditional finance, will create reflection and commitment to a greater sustainable sensitivity when businesses and event citizens consider how their change of behavior may affect other people, the planet and profits.

Scope	Adoption rate	Rewards per citizen	Social impact return (↓GHG)
SME (100 employees)	80%	203,889	4,5 Tons
Large Corp (35.000 empl)	90%	407,778	3.325 Tons
Country (65 m citizens)	65%	543,704	6,3 mill Tons

Table 4.
Simulation. Social impact returns.

4. Conclusions

As our case study shows, there is an opportunity to use data to fill in a gap in the regulatory and social contexts. Capturing the value of data combined with an appropriate architectural framework and use of technology can rapidly help companies overcome a current compliance challenge while at the same time it can produce social returns that pay for previous years of heavy IT investment that has not yet been monetized.

The value proposition of the proposed approach is understanding benefit as a common value not exclusive to the organization, but it also has to distribute value among customers, workers, the community and, why not, to contribute to regenerate our planet based on a new economy.

Companies need to realize that the future is already here. Data-driven companies that have understood the importance of combining quantitative and qualitative models, Alipay, Tencent, Baidu, Huawei, Samsung, Apple, Amazon, Facebook, Google, and Walmart, to name a few, are rapidly grasping profit enhancement and social impact generation opportunities and filling the wide-open gap left by traditional players. Google (and Baidu in China) is used by every person on the planet who is connected to the internet. Facebook has over two billion customers. Baidu, Apple, Tencent, and Samsung's customer bases are close to one billion customers each. These companies have scale and very satisfied customers whom they really understand. They are essentially ready to deal with upcoming challenges which demand rapid adaptation (e.g. need for Regulatory Compliance with little guidelines for companies on how to report, VUCA (Vulnerable Uncertain Complex Ambiguous) environments which lack Supervisory Competence Boards).

We are living through a paradigm change, driven by new rules of competition in terms of both the speed of product development and the speed of obsolescence of products and services. Adopting new technologies and operationalizing the capture of value from data as the core strategic is imperative to maintain competitiveness. Digital transformation investments without focus on social impact returns has a very low success rate.

In this article, we have emphasized the need for an integrated, systematic approach, incorporating continuous improvement and constant feedback. The framework we propose is firmly based on empirical evidence, including both quantitative data and qualitative experience. As the PoC demonstrates. Implementing the framework can result from individual to country-wide contributions and improve sustainable development goals.

The framework described is in line with global reporting standards and at the same time, flexible enough to be tailored to each business's specific context, and if necessary, it can be implemented progressively, modulating the adoption rate. The higher the adoption rate, the more rapid profit enhancement and social impact returns. Crucially, though, customized solutions generally start delivering transformation in as little as three months.

As per the contribution of this research to sustainability, we have covered the applicability of modeling to non-financial risks management, and particularly in the field of sustainable finance. Conclusions point out that duality is the solution to capture the essential value of data and have an impact on planet, people and profits, which are associated to the three main pillars of Sustainability: Environment, Social and Governance (ESG).

Developing a framework is the first step towards systematization that can help businesses to generate value and impact in a recurrent way. Our framework is built under a pragmatic, universal and adaptable philosophy, which demands completion and commitment from the adopters' side. One of the main contributions of

this model is that when companies are often asked what is the impact of their social investments, a silence is met. Next time, it is hoped that our solution represents a starting point that can be enhanced in a collaborative way, fostering open innovation and preempting any efforts to reinvent the wheel.

Capture of the essential data value, beyond data analytics, to generate returns and profit enhancement is the basis of all our work, which enables convergence between people, technology and value creation. One of the main limitations we faced is the volatility of data and its reliability and relevance. Most Large Corps., in order to comply with the EU Directive on non-Financial Reporting, have developed their own solutions. The problem is that lack of alignment and comparability of KPIs result in inefficiency of results when attempting to measure progress and achievement of targets. At this stage there is an urgent call to action to adopt standards that allow companies to co-pete (Collaborate and Compete), helping each other to improve and learn. Unless a shared strategy, goals and metrics are in place, actions will lead to sub-optimal results.

Finally, technology as a facilitator, plays a key role when it comes to the capture and exploitation of data value. In the las three years, investment in Digital Transformation accounts for $1 Trillón but only 12% of companies obtained a return. Decoupling Data Value capture from Digital Transformation is imperative. Companies need to understand which metrics are relevant and can generate an impact and then, adopt a data driven strategy. This framework is aimed to enable companies differentiate such aspects and start putting the right pieces together to capitalize the data value opportunity.

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Alastria.
WStartup Community.
Kunfud.
ClimateTrade.
MujeresTech.
SWN

Notes/thanks/other declarations

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Nomenclature

AI	Artificial Intelligence
DLT	Distributed Ledger Technologies
ESG	Environmental Social and Governance
EU	European Union
GHG	Green House Gas emissions
GRI	Global Reporting Initiative
KPI	Key Performance Indicators

ML	Machine Learning
ODM	Operationalized Data Monetization
PoC	Proof of Concept
SDG	Sustainable Development Goals
SME	Small and Medium Enterprise
SWN	Santander Woman Network
UN	United Nations
UPM	Universidad Politécnica de Madrid
VUCA	Vulnerable Uncertain Complex Ambiguous

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