

# GLOBAL PERFORMANCE MANAGEMENT USING THE SUSTAINABILITY BALANCED SCORECARD AND BUSINESS INTELLIGENCE—A CASE STUDY

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## ABSTRACT

*Managing Corporate Social Responsibility “CSR” performance presents a great difficulty for the company since it involves managing the three main dimensions of sustainability simultaneously. This is why we focus on decision-making and control systems to achieve the main objective of the research; which serves to manage global performance. A qualitative study was carried out through a case study carried out within a Moroccan company labeled “CSR”. Analysis of the results showed that the sustainability balanced scorecard can be an effective instrument for managing global performance. The latter is a complicated and systematic process that necessitates a high level of coordination among the company's stakeholders. Again, the use of Business Intelligence helps the company to control its strategic information through its ability to process a large volume of data with better quality, its decision-making capabilities, and better support for strategic objectives through improved performance and the integration of data from different sources..*



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## 1. INTRODUCTION

In the 1980s, economic models of performance measurement were initially criticized because the indicators were too historical and not aligned with the strategies of the managers. They did not support indications on the performance of the company. at the strategic level (Bughin, 2006; Neely, Adams, & Kennerley, 2002; Wright & Keegan, 1997). These indicators, which measure past performance, are not excellent indicators to guide decision making. In

addition, accounting indicators such as return on investment (ROI) or economic value added (EVA) focus on tangible assets, while the creation of value may also depend on intangible assets. According to (Raviart, Senechal, & Tahon, 1999) "Other forms of performance have gradually emerged, induced by increased competitiveness and based not only on costs, but also on quality and, particularly, deadlines." Indeed, aspects such as customer satisfaction, employee skills, and the value of the product or service provided by the company are now key to the success of the company. In addition,

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concerns over the quest for short-term financial performance, described as short-sighted financial logic by (Bartenstein, 2005) and denouncing the harmful effects of this logic, such as scarcity or pollution, have brought the world's companies to tackle and therefore its responsibility in the field of social problems.

In a corporate social responsibility strategy, performance is measured not only in economic and financial terms but also in multiple dimensions (economic, social, and environmental). CSR reflects the application of the concept of sustainable development to companies and invites them to take into account the economic, social, and environmental aspects of their activities.

Organizations turn to dedicated tools to help them comply with the complex requirements of CSR management. These tools are, however, limited in their capacities and are not all adapted to the needs of the companies. Many tools do not cover the full spectrum of sustainability, but focus only on environmental reports and neglect the social aspects of sustainability, while others only focus on two of the three aspects and neglect the third. The reporting guidelines that these tools follow are also not adequate for companies that follow a CSR strategy.

The limited nature of these tools highlights the need for an alternative tool to help organizations improve and manage their sustainability efforts more effectively. Strategic management requires more than a simple "reporting" tool. For strategic management to effectively manage sustainability, a tool is needed that can effectively analyze data and provide managers with the information they need to make decisions. Advances in information and communications technology have improved the way businesses report and make decisions. We use tools that allow for the easy collection, storage, processing, and presentation of data.

The growth of information system tools in various organizations has been fueled by the increasingly complicated decision-making process resulting from the explosion of data volumes, the need for greater agility in decision-making and technological advances leading to more sophisticated software tools, which are under development (Becerra-Fernandez & Sabherwal, 2011). The value provided by decision support tools depends heavily on the underlying data. Real-time data provides a more solid basis for accurate decision-making than historical data taken in isolation (Watson & Wixom, 2007). A solution that uses both historical and real-time data can help reduce delays in the decision-making process, thereby increasing the value of the decision. The use of traditional tools does not meet the

requirements of CSR management, because the main objective of these tools is historical reporting and ad hoc requests. This falls within the realm of descriptive analysis, which is a retrospective analysis that provides insight into what is happening now and what has already happened (Hacklin & Wallnöfer, 2012). This is not suitable for a strategic level where the emphasis is on strategy and long-term decision-making, which requires a more predictive approach (Kandogan, 2012). In this study; we're trying to find answer to the following research question:

How to use management control and the decision-making system to manage global performance in a CSR strategy?

The rest of this paper is organized as follows: The theoretical underpinning for our study is described in Section 2. The research methodology and the case company are described in Section 3, and the results are presented in Section 4. Section 5 includes a discussion based on the previous findings and analysis. Finally, in Section 6, the conclusions are briefly presented.

## **2. CONCEPTUAL FRAMEWORK**

### **2.1 Corporate Social Responsibility and Global Performance Management**

The application of sustainable development concepts at the company level, according to the European Commission, must be translated into a corporate social responsibility plan (Commission des Communautés Européennes, 2001). Corporate social responsibility is defined as the voluntary integration of social and environmental issues into business activities and stakeholder relationships. This responsibility states that companies are willing to work with stakeholders to protect the environment and society. According to Freeman, "stakeholders" are defined as "any group or individual who can influence or be influenced by the activity of the company, and expect companies to report on how they conduct their business and assume their responsibilities, towards their employees, shareholders, residents, the environment, etc." (Freeman, 1984). In this context, the notion of global performance is used in management literature to assess the implementation of organizations' sustainable development objectives and to report their social responsibilities to various stakeholders (Capron & Quairel, 2006). Global performance is defined by the aggregation of economic, social, and environmental performances (Figure 1). (Baret, 2005; Germain & Trebucq, 2004; Reynaud, 2003)

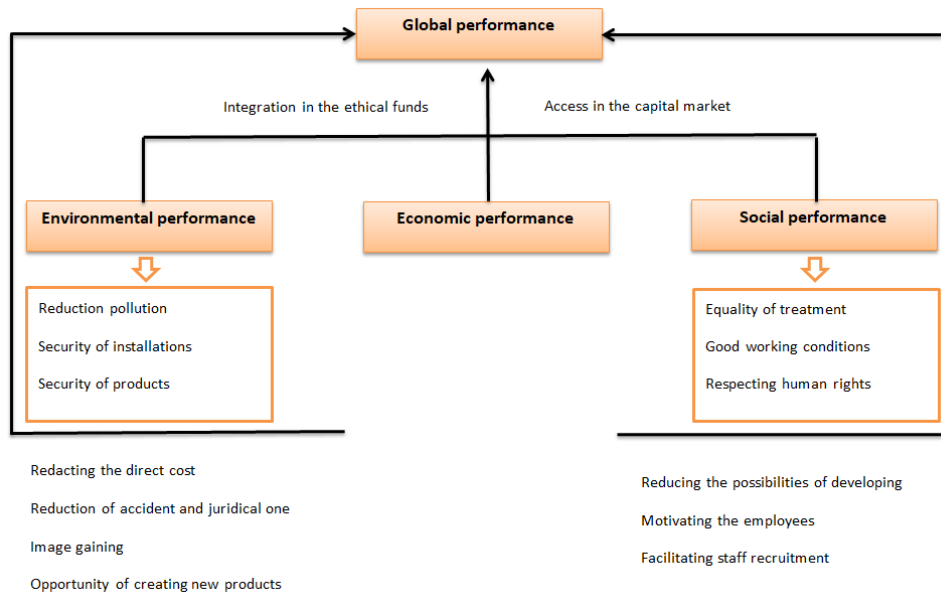


Figure 1. The components of Global Performance (Reynaud, 2003)

## 2.2 Global performance management through DASHBOARDS (SBSC)

A balanced scorecard is a management tool that allows performance measurement to be linked to a strategy that uses financial and non-financial indicators. In 1991, Kaplan and Norton introduced the notion of a balanced scorecard and extended it further in the Balanced Scorecard (1996). The traditional model has four elements that are linked to business strategy and values. These dimensions include: financial, customer, internal business processes, and organizational learning and growth. In practice, many managers refer to a "balanced scorecard" as any mix of financial and non-financial measures that link performance indicators to corporate objectives. (Kaplan & Norton, 1996)

The balanced scorecard's four perspectives indicate four major components of company value:

- The financial perspective emphasizes the interests of shareholders and demonstrates the link between strategic and financial goals.
- The customer perspective emphasizes activities that demonstrate the company's strategy and actions to produce customer value.
- Measures that show a company's performance in important internal aspects are included in the internal business processes perspective.
- The learning and growth perspective emphasizes how well the company is prepared to respond to future challenges by maximizing its organizational and human resources.

In the literature on the balanced scorecard, social and environmental factors were considered. Economic and social aspects can be decoupled or integrated into a company's management control system. On the one hand, it is critical, since some authors proposes the

formation of a distinct, long-term "BSC" that is unrelated to the primary traditional "BSC." It entails the management and measurement of the company's social footprint by a third party. Because of this decoupling, there is a strong risk that social and environmental problems will be seen as afterthoughts, employed only to boost the company's image. Most authors, on the other hand, prefer to incorporate social and environmental concerns within the traditional "BSC." There are two basic approaches to including social and environmental considerations into the "BSC":

The first approach is to use the four traditional aspects of the "BSC" (Hockerts, 2001) to deal with social and environmental issues. By combining indicators, measurements, and objectives, these authors propose that social and environmental concerns be included in the other dimensions. The classic "BSC" is now fully integrated with social and environmental aspects. As a result, they are automatically integrated into their cause-and-effect linkages and orientated toward the successful implementation of the company strategy. According to (Kaplan & Norton, 2000), the ability of a company to be a citizen must be an intrinsic aspect of performance evaluation and represented by the presence of social indicators in the "internal processes axis." They also recommend that the "customer" axis be extended to all of the company's partners

Secondy, (Bieker, 2002) suggest a "Sustainability Balanced ScoreCard" strategy, which adds a fifth perspective to the four already existing ones. According to this author, an additional "non-market" dimension must be included to expressly tackle the social problem, and all five dimensions must be given equal weight. In general, both the financial and social components must be addressed at the same time and in the same way (Figure 2).

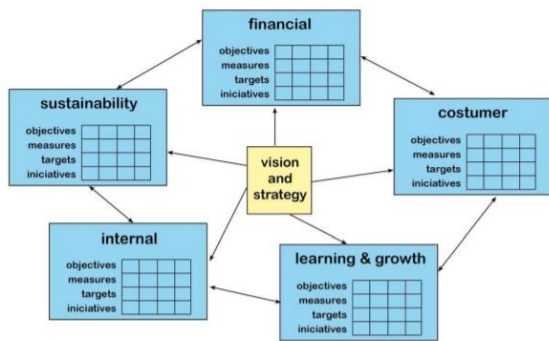


Figure 2. The model of the “Sustainability Balanced ScoreCard” (Bieker, 2002)

### 2.3 Business Intelligence

Business intelligence systems are one of the technologies for converting large amounts of data into useful information (Hočevar & Jaklič, 2008). Additionally, "BI" systems are used to understand business capabilities, trends, and future directions in markets, supported by information technology and the environments in which a business operates (Negash & Gray, 2003). A real novelty offered by "BI" systems is their ability to present information quickly, easily, and efficiently so that users can easily understand the logic and meaning of the information sought (Chen, Chiang, & Storey, 2012). Indeed, users would use a wide range of analytical tools, concepts, and approaches to maximize business value. In addition, business intelligence systems can offer certain competitive advantages (McAfee & Brynjolfsson, 2012), as they offer increased functionality with regard to data access and analysis (Michalewicz, Schmidt, Michalewicz, & Chiriac, 2006). However, on the other hand, the use of "BI" systems within a company requires a lot of resources, and it would often be very difficult to precisely define the benefits of its use (Rouhani, Asgari, & Mirhosseini, 2012).

There are several definitions of BI, and these definitions vary not only depending on the author, but also from the point of view of observing the term. Thus, according to (Negash & Gray, 2003), the "BI" system is both an architecture and a set of integrated operational applications that attempt to understand the position of the company, its customers, and its competitors. The main purpose of this architecture is to serve as a basis for decision-making. In addition, according to (Narasayya, 2011), the BI system constitutes a set of applications and decision-support technologies for companies, with the aim of enabling executives, managers, and analysts to make quick and accurate decisions. Based on the above, BI definitions indicate that "BI" systems include the process of collecting relevant internal and external data available, and then translating it into useful information that can help users make decisions.

Awareness of the benefits arising from the use of business intelligence systems in complex business environments is becoming increasingly important, and the need to set up and apply such information systems, especially with the introduction of tools and decision-making information systems, allows the use of this discipline in practice. Business users should be able to better visualize through the analysis of huge amounts of complex data (Ranjan, 2009). Then, business users determine information from that data and make decisions that enable them to solve critical and critical problems, thereby creating a wide range of tangible and intangible business values (Wixom, Yen, & Relich, 2013). An important assumption of the application and use of "BI" systems could be that consumers express their preferences based on the type of information they wish to receive, the frequency of the information, and the methods of communication by which this information is received.

The “BSC” and “BI” interconnections can be summarized as follows:

- By providing strategic objectives, BSC focuses the collection and analysis of business intelligence data on the essentials.
- BI feeds the KPIs of the Balanced Scorecard with relevant data.
- BI can be a source of action plans aligned with strategic goals and KPIs.
- Integration of "BSC-BI" is recommended when there is a foundation for a strong, business-centric BI architecture.
- BSC is used in "BI" architectures as a valuable tool to explore more business opportunities, as "BSC" focuses on collecting important data and categorizing it based on its connections.

As shown in Figure 3, there is a common set of correlations between "BI" and "BSC", which provides the necessary foundations represented in data collection, strategic goal alignment, and "KPI," this alignment being translated and interpreted by "BI" tools.

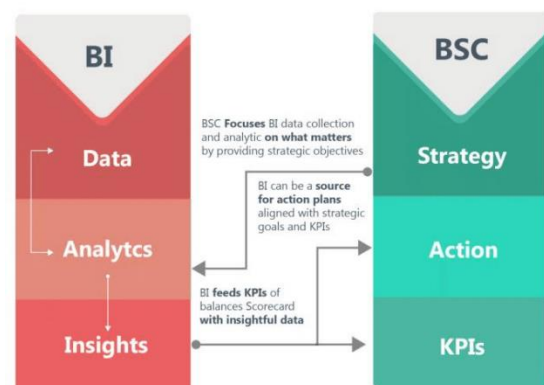


Figure 3. Integration of BSC with Business Intelligence

Strategy presentation and performance measurement using "BI" is an essential part of performance translation in order to use "BI" in effective presentation and consolidation of performance measurement. The main steps are followed in order to prepare the presentation of performance measurement by BI, which involves data collection, data consolidation, and exploitation.

### 3. METHODS

#### 3.1 Research Design

Due to the nature of our research question and its exploratory nature, generally, a unique case study approach of action research has been selected for the present analysis (McNiff, 2013; Yin, 2009). Indeed, a case study is not a specific method, but rather a process which combines various methods of empirical social research (Brüsemeister, 2008). The case study approach must be seen in an action research context, which means that the researcher's participation in the project was useful for understanding what practitioners are doing and helps practitioners to improve their thinking and actions. (Perry & Gummesson, 2004; Wilson, 2004). An interpretive perspective might be taken thanks to the method used for the case study of action research (Flick, 2011). Interpretivism (interpretivist) researchers understand "the world of human experience" (Cohen, Manion, & Morrison, 2011). According to this point of view, the interpretive researcher explores reality through the participants' perspectives, backgrounds, and experiences (Schwartz-Shea, 2011).

#### 3.2 Selection of case

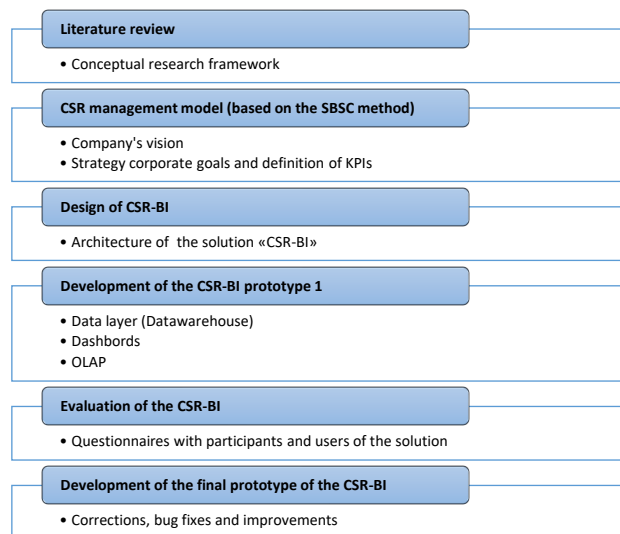
This article explains the process used to manage CSR using a combinatorial "SBSC" and "BI" method in a multinational cement company (based in Morocco). The company was chosen for two reasons. To begin with, given their importance in Morocco, it would seem ideal for such an "SBSC" and "BI" analysis. Second, the company is a pioneer in terms of sustainability and environmental management and could be called an example of best practice in the field. Years of experience in integrating sustainability into a business has made it possible to build an "SBSC" with the essential structures and management systems.

#### 3.3 Data collection and Analysis

Data was gathered by reading the documents attentively and conducting interviews (unstructured and semi-structured) with the managers and participants of each department.

The "CSR" management model and the "BI" framework to manage the global performance of the company will be evaluated. The process of evaluating, designing and

developing the solution will be called "CSR-BI" and has been identified (Figure4).



**Figure 4.** Design process, development and evaluation plan of the global performance management model "CSR-BI"

### 4. RESULT

#### 4.1 The company's vision statement and strategy definition

The company studied is an international leader in the cement manufacturing industry. It's a vision statement that articulates around five strategic aspirations and is titled "Bringing greater solutions for creating Morocco tomorrow." In truth, this corporation has a strong belief in and a strong desire to be:

- The safest Moroccan company for its employees, customers and stakeholders, and a national economic model.
- The preferred employers and national corporate citizens
- The most successful business, as well as the most cost-effective.
- Customer's favorite firm, providing innovative and tailored solutions with the highest quality products and services.
- A model for development that is flexible, innovative, and long-term

#### 4.2 Strategy corporate goals and definition of KPIs (key performance indicators)

- ✓ The Financial perspective

In the "SBSC", the financial perspective serves a dual purpose. The first is known as a strategy's financial performance, and the second is known as the endpoint of the causal and effect chains, which refer to the BSC's other perspectives. Otherwise, the company recognizes

that growth and productivity are two key strategies in the financial axis. These tactics aim to increase asset utilization, improve the cost structure, and increase turnover. In addition, with stated objectives such as turnover, percentage of cost savings, return on capital utilized, cash flow, return on investment, and return on equity, the best relevant performance indicator was rewarded.

✓ The Customer perspective

From the customer perspective, it specifies which category of customers should be targeted in order to achieve the desired economic result, as well as how the company intends to be competitive in the market. It has to be apparent how all measures and objectives link to the fulfillment of the objectives of the financial perspectives (Germain & Trebucq, 2004). For such customers, the company has a clear plan to become its preferred supplier. This strategy has two main objectives: (1) reducing customer wait time by responding quickly to these requests, which are measured by wait time; and (2) preventing and reducing customer complaints by measuring the number of customers complaining. This allows us to assess the satisfaction of our customers.

✓ The internal business processes perspective

It's about evaluating the critical processes that contribute to the long-term competitive advantage of the business and determining whether innovation and maintenance are the most effective tactics for delivering high-quality solutions. Indeed, through the introduction of new products, the company's primary objective is to provide innovative solutions that meet the needs of its consumers. Thus, the maintenance strategy adopted focuses principally on the reduction of oven and crusher failures. The performance of these objectives is measured by the mean time between failures (MTBF) and the timing for product launch.

✓ The learning and growth perspective

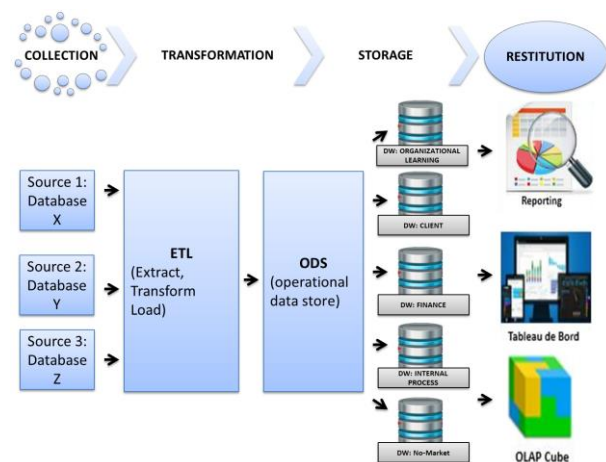
The infrastructure that is required for the achievement of the goals of other perspectives is described by the learning and growth perspective. "How to manage change in the company?" is the question in this situation. It's all about achieving the stated strategic goals: Employee skills and safety development are the main components of the learning and growth axis. Indeed, the company's skills development approach may be split into two goals: (1) skill development and (2) information access facilitation. The number of training hours per employee and the availability of information were used to evaluate the strategy's effectiveness. The company's safety strategy is generally aimed at achieving zero fatal accidents, with lost time injuries and the number of work accidents being used to assess the strategy's effectiveness.

✓ Non-Market perspective

The company has implemented an educational program, shared security practices, and supported access to care as part of a strategy to add value to its local community. Children who benefit from the school dropout program, efforts taken to improve employability, and the use of medical caravans are all performance markers for this strategy. It is Morocco's first industrial enterprise to build treatment and recovery platforms for industrial and domestic waste, as well as the region's lowest water consumption cement maker. The company aims to save water, reduce NOx emissions, reduce dust emissions, reduce CO2, rehabilitate careers, and recycle waste on a daily basis in order to further reduce its environmental footprint through local actions to promote a circular economy and ecological protection, which is why the company aims to save water, reduce NOx emissions, reduce dust emissions, reduce CO2, and recycle waste. Water consumption, NOx emissions, dust and CO2 emissions, and recycling rates are all used to determine how well these goals are met.

**4.3 Design of "CSR-BI"**

The "CSR-BI" architecture adopted for our study is mainly based on the "BI" framework proposed above (Figure 5). In fact, "data sources," "ETL processes," "data warehouses," and "data cubes" have already been created in isolation by different services, as cubes are used for analysis and data presentation. Thus, the architecture on which "CSR-BI" is developed uses data that covers more than one category of "CSR". It uses a combination of technologies, including "Microsoft SQL Server" as the enterprise data platform. A combination of tools will also be used in the analysis and monitoring reporting layer. Thus, the "Microsoft SQL Server" is used as a data platform because it has already been adopted by the company. In addition; "PowerBI" allows the creation of "dashboards", which are easily viewable in a PDF reader such as Adobe Acrobat Reader.



**Figure 5.** Architecture of "CSR-BI"

#### 4.4 Data layer of “CSR-BI”

The “CSR-BI” obtains its data from the data layer. A number of strategic capabilities are provided by “CSR-BI” to enable management to better analyze and manage strategic CSR information. It provides information to management via performance dashboards.

It is always important to approach the data layer because the information provided by "CSR-BI" depends entirely on the quality of the data provided. The lower layer of the architecture is made up of operational data sources. Due to the time constraints of this project, operational data sources are limited to three: "Database X," "Database Y," and "Database Z." These data sources cover two categories of "CSR." Data from operational data sources goes through the "ETL process," where data is pulled from operational data sources, cleansed and transformed into the required data warehouse

format, and then loaded into the data warehouse. Of which, the "ETL process" is performed using "SQL Server Integration Services (SSIS)".

The "Organizational Learning Datawarehouse" stores employee historical data in order to obtain information on the turnover achieved by the employee as well as the training taken in order to group this data by employee, date, and time (Figure 6).

Concerning the "Customer Datawarehouse," it stores historical customer data from which we can obtain several information relating to the customer, such as: details on the customer (name, first name, address ...), orders processed for the customer, the date of the order, the duration of processing of the order, the degree of customer satisfaction... in order to group this data by customer, date, and order (Figure 7).

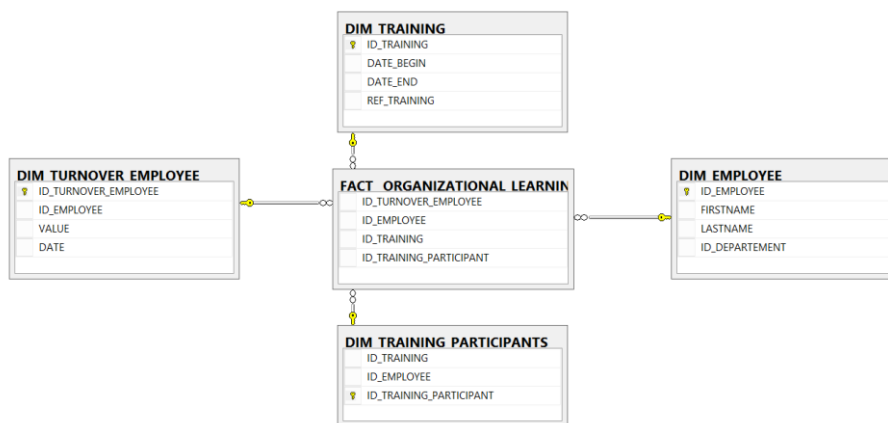


Figure 6. Organizational Learning Datawarehouse

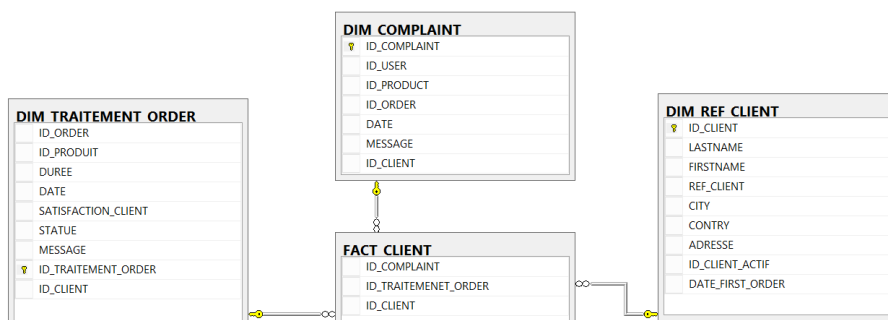


Figure 7. Customer Datawarehouse

The "Financial Datawarehouse", as shown in Figure 8, presents the turnover achieved to date.

The "INTERNAL PROCESS DATAWAREHOUSE" occupies the production process part of the company. Through this "datawarehouse," we can determine the availability and downtime of machines with crucial details, allowing the data to await information by machine and by date (Figure 9).

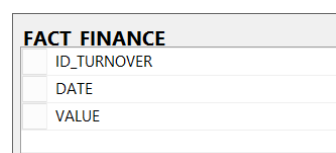


Figure 8. Financial Datawarehouse

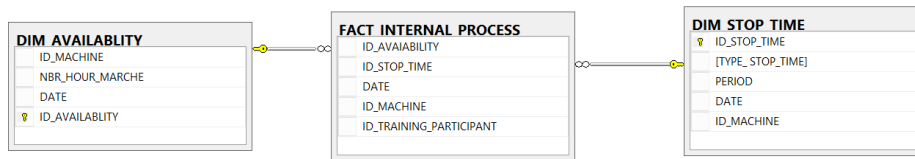


Figure 9. INTERNAL PROCESS Datawarehouse

Moreover, the No-Market datawarehouse is the most important for our study and the most difficult to achieve in terms of data development and availability. It is used to store data relating to the “CSR” of the company, such

as the “CSR” actions carried out by the company and the consumption of water and electricity, as well as gaseous emissions (CO<sub>2</sub>, NO<sub>x</sub>, ...) (Figure 10).

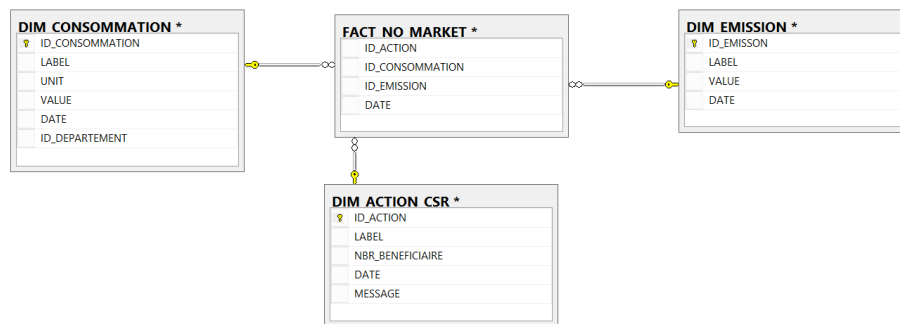


Figure 10. No-Market Datawarehouse

#### 4.5 Dashboard

Performance dashboards provide a crucial tool for driving strategic “CSR” information and, therefore, a platform to manage “CSR” more effectively. These dashboards, compiled by “CSR-BI”, provide users with the ability to monitor key metrics and “KPIs” while covering several aspects of “CSR” (Figure 11 and Figure 12). The information collected is grouped into a single view by area, such as electricity consumption, water consumption, and emissions.

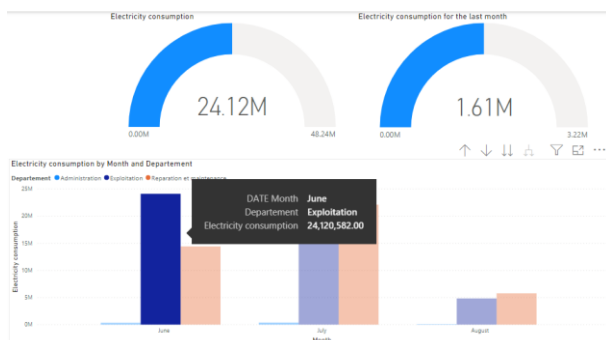


Figure 11. Dashboard relating to the environmental aspect and electricity consumption

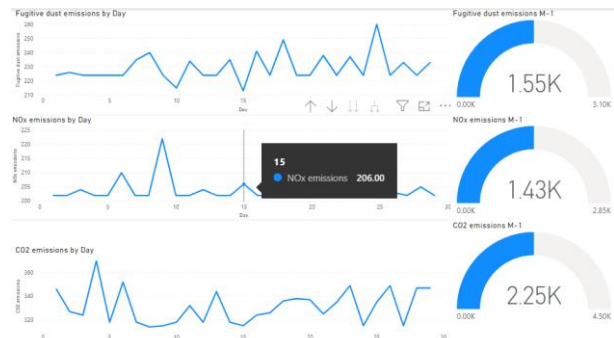


Figure 12. Environmental dashboard (case of emissions)

#### 4.6 Online analytical processing “OLAP”

One of the “OLAP” capacities provided by “CSR-BI” is “Drill-down” and “Roll-up”. These allow users to view data from different levels of aggregation. In fact, viewing the data from a high level of aggregation helps determine if there is a problem with the operations that require action. Viewing more detailed data with low aggregation can help determine the source of the problem. To do this, explorations can be configured by creating hierarchies in the information.

Below, Figure 13 shows an example of the number of machine uptime hours. So, to show the root of the decrease in machine running hours (to one month observed), we can first filter the hours by month, then by day, and then get the number of running hours for each machine on the selected day.



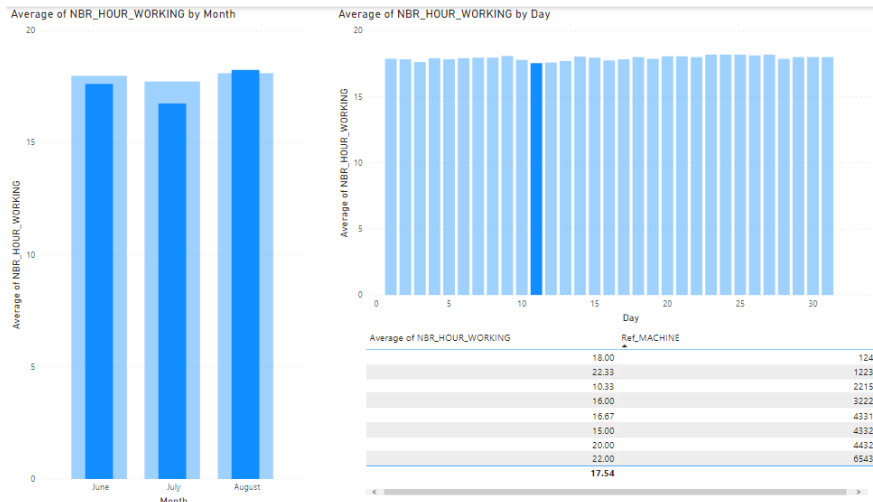


Figure 13. Determination of the number of hours of machine availability by the “Drill-Down”

#### 4.7 Results of the usability assessment of “CSR-BI”

Assessment results are broken down into the seven "BI" assessment metrics: visibility, flexibility, learning, error control and help, operability, effectiveness, and efficiency. Users were also asked to assess to what extent "CSR-BI" can help achieve the identified benefits of "BI". Participants also had to identify all the positive and negative aspects of "CSR-BI".

##### ➤ Visibility

The visibility metric consists of four separate statements. The highest rated visibility statement is “information is displayed in a clear and well-structured manner” (M = 4.62), followed by “the application communicates system status at all times” (M = 4, 54) and “the instructions are visible and explicit” (M = 4.54). The statement “navigation options are clearly displayed”

displayed” was the lowest rated statement (M = 4.38). Participants were satisfied with the visibility of “CSR-BI” since all four statements received an average score in the positive range. The global mean score for the four visibility statements was in the positive range (M = 4.52). This indicates that users believe that the information provided by “CSR-BI” is highly visible at all times. (Figure 14).

##### ➤ Flexibility

The flexibility metric consists of two statements: The highest rated aspect is "the application is customizable for individual or collaborative use" (M = 4.62), followed by "I felt in control of the application." (c = 4.38). Both statements received an average score greater than (M = 4.5), which is in the positive range, indicating that participants were satisfied with the flexibility of "CSR-BI". (Figure 15).

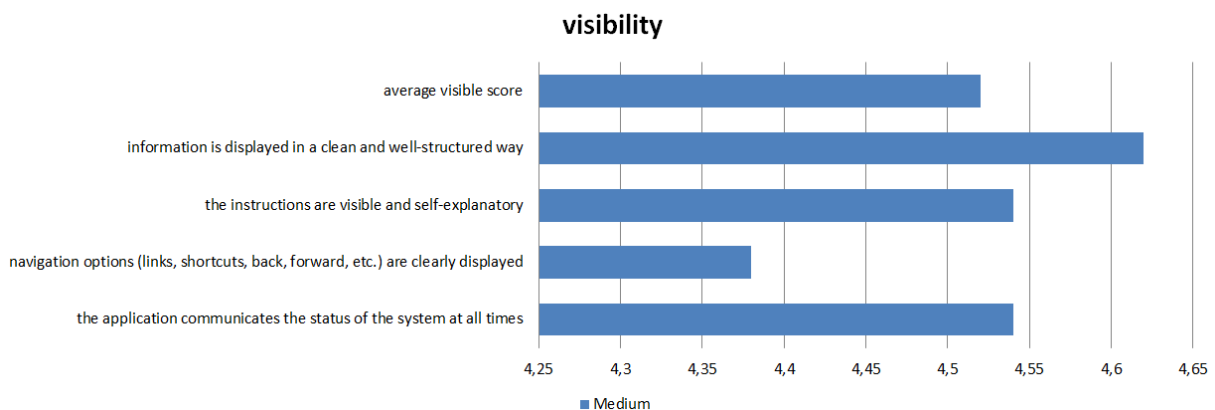


Figure 14. Visibility of “CSR-BI”

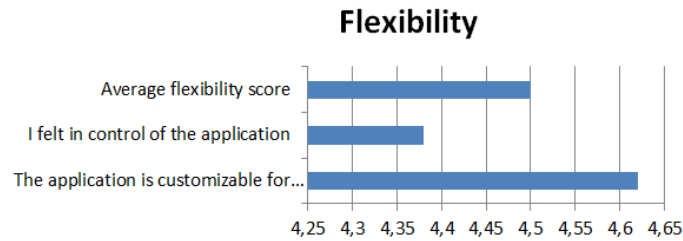


Figure 15. Flexibility of "CSR-BI"

➤ **Learning ability**

The learning metric consists of four different statements: The highest rated statement is "the terminology used by the application is familiar" (M = 4.46), followed by "the application promotes ease of learning." To make it accessible for infrequent use (M = 4.38), and "the application requires a limited memory load" (M = 4.31). All three statements received mean scores above 4, which is in the positive range, indicating that participants rated "CSR-BI" as easy to learn to use. The evaluation of "CSR-BI" revealed that the global average learning score is 4.38, which is positive and shows that "CSR-BI" has met the non-functional

requirement that "the solution of BI must be easy to learn to use." (Figure 16).

➤ **Error control and help**

The error control and help metric consists of two statements. The highest rated statement is "the application provides support to users" (M = 4.08), followed by "the application provides for error prevention and recovery" (M = 4). The global average error checking and help score is 4.04, which is in the positive range, but it is the lowest average score of all usability metrics. (Figure 17).

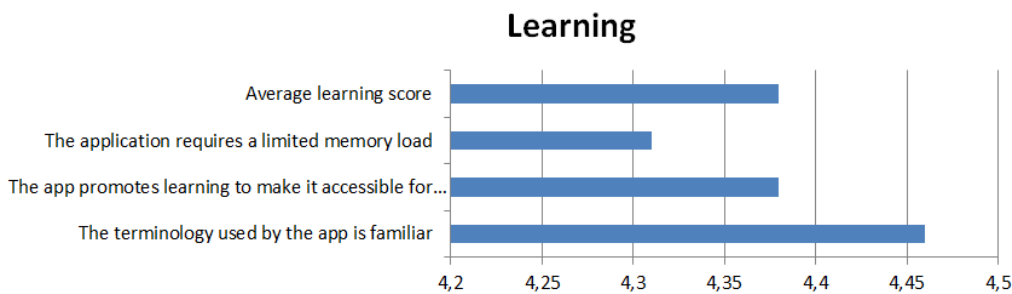


Figure 16. Learning capacity of "CSR-BI"

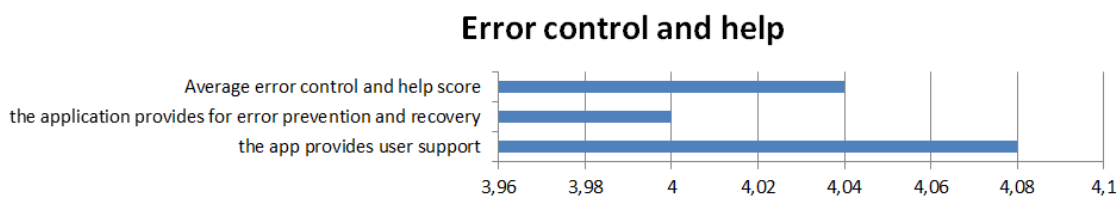


Figure 17. Error control and help of "CSR-BI"

➤ **Operability**

The operability metric consists of eight instructions. The top-rated statements are "I have the ability to save views of data to the app" (M = 4.92) and "the app allows knowledge sharing and data export" (M = 4.92). Then come "the behavior of the application is consistent" (M = 4.85) and "there is an information visualization feature" (M = 4.85), "the data is accessible at different

levels of aggregation" (M = 4.77), and "the filters applied to the data are very visible at all times" (M = 4.69). The lowest ranked statement is "the system displays a hierarchical map to determine the level of granularity of the data" (M = 4.54). All of the mean operability scores are above 4.5, with a global mean operability score of 4.77, which is in the positive range, indicating that participants are very satisfied with the operability of "CSR-BI." (Figure 18).

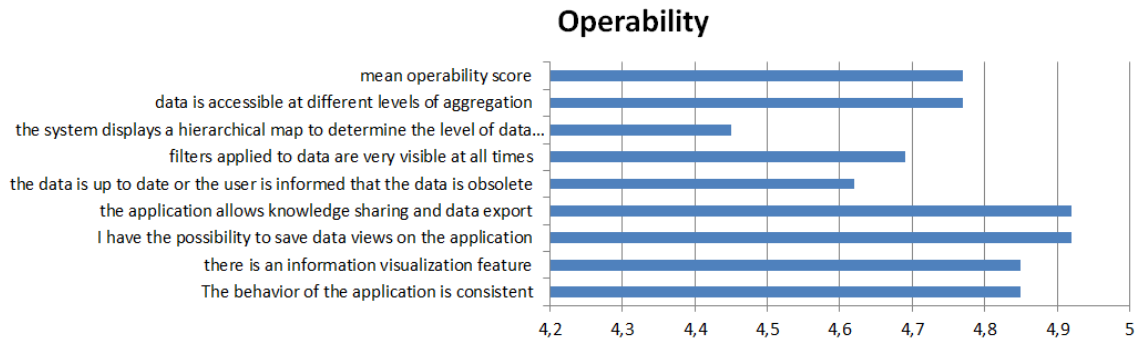


Figure 18. Operability of "CSR-BI"

➤ **Effectiveness and efficiency**

The effectiveness of "CSR-BI" is measured by two methods. The first method was to use the post-task questionnaire, which contained an efficiency category. Participants had to answer questions for each task based on the information provided by "CSR-BI". The second method of measuring effectiveness is through the accuracy of the responses provided by participants.

The measure of effectiveness consists of two statements: "I could perform tasks and scenarios efficiently using the system" and "I could perform all tasks successfully using the system". Both items were

scored at 4.69, which mean the global average effectiveness score is positive.

The efficiency category consists of three statements. The top-rated statement was "the application provides a fast response rate" (M = 4.77), followed by "I was able to effectively complete tasks and scenarios using the system" (M = 4.54) and "I was able to complete tasks and scenarios using the system" (M = 4.46). All three items were rated 4 or higher, which is in the positive range, indicating that participants were satisfied with the effectiveness of "CSR-BI" in performing the required tasks. (Figure 20)

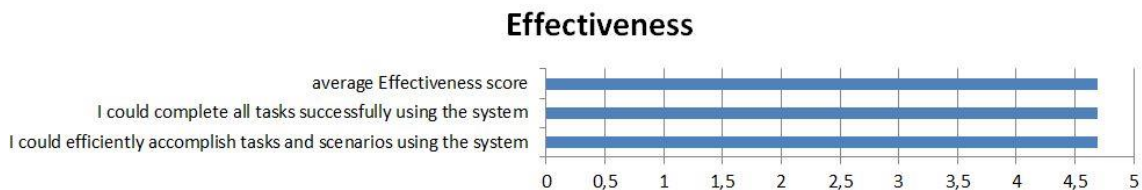


Figure 19. Effectiveness of "CSR-BI"

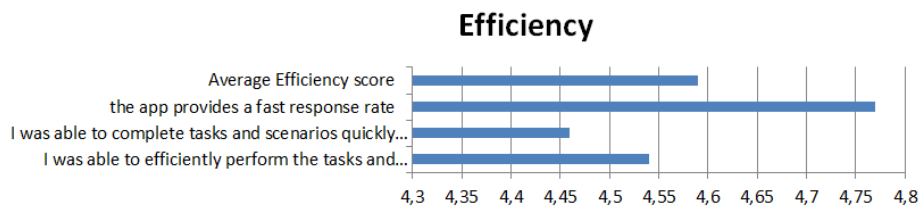


Figure 20. Efficiency of "CSR-BI"

**4.8 Final improvements (Prototype 2)**

Based on the results of the usability assessment, final improvements were made to the "CSR-BI". The final improvements were all minor in nature. The following usage issues have been discovered and resolved:

- Dashboards have been minimized so that users can more easily find information.
- Filters have been added at the top of the dashboard, so that they are more visible.
- Servers have been boosted to improve dashboard performance and runtime.

**5. DISCUSSION**

In our research, we provided an example of developing and implementing a global performance management system in a "CSR" strategy based on the "SBSC" approach and BI technology, presented by a unique case study at an industrial cement company in Morocco.

We note that a working strategy and a clear understanding of the "CSR" approach are essential supporting aspects. Our finding is supported by (Fernandes, Raja, & Whalley, 2006; Rompho, 2011) studies, which suggest that collaboration between departments and employee involvement, are crucial

prerequisites for "SBSC" development. Furthermore, in the formulation of "SBSC," limiting performance indicators and the number of strategic objectives (in our case, two to six objectives per perspective, one or two indicators per objective) is an important factor in improving efficiency and facilitating performance management (Arnold, Freimann, & Kurz, 2001; Fernandes et al., 2006). The challenge lies in determining which objectives and indicators to use, selecting the targets and indicators on which a manager and his team may improve in line with the company's strategic priorities

Using the additional "SBSC" approach, the classic BSC incorporates a "non-market" perspective. According to our case study, the fifth particular axis of differentiation from the "non-market" perspective in the formulation of a sustainability balanced scorecard makes it possible to simply integrate corporate social policies (Bieker, 2002). In contrast, (Figge, Hahn, Schaltegger, & Wagner, 2003) considers that incorporating a specific fifth axis to integrate social issues into traditional "BSC" involves the risk of the additional perspective being easily excluded, for example, caused by changes in top management objectives, which is why our used architecture needs the "SBSC" five perspectives to be considered with the same importance.

Furthermore, we have demonstrated that the Sustainability Balanced Scorecard is a very powerful tool for managers to use in corporate social responsibility strategy performance management, with a strong ability to integrate and treat the three dimensions of "CSR" simultaneously, as confirmed by (Bieker, 2002; Hansen & Schaltegger, 2016; Kaplan & Norton, 1996)

We presented arguments for how business intelligence (BI) methodologies and technologies may improve the collection, analysis, and dissemination of business data among employees, clients, and partners, including corporate sustainability data. Sustainability KPIs have been presented (Lee & Farzipoor Saen, 2012; Thomas & McElroy, 2015) and used in balanced scorecards, with the theoretical fundamentals being part of a business intelligence framework in terms of performance management principles (Laursen & Thorlund, 2016; Pondel & Pondel, 2015).

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Methodologies and frameworks for managing corporate sustainability have been presented and tested. In conclusion, the focus has been primarily on business challenges, such as integrating sustainability management into the corporate performance management system and combining business intelligence methodologies with corporate sustainability. We support our viewpoint that corporate sustainability management necessitates the application of business intelligence methods and technologies to analyze the financial, environmental, and social components of the company (Getz, 2014).

## 6. CONCLUSION

We have presented a decision support environment using a combinatorial method using SBSC and BI technology in order to drive the performance of "CSR." We have defined a process of design, development, and evaluation plan for the global performance management model "CSR-BI". And we applied this process to a specific case study to validate our work.

The results revealed that the sustainability balanced scorecard can be an effective instrument for managing global performance. The latter is a complicated and systematic process that necessitates a high level of coordination among the company's stakeholders, rather than a sequence of procedures. Again, the use of Business Intelligence (BI) helps the company to control its strategic "CSR" information by its ability to process a large volume of data with better quality, its decision-making capabilities, and better support for strategic objectives through improved organizational performance and the integration of data from different sources. And we see BI as a set of methods and tools based on intensive use of IT, which has great potential, as yet unexplored, to support sustainable development practices and management.

There are many ways to continue this work. Initially, it will be interesting to study the companies in the sectors outside of our case study. It will also be relevant to try to test the conclusions and recommendations drawn from this research on a larger sample of companies, companies of different sizes and belonging to heterogeneous activities.

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