Exploring the Effects of Sustainability on Accounting Information Systems: The Role of SBSC

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Abstract In the last twenty years the companies and governments (see the recent directive—2014/95/EU) paid increasing attention to sustainability issues: they gained strategic relevance for the business and deserved interest of stakeholders. According to these sustainability information needs, academics and practitioners examined the development of new accounting information systems (AISs), aimed to collect, elaborate and integrate environmental and social data. In this paper, we consider the Sustainability Balanced Scorecard (SBSC), considering it as an urge to develop and integrate the AISs. The aim of this paper, through a case study, is to investigate the role of SBSC and try to highlight a relationship between the different designs of SBSC proposed by literature and different levels of integration of AISs. This work provides a theoretical contribution to the debate on accounting information system for sustainability and offers useful reflections for the practitioners about the potentialities and critical aspects of SBSC.

Keywords Sustainability · Accounting information system · Sustainability balanced scorecard · Information integration

1 Introduction

In the last two decades, the companies paid increasing attention to environmental and social issues and now they have gained strategic relevance for the business [1–3]. They represent risks and opportunities that can affect the financial results, it need only consider their positive or negative effects on corporate reputation [4, 5].

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This attention to environmental and social issues leads companies to pursue a sustainable development defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" [6, p. 54]. Today, many companies are oriented towards sustainability, which "became a multidimensional concept that extends beyond environmental protection to economic development and social equity" [4]. The approach of sustainability is called also the "triple bottom line model" (TBL or 3P: people, planet and performance), suggesting that the organizations cannot realize only economic performance, but they need to engage in activities that positively affect the environment and society [7, 8]. The sustainability strategies are simultaneously focused on environmental, economic and social/ethical goals in order to create value for all stakeholders. Because of this, the increasing attention to corporate sustainability regards also external subjects, with the consequence of increasing and improving the sustainability disclosure. It is confirmed also by recent regulations from UE (Directive 2014/95), which includes the information about the sustainability in the corporate disclosure, showing the need of communicating to market the engagement on environmental and social issues.

According to the corroborated literature on the relationship between strategy and management control systems [9, 10], the sustainability strategies affect control systems and particularly AISs, in order to satisfy new, internal and external, information needs [11–13]. The AISs, supporting the decision-making process of stakeholders, are versatile and flexible, and they adapt to the new strategic orientation [13, 14]. In line with the sustainability, the AISs change by using new tools, techniques and methods to supplement and complement economic goals with environmental and social ones. In sustainable development context, the AISs must provide the information to test the potential growth, the financial viability and the capability to create value: the sustainability, if is not connected to value creation, is untenable and in long terms it generates more costs than benefits. The AISs that support the sustainability decision-making process (such as accounting social responsibility-ASR; environmental management accounting-EMA; social management accounting-SMA, just to name a few) [15, 16], regardless of their name, must be integrated into multidimensional information systems.

A significant stimulus to this integration also comes from the need to use specific tools of management control to support the sustainability strategies. The traditional model of BSC of Kaplan and Norton [17], with its four perspectives, is one of the most used tools for strategic control. It doesn't represent a kind of "straitjacket", but can be reviewed and changed, according to the company context and strategy. Because of its natural multidimensional and flexibility [18, 19], several scholars [20, 21] argue that the balanced scorecard represents the best tools to realize the sustainable development, proposing the Sustainability Balanced Scorecard. It can be considered an upgrade of traditional method of BSC, through the application of the TBL approach and the integration of social and environmental goals. The SBSC allows to pursue a sustainable development, addressing the three sustainable dimensions "in a single integrate management system instead of requiring parallel

system" [22, p. 196]. According to literature, there are different SBSC configurations, which present various ways of integrating environmental and social aspects.

The aim of our work is to investigate, through a case study, the role of the SBSC as a tool to formulate, control and communicate the sustainability strategy, and the relationship between the design of SBSC and different levels of integration of AISs designated to measure the environmental and social aspects.

Afterwards, on the basis of the case study findings, this work provides a theoretical contribution to the debate on AISs for sustainability and offers useful considerations for the practitioners about the potentialities and critical aspects of SBSC and the AISs associated to it.

The paper is structured as follows: in the second section we reviewed the literature concerning the AISs to support the sustainable development and about the SBSC; in the third section research framework and methodological notes are presented; in the fourth section is provided a detailed narrative of the SBSC and AISs adopted by the company analysed; in the final section we discussed the main findings and concluded with some consideration, highlighting the limits of the research and suggesting further direction for future research.

2 Literature Review

2.1 The Accounting Information System for Sustainability

Most companies are struggling to engage sustainability initiatives in their corporate strategy [23]. In order to allow to achieve the sustainable business goals, enterprises can be helped by a new approach to accounting considering the three dimensions of sustainability (TBL): the sustainability accounting [16, 24]. It plays a pivotal role in improving the corporate sustainability [25], as allows to manage and report the social and environmental issues [26, 27]. It is "an updated form of traditional financial accounting with consideration of both economic and environmental issues at multiple levels" [28, p. 2].

In the sustainable companies, the decision-making process is oriented to balance financial and non-financial requirements [29] and it requires to capture the full costs of products, namely economic in stricto sensu, and environmental and social costs [30]. In order to create a framework for sustainability AISs, it is possible to identify at least three types of accounting information sub-systems, according to the three bottom line approach [31–34]:

- Traditional Management Accounting (TMA), that measures economic impacts (with quantitative and financial measures) to support the traditional management accounting and financial accounting. It, generally, provides information on the economic exchange transaction and is not able to collect and process data on sustainability issues and to cover all aspects of the value chain [11].

- Environmental Management Accounting (EMA), aimed to reduce negative impacts on the environment and to improve material efficiency [36]. It identifies, collects and elaborate information on physical unit such as materials, energy, water and wastes and monetary unity, particularly regarding environmental costs [34, 36].
- Social Management Accounting (SMA), aimed to measure social costs in order to reduce negative impacts on society, on employees and all stakeholders as a whole [37–40]. These AISs not only use social and environmental information to support decision-making processes, but also can improve the external disclosure, strengthen the links between management, control and reporting of sustainability [41].

The sustainability accounting is not only a tool for the collection and disclosure social and environmental data but a managerial logic which sometimes can be misinterpreted, losing its substantial meaning. Indeed sometimes the sustainability disclosure could be interpreted as a greenwashing [42] or an half-way "sustainability" approach "based on a win-win situation to demonstrate (and justify) their conduct and development is sustainable only if it can generate economic returns" [43, p. 296]. In order to fully realize a corporate sustainability it needs to increase social accountability, making the organization more aware regarding environmental and social issues [44] and adding value to ensure the sustainability goals [32–34].

The achievement of these purposes also depends on how EMA and SMA are used and integrated between them and with the traditional management accounting system (TMA): this integration is defined as "the basis for sustainable controlling" [40, p. 309].

According to the literature [45], they can be conducted in the companies as shown in Fig. 1:

(1) Autonomous subsystems: EMA and SMA record non financial effects of the environmental and social impacts of corporate strategies. It generally is due to lack of market prices that should facilitate the measurement of these impacts and to frequent use the equivalence ratios determined by an interdisciplinary team of experts.

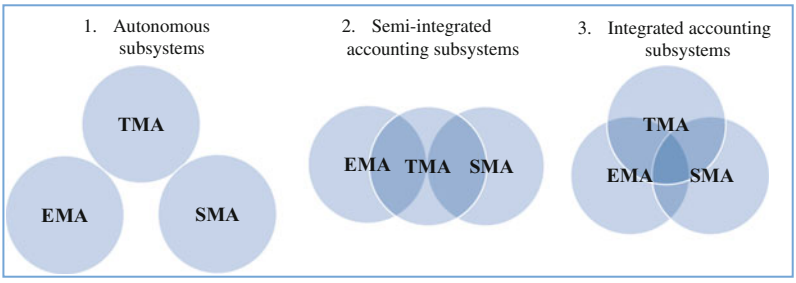

Fig. 1 Models of integration of AISs for sustainability (our elaboration from Petchard and Mula [46])

(2) Semi-integrated accounting systems: EMA and SMA are more consistent with the traditional accounting system. They regard the measurement, evaluation and recording the resources involved in environmental protection and social engagement, with particular attention paid to financial impacts.
(3) Integrated accounting subsystems: EMA and SMA use different measures (financial, non-financial, qualitative and quantitative) to evaluate the environmental and social issues and create useful information to ensure the companies' sustainability [32–34].

From literature, in this last case, it emerges a new approach, the Sustainability Management Accounting System (SMAS) [16], that allows to add value in three sustainability dimensions. Measurement of social and environmental costs gives more accurate information if their scope is to provide cost information to support financial reports and disclosure of sustainability performance [47, 48], as well as contribute to a sustainable value chain as a whole.

In this integrated use of different AISs, it could use a broader ERP such as Sustainable Enterprise Resource Planning (S-ERP), defined as "holistic, integrative and complete solutions for sustainability business issues" [23, p. 142]. It assists companies to collect, integrate, automate and monitor the information coming from the three dimensions of sustainability [23, 49], and it allows companies to balance the benefits and costs linked to achievement the sustainable goals and satisfy different stakeholders.

2.2 The Sustainability Balanced Scorecard

There is a broad range of frameworks to design, measure and communicate the corporate sustainability performance proposed by international governmental, non-governmental and intergovernmental organizations such as ISO 14031, the Global Reporting Initiative (GRI), and the Global Compact [49]. Basing also on them, scholars [51–53] have proposed several strategic management tools, including the SBSC, as an upgrade aimed to sustainability of BSC.

The original framework developed by Kaplan and Norton [17], is a performance measurement system, which represents a close relation between strategies, corporate objectives and performance, using a multidimensional set of financial and non-financial performance metrics, which equally regard four traditional perspectives: financial, customer, internal business process, learning and growth [59]. This tool helps managers to: improve accountability; clarify the strategy (allowing to articulate and communicate the business objectives and priorities); monitor its progress (including the cause-effect linkages and distinguishing leading and lagging measures of performance); define action plan consistent with the strategic objectives in different organizational levels; balance, according to its "philosophy", short, medium and long term indicators, qualitative and quantitative indicators regarding external and internal, tangible and intangible aspects [55–58].

In order to better determine performance measures, managers must understand the cause-effect chains between strategic objectives, that are illustrated by strategy map [60], which represents the BSC's architecture [22, 61, 62].

Among the strengths of BSC [17, 64, 65] there is its flexibility, which allows to combine and adapt the instrument to manage and control the aspects of sustainability, thus creating a new tool, called Sustainability Balanced Scorecard [22] or Sustainability Scorecard [66]. It, compared to traditional BSC, recognizes explicitly objectives and performance measures related to sustainability [55, 67], and shows the relationship between long-term resources and capabilities and short-term financial outcomes, within the cause-effect chains that involves social, environmental and economic, direct and indirect outcomes. The SBSC, in this way, encourages the alignment and management of all corporate activities according to the company's sustainable strategy.

The process of formulating an SBSC elaborated by Figgie et al. [68] includes the following steps:

(1) Choose strategic business unit.
(2) Identify environmental and social exposure.
(3) Determine strategic relevance of environmental and social aspects in the four traditional perspective of the BSC.
(4) Determine whether strategically relevant environmental or social aspects influence significantly the company success via other mechanisms than market system.

Particularly the third step allows to determine the environmental and social aspects' relevance for strategy implementation and execution. To translate the strategy into indicators, causally linked, the company must recognize three levels of strategic relevance of sustainability objectives and indicators [67, 69]:

(a) Sustainability aspects that are strategic core issues for which lagging indicators (that are typically "output" oriented, confirm long-term trends and measure the outcomes achieved through the management of leading indicators) can be developed.
(b) Sustainability aspects that are considered business drivers for which leading indicators (typically input oriented that tend to communicate changes in the environment, and therefore are considered business drivers) can be defined.
(c) Hygienic factors that are necessary but not sufficient to realize a strategic advantage [70], and for this not included in the scorecard.

The fourth step regards the check of the aspects which are non-measurable via market mechanism but equally influencing the company's strategy and then must be included in the SBSC and connected, through the cause-effect links, to strategic objectives.

According to the literature [67, 71], the above-mentioned aspects can be integrated in a BSC tool, following three approaches, progressively extensive:

(1) The first type of integration leads to the inclusion of the environmental and social aspects in the traditional model of BSC. These aspects become an integral part of conventional perspectives like all other potentially relevant strategic aspects: goals and indicators are integrated in the model in their cause-effect links and oriented towards the financial perspective. We call this approach Integration into Traditional BSC (ITB).
(2) The second type of integration adds one or more non-market perspectives regarding the environmental and social aspects [55]. This requires a broader strategic map and the formulation of non-market perspectives in a similar way to conventional scorecard: individuation of the strategic core aspects, leading indicators and linkages with the financial perspective through hierarchical cause-and-effect chains. We call this approach Addition of Non-Market Perspective (ANMP).
(3) Deduction of a derived environmental and social scorecard, which is an extension of one of previous variants and not an independent alternative for integration. This scorecard cannot be developed parallel to the traditional BSC, but it must be carried out only after one of the two previous approaches. The aim of this third approach is to coordinate, organize and further differentiate the environmental and social aspects, once their strategic relevance and position in cause-effect chains between market and not market perspectives have been identified by the previous approaches. We call this approach Deduction of a Derived Scorecard (DDS).

The choice between one of three ways to integrate environmental and social aspects cannot be taken in advance, but during the process of formulating an SBSC [21, 22, 72].

Considering the widespread disagreement on how sustainability can be measured [73, 74] and the companies' need of validated indicators that drive the company's financial long-term success [71], many companies adopt the GRI's reporting methodology, which provides various standard indicators regarding the sustainability performance.

In this way, the companies could design the SBSC using GRI indicators and highlight the links between long-term environmental and social goals and short-term financial benefits of firms [21, 29, 75–77]. The usefulness of GRI indicators is emphasised because of the frequent difficulty of the companies to autonomously identify appropriate sustainability indicators [78], and by the possibility to use "a single language as a bridge of communication between the entity and the stakeholders" [79: 4992].

Compared to traditional BSC, this involves a transformation of the financial perspective in economic perspective, gathering information about the wider economic growth (including financial, social and environmental aspects) [21] and a change of the customer perspective in external stakeholder perspective [66].

3 Research Framework and Methodology

The aim of this paper is firstly to investigate the role of SBSC and secondly to try of showing the relationship between the SBSC and the level of integration of AISs designated to measure the environmental and social aspects.

The second aim is based on the literature analysis, carried out in the previous paragraph. It shows three types of SBSC configurations and three different uses of sustainability accounting information systems (EMA and SMA) (as shown in Fig. 2).

According to literature [9, 10], the strategy management affects the management control system and the AISs in it incorporated [81]. In this case, the strategic relevance of the aspects non-measurable via market mechanism should affect the SBSC configuration and the sustainability AISs and their integration. Increasing strategic relevance of the social and environmental aspects should increase: (a) the need to control them and therefore the use of a more complex configuration of SBSC in order to highlight how these aspects contribute to value create; (b) the need of AISs to capture these aspects that are not measurable through financial measures, and integrate all aspects of the triple bottom line, in order to collect, elaborate, control and report data and information which allow to realize the sustainability strategy.

These impacts of strategic relevance of sustainability aspects on SBSC configuration and the integration of AISs could be explained by using the Simons' levers of control (LOC) framework [81, 82]. In this framework there are two possible uses of management control and information system:

- Interactive use, focused on actors' attention on key goals and aimed to support changes aligned with strategic objectives.
- Diagnostic use, aimed to correct actors' actions.

In the conventional BSC, the traditional management accounting has an interactive use because the information "(1) must be simple to understand (…); (2) must provide information about strategic uncertainties (…); (3) must be used by

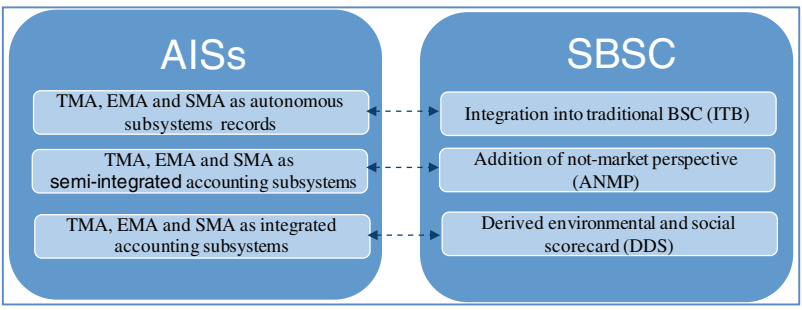

Fig. 2 Relationship between AISs and SBSC (our elaboration)

managers at multiple levels of the organization (…) and (4) must generate new action plans" [81, p. 220].

In SBSC, the use of sustainability accounting information system (and specifically the EMA and SMA) in an interactive or diagnostic way, depends on the integration between sustainability and strategy [83], reflected also in specific configuration of SBSC.

- In the first configuration of SBSC (ITB) the aspects non measurable via market mechanism do not represent resources with strategical value and therefore do not need a detection and integration with other resources. For this reason, the sustainable issues should be managed diagnostically with EMA and SMA (represented by simple tools of collect data, such as excel), not integrated with TMA, and developed to respond to external pressure to comply with standard [83], such as GRI. This type of companies have a "compliant-driven sustainability strategy" [83].
- In the second configuration of SBSC (ANMP), in which the sustainability aspects have a medium strategic relevance, they frequently represent external constraints "rather than business opportunities" [82, p. 214], which affect strategic choices and the financial results. In this SBSC configuration the aspects non measurable via market mechanism are showed in a new specific perspective in order to highlight the attention paid to these aspects and to improve the control of objectives linked to issues of legality and autonomy of action, such as the ethic objective of no child labour [68]. This configuration of SBSC requires a minimum of integration of AISs to catch the impacts of non-market aspect on financial results. The EMA and SMA are used only in diagnostic way to increase reputation and legitimacy to operate.
- Finally, in the third configuration of SBSC (DDS), in which the sustainability aspects have a high strategic relevance, the firm's commitment to recognizing, measure and disclosure the strategic aspects is stronger. The EMA and SMA should be more integrated in order to allow the deployment and renewal of sustainability strategy and to catch all the cause-effect chains among the TBL's aspects. All AISs must have an interactive use in order to generate organizational learning and new action plans [83].

In order to examine the process of implementation and the use of SBSC and to show the relationship with AISs, we use a qualitative case study methodology [84, 85].

The case examined, from a methodological viewpoint, represents an exploratory case study, according to the Yin's taxonomy [85]. In this work the qualitative case study methodology [84, 85] is justified because it is a preliminary study, aimed to fill the literature gap about the relationship between the AISs and SBSC, and because in accounting study "we can use case studies to provide descriptions of accounting practice, to explore the application of new procedures, to explain the determinants of existing practice" [86, p. 143]. The case study concerns the description of an SBSC adopted by Hera Group, one of the more relevant Italian multi-utility company.

The choice of this case study is due to the attention paid by Hera to aspects of sustainability, as shown by exhaustive sustainability report and by unusual disclosure of SBSC.[1] The information sources used to perform the case study come from the exhaustive website of the company and from the phone calls (about 20 min) with two managers of the Management Control Department, to which we have turned a semi-structured interview and subsequent email, regarding the SBSC use, the existing AISs which support SBSC, their assessment of these tools and future developments.

4 Case Study Description

The Hera Group S.p.A. operates in 358 Italian municipalities, including many major cities of Central and Northern Italy. It provides energy (gas, electricity), water (aqueducts, sewerage and purification) and environmental (waste collection and disposal) to more than 4 million citizens, realizing annual revenues (in the 2015) of 4817.8 million Euro, with 8571 employees.

The group has three strengths: the balance between the services in the free market (such as sale of gas and disposal of special wastes) and regulated services (such as gas distribution, integrated water services, collection and disposal of municipal waste); territoriality and strong attention paid to aspects of sustainability; the presence of a free float of about 24,000 shareholders.

Hera, since its establishment in 2002, attributed a central role to sustainability, integrating it into planning and control systems, and then in the activities related to business management. This justifies the implementation of a sustainability balanced scorecard, which allows to formulate the strategy into operational projects that are part of the incentive system of management and the reporting.

The principles underlying the sustainable management are enshrined in the Group's Code of Ethics, in which there are all values that are the basis of the group's strategy and consequently of strategic business plan and of disclosure to stakeholder, including a sustainability annual report.

The process of formulating the SBSC in Hera can be ideally divided into two steps.

The first refers to the formalizing business goals and includes:

- Mission: to be the best multiutility in Italy.
- Vision: to develop an original business model oriented to innovation, to acquire trust of stakeholders and to strengthen the links with the geographical areas in which it operates by respecting the local environment.

[1]We selected this case from AIDA, the Bureau van Dijk database. Among 25 listed Italian energy, water and environmental enterprises selected, only 10 draw up a sustainability report and only five of these adopted, or was starting to adopt, the SBSC (Hera, Terna, A2A, ERG, Iren).

- Business goals: a multi-business growth strategy focused on three business areas (energy and gas, environment, water services), keeping a business portfolio that is balanced between regulated activities with low risk and deregulated services offering growth perspectives.
- Priorities: excellence, growth, efficiency, innovation, but also improve the environment, ensure quality and safety, be transparent, engage and motivate workers, have partner suppliers for sustainable growth.

The second step, starting from strategic priorities, relates more closely to the design of the SBSC defining specific objectives and indicators (KPI).

The economic and financial highlights in the business plan to 2019 are: (a) EBITDA of 1030 million Euro; (b) earning per share of 5% per year; (c) total investment of 2.2 billion Euro (d) Net Financial Position/EBITDA of 2,9. The industrial highlights are: (a) keep the ratio "regulated activities-to-liberalized activities" substantially unchanged (55–45% in 2019, vs. 53–47% in 2014); (b) coexistence of internal Growth and External Growth Strategies; (c) exceed 2.3 million "energy clients" in 2019; (d) maintain high levels of sustainability targets. This second step involves the identification of all potential environmental and social exposure of the company, that allows to draw up a list of all environmental and social aspects that may be strategically relevant.

According to the framework elaborated by Figgie [68], Hera recognizes its environmental exposure about the emissions (increasing renewable energy), wastes (further reduction in the use of landfills for municipal wastes) and energy (electricity, gas and water grid modelling).

The social exposure analysis initially involves the identification of all relevant stakeholder groups, which are divided into direct and indirect stakeholders, and subsequently, their social claims and issues are identified. The direct stakeholders of Hera are: internal (employees with regard to the job security, the work conditions, the professional development and enhancement) and along the value chain (customers with regard to the rate tariff, electronic meters, response timing, and on-line services). The indirect stakeholders of Hera are: along the value chain (suppliers' employees with regard to the job security and the legality, social cooperatives); the community (non-profit organization of the territory and educational initiatives) and the society in a broad sense (consumer groups, trade associations, certification institutes, government with regard to the employment, regional development and legislation compliance).

The Hera's relevant commitment to involving stakeholders is manifested in numerous dialogue and consultation initiatives with stakeholders, as well as customers and employees satisfaction surveys, of which results are used to plan improvement actions.

In order to define the perspectives of the SBSC, Hera has adopted the approach proposed by Crawford and Scaletta [77], referring to sustainability report standard (GRI-G4) and using the four traditional perspectives of BSC.

On the basis of the indicators used for sustainability reports, compliant with GRI-G4, Hera group has mapped the relations of cause-effect between the 29

strategic objectives to increase the company's value in the long-term. Furthermore, the financial perspective is renamed as the economy-financial viewpoint, the customer perspective as the customer and region viewpoint, and the learning and growth perspective as the training and development viewpoint (as shown by strategic map in Fig. 3).

- In the economic-financial perspective, the lagging indicators are those identified in the strategic formulation step and represented by three financial highlights and four industrial highlights, previously exposed.
- The customer and region perspective shows three strategically important issues, namely aimed to increase their market share, to grow in new territories, and to increase customer loyalty. The relationship with customers has three performance drivers, such as: (a) characteristics of the product linked to reliability and renewable sources; (b) customer relationship focused on the tariff plan, the timing and on-line services; (c) the image and reputation. These performance drivers are accounted for both consumers and trade associations.
- The third perspective, focused on internal processes, reveals the presence of three environmental aspects, regarding the increasing alternative energy sources, reducing waste in landfills, and standards compliance, as well as the social aspects concerning prevention and health of workers, the reduction of the response timing to the customers and the increase in online services.
- The employee satisfaction is a strategic core business of fourth perspective and its performance drivers identified concern the employees (prevention, safety, involvement, and professional development), the promotion of QSE policy, the alignment with the principles of the code of ethics, the effectiveness of information systems, and the focus on the result-based strategy and culture.

According to Figgie [67, 68] the choice of SBSC configuration is linked to relevance of social and environmental aspect, measurable with non-market mechanism, such as legitimacy and legality. In the Hera's SBSC there are many environmental and social indicators closely linked to economic one and integrated in market system, but there are also non-market aspects such as dialogue with stakeholders and region and reputation that influence the business via non-market mechanisms. Hera recognizes the relevance of the latter, but it does not attribute them a strategic identity in contributing to the success of the company. For example, Hera identifies the dialogue with stakeholders and the region as relevant non-market aspect, defining three main objectives: (a) the further development of initiatives of involvement and dialogue with stakeholders; (b) the consolidation and promotion of the CSR to improve the long-term competitiveness and create shared value in the region; (c) the further contribution to the economic, social and environmental development for the relevant territory and for all stakeholders. Hera, although recognizes that this non-market aspect is relevant, does not believe that his contribution is so significant to justify a separate representation. For this reason, it decided to include this aspect in the four perspectives (in particular in the third perspective), without creating another perspective (as shown in the Fig. 3).

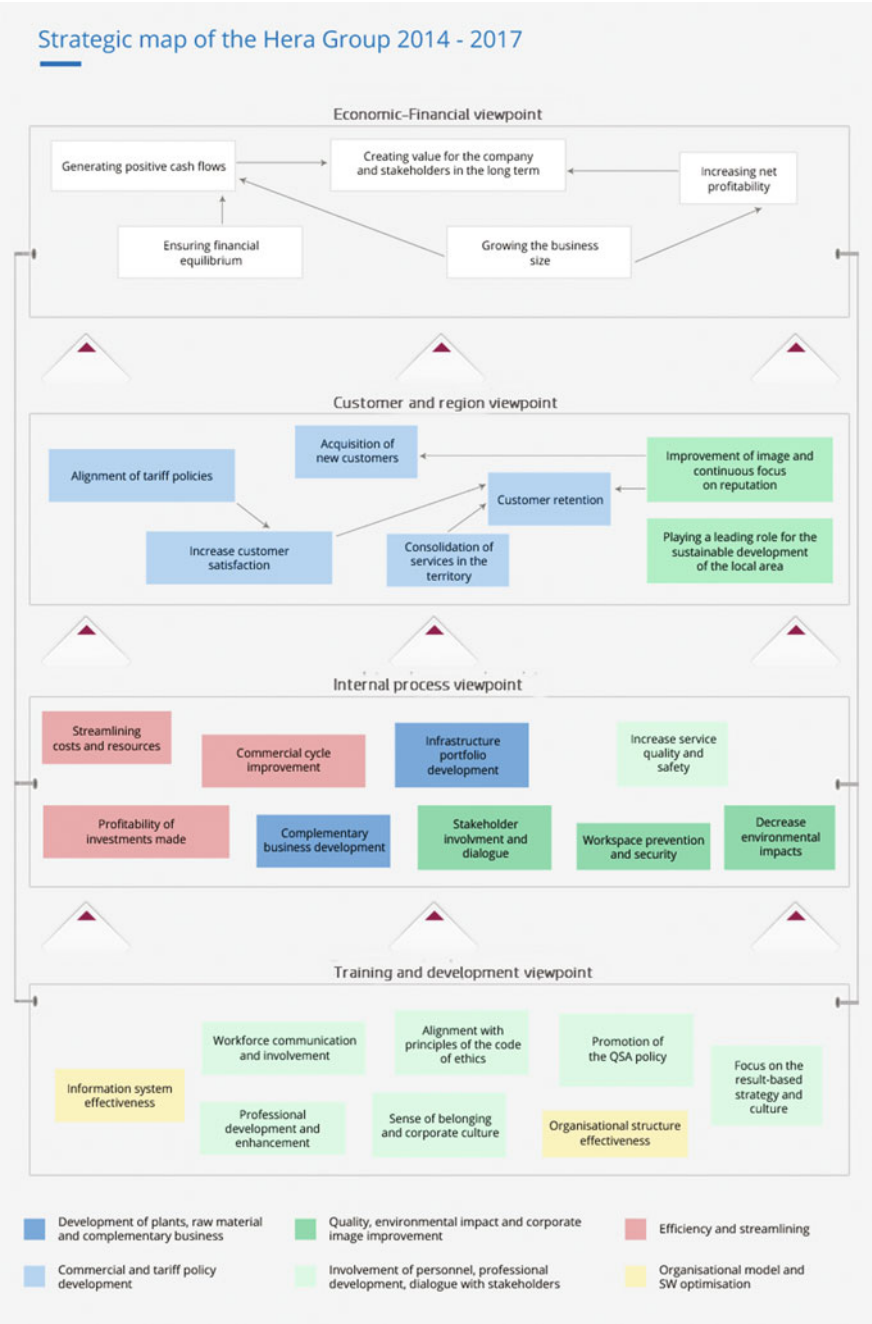

Fig. 3 Strategic map of Hera Group 2014–2017

In this way, Hera does not use the SBSC to its full potential. In Hera, the SBSC is closely linked to incentives' system: it articulates the strategy into operative projects that are linked to bonus system of management and to reporting. All projects include: (a) the assignment to a manager and their inclusion in the incentives' system for managers; (b) the process and result indicators; (c) the key action plan for achievement of the project objectives in terms of time and cost; (d) a monitoring, on a quarterly basis, at central and local (budget units) level.

The main link of the SBSC with AISs regards the collection of indicators, which are related to management of individual projects target, included in the SBSC system. This is often a general problem in traditional BSC, but it is amplified in SBSC due to the heterogeneous data, generally non-financial and coming from different sources according to the typology of KPI.

In order to manage the SBSC projects, Hera recently implemented a simple software, which allows the project managers to develop their projects and to carry out quarterly an upgrade of the project. Particularly this system allows to enter the following information: project plan (such as GanttProject); a description of the project; working group; results and activity indicators. The implementation of the new information system required a specific training initiative addressed to all managers and executives. This initiative aimed to provide operating instructions on systems use, to present the techniques of project management and to ensure greater capacity for planning and managing the project in a sustainable perspective.

There is not an automatic interface between the information system and the SBSC that allows the recovery of the indicators loaded by project managers or in other planning and control system: the integration of social, environmental and financial aspects is made as a function of sustainable reporting. Despite this, there is always a consistency control between the financial, environmental and social objective loaded by the project managers and the indicators included in the SBSC.

The use of the information system at project managers level, even if not integrated with other accounting systems ensures a great efficient and effective management of the balanced scorecard process through:

- The simplified updating and monitoring of projects.
- Better control of the correct monitoring of project sheets (inability to change the assigned objectives), through the maintenance of initial planning (no change objectives assigned).
- Increasing the visibility of the projects by the members of the working group.
- Automatic generation of displays and summary reports.
- The definition of procedures to facilitate the retrieval and management of data.

5 Discussion

The role of sustainability issues is becoming more prominent on company agendas. The most of listed companies are actively integrating sustainability principles into their businesses, and are managing the three dimensions of sustainability to improve

processes, pursue growth, and create value for the company and stakeholders and finally are providing the exhaustive disclosure also on environmental and social issues. In order to support the sustainability, enterprises should seek an integrative and complete view spanning all sustainable value chain elements of the organization, requiring an information system able to allow the achievement, jointly, of economic, social and environmental goals.

The SBSC allows a diversified integration of financial objectives with social and environmental aspects on the basis of the strategic importance attributed to them. According to literature [87] the SBSC could have the following strengths: improvement in understanding of corporate environmental and social responsibilities; improvement in planning of environmental and social targets; improvement in employees' attitude toward their environmental and social responsibilities; improvement in environmental and social performance; improvement in resource allocation; potential facilitation of the introduction of other AISs; improvements in data collection and data quality; connection between environmental, social and financial targets; alignment of different business units in common environmental and social targets.

Among the three configurations of SBSC derived by literature, Hera adopts the first configuration, integrating the environmental and social aspects in the four traditional perspectives of balanced scorecard. Hera believes that the non-market aspects (such as stakeholder dialogue) are important to be "a good citizen" but are not enough strategically relevant to generate a new perspective. Hera uses the SBSC especially to take over the sustainability issues in multi-utilities sector and to link the incentive mechanisms also to sustainability goals. The AISs support the process of collection and manage the information to implement and use this tool. There are different AISs to achieve this task in relation to not only economic dimension, but also the social and environmental aspects (manifested through market and non-market mechanisms), such as EMA and SMA.

The AISs of Hera are the autonomous subsystems: several information systems separately detect, collect and process social, environmental and economic information. The integration of information arising from the social, environmental and economic dimensions, takes place through the product manager control, recording environmental and social data in an autonomous way. Recently, Hera implemented a simple software to allow the project managers to manage the project plan, working group, result and activities' indicators, and to carry out quarterly an upgrade of the projects.

According to literature, the strategic relevance of the social and environmental aspects non measured via market mechanism affects the SBSC configuration, the sustainability AISs and their integration.

The greater strategic importance of social and environmental non-market aspects, generates (1) a progressive evolution of the SBSC configuration, that drives towards (2) the use of SAISs, increasingly integrated.

If the company's strategy is strongly focused on social and environmental issues, the company needs of AISs more integrated in order to collect and elaborate data and information to monitor and evaluate all aspects of sustainability, in a way more

timely and with less efforts. The case examined allows us to, only partly, explore this problem and the findings from it are indicative rather than conclusive.

Hera adopts the first configuration of SBSC (ITB), which not fully takes strategic advantages of this tool, supported by a "diagnostic" use of AISs. Hera considers that the AISs will allow to facilitate investigation and monitoring of projects, and to increase the commitment of the working group to realize the sustainable project objectives. However, the EMA and SMA in Hera are autonomous systems which provide useful data to create indicators needed in multiutilities sector and compliant with GRI, but they do not allow to recover all non-market aspects which can contribute to achieving the company's long-term success.

6 Conclusion

The main purpose of this study was to advance understanding of the role of sustainability in the evolution of control and accounting information systems.

To achieve this, the authors examined literature regarding sustainability and accounting information systems, focusing on the contributes regarding: (1) the role of SBSC as a tool for formulating, controlling and communicate the sustainability strategy; (2) the role of the new accounting information systems to support the sustainable commitment of business; (3) the possible relationship between AISs (especially in terms of their integration) and SBSC (which reflects the strategic relevance of sustainability aspects).

The accounting and control systems evolve consistently with the strategy and complexity of decision-making process. Academics and practitioners proposed many accounting and control instruments: one of the most important instruments, which link sustainability and strategy, is the SBSC, an integrated system of indicators, aimed to evaluate the corporate sustainability performance.

The SBSC requires specific AISs to collect, process and report information relating to the three dimensions of sustainability and that can interact in different ways and be variously integrated. According to literature, there are several AISs, which recognize the social and environmental dimensions in addition to the economic dimension, such as EMA and SMA, which use market and non-market mechanisms.

If the company's strategy is strongly focused on social and environmental issues, the company should use the more evolved configurations of SBSC (such as ANMP or DDS as shown in Fig. 2). This requires AISs more integrated in order to collect and elaborate data and information to monitor and evaluate all aspects of sustainability, in a way more timely manner and with less efforts. In this way, the company could avoid the risk of not being able to manage a significant part of the strategy or the risk of inefficiencies associated with recovery and processing times of information and with duplication, unreliability, incompleteness of data.

The case examined allows us to, only partly, explore the relationship between the environmental and social aspects considered strategically relevant and AISs to detect them, because of the exploratory nature of this work.

The case study illustrated can be collocated in the first relationship (as shown in Fig. 2), showing a basic SBSC configuration (ITB) in which the sustainability aspects are included in the four traditional perspectives and the EMA and SMA are autonomous and not integrated with traditional information system, providing only environmental and social data. This does not allow us to explore the full relationship supposed between AISs and SBSC, but it represents the first step to fill the gap in literature about the integration issue of information, which seems to be the pivotal aspect to make effective the sustainability management and each strategic control tools. Consequently, the main outcome of this work is to show how a leading company in the multiutilities sector oriented towards sustainability uses the SBSC and the AISs to manage all aspects of corporate sustainability, but we intend to expand it in a larger research. We believe that a greater number of case studies, also in no Italian context, is needed, in order to better validate our considerations and test all possible relationships between AISs and SBSC. There are many possible directions for future research, in particular, it would be interesting to improve the investigation of the different AISs to sustainability, which can be used to draw-up the SBSC but also to satisfy the disclosure need, as recently required by the new EU Directive.

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