

CONTRIBUTIONS TO ENVIRONMENTAL SUSTAINABILITY: IMPLEMENTING AND DEVELOPING A BALANCED SCORECARD IN A TOWN COMPANY

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Abstract

This paper analyzes the implementation and results of a BSC, in a town company from the water sector. A case study approach was used to describe how this tool can contribute to an improvement in planning and control processes, and to manage social sustainability goals. The main findings are related to the contribution that accounting systems can bring to sustainability issues; it has been founded that potential for introducing innovation by entrepreneurs, may be high and should be reinforced in Public Sector organizations; performance measurement tools allow a balanced control of both social and financial performances in an hybrid organization.

Keywords:

Balanced Scorecard (BSC); town companies; water supply and wastewater services; strategic management; case study.

Contributions to Environmental Sustainability: Implementing and developing a Balanced Scorecard in a town company

Introduction

Several authors mention the need to use management methods from the private sector to support greater transparency in the use of public resources, referring the Balanced Scorecard (BSC) as an important tool in this context (Dimitropoulos *et al.*, 2107; Moullin, 2017; Tomažević *et al.*, 2017; Northcott & Taulapapa, 2012; Greatbanks & Tapp 2007; Niven, 2006; Moore, 2003).

The need for public entity managers to focus on the satisfaction of citizens/customers, the efficiency of internal processes and the public image of the institutions has been on the day's agenda.

The analyzed belongs to the universe of town companies, which are regulated in Portugal by Law n.º50/2012, of 31 August, which approves the legal framework of local business activity and local interests. This is a local sole proprietorship company. It assumes the performance of the tasks related to the management and operation of local public water supply systems, sanitation of urban waste and waste waters; the management of the public sanitation system in the county; the creation, management and operation of a network of urban/local transport within the town area.

Among these activities we will explore in more detail those related to the management and operation of public water supply systems, sanitation of urban waste water and urban waste, as an evaluation system performance based on the classical model of BSC has been in operation in this activity since 2011. The implementation process took place between 2010 and 2011, and the initial stage was characterized by realizing what the broad guidelines were based on company's mission and vision. In the following phases an alignment of the strategy was developed, using the four classical perspectives of the BSC model, and the indicator setting process, according to Kaplan & Norton (1992, 1996a, 1996b).

Thus, our research questions are linked to motivation identification and the role of stakeholders who responded to this motivation. We highlight the issue of identifying the implementation need, how this need was supplied and the means used to do that. It seems that these factors may be explained by the characteristics pertaining to the entity and to the responsible for the introduction of this innovation, the resources that the latter uses and the information used.

Another set of research questions are related to the kind and composition of indicators used to assess and improve the capability of the organization in order to achieve a better management level on resources related to drinking water and to improved sanitation. These two themes are among the United Nations Sustainable Development Goals (U.N., 2015), that, according to Bebbington & Unerman (2018), are emerging in several disciplines, but are just making a start by appearing in the accounting literature.

We also analyzed the evolution of the development conditions of the system, the future prospects for its continued use, and the perceived results after system implementation.

Literature Review

The response to the new challenges related to satisfaction of all stakeholders, often assumes a strategic reorientation, with greater focus on the organization's stakeholders and on results

(Dimitropoulos *et al.*, 2107; Tomažević, *et al.*, 2017; Buick *et al.*, 2015; West & Blackman, 2015; Bryson *et al.*, 2014; Bianchi and Montemaggiore, 2008). In this context, the importance of a tool such as the BSC is emphasized and may represent an important step in the management process of these organizations; those have special characteristics that is important to analyze in depth. In this context, we will focus our analysis on the case study of an entity belonging to the water supply and wastewater sector.

On the other hand, the entities who play an important role in the area of the natural resources, like water, must be oriented to better handle and manage these resources. In this sense, the role of management accounting is highlighted by Lowe & Tinker (1989), who claim that cybernetics, management science and organizational theory could render management accounting more anticipatory by monitoring key environmental variables and employing feed-forward controls; emphasising long-run organizational survival and growth rather than profit maximization in order to build organizational controls matching environmental complexity. Another authors like Hoper & Bui (2016), Bebbington & Thomson (2013), Virtanen *et al.* (2013), Songini & Pistoni (2012), Gond *et al.* (2012), Milne (1996), highlighted the necessity to conduct works on the area of sustainability in the accounting literature.

The accounting and sustainability issue in water sector has been addressed by Moore (2013), and by Chalmers *et al.* (2012).

Only a small number of studies were identified about the application of the BSC in the water sector, so it seems to be a little explored subject in the literature. The theme is treated by Franceschini and Turina (2011), in which a performance indicator was set, in order to monitor the services provided by companies in the sector in an Italian region; Bianchi and Montemaggiore (2008) developed a study in a town company in an Italian city; Rocha Fernandes *et al.* (2005) carried out an analysis based on the BSC, in a water supply company and a wastewater Brazilian state; finally, Tebbutt *et al.* (2003) considered the applicability of the BSC as a decision-making tool for investments in the water sector in England and Wales.

In the literature review we found some articles related to the BSC application in the public sector in Portugal. However, very few apply to water supply and wastewater services, and even fewer seek to analyze the results in the post-implementation phase, *i.e.*, a few years after the implementation. This case study is set in this context, as we continue the implementation of the BSC classical model applied to lucrative purpose entities. Thus, our main theoretical framework is the one presented by Kaplan and Norton (1992, 1996a, 1996b).

We followed the BSC classification for implementation phases by Saraiva (2011), in order to classify the tool type usage, by identifying the implementation phase.

This work will also address the issue of BSC implementation in the light of the introduction of innovations in the Public Sector entities. We assume the concept of innovation in this sector as understood by WinDrum and Koch (2008): the ability of those involved in public programs to be creative, entrepreneurial, take risks, develop learning from experience in order to improve new programs. In this case, the initiative for the BSC implementation came from the middle management of the entity. This is relevant, since it is usually considered that the entrepreneur is the driving force that initiates the development of innovation and successfully manages its diffusion (Schumpeter, 1934).

Methodology and theoretical framework

We used qualitative methodology, namely through a case study. To deepen the research questions several interviews in the entity were conducted, including the person responsible for implementation and monitoring of the project, as well as the top management. These interviews were conducted during the first months of 2016; a second set of interviews, to the same actors, was conducted by the end of 2018. We also collected material directly from various sources, including: organization's website information, the annual reports, internal documents provided by the entity, and several presentations made by the entity and publicly available.

In this context, the guidelines for qualitative studies cited by Ryan *et al.* (2002), Yin (2003) and Parker (2012) were followed. Thus, we understand that reality is created by organizational actors interacting with other actors and their environmental context; the researcher's role is to study and understand how the processes within the accounting and management control interact, reflect and generate specific events, activities and changes in organizations.

The issue of continued qualitative approach is justified if a close connection between research and actors is pursued, characteristic of this type of research instead of research carried out in a distanced way (Vaivio, 2008; Parker, 2012). This provides permeation and unzipping from within the organizational processes and analysis of the interaction of accounting with these processes (Parker, 2012).

This allows to move towards understanding and clarifying the application of accounting tools for organizational change situations (Ahrens et al, 2008; Parker, 2003, 2012), as well as processes of introducing innovation by extension.

Interviews were lead in a semi-structured way, by using a detailed script, in conjunction with the fact that many of the questions were open, allowing the respondents to present their point of view. It should also be noted that after an initial analysis of the responses to the first interview stage, some of the points that had raised doubts were clarified with the respondents.

As a result of this phase, the interviews were transcribed and their content analyzed in order to answer the research questions.

Although much of the theoretical framework has already been presented, we want to highlight and contextualize the issue of change in accounting management, coupled with the introduction of innovation. According to Chenhall and Moers (2015), the BSC had a significant impact on how the accounting profession conceive the relationship between management control systems and innovation strategy, based on "extended control notions" (Chenhall and Moers, 2015, p.6).

In this concept, extended control notions, the issue of innovation is referenced by WinDrum (2008, p. 9) to define conceptual innovations such as those that are particularly important for institutions operating under public or social aims, because they establish links between economic and social objectives of a public body and its operating logic.

Still on the issue of the spread of change in accounting management, and more specifically in relation to the diffusion process of adopting the BSC, Busco & Quattrone (2014), *cit. in* Busco *et al.* (2014), claim that its adoption is facilitated by the ability of the tool to create a scenario in which:

- Complex issues are translated into clear visual representations;
- Order and knowledge can be classified and reinvented;

- Interests may be accommodated through a constant process of questioning and reinvention
- The involvement of human resources is supported through participation in a recurring series of activities.

This last question, leads to how management innovations and the individuals responsible for them improve the efficiency of organizations and provide added-value ways of working (Kaplan, 1998).

Regarding this, Busco *et al.* (2014), fall within the capacity that BSC has to accommodate the interests of different users, allowing for a question and mediation route. This route leads to the construction of knowledge, by letting users question the strategic themes as well as the objectives and indicators.

Alongside these factors, the conditions within organizations seem to take influence on the adoption process and the BSC implementation success (Laitinen, 2001; Libby and Waterhouse, 1996; Shields, 1995; Innes and Mitchell, 1990).

Results and discussion

This paper presents the work that has been done by the management of an entity in charge of the regional water supply and wastewater services of central Portugal. This is related to the consolidation of a board framework for management support, within the concept of BSC, whose purpose, according to the results of our interviews, is not only to build a performance evaluation system with integration of indicators for regulation, as well as a management tool for monitoring and evaluating the organizational strategy.

As stated by the organization, before making the BSC implementation decision, the entity was already using a performance evaluation system, with a number of non-financial indicators. However, it was a system where the goals do not communicate with each other, being mainly operative, relegating strategy, pursuing a process approach. According to the responsible for implementing the BSC, the previous system had limitations because the strategic positioning of the entity or its systematization was not considered, nor the communication to its human resources.

Identification of the need for a new performance evaluation system

Although there was previously in the entity an evaluation system, it was necessary to extend the performance analysis to the company's activities that were not regulated.

The system previously in force had arisen with the implementation of ISO 9001: 2008, ISO 14001:2004 and 18001:2007. Performance indicators and appropriate assessment of the sector Regulatory Authority also had repercussions in this system.

However, from the responsible for implementing the BSC perspective, the objectives of the Regulatory Authority were not fully consistent with those of the entity, and the same kind of problem relating to the indicators used arose.

These indicators were generated from either the referenced ISO standards or the Regulatory Authority, assuming no specificity in the reality of the organization, as it was necessary to extend the performance analysis to other business activities that were not regulated, the goals did not communicate with each other, they were not understandable/noticeable by the human resources of

the organization, they were not aligned with strategic issues and there was no clearly established relationship of cause and effect.

According to the interviews, the previous system was inadequate to address the organization's needs, as it was essential to systematize coherently and articulately its strategic objectives and identify, for each of these objectives, evaluation indicators of the respective performance, as well as initiatives to achieve compliance with the established goals.

Another of the identified needs was the communication strategy for human resources, as well as the actions developed for achieving the set goals. It was understood that the most effective way to meet these needs would be to implement a BSC for the entity.

The identification of the solution is related to the technician actual training course and skills. He is a certified accountant with basic academic training and registered with a professional association. When asked about the form of initial contact with the concept of BSC, he clearly identified two situations: participation in a post-graduation, where he had the first contact with it, as well as the integration, at a later date, in a short expertise course on the concept and its application. In relation to prior knowledge of the BSC concept, his answer was inconclusive. These facts seem to accord with the idea referenced by Saraiva & Alves (2015) on the main forms of diffusion of the BSC in Portugal.

In this case, the existence of organizational characteristics conducive to the introduction of innovation and change seems to have occurred:

- The presence of the necessary features of the individual actor and activities (Anderson, 1995), in the sense that the initiative comes from a specific actor within the entity, which entrepreneurially, promotes the incorporation of innovation activities of his competence;
- The ability to promote change (Libby and Waterhouse, 1996) - the actor has technical skills to promote change through the introduction of innovation;
- The presence of facilitators of change and introduction of innovation (Innes and Mitchell, 1990; Laitinen, 2001) – embodied, in this case, in taking part in academic and professional training that allowed the actor to obtain knowledge and application of this knowledge in the implementation of change.

BSC Implementation

The BSC implementation process took place between 2010 and 2011. The promoter of the initiative said it was very easy to gain top management acceptance. He characterized the entity's management as participatory, in the sense that it encourages dialogue with the entity's employees, it listens to their proposals and ideas, and then decides in accordance with the outlined objectives.

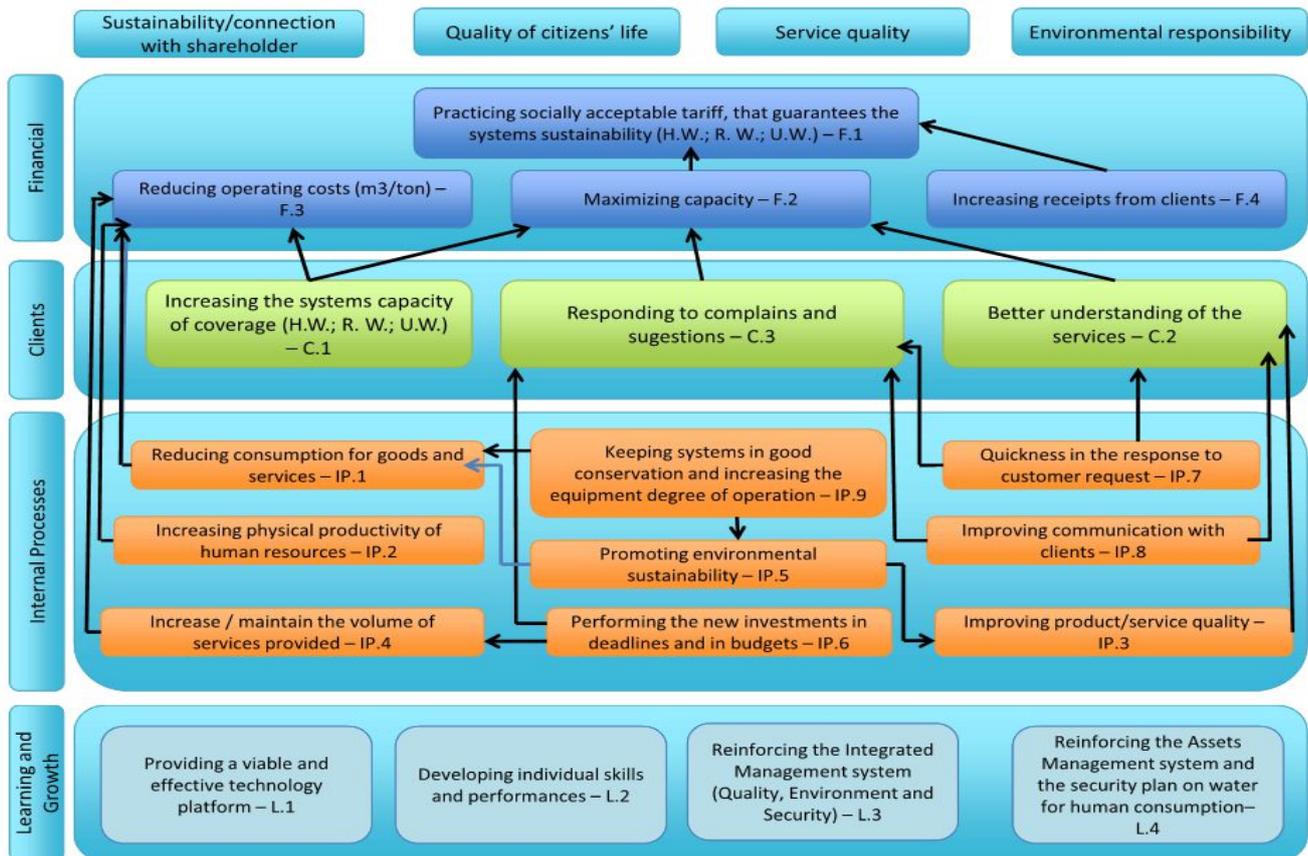
Based on the mission and vision of the organization, the following broad guidelines were defined and its strategic themes identified: economic and financial sustainability, guidelines issued by the shareholder, quality of life of county citizens, quality of service.

At a later stage, the strategy was outlined, anchored in the organization's mission and vision. The mission, according to the organization's website, aims "(...) to ensure the quality of municipal public services of water supply, wastewater and municipal waste at a socially acceptable cost, and ensure

that all other tasks delegated by municipality (...) are developed with effectiveness and efficiency criteria, promoting the quality of life and obeying the economic, financial and environmental sustainability criteria." Also according the same, the vision embodied in "(...) being a management company of national reference in respect of public water supply services, wastewater and municipal waste and contribute to (...) being a county with the country's best quality of life. "

At this stage the mission and vision of the organization were incorporated into the Classic BSC prospects model, resulting in the strategy map in Figure 1.

Figure 1 - Entity's strategy map



Source: entity's internal data

Caption: H.W. - High Water (clean Water); R.W. – Residual Water (sanitation system); U.W. - Urban Waste.

This strategy map distinctive feature is the fact that goals were integrated in each perspective. These objectives have been characterized as strategic by the entity's management. Cause and effect relations between the objectives of the three perspectives of the strategy map were also cited, except for the Learning and Growth perspective. According to the interviews, those responsible for implementing the BSC stated that not identifying cause and effect relationships in the basic perspective objectives is due to the fact that these are transversal to the organization and take impact in all strategic goals.

The interview also shown that obtaining consensus was the least complicated situation, whereas setting objectives and goals were the most complex aspects of system design. However, it is important to emphasize that many of the indicators used to measure the performance of regulated services were previously tested. For other sectors of the company, the choice of indicators was also consensual.

The objectives were subsequently translated into indicators. The interviews identified that the indicators selected by the Regulatory Authority in its evaluation model were integrated into the BSC. The indicators from the model used by the Regulatory Authority are integrated in the three top perspectives, *i.e.*, just do not integrate the Learning and Growth perspective.

According to the analysis results, the Regulatory Authority did not have in its model any indicator that could be integrated into the basic perspective. On the other hand, another purpose behind the implementation of the BSC was the strategy communication. The person responsible for implementing the BSC clearly mentioned this aspect during interviews: "(...) it was necessary to translate the strategic objectives into the language of our company, so that everyone would understand them".

It was also noted by those responsible that "it was necessary to extend the performance analysis to other company activities that were not regulated."

Below are displayed the indicators associated with each perspective, in Figures 2 to 4. We followed the order in which the first contribute to or justify the following perspective. We start our analysis with the learning and growth and end in the financial and clients perspective.

Figure 2 - Overview of learning and growth indicators

Perspective	S.M. (S.O.)	Performance Indicator	Reg.Auth.	Measure unit	2014	2014 goal	Performance
Learning and growth							100,49%
	A.1	A.1.1 - Facilities georeferentiation Wss	No	%	100	90	111,00%
		A.1.2 - Facilities georeferentiation WSS	No	%	90	90	100,00%
		A.1.3 - Facilities georeferentiation UWMS	No	%	90	90	100,00%
	A.2	A.2.1 - Training hours	No	hours	3.672	750	489,60%
	A.3	A.3.1 - # Major compliance QESMS	No	unit	0	0	100,00%
		A.3.2 - # Minor compliance QESMS	No	unit	8	8	100,00%
	A.4	A.4.1 - Completion and update AIM	No	%	80	70	114,29%
		A.4.2 - Completion and update WSP	No	%	70	70	100,00%

Source: entity's internal data.

Caption: S.M. (S.O.) – StrategyMap (StrategicOrientation); Reg.Auth. – Regulatory Authority; Wss – Water supply system; WSS - Wastewater Sanitation System; UWMS - Urban Waste Management System; QESMS - Quality , Environment and Safety Management System; AIM - Asset Infrastructure Management; WSP - Water Safety Plan.

We highlight the following facts: Learning and Growth perspective includes measures such as the number of training hours related to the development of skills and individual performances; the number of compliances with the consolidation of the quality system, environment and safety; the geo-reference infrastructure, regarding the availability of a reliable technology platform; the degree of completion and upgrading of *AIM* and *WSP*, related to the property management system and respective consolidation and water for human consumption safety plan .

It seems that the defined set of indicators adheres to the model proposed by Kaplan & Norton (1996a), in the subdivision of this perspective in indicators related to human resources and respective learning, as well as in information and management systems of assets.

We also highlight the fact that all indicators integrated in this perspective are not referenced in the Regulatory Authority model - which indicates that the Regulator does not consider this level on its own model, since the interviews showed that all entity model indicators were integrated into the organizational BSC.

Here, once again, the critical spirit and leadership characteristics of promoters of innovation are evidenced, based on the vision of the development of intellectual abilities, which are connected to the approaches of NPM. The introduction of innovations has been repeatedly associated with these new management practices within the public entity sector, responsible for promoting modernization in the sector (Saraiva & Gabriel, 2016; Salge & Vera, 2012).

As far as the aspects of sustainability, we highlight the indicators referring to strategic orientation relating to AIM - Asset Infrastructure Management and WSP - Water Safety Plan, because these ones are directly related to the quality of the system operational conditions, and to the promotion of environmental sustainability.

Figure 3 - Internal Process Perspective Indicators:

Perspetiv e	S.M. (S.O.)	Performance Indicator	Reg.Aut .	Measur e unit	2014	2014 goal	Performance	
							100,49%	
Internal Processes	IP.1	IP.1.1 - Influx of Rainwater	No	%	119,34	104,25	85,53%	
		IP.1.2 - # Waste delivered for treatment	No	%	3,76	-0,5	59,44%	
		IP.1.3 - Energy consumption in Wss	No	unit	0,78	0,76	98,97%	
		IP.1.4 - Energy consumption in WSS	No	unit	0,76	0,72	94,86%	
		IP.1.5 - Expenses with the completion and distribution of billing invoices and office supplies	No	€	144.562	149.916	103,57%	
		IP.1.6 - Average fuel consumption of waste collection vehicles	No	%	53,43	50,45	94,10%	
		IP.1.7 - Expenses with equipment and vehicles compensation of regulated services	No	€	72.480	91.000	120,35%	
	IP.2	IP.2.1 - Suitability of Human Resources in H.W.	Yes	unit	1,62	2	81,15%	
		IP.2.2 - Suitability of Human Resources in R.W.	Yes	unit	4,17	5	98,34%	
		IP.2.3 - Suitability of Human Resources in M.W.	Yes	unit	2,4	1,5	120,04%	
		IP.2.4 - Absenteeism rate	No	%	6,49	4,5	55,78%	
		IP.2.5 - Workplace accidents - frequency indexes	No	unit	49,55	40	76,11%	
		IP.2.6 - Workplace accidents - severity indexes	No	unit	1.172	400	-93,00%	
	IP.3	IP.3.1 - Occurrence of supply disruption	Yes	unit	0,17	0	96,50%	
		IP.3.2 - Water quality	Yes	%	99,82	99	100,83%	
		IP.3.3 - Occurrence of floods in wastewater - R.W.	Yes	unit	5,71	0	28,68%	
		IP.3.4 - Containers laundering	Yes	unit	6,35	6	101,94%	
	IP.4	IP.4.1 - Water not billed	Yes	%	35,89	31,4	85,70%	
		IP.4.2 - Invoiced m3 of Supplied Water	No	unit	2.624.845	2.599.480	100,98%	
		IP.4.3 - Invoiced m3 of wastewater	No	unit	2.283.995	2.157.722	105,85%	
		IP.4.4 - Invoiced m3 in special contracts - U.W.	No	unit	19.048	18.500	102,96%	
	IP.5	IP.5.1 - Water actual losses	Yes	unit	142	131,97	92,49%	
		IP.5.2 - Licensing compliance for the water abstractions	Yes	%	100	100	100,00%	
		IP.5.3 - Energetic efficiency of pumping facilities in H.W.	Yes	unit	0,40	0,41	103,17%	
		IP.5.4 - Energetic efficiency of pumping facilities in R.W.	Yes	unit	1,20	0,88	63,98%	
		IP.5.5 - Adequate disposal of collected wastewater	Yes	%	100	100,00	100,00%	
		IP.5.6 - Wastewater emergency discharge control in R.W.	Yes	%	95,45	100,00	95,46%	
		IP.5.7 - Accomplished tests on wastewater	Yes	%	100,00	100,00	100,00%	

	IP.5.8 - Compliance with water discharge parameters	Yes	%	98,93	85,68	115,31%	
	IP.5.9 - Destination of muds resulting from wastewater treatment - R.W.	Yes	%	100,00	100,00	100,00%	
	IP.5.10 - Use of energy resources in municipal waste - M.W.	Yes	unit	5,69	5,86	102,94%	
	IP.5.11 - Emission of greenhouse gas in urban waste - U.W.	Yes	unit	17,26	17,39	100,74%	
IP.6	Gap in performing/executing new investment	No	%	22,83	20,00	85,87%	
	Gap on the contracted amount of the planned works	No	%	0,00	0,00	100%	
IP.7	IP.7.1 - Maximum execution time - installation of new water consumption readers	No	%	94,50	95,00	99,48%	
	IP.7.2 - Average execution time - water and sanitation extensions	No	%	91,32	90,00	101,47%	
	IP.7.3 - Average execution time - cleaning of septic tanks	No	%	100,00	95,00	105,26%	
	IP.7.4 - Average execution time -picking of greens	No	%	99,60	95,00	104,18%	
	IP.7.5 - Average execution time -picking of monsters	No	%	98,30	95,00	103,48%	
	IP.7.6 - Deadline for information and responses in construction processes	No	%	100,00	95,00	105,26%	
	IP.7.7 - Deadline for information and responses in allotments processes	No	%	100,00	80,00	125%	
IP.8	IP.8.1 - Service interruption notices (scheduled)	No	%	100,00	100,00	100%	
	IP.8.2 - Implementation of a digital desk	No	%	25,00	90,00	27,78%	
	IP.8.3 - Promoting environmental awareness raising actions	No	unit	30	70	42,86%	
	IP.8.4 - Number of news reports on the company site	No	unit	17	6	283,33%	
IP.9	IP.9.1 - Rehabilitation of pipelines in H.W.	Yes	%	0,51	0,58	-103,75%	
	IP.9.2 - Malfunctions in pipelines	Yes	unit	18,82	10,51	68,54%	
	IP.9.3 - Rehabilitation of collectors	Yes	%	0,42	2,55	16,33%	
	IP.9.4 - Occurrence of structural collapses in collectors	Yes	unit	0,77	0,00	80,80%	
	IP.9.5 - Recycling of packaging wastes	Yes	%	124,48	141,00	88,28%	
	IP.9.6 - Renewal of the vehicle fleet in M.W.	Yes	unit	426.313	430.202	100,90%	
	IP.9.7 - Profitability of vehicle fleet in M.W.	Yes	unit	539,08	543,00	99,28%	

Source: entity's internal data.

Caption: S.M. (S.O.) – StrategyMap (StrategicOrientation); Reg.Auth. – Regulatory Authority; Wss – Water supply system; WSS - Wastewater Sanitation System; H.W. – High Waters; R.W. – Residual Water (sanitation system); M.W. - Municipal Waste

A large number of indicators is considered in the internal process perspective. Since the total model is composed of one hundred and nine indicators, this perspective includes fifty-two. The definition of indicators was reported by the head of the project, as one of the greatest difficulties in implementing the BSC. This definition also involved the calculation of the respective formulas for the indicators, in order to assess the performance and goals achievement. In order to achieve the realization of the goals set, actions to be developed have been identified, and responsibility for the implementation of those actions assigned to the various elements within the organization.

According to interviews, the question of the definition of action and result indicators (lag and lead) was not present at the time of system construction.

On the other hand, one of the underlying concerns during the construction of the BSC was the issue of addressing the needs of system users, being assumed all of the stakeholders. Thus, it is natural

that the number of indicators in this perspective is very high, since the following were assumed as recipients: the entity itself, the Regulatory Authority, financial auditing firms, auditing companies under the certification schemes, and quality management by ISO standards (NP ISO 9001: 2008, EN ISO 14001: 2012 and OHSAS 18001: 2007 / NP 4397: 2008).

The range of needs that this information was designed to address also leads to the expansion of this perspective. Concerning the response to the organization's needs, the information essentially serves management purposes - including control, monitoring strategy, decision-making. With regard to the needs of the Regulatory Authority, the information is for the purpose of assessing the quality of service of regulated services, involving regulation by comparison, as well as the benchmarking exercise. Regarding the latter aspect, it essentially assists evaluation of the objectives defined within the quality, environment and safety management system.

As to the purpose of Sustainability Development Goals, related to water, we should highlight that the indicators designed in IP.3 (maintaining product/service quality), IP.5 (promotion of environmental sustainability), and IP.9 (quality of the system operational conditions), seems to contribute to the purpose of the objectives of SDGs.

Figure 4 - Indicators of Financial and Clients Perspectives:

Perspective	S.M.	Performance Indicator	Reg.Aut.	Measure unit	2014	2014 goal	Performance
		Global Performance					100,49%
Financial	F.1	F.1.1 - Affordability of H.W. service	Yes	%	0,23	0,25	100,40%
		F.1.2 - Affordability of R.W. service	Yes	%	0,38	0,42	100,24%
		F.1.3 - Affordability of U.W. service	Yes	%	0,17	0,19	100,53%
		F.1.4 - Coverage of total spending in H.W.	Yes	unit	1,09	1	101,70%
		F.1.5 - Coverage of total spending in R.W.	Yes	unit	0,97	1	98,10%
		F.1.4 - Coverage of total spending in U.W.	Yes	unit	1,08	1	102,20%
	F.2	F2.1 - Membership/customer adhesion to H.W. service	Yes	%	97,81	90	108,68%
		F2.2 - Membership/customer adhesion to R.W. service	Yes	%	97,72	87	112,32%
		F.2.3 - Total number of clients in U.W.	No	%	89,38	89	100,44%
	F.3	F.3.1 - Operating costs per unit in H.W.	No	unit	0,39	0,42	107,14%
		F.3.1 - Operating costs per unit in R.W.	No	unit	0,72	0,8	110%
		F.3.1 - Operating costs per unit in U.W.	No	unit	75,91	81,95	107,37%
	F.4	F.4.1 - Shipping time of listing debts for litigation	No	%	69,56	90	77,29%
Clients	C.1	C.1.1 - Physical accessibility of H.W. service	Yes	%	99,66	99	100,67%
		C.1.2 - Physical accessibility of R.W. service	Yes	%	95,56	96	99,54%
		C.1.3 - Physical accessibility of U.W. service - undifferentiated collection	Yes	%	95,36	94	101,45%
		C.1.4 - Physical accessibility of U.W. service - selective collection	Yes	%	67,32	66	102,01%
	C.2	C.2.1 - Customer satisfaction survey - Wss	No	unit	3,73	3,5	106,57%
		C.2.2 - Customer satisfaction survey - WSS	No	unit	3,68	3,5	105,14%
		C.2.3 - Customer satisfaction survey - UWMS	No	unit	3,57	3,5	102,00%
		C.2.4 - Comparison of quality of service in relation to the neighboring municipalities – Wss (RASARP)	No	unit	3	3	100%
		C.2.5 - Comparison of quality of service in relation to the neighboring municipalities – WSS (RASARP)	No	unit	3	3	100%
		C.2.6 - Comparison of quality of service in relation to the neighboring municipalities – UWMS (RASARP)	No	unit	5	3	33%
	C.3	C.3.1 - Responding to complaints and suggestions - H.W.	Yes	%	100	100	100%

	C.3.1 - Responding to complaints and suggestions - R.W.	Yes	%	100	100	100%	
	C.3.1 - Responding to complaints and suggestions - U.W.	Yes	%	100	100	100%	

Source: entity's internal data.

Caption: S.M. (S.O.) – Strategy Map (StrategicOrientation); Reg.Auth. – Regulatory Authority; H.W. – High Waters; R.W. – Residual Waters (sanitation system); U.W. - Urban Waste ; Wss – Water supply system; WSS - Wastewater Sanitation System; UWMS - Urban Waste Management System; RASARP – Water supply and Wastewater Sanitation in Portugal Report.

In both perspectives now analyzed, we emphasize the integration of indicators, in addition to those previously belonging to the Regulatory Authority evaluation system, such as those related to customer satisfaction and those involving comparisons with entities of the same region on the service quality.

In the financial perspective, the introduction of essentially targeted indicators for the purpose of control of costs and expenses (and as well to control unrealized revenue) seems relevant and directed to the introduction of management control practices.

It is important to highlight the tendency, to pursue management practices based on private management, as features of NPM and Public Administration modernization programs.

Concerning to SDG, we highlight the indicators related to affordability and accessibility of the services provided by the organization.

Implemented BSC: evolution and main results

According to information collected in the organization's documents and in interviews, we were able to review the main developments continued after the implementation of the entity BSC, which was documented in the previous two subsections, as well as the results obtained after implementation. According to the classification used by Saraiva (2011), the BSC is used in the entity in all defined aspects, although the aspect emphasized at the last phase, is applied only partially and in a less significant way, because the entity in question is not intended for the realization of alliances - that responsibility belongs to the participating entity.

In terms of the BSC evolution we considered two levels: the composition of the framework set of indicators - which remained stable between 2011 and 2015; and the route on the operationalization of the BSC and its regular operation, which led to the implementation in 2013 of an IT application that allowed the automation of the process and increased the evaluation frequency.

The introduction of this IT application provided a number of advantages, as follows:

- Centralization of recorded objectives, indicators, action plans, initiatives and resources, on the same platform;
- Record of all changes made to data and security mechanisms;
- Simplification of the data loading process to obtain indicators;
- Possibility of obtaining data and reports to explain the systematic information and reports that enable integrated information view;
- Communicating clear information about the results through a management cockpit, considering the weight taken by each indicator and for each group of indicators.

The responsible for implementing the BSC considered that the introduction of computer support was extremely important in the implementation, since the volume and complexity of the work associated

with the system decreased significantly. The system graphic outputs, which show a clear evolution of the indicators and the pursuit of the strategy was also valued.

As to the purposes and ways the BSC is used, the following situations were stated:

- For entity management: control, monitoring strategy, decision-making;
- To evaluate the quality of service of regulated services (involving benchmarking exercise);
- To evaluate the objectives defined in the quality, environment and safety management system (this relates with UN SDGs);
- As a strategy communication system;
- As a system of evaluation, support and strategic management, through performance evaluation;
- As a system that contributes to develop the skills of its employees in its adaptation to the strategy.

The main results of the implementation and the perceived benefits related, mainly, to:

- Greater perception of the effects of using non-financial indicators;
- Greater strategic focus;
- Better clarification and communication strategy (use of common language in communication)
- Closer links between medium and long-term activities and short-term actions; accordingly, it has to have an annual practice of rehabilitation of infrastructures in order to prevent its collapse in the future;
- Better perception and understanding of the motivations and purposes from different stakeholders;
- Obtained information permits a fine tuning of the strategy development;
- Encouraging investment in intangible assets by the perception that investment in staff training, implementation of management systems and the use of new technologies can improve the effectiveness and efficiency of production processes and consequently the overall performance of the organization.

It was also noted that the ability of the entity to accomplish strategic goals increases, since the BSC facilitates the identification of opportunities for improving the performance and consequently achieve the strategic objectives, even those related to sustainability.

Positive results were also perceived in terms of improving internal processes, innovation capacity, customer and shareholders relationships. As one of the elements of the management staff stated: “in all these aspects, the measurement of phenomena allowed us to know them better and this knowledge allowed us to achieve the improvement”.

As for the identification of the indicators related to the management of Water, as a key resource in the field of SDGs, we list the most relevant sets in figure 5.

Figure 5 – Identification of sets of indicators related to SDGs in the BSC Management Cockpit:

	Annual Assessment	Weight	ScoreGoal	Performance
	Global Performance	100,00%		102,88%
	Financial	25%		83,48%
F.1	Practicing socially acceptable tariff, that guarantees the systems sustainability (H.W.; R. W.; U.W.)	42,50%		100,53%
F.2	Maximize the use of existing infrastructure and optimize its management	5%		107,14%
	Clients	25%		98,39%
C.1	Increasing the systems capacity of coverage (H.W.; R. W.; U.W.)	33,33%		100,70%
	Internal Processes	25%		88,02%
IP.3	Improving product/service quality	13%		80,18%
IP.5	Promoting environmental sustainability	13%		99,07%

IP.9	Keeping systems in good conservation and increasing the equipment degree of operation	13%	61,21%
Learning and Growth		25%	141,62%
L.4	Implementing the Assets Management system and the security plan on water for human consumption	25%	107,14%

Source: entity's internal data.

At this point we can define a set of objectives related to the assuring of sustainability that relates to a set of indicators used to this end. This set of indicators can be now evidenced as a part of an accounting and control system which can contribute to understand how the management of natural resources can be enhanced by the system.

Conclusions

The effort conducted in Public Administration entities, in order to develop planning and management control has also to do with the purpose assigned to the tools used, not only in an operational perspective, but also in a strategic one, taking into account issues such as the satisfaction of customers/citizens, its well-being, the efficiency of operational processes, the image of the entities that respond to public needs and obtaining visibility and power for each of these entities and also on sustainability issues. We found the presented case can provide evidence on the role that management accounting can assume in this field.

This case study can be analyzed in the light of the existence of organizational characteristics conducive to the introduction of innovation and change: including support from top management, connection performance evaluation and compensation policy (current intention in the studied organization), adequacy of material resources and training of human resources (Shields, 1995). We added to the referred issues the contribution related to the identification of indicators (financial and non-financial), that can be used in a water company, in order to find paths to identify ways to make resource management more rational and controllable from the point of view of sustainability maintenance.

In general, studies show that entrepreneurs are essential in cases of innovation in public administration - which was also observed in this case. WinDrum (2008, p.4), says entrepreneurs in public programs are innovation "champions", being willing to experiment and take risks, applying new ideas for the first time. These ideas are either developed by them or by others, but applied by them.

Thus, this case supports a closer analysis of the entrepreneur role, considering these entrepreneurs important in the diffusion of innovation policies. It takes into account the role of these actors: recognizing them, giving them the necessary resources and associated responsibilities. In this context, we analyzed a case of successful entrepreneurial initiative, accompanied by an implementation of a successful case of a BSC in a public sector entity.

It is also important to point out that there seems to be some preconditions that some organizations have and that enable the successful introduction of innovation and change in accounting and management:

- The presence of facilitators of change (Innes and Mitchell, 1990) - prior existence of a performance measurement system is a facilitator, and the success of the supplementary system is more probable;
- Operational characteristics and actor (Anderson, 1995) - entrepreneurial attitude of the actor and his mastery of the technical aspects necessary for the implementation and development;

- Catalysts and drivers of change (Innes and Mitchell, 1990; Laitinen, 2001) - identified the need to implement a performance evaluation system that is adjusted to the organization's objectives and strategy;
- Ability to promote change and to implement it (Libby and Waterhouse, 1996) - the entrepreneur's characteristics and knowledge;
- Support and engagement of the top management (Shields, 1995).

It should be noted that all these conditions are usually referenced in private sector entities.

The main limitations of the research presented, relates to the fact that a research of this nature should monitor developments of the cases studied - so this research will be continuing or ongoing. We also would like to highlight the issue of choice of the BSC model applied by the organization - which has yet to be deepened with the desired intensity.

So these issues have to be considered as indications for further investigation. Other future research issues include the effective implementation and evaluation of results in the public sector in general and in the water sector, in particular, as it seems a relatively unexplored path.

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