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2022-06-27

Deposited version:

Publisher Version

Peer-review status of attached file:

Peer-reviewed

Citation for published item:

Lopes, I. (2014). The drivers of intellectual capital in an agriculture, cattle and forest farmstead. In Dagmar Cagánova and Milos Cambál (Ed.), *Proceedings of the 6th European Conference on Intellectual Capital*. Trnava: Academic Conferences and Publishing International Limited.

Further information on publisher's website:

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The Drivers of Intellectual Capital in an Agriculture, Cattle and Forest Farmstead

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Abstract: The pursuit of economic value, especially in the organizational context, has risen into a diversity of new concepts that reflect the genesis and importance that knowledge has been assumed in fields of companies' strategies and performance. Intellectual capital has been emerged in the economic literature as knowledge capital which is embodied in knowledge-based organizations, driven them through multiple learning organizational processes. From a wholly accounting approach, it has been scanned and reported as intangible assets, source in itself of sometimes abnormal expected future returns. The identification of its multiple dimensions can be attained through two complementary orientations of thought: through a strategic approach, related to the creation and use of knowledge and its articulation with the dynamic value creation and, complementarily, through the construction of new information systems and performance measures which are beyond the traditional financial approaches and measures. It is an approach that embodies the importance and the need to spread the unseen side of organizations. Its main aim is to translate and disseminate the companies' real value, its own and invisible drivers, and identify the origin of their multiple inflows and returns. The company under analysis is the largest agriculture, cattle and forest farmstead in Portugal, covering several marshlands. The diversity of activities currently developed (Forest exploration; Hunting; Agriculture; Wines and olive oil production; and Tourism) requires an integrated research towards the construction and disclosure of its intellectual capital drivers. Through an experimental and interpretative case study approach, we seek for an integrated intellectual capital scorecard towards the organizational development and sustainability. In the first step of this research, it was possible to identify several sustainability drivers, namely forest management certification, commercial brands and awards, strategic alliances and networks, and biodiversity reputation.

Keywords: intellectual capital, agriculture, intellectual sustainability drivers, intangible assets

1. Introduction

Information, as a new insight in the connection process within individuals and organizations, has launched the requisite of new rules (Shapiro and Varian, 1999) in the integrated management of networks. This assumption has been gradually conducting into a semantic dispersion around the concept of information and knowledge, driving multiple and profuse researches in this scientific domain. Innovation, as a structural driver for society's development, aligned with the contribution of information and communication technologies has become a critical source of strategic value and financial positioning. Quality oriented to sustainable productivity, and aligned with social and environmental responsibilities, have emerged as an important booster of competitiveness.

Within the semantic boundaries of intellectual capital, several other concepts have come out and developed. From an integrated framework, Knowledge, knowledge management, intellectual capital (Edvinsson and Malone, 1997; Saint-Onge and Armstrong, 2004), intangible assets (Sveiby, 1997; Lev, 2001; Lopes, 2010) or even digital capital (Tapscott *et al.*, 2000) are concepts that accurately drive individuals and organizations into value creation and innovation. Organizations have intensified their activities of innovation in order to increase the value derived from products and processes. This innovation process, embodied in routines and merged from individuals and organizations actions, reflects the knowledge dynamic transformation conceptualized by Nonaka and Takeuchi (1995) and systematically adjusted by the academic and scientific communities in their subsequent researches.

Broadly, the upsets around the concepts of time and space have been the cause of deep changes in organizations, based on the adoption of initiatives that seek for the identification of the true value drivers and thereby to find the source of sustainable competitive advantage. Thus, the paradigm of networks management is based on information sharing processes, and on knowledge capture, transformation and dissemination. The agility and feasibility of those processes contribute to the building process of an individual and collective organizational memory which conducts its sustainability performance.

From a financial and accounting perspective, the research about intangibles is based on their identification, their measurement and disclosure processes. Concerning organization's intellectual capital resources

measurement, several approaches have also been followed: measurements based on cost, based on market prices or based on discounted future returns (income). Relating its dissemination, those resources have been capitalized and included in the organizations' balance sheets (in the cases supported by international accounting standard 38) or reported through complementary statements (intellectual capital reports, programs, scoreboards, ratios, qualitative approaches). Those measurement and disclosure approaches tend to complement the traditional financial statements (balance sheet, profit and loss account, cash flows statements), providing a more comprehensive and integrated view of the factors that potentially create economic returns.

2. Aims and objectives

Based on an interpretative approach, this paper aims to identify and characterize the boundaries of intellectual capital in a Portuguese agriculture, cattle and forest farmstead. Due to its diversity of activities, value come from resources not measured, not included in the financial statements but disclosed to stakeholders through a non structured framework. Aligned with intellectual capital and contingency theories, and through a descriptive and interpretative methodology, we seek for the identification of sustainability drivers, most of them recognized by management but not linked as sources of strategic value.

3. Intellectual capital: A retrospective approach

Several and profuse developments have occurred around the concept of intellectual capital and, consequently, around the search and development of models and frameworks that can contribute for its measurement and disclosure. Traditionally spread into three vectors - human capital, structural capital and customer capital -, intellectual capital provides a dynamic view of value creation in organizations (Roos *et al.*, 1997; Saint-Onge and Armstrong, 2004). Measure, manage and disclose these intangible resources (Lev, 2001; Lopes, 2010) are the new insights of the research in this scientific field. Broadly, those approaches focus on the search for appropriate correlations between intellectual capital and financial performance of the companies, as historically made, for tangible assets indeed.

As evidenced in practice, intellectual capital assumes a dynamic nature once knowledge is continuously converted into value (Nonaka and Takeuchi, 1995). Human capital can be generically defined as the capabilities (experience, skills, creativity, and general knowledge), collectively or individually owned, in order to meet the needs and expectations of stakeholders. Those capabilities reside in individuals, organizational routines and procedures and its protection is guaranteed by the agreements established between them and their employers. In many cases, some intellectual assets are internally developed and legally protected (intellectual property) by the companies through the national and international legal institutions (*v.g.* patents registered in *European Patent Office*, in the *United States Patent and Trademark Office*, among others).

Structural capital emerges as the infrastructure that organizations develop to convert those capabilities through a direct (information systems, software, work procedures, marketing plans and organizational knowledge) and indirect mechanisms. These mechanisms reside in tangible assets (*v.g.* buildings, equipments, etc.) and in intangible resources as strategic and restructuring plans, relationships with suppliers and customers, alliances and networks, certifications, among others (Lopes, 2010). This structural component translates the facilitating context for the creation and consequent effect of knowledge leverage. It is intangible capital, in most cases more important and accurate than its physical dimension. If we include organizational culture, business history and intrinsic part of their management, human capital can also be understood as the source of knowledge that becomes the object that drives the company into its vision, mission, values and goals. In this transactional process, innovation developed by human capital is the key element that converts those capabilities and skills in integrated networks, in external organizational capabilities, in brands and trademarks, in processes and in other intangible and sustainability resources.

The third component (relational capital) evidences the relationships and networks within the company value system. It really covers the full range of networks with suppliers, distributors, business facilitators, and innovation contributors as universities and other scientific institutions. It also includes the mechanisms related to brands reputation and other external recognition procedures (*v.g.* awards and certifications). In essence, it translates the origin of the operational cash flows, assuming it an important source of sustainability and economic value creation (Lopes, 2012).

From a pure accounting and financial point of view, intangibles includes patents, copyrights, brand names, customer lists, import quotas, computer software, marketing rights, specialized know-how, trade names, and other specific rights that typically can be conveyed by an owner without necessarily also transferring related physical assets (IASB, 2000). Thus, intangibles are, in essence, resources that have no physical substance but are identifiable, controlled by an entity with an expected future economic benefits. Broadly, those assets are measured at cost (purchase cost, including taxes and import duties, less any trade discount and rebates, plus any directly attributable expenditure incurred in their preparation for effective operation or costs incurred in the development phase) or subsequently measured at fair value if this value is determined on a reliable basis. In many cases, intangibles cannot be recognized by accounting rules, once they cannot comply with the accounting norms (*v.g.* internally generated software, brands and trademarks). However, companies should report their intangibles in separate classes as: 1. Brand names; 2. Licenses and franchises; 3. Mastheads and publishing lists; 4. Computer software; 5. Copyrights, patents and other industrial rights, service and operating right; 6. Recipes, formulae, models, designs and prototypes; and 7. Intangibles under development) as a complement of the information quality and comprehensiveness (Epstein and Mirza, 2005).

Measuring intellectual capital could be the most important challenge in the recent social sciences research, particularly in the field of accounting and corporate finance. Value creation and sustainability indicators analysis require new approaches, once empirical evidence has demonstrated that, increasingly, the value has its origin in the most invisible side of organizations. This evidence consolidates the importance attributed to intangibles and intellectual capital while drivers of value. Measurement and disclosure alternatives, based on new conceptualizations, still complain new evidence to gauge their reliability and feasibility. It is really unquestionable that the models historically used (based on tangible assets and in less complex environments) do not respond to the contemporaneous requirements of resources measuring and performance monitoring. Companies should increase the voluntary information disclosure to a wide range of stakeholders, increasingly informed and requiring for new insights.

4. The sustainability perspectives

The usefulness of information for decision-making is now one of the critical issues in the designing process, towards the information dissemination to the companies' stakeholders. The dynamic transformation occurred in businesses and, consequently, inside the companies, requires more and better information to be disclosed in a timely way which should meet the expectations of its users. However, many are the features that determine the type, timing and intensity in which this information is disclosed.

There are several theories that have explained the multiple strengths and detractors that influence information disclosure: contingency theory (Reid and Smith, 2000), institutional theory (DiMaggio and Powell, 1991; Chapman *et al.*, 2009) and legitimacy theory (Guthrie *et al.*, 2004). However, other agents exist that determine the intensity and timelessness of that dissemination. Companies' management avoids sometimes the voluntary disclosure of information, based on the unstructured information produced inside the organizations they manage. There is no linkage between value drivers and the income resulting from them. Any of those theories has its basis in a social contract between the company and its stakeholders, creating internal mechanisms to respond to changes that occur in the environment.

The contingency theory perspective assumes that general contingencies such as size of the organization, uncertainty and risk, technology and environmental pressures affect organizational development and operational processes. Thus, organizations can not develop a standardized structure to plan, organize and control their own activities and information disclosures. The institutional theory reflects the fact that organizations must constantly adapt to external expectations and changes, that is the pressures leading to the implementation of best practices in information dissemination. There is a trend to implement the same structures and practices over time in response to social demands which are dubbed in the literature as an institutional isomorphic (DiMaggio and Powell, 1991). In a traditional approach, organizations were more concerned with the standardization of routines and processes than with the adaptive capacity to changes in the environment. In the era of knowledge, such practices are no longer compatible with the informational requirements either with generalized volatility that pervades the economic and social contexts

The third theory (legitimacy theory) is based on the assumption of a social contract between the reporting entity and the society in which it operates (Guthrie *et al.*, 2004). The disclosure of information turns out to be a way to relieve social pressure and legitimize the activities that the organization develops. It is an approach in

which the connection between the entity and dichotomous social agents consolidate both the object as the substance of the transactions. The dialectic legitimized reinforces the emerging dimensions of social and environmental responsibility that increasingly are being integrated into systems management control. In a value added perspective, we understand those two dimensions as the consolidation of permissive and sustainable development. This approach clearly fits in companies publicly owned.

The topic of the information management usefulness is actually a quite diffuse scope. Based on multiple boosters: type of information user, informational needs, pressures emerging from capital markets, changes in the environment in which organizations develop their activities and, when appropriate, the requirements of regulators who can translate the most diverse political orientations. Thus, we cannot, in a bidirectional relationship, associate a single theory with entities and user's behavior (management and stakeholders). All those theories have specific determinants that incorporate individual and collective behaviors.

Intellectual capital and intangible sustainability has been usually translated and reported using multiple Key Performance Indicators (KPI) and through multiple types of scoreboards (Kaplan and Norton, 1996; Lopes, 2012). Although they are identifiable and controlled by the entity, its essence lies in the organization, in contributing to the creation of future benefits. Broadly, sustainability is strongly supported by important intangibles that are not capitalized in the financial statements nor reported to stakeholders. In this scope, intangibles and sustainability can be reported through six dimensions as stated in the figure below [adapted from Lopes (2012)].

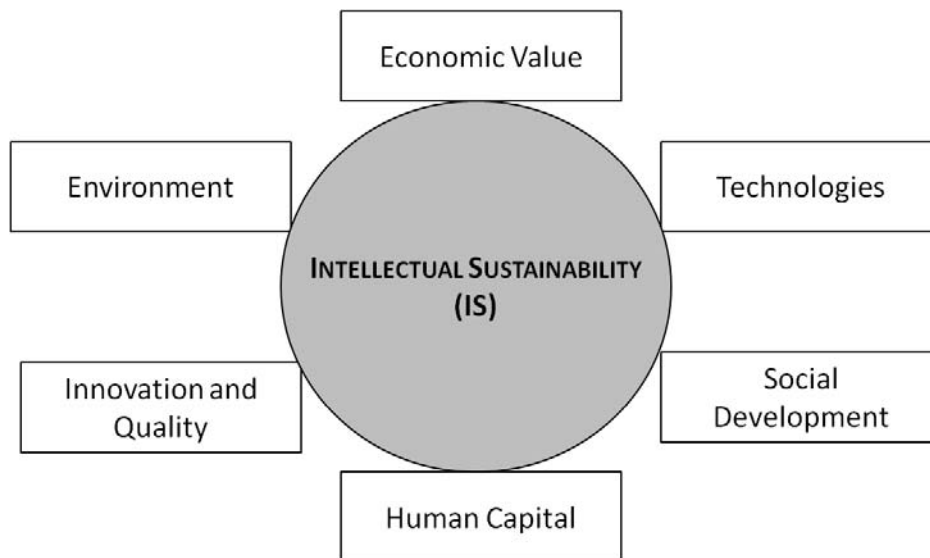


Figure 1: The sustainability dimensions

This framework reflects a strategic holistic model that allows individuals, groups and organizations to understand, through an integrated view, the Sustainability Performance Indicators (SPI_n), most of them based on intangible resources. It enables organizations to align strategies, to identify their goals and to evaluate on an ongoing basis, its performance in each of those six dimensions.

5. Methodology

In this research, content analysis was the main method used to identify the potential value drivers that are not recognized in the financial statements or disclosed through integrated and structured complimentary reports. Through a descriptive and interpretative case study (Sekaran and Bougie, 2013), and based on the literature review, we seek for the identification of intangibles that can positively contribute for the company strategic and financial positioning. That interpretative approach provides deep and rich understandings of the social nature of practices, and attempts to locate these practices in the organizational specific context (Ryan *et al.*, 2002). This holistic orientation aims to identify the core intangibles of the company and disseminate them through standardized reports and using multiple platforms as electronic networks. Using a normative reasoning, it is also intended to indicate to management, in the forthcoming research steps, what should be done in practice. Observation will complement and consolidate all the issues that emerge in this exploratory phase.

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The company under analysis [*Companhias das Lezírias* (CL)] is the largest agriculture, cattle and forest farmstead in Portugal, covering several marshlands. After the pastures and the fodder production area, rice is the predominant crop, covering an area of 1,100 hectares, followed by 140 hectares of corn. It was nationalized in 1975 and later, in 1989, it became a public limited company wholly owned by public funds. Since 1997, the company has consolidated its situation over time in both technological and financial terms, based on a sustained development philosophy.

CL sustainability and productivity is recognized as derived from the great set of natural assets it holds. At the threshold of Lisbon, with almost 200 km² of land and occupying marshland and heath, is subject to strong management constraints due to its location in a protected area of the *Natura 2000* network. The company operates some 7000 ha of agro forestry system, unique in the world, the cork oak forest with natural grass and improved pastures where the nearly four thousand head of cattle and 140 pets horses *Lusitano*. Company extracts an average of forty thousand kilos of cork by year. But beyond its economic value, the fitted also has a strong environmental value because it is a land use appropriate to the moorland, covering the major aquifer of the left side of the *Tagus River*, whose protection does not allow the intensification of production.

The company also produces many other goods and services. Strategically, and in the horizon term of a drastic decline in public support for farming activity in the context of *Common Agricultural Policy*, the market orientation in productions with particular conditions success is based on rice, wine and olive oil in the agricultural sector, and beef or organic in the livestock sector. On their own and integrated production, rice occupies about 220 ha of bogs, with a predominance of the variety *Ariete Rice Carolino' s Wetland*, first European geographical protection indication for this production. Strong investment in improving the structural conditions of culture was carried out in the last couple of years, which income rise finally normal. The same type of investment continues now in land rice that the company leases.

The identification of specific intangibles (certificates, brands, awards, networks, alliances, etc.) was carried out through a content analysis process (v.g. management and sustainability reports and other documentation available through multiple platforms) and through direct observation. Other intellectual capital drivers as satisfaction, databases, software, human capital, management systems, among others, were excluded from the current analysis. Our main focus was the intellectual property directly derived from agriculture, cattle and forest farmstead.

6. Discussion and conclusion

6.1 Sustainability indicators

As stated in figure 1, company sustainability is structured around six leading causal strengths: 1. Economic value creation; 2. Environment; 3. Innovation and quality; 4. Information and communication; 5. Social development; and 6. Human resources (Lopes, 2012). Table 1 evidences a set of key performance indicators used by CL and usually disclosed to the stakeholders on a yearly basis. However, this information is disclosed through a non structured framework.

Concerning the environmental perspective, it should be noted that much of the area is included in the CL Nature Reserve of Tagus estuary and Special Protection Area (KPI₉). Therefore, there is a constant concern in the alignment of their farming, forestry and livestock strategies with the conservation of the environment promotion of biodiversity and natural resources. Besides the fact that CL is a member of the *Council for Sustainable Entrepreneurial Development*, the main strategies can be described as follows: 1. the adoption of the method of integrated and organic production, in extensive; 2. Natural pastures; 3. Forest model with international certification of their management (cork oak); 4. Applied research projects in the area of the environment, in association with several universities; 5. Respect for the birds, as evidenced by European projects as *Birds Watching Project*, carried out by CL as project promoter, in association with its partners such as associations of farmers, environmentalists, local government authorities, central government and companies.

Although the company evidences a weak return on equity (SPI₁), CL has a positive operational return as evidenced by its EBITDA (SPI₂). These positive returns also derive from the company intellectual capital, not measured nor included in the financial statements (v.g. commercial brands and trademarks, awards,

certificates, alliances, networks). Despite the accounting limitation in their recognition, CL tries to disclose them in its yearly reports, matching the information quality and comprehensiveness.

Table 1: Sustainability performance indicators

SPI _n	Description	Unit	Value
1	Gross revenues	'000 €	7.286
2	Earnings before interests, taxes, depreciation and amortization	'000 €	2.278
3	Net investments	'000 €	674
4	Return on equity	%	2,97
5	Permanent employees	#	98
6	Employees productivity	'000 €	21,1
7	Water consumption	'000 m ³	4.519
8	Energy consumption	TJ	13,3
9	<i>Natura</i> area (protected area)	ha	1.900
10	Forest area (model)	ha	4.328
11	Biologic production area	ha	8.670
12	Fossil dioxide carbon emissions	Kg / t CO ₂	85,7
13	Gas greenhouse emissions	T CO ₂ eq	84.952,66
14	Social intervention	000 €	240

Source: *Companhia das Lezírias* (2012) annual reports

6.2 Intellectual sustainability strengths

The activities of CL includes traditional agricultural products for sale, such as rice, olive oil and wine, forest products, and a set of extended services to the community in the fields of recreation, environmental education and support to scientific knowledge. In this research, and based on the requirements stated in International Accounting Standard 38 (IASB, 2000) scope, we tried to identify the intangible resources that are not included in the traditional financial statements but constitute important drivers for the company sustainability. These drivers are based on the operational activities and include external recognition with impact in the expected future benefits and returns.

The company is certified in most of its essential activities, namely in the forest management processes (ISD₁) and in some of its rice brands (ISD₂). In this particular case, it is produced through an integrated protection process, following a full process of combating crop pests and using methods that meet ecological requirements and toxicological restrictions (productions are made in respect to economic thresholds, with specific and biodegradable herbicides, but without insecticides). These conditions are the basis of the market recognition of their rice varieties and trademarks, such as *Ariete*; *Albatroz*; *Carolino's Wetland*; and *Bom Sucesso* (ISD₇).

CL has also an important range of grapes' varieties (23), allowing a range of products with various niche markets, including varietal, blended wines, sparkling wines, and spirits, which have earned good critical reception and placement in the national and international markets (ISD₆ and ISD₁₁). The main castes used in the wines production are: *Castellan and Alicante Bouschet*, for the production of red wines, *Fernão Pires* and *Trincadeira das Pratas* for white wines. Other red varieties are: *Trincadeira*, *Aragonez*, *Touriga- Nacional*, *Cabernet Sauvignon*, *Syrah*, *Merlot*, etc.. The white wines' varieties include: *Arinto*, *Wardrobe*, *Talia*, *Verdelho and Vital*.

The table 2 evidences the main intellectual sustainability drivers, identified in the company and disclosed, through a non structured framework, to the stakeholders as a whole. These drivers were grouped in five classes, according their substance and origin (1. certification; 2. brands and trademarks; 3. awards; 4. networks and alliances; and 5. ecological reputation). As already mentioned in the methodology, standard intangibles as software, management systems, customers lists, and patents, were excluded from this scope of analysis.

The forestry assets of the company are also very valuable. The most important productions are cork and pine woods, beyond timber and firewood, resulting from annual activity planning and management (ISD₁₅ and ISD₁₆) as cultural and health cuts. The certification of sustainable forest management (ISD₁) by the *Forest*

Stewardship Council (FSC), in 2010, consolidates the cork production as one of the main sources of future returns achievements. The purpose of accreditation is, particularly, a credible demonstration of the product market recognition, by which a certificate is included for timber and cork.

Table 2: Intellectual sustainability drivers

Dimension	ISD _n	Intellectual Sustainability Drivers
CERTIFICATION	1	Forest management certification (<i>Forest Stewardship Council Standards</i>)
	2	Brands certification (<i>ISO 9001:2008</i>)
BRANDS AND TRADEMARKS	3	Wines (v.g. <i>Samora; Catapereiro; Azul Portugal; Companhia das Lezírias; etc.</i>)
	4	Olive oil (v.g. <i>Azeite Virgem Extra</i>)
	5	Horses (<i>Lusitano</i>)
	6	Grapes castes (v.g. <i>Aragonez, Touriga- Nacional, Cabernet Sauvignon, Syrah, Merlot, etc.</i>)
	7	Rice varieties (v.g. <i>Ariete; Albatroz; Carolino's Wetland; Bom Sucesso</i>)
AWARDS	8	<i>Lusitano</i> horse lineage
	9	Olive oil
	10	Horses breeding
	11	Wines (v.g. <i>Shanghai International Wine Challenge, 2010; Viniales Internationales; International Wine Challenge</i>)
NETWORKS AND ALLIANCES	12	Agreements with customers (v.g. <i>SONAE; SAVEN</i>)
	13	Alliances (v.g. <i>Ovivárzea</i>)
	14	Research and development projects (with universities and other scientific institutes)
ECOLOGICAL REPUTATION	15	<i>Natura 2000</i> protected area
	16	Biodiversity protection recognition

The company integrates a wide range of networks and alliances. Products usually reach the markets through selected and specialized distributors and wholesalers (ISD₁₂ and ISD₁₃), which are the basis of the external recognition (ISD₉ and ISD₁₁). The products quality is strongly based on the research projects, developed through universities and other scientific institutes (ISD₁₄). Thus, if the active forestry and agro-forestry is so important, its sustainable development requires deeper knowledge of the state of natural stocks and dynamics of values conservation that are influenced by the decisions of resource management. These projects integrate the research and development activities that support the company innovation capacity. The market approach associated with the development of products and processes that protect the environment and ecologically healthier, also constitute one of the most valuable and recognized intangible assets.

In this phase of research, we have evidenced that the company voluntarily discloses information concerning the forest management and protection, and concerning the productive activities related to it. The external recognition of those activities (certification, awards, ecological reputation, brands and trademarks recognition) consolidates the operational sustainability of the company. As a public company, we consider that the information disclosure in CL fits to the legitimacy theory, as argued by Guthrie *et al.* (2004). In fact, in companies publicly owned, we have evidence of a social contract (social and environmental responsibilities) between companies and the society in which it operates. The disclosure of the activities that effectively were developed turns out to the way to relieve social pressure and legitimize these activities. This underlines the approach in which the connection between the company and social agents consolidate the object and the substance of the integrated operations.

7. Final remarks and forthcoming research

The central objective of this paper was the identification of the main intellectual drivers, as sources of future economic benefits that contribute to the company sustainability. Based on the intellectual capital and sustainability theories, and through a descriptive and interpretative approach, we were intended to identify the most recognized intangibles, not included in the traditional financial statements but recognized by management as important drivers and voluntarily disclosed to company stakeholders. However, this is only the first step of a deep research in which the main objective is the consolidation of a sustainability scoreboard, to be implemented in the company in the forthcoming times.

In this research, it was possible to identify 16 intellectual sustainability drivers which derive in expected future returns. These resources are not measured or included in the traditional financial statements. They do not comply with some requirements for intangible assets recognition, namely the feasibility in their measurement and the full control by the entity, as required by accounting standards. However, these value enablers are the basis of expected returns which are intended to be measured through an income based approach (Lopes, 2011) in the forthcoming steps.

Companhia das Lezírias does not follow any of the intellectual capital models provided in the literature (Edvinsson and Malone, 1997; Roos *et al.*, 1997; Saint-Onge and Armstrong, 2004). However, the information disseminated to stakeholders is extensive and rich in what may be considered the basis of its economic return. While the theoretical framework of intellectual capital can be internally perceived, it urges the implementation of structuring mechanisms towards an immediate evidence of the leading drivers of its operational sustainability.

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