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Looking for missing outcomes: accounting for intellectual capital and value creation in ecosystems

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Abstract

This article investigates intellectual capital (IC) and value creation at an ecosystem level, which is a topic relatively unexplored within public administration. Yet, public sector organisations are a prime example of how IC transcends the scope of individual entities and contributes to knowledge transfer and value creation into wider society. The research was developed within the first step of an interventionist research project focusing on a public sector agency which supports local authorities in Italy and launched an in-depth review of its processes to assess in how far it was fulfilling its mission. Part of this initiative was to assess whether, how, and to what extent the agency creates value for itself and for its stakeholders. The research develops a framework which visualises the importance of accounting for outcomes which are both internal and external to an organisation. The analysis underlines the need for reporting frameworks to consider the overall value creation, maintenance, and erosion. The analysis moves beyond the outcomes of activities and outputs for a single entity to appreciate their impact on its stakeholders' IC. Results call for the emergence of defined roles for IC management and for the adoption of an ecosystem perspective in governance, business, and reporting models for the public sector. Public managers should adopt a business case imperative with a particular emphasis on maximising value creation for the whole ecosystem. IC visual maps including key stakeholders can help in such endeavour and improve reporting frameworks.

Keywords Intellectual capital · Value creation · Reporting frameworks · Ecosystem perspective · Public administration

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1 Introduction

Intellectual capital (IC) reporting frameworks, such as IC statements, sustainability reports, and integrated reports, explore the factors which impact value creation beyond tangible assets. Such frameworks consider that traditional financial reporting models focus primarily on past performance by tangible assets, which in isolation does not facilitate a full understanding of the value maintenance and generation mechanisms of an organisation. IC frameworks focus on how businesses create value over time through the creation, management, combination, and utilisation of knowledge and intangible resources, not only tangible ones. However, while emphasis has been placed on what IC is and how organisations should report on it (Zambon et al., 2019), traditional IC reporting frameworks fail to consider the impact of IC for value creation beyond single organisations into wider society (Dumay et al., 2020; Konno & Schillaci, 2021). This is even more relevant for the public sector, whose organisations focus on intangible resources (Puntillo, 2011), need to produce economic and social value for their ecosystem (Burgman & Roos, 2004), and have a stewardship role in promoting value co-creation within ecosystems and across multiple stakeholders (Osborne, 2018; Iacuzzi et al., 2020).

This paper explores the performative dimension of IC and contributes to reporting models by developing a framework that considers how IC helps maintain and create value beyond individual organisations into their ecosystems, as described in the fourth stage of IC research (Dumay & Garanina, 2013; Guthrie et al., 2017; Massaro et al., 2018). According to Dumay et al. (2020) this perspective is necessary to be able to move to the fifth stage of IC research, that is to appreciate how "IC can be used to create economic utility, social and environmental value" (Dumay et al., 2020, p.9). The framework was developed through an Impact Value Chain Model (IVCM) approach within the first step of an interventionist research project (Baard & Dumay, 2021; Jönsson & Lukka, 2005) for an Italian public sector agency whose main asset and outcome is IC, where theory was used to diagnose issues, develop solutions by applying a theoretical construction, and contribute to new knowledge (Baard, 2010). Case study research is particularly suitable to IC's complex nature (Mouritsen, 2006), since it allows for a holistic and deep consideration of a complex issue in the actual context in which it takes place, especially when, as in this case, it is not possible or desirable to separate the phenomenon under investigation from its context (Yin, 2014). The agency supports public authorities in Italy and focuses on strengthening their competences through consulting and training initiatives. It was looking for a meaningful assessment of the long-term viability of its strategy and business model and chose to realize an integrated report focusing particularly on its IC, which is one of the focal elements of these reports (Badia et al., 2019). The analysis of its activities' inputs, outputs, and outcomes has thus helped draw attention to the agency's impact on its own IC as well as on the intangible assets of its stakeholders and on society at large.

Findings are relevant from an academic perspective since they shed further light on IC, ecosystems, and value creation by exploring how they can be assessed in a public sector organisation (PSO). The study answers the call for more empirical research on knowledge management and IC within public administration (Dumay

et al., 2015; Guthrie et al., 2012; Guthrie & Dumay, 2015; Massaro et al., 2015) and their role in the value creation process within ecosystems (Borin & Donato, 2015; Edvinsson, 2008; Iacuzzi et al., 2020; Konno & Schillaci, 2021; Secundo et al., 2018). Findings are also relevant for practice since they offer a contribution to current reporting frameworks by incorporating an ecosystem perspective to integrated reports, and some useful insights on how decision makers can monitor and promote IC to enhance its impact on value maintenance and creation. In particular, it is important that PSO improve their relationship with external stakeholders, which is considered weak (Feng et al., 2017), since they play a key role in defining what constitutes value and how it is created. In this way, PSOs can better appreciate how value is created and co-created not only at organisational level, but also at societal level, in order to manage it and fulfil their institutional mission (Dameri & Ferrando, 2021; Höglund et al., 2021; Iacuzzi et al., 2020). Such considerations ought to advance IC accounting through integrated reporting and encourage PSOs to adopt a wider perspective on the concepts of IC and value creation. Other studies have demonstrated that a research interventionist strategy can help IC mobilisation by affecting the actors' own learning (Chiucchi, 2013).

The remainder of the work is organised as follows: after a short overview of the relevant literature, a framework to assess the impact of the activities and outputs of a PSO on its IC and on its stakeholders' IC is developed revising the model elaborated by CIMA, IFAC, and PWC (2013). After discussing and validating such approach, the paper describes the methodology and data sources, and then moves on to the analysis of the data and the related findings. Finally, in the concluding sections, the paper discusses the main theoretical and practical implications of this study, as well as its limitations and the need for further research.

2 Literature background

From a research-based view perspective (Wernerfelt, 1984), inputs are key for value creation and in particular intangible assets are key resources for organisations to generate value in a sustainable way over time (WICI, 2016). In particular, the concept of IC is closely related to the creation, sharing and management of knowledge within organisations (Guthrie et al., 2012; Mouritsen et al., 2001). It is traditionally considered that IC allows the "activation" of intangible resources, i.e. the knowledge assets connected to employees, customers, other stakeholders, technologies and processes that fall into human, structural, and relational capital (Cinca et al., 2003; De Villiers & Sharma, 2020; Dumay, 2016). Human capital concerns people's know-how, skills and experience which facilitate value maintenance and creation through an organisation's strategy and the improvement and innovation of processes, goods and services. Structural or organisational capital concerns not only knowledge-based intangibles such as software or intellectual property, that is patents, copyrights, and other licences, but also corporate culture, systems, procedures, and protocols. Relational capital includes the trust, bonds, and willingness to engage that an organisation has built with its customers, business partners, suppliers, and other external stakeholders to support key relationships and networks that help build and preserve value.

IC disclosure has been used to motivate and align staff, attract talent, mitigate risk, encourage innovation and continuous improvement, and enhance reputation and accountability to stakeholders (Brown & Fraser, 2006). Yet, investing in IC does not always allow to maintain or create value, but might result in value erosion, that is in destroying value for oneself or for others. For example, endowing responsibility on human resources may help motivate them, but it may also lead to too much pressure and may end up in their burnout (Bartlett & Ghoshal, 2002). Similarly, investing in the wrong testimonial or an inappropriate event to promote relational capital may result in its erosion (Girella et al., 2019).

Considering a dynamic resource-based view (Barnabè et al., 2019) such strategic resources are interconnected and must be managed with the collaboration of all stakeholders to inform governance actions and create value with a holistic perspective. For many businesses these assets, which are mostly grounded in different forms of knowledge and IC, account for a sizeable amount of their current and future value. Value creation occurs within a context through the connectivity of a wide range of factor, including IC components both individually and by virtue of their dynamic interrelations. IC is a dynamic entity not a stock, as it is not the result of summing up intangible components, but rather of their integration to create value (Bratianu, 2018). IC has been identified as a crucial factor for understanding how value is created within organisations and society, i.e. as a driver of the ecosystem economy (Bounfour & Edvinsson, 2012; Nicolò et al., 2020) and as an innovative force (Konno & Schillaci, 2021; Mercier-Laurent, 2011). IC can help coordinate individual and distributed assets and expertise into a collective framework which can support organisational and governance structures, connectivity patterns in improving the flow of information and resources within ecosystems to achieve a collective, yet not necessarily consensual, goal (Secundo et al., 2018). Therefore, internal stakeholders contribute with their individual intelligences to their knowledge (micro or individual level), to the collective intelligence of an organisation (meso or organisational level), while both internal and external stakeholders contribute to the collective intelligence of an ecosystem (macro or societal level) (Iacuzzi et al., 2020).

2.1 IC in the public sector

Given the impact of IC described above on single organisations as well as across stakeholders and ecosystems, for PSOs IC is a powerful driver of value creation in four distinct ways: within PSOs themselves, towards users of public services, for ecosystems for which PSOs produce economic and social value, and as promoters of value co-creation at multiple stakeholders across ecosystems, so that they in turn produce value.

First, within a PSO, IC helps creating value beyond financial assets by helping acquire, generate, and disseminate knowledge, because PSOs use intangible resources and knowledge more intensively than private firms, because they tend to have intangible objectives and to produce services that are essentially intangible (Cinca et al., 2003; Puntillo, 2011).

At societal level, the role of PSOs is to maintain and produce value for the users of their services and also for the entire ecosystem, that is a community of interact-

ing organisations and individuals which concur to create value for all the members, avoiding eroding value (Iacuzzi et al., 2020; Secundo et al., 2018). PSOs are not only responsible for the delivery of specific public services, but also for the economic and social value they create, promoting welfare and equity (Burgman & Roos, 2004), and for creating value through fostering the enhancement of IC at systemic level (Dumay & Garanina, 2013; Guthrie et al., 2017), that is the promotion of value co-creation across multiple stakeholders through their stewardship and regulatory role (Burgman & Roos, 2004; Osborne, 2018). This is often referred to as "public value" (Moore, 2014), which is particularly complex, elusive, and widely debated (Bracci et al., 2019; Katsikas et al., 2017; Petrescu, 2019). In simple terms, value creation in a public entity is the change caused by a PSO's activities and outputs to all assets, private and public, that is the organisation's as well as its stakeholders' capitals (IIRC, 2016). In a more complex view, public value is derived from the mission of PSOs (Höglund et al., 2021) and their general aim is to satisfy collective needs and aspirations (Bryson et al., 2014; Iacuzzi et al., 2020), that is focusing also on external value creation rather than only on internal benefits (Osborne, 2018). Hence, public value is the focus of PSOs' strategy (Bracci et al., 2019), where public managers become agents of collective purposes and multiple stakeholders are "arbiters" of public value (Prebble, 2016), as they provide information about what constitutes value and are involved in co-creating and disseminating it (Höglund et al., 2021). Public services are often managed and delivered by private or third sector organisations, so much that stakeholder engagement is often an implicit necessity for PSOs (Iacuzzi et al., 2020). Considering the multiple levels and stages at which stakeholders interact, the delivery of public services may foster IC development and create value at the micro, meso, and macro level throughout the service delivery process. Hence, IC contributes to value co-creation engaging stakeholders in creating value which is co-created through balancing the diverse interests of multiple stakeholders who have different value propositions, roles, and attributes of salience (Best et al., 2019). Value co-creation is at the basis of the so called "public service logic" (PSL) (Osborne, 2018), where a public service is the basis of an exchange, that is an intangible and process-based delivery, which represents the application of different competencies, knowledge, and skills by one party to benefit another and results in the co-creation of private and public value (Petrescu, 2019).

2.2 Stakeholders, materiality, and business models for PSOs

Considering the key role played by stakeholders in public service provision, public managers have the task to integrate and build upon the relationships and interests of citizens, employees, organisations, and communities at large and must formulate policies and implement strategies which satisfy all stakeholders, that is all those groups who have a stake (Mitchell et al., 1997). According to stakeholder theory, organisations should undertake activities and pursue aims deemed important by their stakeholders and report back to them on such issues. Such stakeholder engagement and accountability imply that stakeholders have a right to be involved in value creation and provided with information on how organisational activities impact them directly through their products and services, or indirectly through, for example, pollution

or community initiatives (Guthrie et al., 2004). Some authors talk about the knowledge-based partnerships that PSOs need to establish with their stakeholders (Riege & Lindsay, 2006). Yet, some scholars highlight how weak IC reporting is in creating an understandable communication channel with stakeholders (Feng et al., 2017).

Stakeholders are engaged in value creation through the principle of materiality which concerns "what matters most to an organisation's ability to create value over time" (WICI, 2016, p.18). A materiality assessment reveals issues that are relevant for an organisation based on their nature and magnitude (Edgley, 2013) and that are crucial to value creation in the view of both internal and external stakeholders (Dumay & Garanina, 2013). On the one hand, omitting or misstating material information could negatively impact decision making. On the other, materiality is considered an important, as well as probably the most effective remedy against two concerns about intangible reporting: information overload or infodemics, and greenwashing or window dressing (Baumüller & Schaffhauser-Linzatti, 2018; Bechmann, 2020). As far as infodemics is concerned, the multidimensionality of intangible assets adds to the overload problem already present in traditional financial reports, which is considered an obstacle for obtaining relevant information out of such documents and makes their usefulness questionable. The need to reconcile financial data with other evidence may cause a further increase in the total amount of information, which might have an adverse effect and hamper the intended positive effect of reporting, especially when it is used purely as a public relation window-dressing practice, rather than as an accounting, management, and accountability tool.

Therefore, in an ecosystem perspective, once an organisation's mission and vision have been clarified, a materiality analysis entails establishing first which stakeholders are most salient in such context (Best et al., 2019), and then which business activities and outputs in its business model produce outcomes which are important to promote value maintenance and creation, while avoiding value erosion, to both the entity itself and its key stakeholders (Eccles & Krzus, 2014). Some authors talk about "value release" or "value diffusion" when referring to the value which is created by an organisation and benefits its stakeholders' IC, so that it is necessary to extend the boundaries of investigations beyond single organisations to assess all value maintenance, creation, and erosion processes (Gray, 2006; Schiuma et al., 2005). Materiality analysis helps frame in a matrix those activities which produce most value for an organisation and its key stakeholders to help develop a full understanding of the business model, that is how IC and other assets are consumed and transformed by an organisation's activities to produce a range of outputs which determine certain outcomes. Organisations should not attempt to look for an exhaustive list of all possible assets but should rather focus on 'material' activities and outputs that have an impact on the organisation's ability to sustain and generate value over time (CIMA et al., 2013). The extent to which activities and outputs generate, maintain, or erode value depends on the outcomes they generate. Indeed, a business model describes the process by which an organisation seeks to generate and sustain value and should be one of the key starting points for assessing IC for business case considerations and stakeholder accountability purposes (Gerwanski, 2020).

However, the business models featured by traditional IC reporting frameworks such as the Intangible Asset Monitor (Sveiby, 1997), the Danish Guidelines (Mourit-

sen et al., 2001), the Meritum project (Sanchez et al., 2001), the IC Statement (Mertins et al., 2009), or the World Intellectual Capital/Assets Initiative (WICI, 2016), are often insufficient and inconsistent in the scope of a PSO, since in assessing value creation they look exclusively to the IC of an individual organisation (Iacuzzi et al., 2020). Even sustainability or integrated reports, which have overtaken and incorporated IC reports (Cinquini et al., 2012; Dumay, 2016), do not take an ecosystemic stance (Borin & Donato, 2015; Konno & Schillaci, 2021), apart from including an organisation's direct social and environmental impact. This is an issue detected also with performance management studies in PSOs (Höglund et al., 2021), which mostly focus on efficiency and effectiveness directly related to the mission of the organisation neglecting societal values, such as equity, stakeholder engagement, and collective IC development.

2.3 IR for PSOs

The debate on IC has been energised once more by the Integrated Reporting (IR) initiative (Abhayawansa et al., 2019; Zambon et al., 2019), whose framework builds on IC and other assets to assess how organisations create value offering a further opportunity to frame and disclose IC (Chiucchi & Giuliani, 2022). The IR framework has a dedicated publication on PSOs (IIRC, 2016), yet it does not contemplate to systematically assess the impact of its activities on its stakeholders' IC. On the contrary, the advice is that "public sector entities don't have to explain all the complex relationships between all the various capitals that would be necessary to reflect a complete picture of an organisation's overall effect on the world's stock of all the capitals" (IIRC, 2016, p.25). However, if not all, given its stewardship role and public accountability needs, a PSO should at least consider the most material impacts on its key stakeholders' capitals. Brown and Dillard (2014) argue that integrated reporting in its original outlook remains an ideologically closed approach that focuses on the business case of each individual organisation and is thus more likely to reinforce traditional practices rather than encourage a more critical reflection on the complexity of value creation particularly for PSOs.

The most recent and revised version of the IR framework acknowledges that "identifying and describing outcomes, particularly external outcomes, requires an organisation to consider the capitals more broadly than those that are owned or controlled by the organisation" (IIRC, 2021, p.43). It also recognises that an integrated report should include "outcomes attributable to or associated with other entities/stakeholders beyond the financial reporting entity that have a significant effect on the ability of the financial reporting entity to create value" (IIRC, 2021, p.31). Yet, it falls short of indicating how to include such outcomes and of visualising such process in its model. In its latest and revised version (IIRC, 2021), the Integrated Reporting business model does not refer to "stakeholders. "society" or the "ecosystem", but only vaguely to the "external environment, which is so visually remote and marginalised in the IR value-creation-process map to appear to be uninfluential and uninfluenced by the value creation process (IIRC, 2021, p.22). The same scholars that refer of the successful adoption of the IR framework in public organisations, highlight the lack of an ecosystemic or external stakeholder perspective, which gives

rise to concerns about self-referencing reporting practices (Biondi & Bracci, 2018) which do not consider intergenerational issues (Montecalvo et al., 2018) and value co-creation processes (Iacuzzi et al., 2020), and fail to address public value and the "DNA of public organisations" (Guthrie et al., 2017, p.569), that is they overlook the fulfilment of PSOs' institutional mission (Dameri & Ferrando, 2021), that boils down to public value creation, and the role of PSOs in developing societies and economies (Secundo et al., 2018).

Several scholars have suggested the inclusion of stakeholders' perspectives into IC assessment and knowledge management for a strategic management of intangible resources (Ricceri & Guthrie, 2011; Schiuma et al., 2005). De Villiers et al. (2014) asked: "How and to what extent does IR influence the consideration of the material impacts of the business across the entire value chain?" (De Villiers et al., 2014, p.1061). CIMA et al. (2013) suggested that the focus should not be restricted to capitals owned or directly controlled by an organisation, but it should also consider "society", that is the entire value chain or at least its key external stakeholders. Indeed, in assessing value creation two key considerations are the potential trade-off between short- and longer-term effects on internal and external capitals and the trade-off between the positive and negative impacts on those assets. For example, some may regard an organisation's usage of non-renewable resources as value-eroding; others may maintain that the financial returns more than offset such depletion if coupled with activities to mitigate such environmental impact. An effective assessment should evaluate such trade-offs, reflect on how the situation is likely to develop over time, and reach a consensus about the overall net impact of such activities, that is effectively enable integrated thinking (Dumay & Dai, 2017; Guthrie et al., 2017), which is driven by such information connectivity across the different units of a PSO to consider outcomes collectively into a full story in a bottom-up approach (Tirado-Valencia et al., 2020). This can encourage the necessary coordination and collaboration to develop and internalise integrated thinking especially in such complex context as PSOs (Massaro et al., 2015; Stacchezzini et al., 2019), which often suffer from an inward-looking silo mentality which impairs the appreciation for value creation across and beyond single organisations (Caruana & Grech, 2019).

Despite the recognised importance of value maintenance and creation at ecosystem level and PSOs' leading role in this respect, little empirical evidence has been collected on these processes for the public sector (Dumay et al., 2015; Guthrie et al., 2012; Guthrie & Dumay, 2015). In general, little evidence has been gathered into whether accounting for IC and fostering integrated reports can promote public values such as social and environmental sustainability or the UN sustainable Development Goals (Abhayawansa et al., 2019; Biondi & Bracci, 2018). The only attempt to adjust the IR framework to include stakeholders and understand how a business model effectively works and creates value for all those involved, was made by Dameri and Ferrando (2021) when looking at a healthcare non-for-profit organisation, with a social rather than a public role and mission. They include primary stakeholders among governance items and as further recipients of value creation but fail to adjust the IR framework so as to delve into what value is created for stakeholders. This paper aims to contribute to such research gap by framing such oversight and further investigating IC in public entities to offer an alternative approach and incorporate

an ecosystem perspective in business models as well as IC and integrated reporting. Therefore, the main research question is how to assess whether, how and to what extent value is created by PSOs by managing their IC to favour its development as well as the development of their stakeholders' IC.

3 Methodology

Taking an IVCM approach to IC business models (Beattie & Smith, 2013; Dameri & Ferrando, 2021), this research used visual representations to understand how assets, and in particular IC, are used to create value.

The IVCM is based on the five-step process through which an organisation reaches its desired outcome and impact, that is inputs, activities, output, outcome, and social impact, where outputs are what the organisation produces, outcomes are the effects that internal and external stakeholders experience, and social impacts are the long-term, enduring changes in society. Hence, outcomes and impacts are considered as value created by the organisation.

Visual representations can be used as strategic tools to map resources, illustrate processes, and support decision making (Barnabè et al., 2019; Montemari & Nielsen, 2013) and are particularly useful to share ideas and represent findings and new knowledge in an interventionist research project (Bagnoli et al., 2020). Focusing on the tools used to represent IC, several authors (Abhayawansa et al., 2019; Corbella et al., 2019; Marr et al., 2004) illustrated how visual maps can be fundamental not only to assessing and reporting IC, but also for decision making, mobilising IC, and making it amenable to intervention. In other words, how organisational actors develop these tools with integrating narratives, sketches, and metrics orients how IC is 'performed' within organisations.

3.1 Framework

This research has applied a modified version of the CIMA et al. (2013)'s framework (Fig. 1) to reveal how resources translate into creating value for an organisation, in particular a PSO, and its stakeholders. This framework is particularly suited to the public sector, as it takes an ecosystemic approach and focuses also on the impact of value creation on "society". while the standard IR framework does not do so even in its updated version (IIRC, 2021). If for private businesses assessing external impacts can be regarded as a managerial choice, which can be considered or not depending on its materiality, it is something PSOs should routinely do, as it is an integral part of their institutional mission (Dameri & Ferrando, 2021; Höglund et al., 2021; Iacuzzi et al., 2020). Therefore, outcomes on stakeholders' IC as well as other societal outcomes considering public value should be included in any framework looking at exploring value maintenance and creation in the public sector.

Figure 1 depicts the map which shows material issues and value creation in relation to an organisation's flow of IC to disclose part of its business model, that is how key assets concerning IC as well as their interrelations, are strategically managed to generate value in an ecosystem. The design of the map follows a top-to-bottom

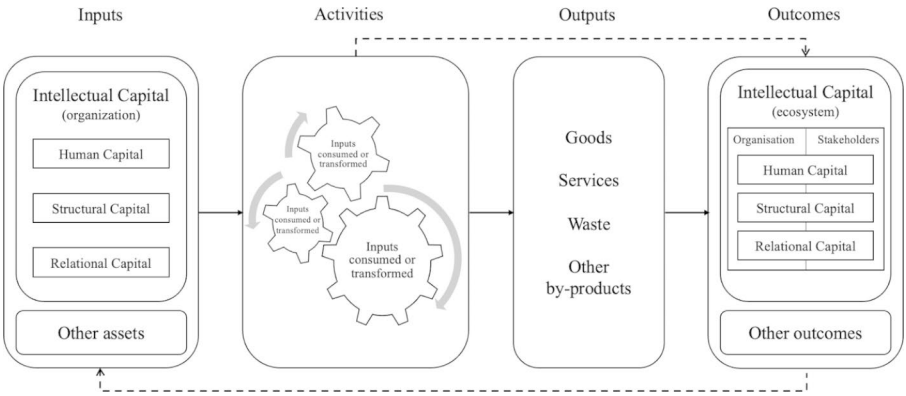

Fig. 1 Business model and intellectual capital map. (adapted from CIMA et al., 2013, p. 9)

approach (Marr et al., 2004), which unravels the interconnections of resources, moving from the organisational IC inputs to the ecosystemic IC outcomes and impacts as in an IVCM. Such a wider stakeholders' approach allows the organisation to show the dynamic interactions of various resources that create value, visualising them as well as their overall link to performance (Marr et al., 2004). More specifically, first an IC ontology explores empirically how IC is constructed (Stacchezzini et al., 2019), that is the intangible resources and the interactions among them that give life to IC are identified. Hence, as in an IVCM, starting from the inputs on the left, an organisation's IC and other assets are consumed or transformed by its activities to contribute to its outputs so as to generate valuable outcomes, yet not only for itself but also for the stakeholders in its ecosystem, as it is the case particularly for PSOs. Outputs are typically recognised to be the products (goods and services) that are produced and sold or delivered by an organisation to generate revenue. However, there are other outputs that may need to be considered, such as waste and other by-products that may erode value. All outputs, whether intended or not, can then lead to a range of outcomes, both internally to the organisation and externally among stakeholders. It is therefore important to visually appreciate that outcomes concern both the organisation and its stakeholders' IC, as well as other outcomes such as the economic and social value generated beyond the directs effects on stakeholders' IC. Moreover, as represented by the top dashed line in Fig. 1, activities can also have a direct effect on outcomes, independently of outputs. For instance, ethical procedures may have a positive outcome in terms of an organisation's reputation.

Activities and outputs that are relevant for value maintenance and creation can be identified through a materiality analysis which considers both the organisation and its key stakeholders' priorities in terms of value creation. This reveals internal and external outcomes, that is outcomes that concern the IC of the organisation and of its key external stakeholders. Employee positive or negative morale are examples of internal outcomes. Stakeholder increased knowledge and innovative practices are examples of outcomes initiated by a PSO and seeping through to the ecosystem, beyond the benefits from goods and services, which are already accounted for in traditional financial and IC reporting models. Hence, the map helps illustrate how

a PSO can create value for its external stakeholders which goes beyond the value of its products and beyond the value created for itself and its inputs. Value creation is a cycle in which the internal and external stock of capitals at the end of a period influences the capitals available for use by the organisation in the following period, as represented by the bottom dotted line, and by its stakeholders in their business models. This way of reporting how IC produces value offers a better visualisation for PSOs of the public value that is co-created, as it considers not only the organisational, but also the societal level. Considerations about the impacts of business activities on the whole ecosystem, rather than just what is directly controlled by an organisation, may highlight issues with the sustainability of a PSO' s current business model and in particular highlight whether and in how far it is fulfilling its institutional mission. For example, current performance and strategy might not be sustainable over time without a change in the business model, because of negative outcomes on the ecosystem, that is on external stakeholders' IC or other assets which then might have an impact on the organisation's inputs.

Moreover, assessing outcomes against strategic objectives and actual performance may lead to changes to business activities and, potentially, to the strategy of a PSO to promote value maintenance and creation. Yet, it may be difficult to assess the impact of an organisation on the IC of another organisation, let alone a whole ecosystem, as it risks being a daunting task and an organisation may not have the necessary access to other organisations to evaluate its impact. This can be a reason why it is rarely done and why the IR guidelines suggest it is not necessary to analyse external outcomes, even if they recognise their importance. Yet, from both a strategic and an accountability perspective it is important for PSOs to be able to identify and assess such impacts and this paper offers an example of how this can be done.

3.2 Case study

A single-case study design was adopted since it is appropriate for descriptive studies, where the main aim is to investigate a unit as a single global phenomenon (Yin, 2014). In particular, the framework for value creation adapted from CIMA et al. (2013) was applied to an Italian public sector agency, located in the North-Eastern part of the country, that, in 2019, launched an in-depth review of its processes to assess in how far it was fulfilling its mission. The agency was established in December 2015 by the local governments' association, the federation of public healthcare organisations, public hospitals, and the local section of the Council for municipalities and regions of Europe. Its role is to support local authorities, in particular municipalities but also local health agencies, and strengthen their institutional, planning, organisational and management capacity by establishing networks where knowledge is sourced and transferred. With a core team of 14 people, supported by more than 30 consultants and trainers, it provides training, consulting, and operational support by, for example, deploying its own employees and collaborators to help customers with specific tasks such as fulfilling new normative requirements, setting up databases, etc. Its mission is to "contribute to the development of public value by enhancing best practices, promoting the circulation of knowledge and the development of skills in public administration" (Articles of Association). Its vision is to be recognised as

"the" centre for competence for public administration, and to become more and more the reference point and a service centre for PSOs for training, advice, and support with the ability of activating internal and external resources to improve public administration practices (Annual Report, 2019).

In 2019, the agency was looking for a meaningful assessment of the long-term viability of its business model and strategy both to validate its business case and to promote a stakeholder accountability approach (Gerwanski, 2020). Its management was interested in exploring and assessing the agency's value creation processes to systematise its business model, advance legitimacy, improve its image, assist in internal and external stakeholders' engagement. Measuring, managing, and reporting IC was essential for managers to govern the value creation process of their organisation and the relationships with their stakeholders (Montemari & Nielsen, 2013) as one of the focal elements of value creation in an integrated report (Badia et al., 2019).

> "Our focus is on understanding how we could take care of intellectual capital in all its nuances by considering the risks and opportunities associated with its management, by understanding how and what value is created for whom and how this can be influenced to improve our performance. We find it hard to formalise and document the value we produce and therefore also to evaluate it and make it perceived as such." (Managing Director).

All in all, they were looking to revise their knowledge management and IC practices not for the sake of such an exercise or for pure window-dressing purposes, but to support business performance improvements (Schiuma, 2012). Adopting a performative approach to IC research entails investigating what IC consists of, how it is appreciated and implemented in practice using a bottom-up approach to help visualise, measure, and manage it (Zambon et al., 2019).

The agency is particularly fitting as a case study for this research because it is a knowledge intensive PSO where IC plays a key role both as an input and as an outcome: as a consultancy and training outlet, its IC is its key asset, while its very purpose is to promote the development of other PSOs' IC. The agency helps them implement new procedures, temporarily lends them qualified staff, trains or assists side-by-side their employees who are unfamiliar with new practices. Hence, the agency works so closely with PSOs that it is in a prime position to be able to appreciate the consequences of its activities and services on their IC and their contribution to value creation, maintenance, or erosion.

3.3 Research data and analysis

The project run from January to December 2019 with the support and collaboration of the Managing Director of the agency. First a research protocol was developed on the basis of the organisation's key strategic and performance documents, its services with all relevant materials, its website, and other digital applications as well as its internal and external stakeholders. It stated the research question, that is to assess whether, how and to what extent value was being created, it indicated the required data and how it would be collected (Eisenhardt, 1989; Yin, 2014). Multiple sources

of evidence were used to address a broad range of contextual, attitudinal, and behavioural issues (Yin, 2014): internal document analyses, interviews, and field observations. In addition, in order to enhance the quality of our analysis and to assess its internal validity, external validity, construct validity and reliability, we considered trustworthiness dimensions adapted from Yin (2014). Table 1 provides a list of the steps followed to improve the trustworthiness of our analysis.

Initially, researchers analysed institutional materials, such as strategic plans for innovative training and competence building, methodology papers, checklists, written protocols, financial reports, memorandum and articles of association, in order to appreciate the agency's mission and vision, as well as its main processes, strategic objectives, structures, activities and outputs. One of the researchers attended full time all the steps of the process with the traditional dual objectives of "strong" interventionist research, that is helping improve the organisation at hand and advancing knowledge in a specific field (Baard, 2010; Bracci, 2017; Jönsson & Lukka, 2005).

In a second instance, two researchers carried out in-depth semi-structured interviews with key stakeholders. During the interviews narratives about IC were elicited as they are an effective means of accessing and comprehending an organisation's complexity (Cuganesan & Dumay, 2009). Interview questions were tested with a pilot sample of 5 respondents (3 internal and 2 external stakeholders) and modified according to the feedbacks received. A total of 15 formal interviews were then carried out, 8 with internal stakeholders and 7 with external stakeholders, between March and September 2019 (Table 2). Interviewees were chosen in conjunction with the agency to include different levels of experience and select information-rich cases for the most effective use of limited resources Patton's (2002). Interviews spanned from 60 to 140 min and were then recorded and transcribed so as to accurately quote the statements of the interviewees. We guaranteed the confidentiality of the participants' identity and informed them of the purposes of the study (Lincoln & Guba, 1985).

The researchers also participated in frequent meetings with key internal stakeholders to collect impressions and evidence from field observations. Meetings were observed, recorded, and then analysed. Such data represented an important control of

Table 1 Trustworthiness dimensions and steps

Trustworthiness	Steps to improve trustworthiness
Internal validity	• Framework of analysis explicitly derived from the main literature • Matching the identified pattern to those suggested by other scholars • Different theoretical points of view considered
External validity	• Explanation as to why the case study was appropriate for the aim of the analysis • Details of the case study context provided
Construct validity	• Triangulation of data (data from multiple sources) • Review of transcripts and drafts by academic peers • Review of transcripts and drafts by key informants working for the organisation examined • Detailed descriptions of data analysis procedure • Explanation of circumstances of data collection
Reliability	• Case study protocol • Case study database

Table 2 Interviews

Interviewees	
8 internal stakeholders	Agency's President
	Agency's Council member
	Agency's Managing director
	Agency's Senior project manager
	3 Agency's Project managers
	Agency's Office manager
7 external stakeholders	2 representatives from local governments
	2 representatives from local healthcare authorities
	1 representative from a public university
	1 deputy director for the local government and public service office
	1 external consultant

the participants' points of view. This helped verify data, corroborate initial findings, sketch visuals, and ensure construct validity.

We then performed content analysis of the evidence collected by using qualitative coding techniques (Strauss & Corbin, 1998). The data collected through internal documents, interviews, and observations were transcribed into the Nvivo software package to provide a basis for data analysis. We read and re-read the transcripts holistically and wrote some memos in the margins. Then, we coded any data at the word, phrase, sentence, or paragraph level to identify specific patterns. In this phase, some codes were redefined, in order to provide a more precise description of the data, while others were grouped in larger categories. Classifying data requires the researcher to look for general themes or dimensions. Interpretation may then allow the researcher to connect themes to each other or to constructs elaborated in a research map.

The general approach taken to analyse the empirical material was to discuss findings first among researchers and then with people from the agency to triangulate inferences and sort out any doubts or inconsistencies. For example, to discern activities and outputs, documents and interview transcripts were read through to identify all activities carried out by the agency, from delivering training to senior managers to recruiting and managing the office cleaning service, from applying for EU funding to purchasing new software, and so on. They were recorded on a sheet of paper indicating their importance for value creation, preservation, or erosion over time for internal and external stakeholders. Activities which were regarded as not important or ancillary by both internal and external stakeholders or were not mentioned at all, even though they appeared in records, procedures, etc., were discarded from further consideration. All others were considered core activities and were grouped according to similarity of content, outputs and/or procedures to help develop a full understanding of the business model. Eventually, findings were discussed with the agency's Managing Director and Senior Manager which helped finalise the list of the agency's core activities and outputs. The content analysis provided a wealth of qualitative information about IC, its dimensions, and their role in value creation.

To understand how inputs, and in particular IC, translate into value, such relationships were also visually represented through value creation maps following Marr et al. (2004). Such maps start from the objectives, mission and vision of an organisation and then identify the assets that represent the key value drivers. As outlined in

Sect. 3.1 and according to Marr et al. (2004), assets can directly create outcomes when involved in activities to create products, but assets can also indirectly generate outcomes through their interactions in performing activities.

Following Cuganesan and Dumay (2009), two methods were used to construct visuals: analysis of interview transcripts and interactive mapping with the agency's internal stakeholders. This allowed to rely on information elicited through different methods to better represent the complex nature of IC interactions and value creation while reducing potential bias (Abernethy et al., 2005). Materiality analysis helped visually differentiate resources, activities, and relationships based on their importance for value creation, first for the organisation, and then for its key external stakeholders. The upshot was a series of visual representations connecting inputs, activities, outputs, and outcomes which helped managers assess internal as well as external impacts and which were then compounded in an initial business model to represent the agency's overall value creation map.

Results were continuously discussed in an iterative fashion with the Managing Director of the agency, repeatedly moving between empirical findings, the concepts identified, and the theoretical framework. At times, the President and the Senior Project Manager were also involved in such discussion and feedback sessions. Six meetings were formally held to report on the project progress and to discuss results, even though there were many informal occasions to obtain support, data, and guidance.

4 Findings

Once the objectives, mission and vision of the agency were identified and the structures and organisation of the agency were clarified, the framework to assess how value is created was implemented through a four-step procedure: at first, the agency's key stakeholders were identified; in a second phase, activities and outputs were outlined and discussed with key internal and external stakeholders; thirdly, the dimensions of IC were explored in order to appreciate what precisely creates value and how; lastly, the agency's business model was discussed exploring its inputs, activities, outputs, and outcomes in order to assess the role of IC in value creation for the agency and its key external stakeholders.

4.1 Phase 1: stakeholder identification

The analysis carried out through documents and interviews revealed that the agency's key stakeholders include a variety of internal and external entities (Table 3). They were identified through an extensive assessment which considered stakeholder saliency, which is based on the stakeholder's power, legitimacy, urgency, responsiveness, and feedback with respect to the agency's mission, vision, strategy, and business model (Best et al., 2019). In particular, following Mitchell et al. (1997) and Best et al. (2019), power was interpreted as the ability of different stakeholders to impose their will on a given relationship through coercive, utilitarian or normative means; legitimacy denoted the appropriateness of stakeholders' actions and claims; urgency was used to indicate timely and crucial impacts by stakeholders;

Table 3 Agency's key stakeholders

Category	Role	Stakeholder
Internal stakeholders	Shareholders	Local government association
		Federation of public healthcare organisations
		Local section of the Council for municipalities and regions of Europe
	Governing bodies	Agency's President
		Agency's Council
		Agency's Managing Director
	Employees	Senior staff
		Junior and technical staff
External stakeholders	Clients and beneficiaries	Local governments
		Local healthcare authorities
		Public service companies
		Auditors and regulatory bodies
	Suppliers	Trainers and consultants
		Other associates and collaborators
		Internal service providers
	Funding and regulatory bodies	Regional government
		National government
		EU
	Partners	Universities and research institutes
		Other competence centres

responsiveness highlighted whether stakeholders reacted appropriately and timely; and feedback denoted the quality and importance of stakeholder interaction. Following the approach described in the Methodology section (§ 3.3), after an initial analysis based on documents and initial interviews, researchers asked the agency's Managing Director and Senior Manager to confirm the results of a four-point scale classification applied to each stakeholder power, legitimacy, urgency, and salience. Those stakeholders who reached a score of three on at least two aspects or four on at least one aspect were identified as key stakeholders on which to focus in the following materiality analysis to frame core activities and value drivers.

One of the main issues faced by the agency's management was not so much to attribute scores of power, legitimacy, urgency, and salience to different stakeholders, but rather to appreciate that trainers, consultants, associates and collaborators are external stakeholder. Therefore, even though they impact the agency's human capital in particular in the eye of clients and beneficiaries, augmenting the agency's relational capital, they are not de facto under the organisation's control and need to be properly managed as external stakeholders with a proper policy to be designed and implemented. As highlighted by the literature, this is the case for most PSOs where operational capabilities often depend on external stakeholders who need to be properly engaged to contribute to value co-creation through their contribution to the actual delivery of public services (Höglund et al., 2021; Iacuzzi et al., 2020).

4.2 Phase 2: sorting activities and outputs

Documental analysis and interviews with key stakeholders were used to distinguish core activities through a materiality analysis, which helped assess their effect on strategy, governance, and performance. For each activity, outputs were recorded and summarised as in Table 4.

This allowed to identify both core activities concerning services to customers and beneficiaries as well as core internal support activities. The former include off-the-shelf and ad-hoc commercial and institutional training, operational support, and consulting activities; the latter research and internal innovation, marketing, as well as administration and management.

Moreover, such exercise allowed the agency to recognise that it has extensive knowledge management initiatives in place which are key to value creation. Interviews revealed that their internal stakeholders are familiar with various knowledge management practices, such as the need to share competences across the organisation, as well as the need to codify good practices into written format, which are all part of the "research and internal innovation" activity.

> "Our internal databases and debriefs are a god-sent. We cannot reinvent the wheel every time for a new project, also because there is no time and local governments often expect that we solve their issues at the blink of an eye. We are seen as a panacea, as a remedy for any emergency, while we should just be an effective support." (Project manager 1).

The agency's knowledge capture system helps avoid that problems are tackled afresh each time and prevents knowledge from slipping away, which is fundamental for a

Table 4 Agency's core activities and outputs

Scope	Activity	Output
External services	Off-the-shelf and ad-hoc commercial and institutional training	Training plans Training courses Training events
	Operational support	Ordinary obligations and tasks Extraordinary obligations and tasks
	Consulting	Development projects Organisational models Steering documents, road maps Advice/opinion papers Other consulting services
Internal support	Research and internal innovation	Training methods Organisational methods Operational tools Projects
	Marketing	Contracts and funding Building relationships and reputation
	Administration and management	Accounting Management control Human resource management

knowledge intensive PSOs. The agency relies on many external consultants, whose performance is rooted in knowledge which is highly tacit in nature and rests with individuals which are not under the direct control of the agency. For every project an internal learning process is in place with briefing and debriefing procedures which should allow knowledge to be acquired, codified, and shared. However, one project manager lamented that while briefings before projects happen regularly:

> "…it often happens that there is no time or not enough time for an adequate debrief after a project as well as there is no official closure of some projects, so that there is no proper evaluation. There are so many things to do and new projects that sometimes we end up writing up some notes and sharing them rather than sitting down and taking time to consider what we did right, what went wrong and what can be improved. Or even if we do this, there is no time to discuss and decide about corrective measures for the future." (Project manager 2).

The agency has recently also developed 'off-the-shelf' or 'catalogue' projects. Most are training courses which aim at offering standardised repeat products where new knowledge elements for trainers and consultants should be minimised to increase efficiency. Moreover, the human resource appraisal and development system is under review with a more sophisticated performance measurement system based on a new software that allows personal data and reviews to be fed through a database together with the results of customer satisfaction questionnaires.

> "The new HR systems allows to rank skill sets and verify customer appreciation to know who to send where for which task. We are slowly also implementing the data about external consultants, so eventually we will be able to identify immediately skill and competence gaps in the whole organisation." (Office manager).

4.3 Phase 3: IC appreciation

The next stage of the assessment involved processing initial results to appreciate and visualise the agency's business model. The starting point was to articulate inputs, outputs, and outcomes through an analysis of IC to appreciate how value is created, maintained, or eroded over time. This was new to the agency as apart from the Managing Director most internal and external stakeholder seemed unfamiliar with issues relating to identifying, assessing, and reporting IC and public value creation. Hence, already being interviewed on these issues was quite revealing for them.

Initial visualisations such as a business model sketch and a connectivity map typical of value creation maps (Marr et al., 2004) and Integrated Reports (IIRC, 2021) were pivotal in defining concepts and dimensions of IC and their connection to value creation, although the quantification of each impact on value creation remained disputed and the issue of how to measure impacts could not be solved. Internal stakeholders maintained that it was not possible to establish some sensible and common metrics, because of the uniqueness of most of the projects. However, as observed by

Abeysekera (2013), IC appreciation requires more narrative and visual tools than numbers to achieve an accountable and transparent representation of its contribution to value maintenance and creation. The contents of the business model and the principle of connectivity represented two important issues in the analysis. On the one hand, the visual representation of the business model required to consider and visualise how IC contributes to value creation and helped stakeholders discuss and converge on a common interpretation of the role of IC (Cuganesan & Dumay, 2009). On the other hand, the connectivity principle, which asks for "a holistic picture of the combination, interrelatedness and dependencies between the factors that affect the organisation's ability to create value over time" (IIRC, 2021, p.26), led to questioning and representing how IC is related to other elements that affect value creation and the performance of IC (Corbella et al., 2019; Marr et al., 2004).

The result showed that all three components of IC are important for value creation, not only for the agency itself, but also for its stakeholders. The agency's human capital plays a central role in generating value and many authors call human capital "primary intellectual capital" for this very reason (Roslender & Fincham, 2004). It includes the knowledge, experience, relationships, and motivation of the people who work for the organisation. Human capital elements which are particularly relevant to the agency and its stakeholders are the skills, competences and professionalism of its employees, trainers, consultants, associates, and other collaborators, as well as their ability to innovate, their moral and motivation, and the initiatives undertaken for the growth and development of human resources. The agency's human capital is one of the fundamental aspects of its ability to create value since the quality of the organisation's outputs and of its relationships with its stakeholders depend on it. Moreover, through the agency's services its human capital is shared into public administration and often feeds directly into the human capital of its stakeholders, which allows for value co-creation. It is thus unsurprising to notice that for most internal stakeholders, the agency's IC has a strong human resource connotation.

> "Our key asset is the competences of our people and our consultants. This is our value added. Knowledge is embedded at the people level. What is fundamental is the attraction of talents, the growth of talents within the company, retaining these talents in such a way that the wealth of knowledge is not dissipated. These people are what allows us to generate value." (Senior Project Manager).

> "The agency is successful because of its people; the quality of its people, their approach, their ability to be inclusive and sensitive with respect to the needs of local governments. At the centre of the agency there are its people." (President).

However, through the narratives it became evident that human capital cannot create value on its own. The performance of competencies, for instance, often depends on the technology available and on the trust among stakeholders. For example, some external stakeholders praised the importance of the agency's software, as well as the importance of its reputation and approach, which are often the key to obtaining an assignment and to soliciting the openness with which knowledge is shared and its people are accepted on customers' sites.

> "Whenever they come, we know they will bring the latest tools, this is why they are an excellence centre. Sure, some people are better than others, but that's also a matter of personal liking. What is important is that the toolbox they use is up-to-date and is consistent throughout the organisation. Also, because if one of their consultants cannot come one day, we need to keep going and they need to guarantee that the result will be achieved." (Representatives from a local healthcare authority).

> "If they did not were who they are, we would not have been able to sign a contract. In public administration it works like this. You need to be known and have a good reputation, so that nobody can accuse you of favouritism or mismanaging public money." (Local government representative).

As far as structural capital is concerned, an informal organisational culture stemming from teamwork is nurtured within the agency. Software and licenses are acquired from suppliers, while procedures, methodologies, operating models, and tools, such as the new HR appraisal and development system, are generated internally by the agency through research and internal innovation as well as learning economies. Procedures, methodologies, operating models, and tools are therefore inputs of the agency's activities, but also one of its outcomes in a feedback loop, which aims at continuous improvement and value co-creation. Similarly to human capital, through its services, the structural capital generated internally by the agency is shared into public administrations and feeds into the human and structural capital of its stakeholders creating value for them as well as for the agency itself. Similarly, the agency's relational capital is highly dependent on its organisational culture. Hence, the agency's structural capital is a focal point of its ability to generate value and it is certainly one of its distinctive elements. However, its employees and contractors alike maintain that improved planning and allowing more time to be dedicated specifically to internal innovation could lead to higher quality products, a better distribution of workloads as well as have a positive impact on morale.

As contemplated in the previous analysis for human and structural capital, relational capital is another central element for the generation of value at the agency. Trust, a listening approach, and an open predisposition towards key stakeholders are considered fundamental to building a positive reputation and knowledge management practices such as networking and communities of practices. The trust from its financiers and beneficiaries is an element on which the agency's existence depends; if it fails, it is likely that its activities will cease. Moreover, interviews with stakeholders confirmed that the agency's network of trainers and consultants, that is part of its human capital, constitutes an important element for its reputation and differentiation from other consulting and training organisations.

"We keep on financing their projects because we know they are the expert in their field, and if they lack something, they have links to universities and top consultants." (Regional deputy director for the Local Government and Public Service Office).

Further, the agency's relational capital allows it to establish collaborative networks (Agranoff, 2006; Singh, 2005) that source, translate and share knowledge that means

more collaborative value for the agency itself and its stakeholders, emphasising again the co-creation of value.

"It is important to be part of their network because you are recognised as a member of a professional community of knowledge. It is not easy because sometimes you are competing with people from big universities or with international experience. So, you can never lower your game." (External consultant).

4.4 Phase 4: explaining interactions within the business model

Bringing everything together in the business model, the interactions between inputs, activities, products, and outcomes for the agency's IC and its key external stakeholders are represented in Fig. 2.

In the final stage of the project such disclosure map was used as the basis for creating an IC management strategy that develops and capitalises on more effective knowledge-based stakeholder engagement. In particular, to highlight how the agency satisfies its institutional mission and creates public value, the map shows external stakeholders as components of the business model rather than folding them into relational capital as done in traditional IC reporting frameworks. This allowed to address the peculiarities of a PSO's value chain by visualising and hence effectively disclosing how business activities and outputs create value for all those involved by fulfilling their needs and expectations, considering direct and indirect value co-creation processes, as shown by the double arrows in the outcome box.

However, three issues emerged which remained to be addressed: measuring outcomes to gauge value creation, assessing public value created, maintained, or eroded beyond key stakeholders, and missing external stakeholder feedback on the final conceptualisation and visualisation of the business model and value co-creation process. The second and third issues were recognised as important and necessary to appreciate value co-creation for PSOs, but beyond the scope of the research project, as the for-

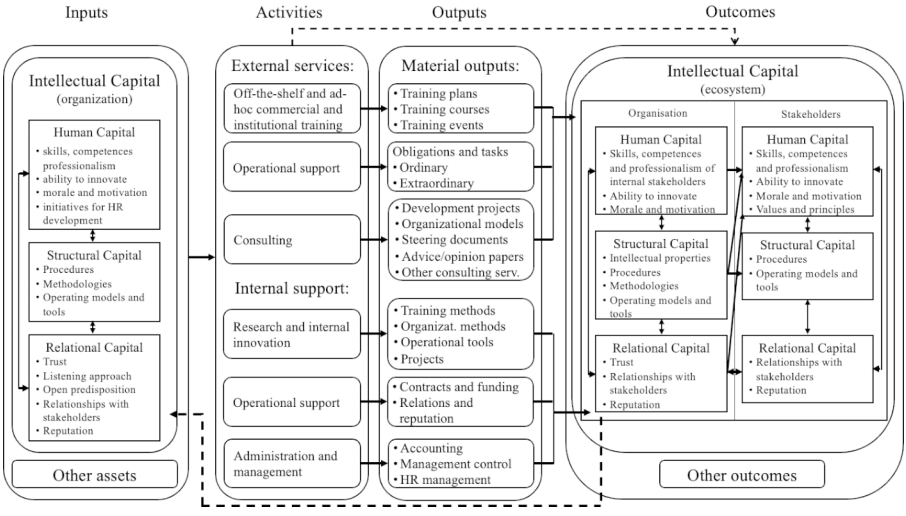

Fig. 2 IC in the agency's business model

mer (an overall assessment of public value) looked beyond key stakeholders which were the focus of the project, while the latter (stakeholder feedback) was necessary to validate the entire process but too complex to be included at a stage of the project when internal stakeholders were still trying to reach consensus among themselves. The first issue (measuring outcomes) is a well-known problem within the public sector, that is outputs should be linked to public value as measurable outcomes (Höglund et al., 2021), yet there are several critics to this approach. On the one hand, too much emphasis on outputs can produce dysfunctional results in relation to public value (Norman, 2007) since focusing on measurements of output can cause a shift towards what is easily measured and audited at the expense of long-term goals which are difficult to measure (Höglund et al., 2021). On the other hand, public value outcomes, in terms of visions and long-term goals, tend to become so broad they can mean anything and thus be difficult, or even impossible, to measure (Norman, 2007). For the agency, it was easy to measure outputs such as hours of training for human capital or number of IT applications developed for structural capital, but a discussion emerged on how to measure outcomes in terms of value created for external stakeholders, let alone the economic and social value created for society at large. The consensus that was reached was that it was impractical to measure outcomes as such, on the one hand because of difficulty in assessing precisely the outcomes regarding stakeholders' IC, let alone at societal level, on the other hand because investments in IC take a long time to emerge and the time gap between activities and outcomes makes it difficult anyhow to take immediate actions and to identify and assess the impact of other factors that might have influenced outcomes in the meantime.

"What can we do? Do we go there and test what municipal officials have learnt and whether their work has improved? Do we ask citizens for an evaluation of whether municipal offices work better? And when should we do it? A month, two months, six months or a year after a project finished? So many things could have changed in the meantime. It is not possible to get to a sensible evaluation." (Project manager 1).

Therefore, a compromise was reached and it was agreed that a more realistic indicator would be the satisfaction of external stakeholders and in particular of the direct beneficiaries of the agency's activities. The same had emerged from external stakeholders, some of whom had suggested during the interviews that value creation, maintenance or erosion could be appreciated from an assessment of customer satisfaction and the positive feedback of other external stakeholders, including customers improved or worsened compliance with regulations and normative requirements.

Hence, once the agency's business model was drawn and consensus was achieved, it was used for strategic purposes and decision making. In particular, the following issues were identified and needed to be addressed:

- Improving the assessment of skills and competences among its human resources according to different customers' needs;
- Allowing more time for proper debriefing procedures and for developing learning points and corrective actions;
- Reducing time and resource invested in non-material issues and activities;
- Promoting more off-the-shelf outputs as customers do not always require, have the budget or time for a project or an approach to be custom designed for them;

– Introducing satisfaction questionnaires at the end of each activity and at least once every two years for key external stakeholders to measure outcomes as well as gain their feedback on the value creation process.

Over the next few months, the agency introduced more focused teamwork, the new human resource appraisal and development system, and an online manual to code and systematise working practices, learning points, and corrective actions. Satisfaction questionnaires were being developed and piloted, but it would take some time to refine them to the point that they would fulfil the need to assess outcomes. In addition, it was agreed that any direct or indirect feedback related to outputs through word-of-mouth, social media, etc., would be recorded within the datasheet for that activity and analysed when reporting IC as a supplement to the questionnaires.

Overall, the research project contributed to IC mobilisation by influencing the actors' learning process (Chiucchi, 2013) by helping enforce standardised practices more rigorously, boost morale, and improve responses to customers' requests by reducing lead time and facilitating access to readily available knowledge for both internal and external stakeholders. In general, the agency learnt to appreciate more stakeholders' contributions and engagement facilitating public value co-creation.

5 Discussion

The process described in Sect. 4 culminating in the disclosure map in Fig. 2 constitutes the answer to the main research question at the basis of this article, that is how to assess whether, how and to what extent value is created by PSOs by managing their IC to favour its development as well as the development of their stakeholders' IC. In this respect, three aspects have emerged as fundamental to manage IC in PSOs: visualisation, integrated thinking, and stakeholder management.

5.1 Visualisation as an effective tool for IC assessment

This study has confirmed that visual representations can be an essential aspect of interventionist research to illustrate phenomena and support decision making (Aas & Alaassar, 2018). On the one hand, visualisation helps show value creation by reproducing IC streams and cause-and-effect relationships detected in practice (Skoog, 2003): it represents a way of enhancing managerial judgement by transforming raw data and information into accessible forms of representations to extract knowledge. On the other hand, visualisation approaches and tools can facilitate the assessment of IC and knowledge management within organisations by providing evidence for value maintenance and creation through IC management and knowledge creation, transfer, sharing, translation, and codification (Eppler & Burkhard, 2007). Indeed, the representation of IC and knowledge flows is particularly meaningful in a strategic decision-making context in the public sector where ecosystems affect an organisation's operations, behaviour, and governance (Iacuzzi et al., 2020; Secundo et al., 2018). This is ever more relevant considering that PSOs' relations and networks are becoming more and more fluid, and that consequently decisions cannot be imposed

but increasingly emerge from the interactions among several stakeholders in an ecosystem (Osborne, 2018).

It is necessary to point out that, even though such representation is useful, it is a bidimensional simplification on paper of interactions which are multidimensional, dynamic, and evolutionary, rather than static or fixed. Even with such limitation, visual maps returned in a clear and effective way the knowledge transfers between the agency and its key external stakeholders. Moreover, while the initial value creation maps concerned different stakeholders, the overall business model considers only two generic labels to help effectiveness: "organisation" for key internal stakeholders and "stakeholders" for key external stakeholders. As already emphasised by Cuganesan and Dumay (2009), the paradox of visualising IC is precisely that visual maps say the most about IC and value creation by saying the least. The translation of raw data into visual maps comes at the possible cost of homogenising a rich information set, which, however, managers should be able to go back to for insight. For example, when the agency helps municipalities "lending" them its operating tools which are innovative and compliant to new legislation, it increases municipalities' structural capital and, at the same time, through the improved municipalities' structural capital, it improves both the municipalities and the agency's relational capital with regional authorities, which are among the controlling and funding bodies of both municipalities and the agency. Such flows are all represented in Fig. 2, yet they are simplified as it would be difficult to draw the impacts on and interactions among the IC dimensions of a dozen key external stakeholders.

5.2 Integrated thinking

Through the project managers also learned that they should focus on developing all three components of IC as they are interdependent and key to the agency's ability to generate value as already emphasised by the literature (Bratianu, 2018; Dumay & Garanina, 2013) because such information connectivity is at the basis of integrated thinking (Guthrie et al., 2017; Tirado-Valencia et al., 2020;). The project showed them how the often-praised human capital cannot create value on its own as it heavily depends on structural capital to codify and relational capital to share the knowledge developed within the organisation. It also lives off the informal organisational culture stemming from teamwork and nurtured within the agency, which together with its relational capital enables the establishment of collaborative networks and communities of practice.

Furthermore, the project demonstrated that the relationships between organisational and stakeholders' dimensions of IC are both mediated through relational capital and linear, that is there is a direct link between organisational human capital and stakeholders' human capital as well as between organisational structural capital and stakeholders' structural capital. This is typical of PSOs especially with relations and networks becoming more and more fluid (Osborne, 2018). If we adopt a standard IC perspective, relationships among the organisational and stakeholders' dimensions of IC are mediated by relational capital (Dumay & Cuganesan, 2011; Giuliani, 2015). However, one of the specificities of value release or diffusion particularly within the public sector is precisely that not all influences need to be mediated, but, in some

cases, they are direct, human capital to human capital, structural capital to structural capital (Huang et al., 2021). This is even more so when considering a training and consulting agency that often supports and replaces public officials and develops their internal procedures.

Hence, the study revealed that integrated thinking requires the establishment of connections between the different components of IC (Dumay & Garanina, 2013), the business model with its strategy, governance, performance and future prospects (Dumay & Dai, 2017), as well as cross-functional areas within a PSO as much as its stakeholders (Feng et al., 2017; Tirado-Valencia et al., 2020), overcoming that silos mentality that often characterises public institutions and curtails value co-creation (Caruana & Grech, 2019).

5.3 Stakeholder management

The agency also learnt that there are still major issues to address in its IC management, especially with the engagement of its external stakeholder and the measurement of outcomes to be able to quantify each impact on value creation, maintenance and erosion.

While argue that integrated reporting in its original outlook provides a very limited and one-sided approach to assessing and reporting on value creation (Brown & Dillard, 2014), the adjusted framework developed with this interventionist research project was the basis for a better decision making and disclosure thanks to improved information flows and communication activities towards stakeholders. In this way the organisation's visibility was strengthened making its mission and created values known, while its decision making was better informed by fostering a better appreciation for value creation within the organisation and a better integration with the economic and social system. The project helped its visibility, the appreciation of the involvement of internal and external stakeholders in public value co-creation, and the development of a strategy for IC management to better govern the agency's value creation and its relationship with its key stakeholders (Eccles & Krzus, 2014).

The analysis confirms how PSOs do not operate in isolation but in ecosystems (Iacuzzi et al., 2020) where value creation is defined by stakeholders, who hold multiple and often conflicting views on what is valuable, which presents a strategic challenge to public managers, and where much of the operational capability PSOs need lies outside their direct control, which exacerbates the strategic complexity. Yet, the issue is that management practices are strongly focused on individual and often standardised organisations and both these aspects do not fit PSOs (Höglund et al., 2021). Creating more interactions among internal and external stakeholders and engaging them through their active involvement in production processes would promote ecosystem collective intelligence (Iacuzzi et al., 2020). This is a much more ambitious proposition, for example, than simply delivering assistance and services, and it is fully in line with the tenets of the agency's mission and vision.

The visualisation maps rendered visible the complexity of IC and made it possible for managers seeking to intervene on IC to appreciate the relationships between the IC dimensions and value creation. Materiality analysis helped identify those activities which produce most value for the agency and its key stakeholders (Edgley, 2013).

The project showed how important it is to focus on 'material' activities and outputs that have an impact on an organisation's ability to maintain and create value over time (CIMA et al., 2013), rather than attempt an all-encompassing approach which risks being unmanageable with little additional benefit.

However, involving only key stakeholders may be considered as limiting participation and a "narrowing in" approach (Brown & Dillard, 2014), while proper stakeholder engagement would entail opening up to a pluralism of views which has been more and more advocated for recently (Grossi et al., 2023). In practice, on the one hand, to avoid becoming intractable and unattainable, key stakeholder should be selected through materiality analysis, while, on the other, a healthy scepticism and reassessment of such selection should be ensured over time.

6 Conclusions

The perspective adopted in this article, in its intertwining theory, models, and empirical findings, provides a rich standpoint from which to consider the issues concerning the managing, visualising, and reporting of IC's value creation particularly in the public sector. This study has not only validated the existence of ecosystem frameworks in public administration and the key role played by IC as described in the fourth stage of IC research (Dumay & Garanina, 2013; Guthrie et al., 2017; Massaro et al., 2018), but it has also highlighted the need for reconsidering the impact of IC, as yearned for in the fifth stage of IC research (Dumay et al., 2020) and for the emergence of new frameworks in knowledge management, business models and reporting to incorporate an ecosystem perspective, particularly for the public sector (Borin & Donato, 2015; Konno & Schillaci, 2021; Secundo et al., 2018).

By exploring IC empirically withing an IR context, this paper, on the one hand, furthers the research on the relationship between IC and integrated thinking (Stacchezzini et al., 2019), and, on the other, it advances IC accounting showing how models, such as the IR framework, fail to consider the impact of an organisation's operations on its stakeholders' IC beyond its outputs (Iacuzzi et al., 2020). Established models lack a way of accounting for "value release" to external stakeholders and need to be challenged through advanced IC accounting with more ecosystemic approaches that consider outcomes at the macro societal level, which is key to a PSO's mission and vision.

The research developed a framework which helps PSOs assess value creation through a materiality assessment of their activities and products, and by considering internal as well as external outcomes. This is necessary to be able to account for the overall impact of a PSO in terms of value creation, maintenance, or erosion within an ecosystem. At the same time, this offers new insights for future advances in managing, measuring, and reporting IC. Given that IC reporting has been gradually dismissed and incorporated into integrated reports, results do not advocate for organisations to revert to IC reporting models, but rather to consider ecosystemic value creation processes when analysing IC within IR, starting from the impact on the IC of key external stakeholders. It would be impracticable and confusing to include all stakeholders in the analysis (Eccles & Krzus, 2014), yet it is fundamental, especially

for PSOs, to verify their impact at least on key stakeholders to get a more complete appreciation for value creation, maintenance, and erosion (Gray, 2006; Schiuma et al., 2005). In essence, this study favoured a more holistic conceptualisation, visualisation, and reporting of IC, which can reinforce the development of integrated thinking and a public service ecosystem logic with an emphasis on public institutions as coordinators and stewards of value co-creation and where their stakeholders are the reference point for everything, including assessing value creation. This way IR can fulfil its promise and help a PSO provide a comprehensive representation of its ability to create value over time and encourage the necessary coordination and collaboration to develop integrated thinking, which is a catalyst for value co-creation.

Moreover, this paper offers some practical insights. First, it reveals how managers in PSOs should adopt a business case imperative with a particular emphasis on maximising value creation and promoting stakeholder engagement in a bottom-up approach that calls for the development of integrated thinking as auspicated by the IIRC. Undertaking an integrated report focusing on integrated thinking and stakeholder management can be a way to mobilize IC to improve management and governance practices in PSOs (Badia et al., 2019). Secondly, the study illustrates the possibility for creating more dynamic modes of performance management through interventionist research and visual maps in PSOs, which can play a role in promoting value creation at organisational but also at societal level. Interventionist research was embraced because of its ability to contribute at advancing both practice and theory, as it helped mobilize IC (Chiucchi, 2013) and visualise its impact on value creation at ecosystemic level (Huang et al., 2021). Visual maps may allow the switch from a static perspective to a dynamic view focusing on material IC assets, their interactions, and their contribution to value creation. A thorough and shared understanding of the business model supports organisational learning, knowledge management, proactive management, and integrated thinking (Dameri & Ferrando, 2019). However, managers should be aware of the simplification processes involved in creating such maps and may at times need to refer to more comprehensive information. The growing relevance of visualisation by illustrating processes and supporting strategic decision-making calls for a more in-depth investigation of the approaches, processes, and tools supporting the fuelling, management, and integration of IC assets and the generation, organisation, and sharing of knowledge at the core of value creation dynamics, strategic performance improvements, and business governance. It would be recommendable that the findings from this research, as well as results from future studies, were collected in specific guidelines to support PSOs in adopting IR or were used by the IIRC if and when they intend to update their framework for the public sector (IIRC, 2016).

This contribution is not without limitations. The framework has been developed on sound premises as it was deduced from the literature and illustrated by applying it to one case study, but it would benefit from being applied further. On the one hand, because IC is an adaptable and dynamic phenomenon, its complexity and ambiguity have to be analysed in the specific organisation in which it is applied (Montemari & Nielsen, 2013). On the other hand, the restricted field and geographical area of the research grant for the prospective application of its findings to other contexts before a generalisation of the findings can be made. In this regard, it would be useful to adopt

a longitudinal study to collect long-term data to examine the dynamic interrelations of the IC components and their impact on value creation at an ecosystem level in greater detail. Further applications may also help solve some of the practical weakness of the proposed methods: the use of visual maps can be further refined, lessening their simplification of reality, stakeholder management and engagement could be improved soliciting involvement beyond key stakeholders and allowing systematic stakeholder feedback, and the issue of how to evaluate external impacts could be tackled further, both in terms of being able to access and, eventually, measure such information. According to the idea that "what you can measure, you can manage, and what you want to manage, you have to measure" (Roos et al., 1997, p.vi), while visualisation is a starting point, managers ultimately need measures.

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Declarations

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