Aug 10th, 12:00 AM

A Three-Fold Perspective of Continuous IT Value Assessment

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Completed Research

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Abstract

Assessing Information Technology (IT) value is a priority in the digital age. The topic has been studied for decades, but the difficulty to (1) continuously measure and (2) steer value creation with IT investments still presents challenges. This paper presents an approach to evaluate the value of IT over time. The results include a multidimensional framework for the main phases of (1) dynamic contextualization and (2) data analysis. The results emerge from the first cycle of design science research conducted in a municipality-owned water supply company struggling to monitor and communicate IT value to different stakeholders, particularly the administration board. IT value assessment in digital transformation contexts must result from continuous monitoring in three essential perspectives: net value, goal achievement, and perceived value. The findings can be helpful to Chief Information Officers (CIOs) dealing with the pressure to report value in turbulent environments and justify their increasing IT investments.

Keywords

IT Value, IT investment, continuous assessment, design science research.

Introduction

Measuring and increasing the value of Information technology (IT) is a significant challenge. As stated by Vial (2019), "[o]rganizations use digital technologies to alter the value creation paths they have previously relied upon to remain competitive". However, the value of information technology in organizations is impossible to capture in single evaluation episodes. Contrasting to the traditional approaches to measure economic benefits (e.g., return on investments), the assessment of IT value needs to address tangible and intangible aspects of the organization and the society (Schryen, 2013). Despite the extensive list of contributions addressing the topic, "methods and processes for assessing organizational value from IT investments are suggestions for further studies" (Gellweiler and Krishnamurthi, 2021).

Several researchers proposed integrated approaches to measure IT value. For example, Davern and Wilkin (2010) differentiate between independently observed measures that can be quantified (e.g., sales) and perceptual measures that include the IT stakeholders' perspectives. According to these authors, contextualization is vital to identify "what is the relevant aspect of the underlying economic reality" (Davern and Wilkin, 2010). More recently, Töhönen, Kauppinen, Männistö, and Itälä (2020) proposed a conceptual framework for valuing IT that points to the importance of the long term effect. The framework suggests integrating (1) a net comparison of costs and benefits of IT, (2) the creation of means-ends chains to understand the causal effect of IT, and (3) the experience logic related to individual perception of value. However, according to the authors, this proposal does not explain all the steps necessary to adopt the framework in practice, opening "long-term" IT value assessment opportunities.

Measurement is only one side of the coin in achieving business value. IT value also requires governance practices, changing the role of the Chief Information Officer (CIO) that needs to be more focused on innovation and agility. The analysis of value is a main pillar of business-IT alignment, contributing to company performance (Luftman, Lyytinen, and Zvi, 2017), but "managers should provision organizational structures to benefit from IT flexibility, such as to account for new IT value measurement strategies" (Minderjahn, Borgman and Heier, 2022). Our research started after informal contacts with alumni CIOs

collaborating with our research group, pointing to the extreme difficulty of measuring IT value in digital transformation. According to them, IT value is not a state (e.g., low value, optimal value) but a process requiring continuous attention from different stakeholders. Having validated the challenges of IT value assessment in recent literature, we have conducted exploratory interviews with CIOs in highly regulated sectors of the economy (local government, pharmaceutical, top company indexed in the stock market). The interviews confirmed the importance of continuously measuring IT value. Therefore, the following research goal was formulated: *propose an approach to continuously assess IT value*.

The rest of the paper is structured as follows. A review of essential concepts is subsequently presented. The following section presents the design science research (DSR) approach (Peffers, Tuunanen, Rothenberger, and Chatterjee, 2007). Subsequently, the proposal to continuously assess IT value is explained: ITVA4 (the fourth version of the IT Value Assessment approach). The result of its application in a real case follows with a discussion. The conclusion summarizes the results, limitations, and future work opportunities.

Background

Over the past decades, new methodologies addressed the growing importance of IT for business value. The traditional economic value assessment perspective resorts to financial methods where decision-making is based on comparing the financial impact of the costs and benefits (Silvius, 2006). Therefore, quantitative elements should not be excluded from the equation but complemented with more rich evidence (Töhönen et al., 2020). Indirect costs can be several times higher when compared to direct costs and have already been studied in the IS field (Love, Ghoneim, and Irani, 2004). Benefits are also multidimensional. Töhönen et al. (2020) suggest classifying outcomes according to organizational performance, process (e.g., efficiency and effectiveness), and individual users. However, the growing importance of societal value needs to be included as a priority in the modern agenda of CIOs (Majchrzak, Markus, and Wareham, 2016).

Important frameworks were proposed to address the comprehensive assessment of IT value, introducing tangible and intangible outcomes in distinct sectors of the economy (Goh and Arenas, 2020; Gellweiler and Krishnamurthi, 2021). Nevertheless, the importance of context and the analysis of strategic goals of IT adoption should be the first stage of IT value assessment (Davern and Wilkin, 2010), and different tools can be used for this purpose. Therefore, the type of IT under analysis must be thoroughly analyzed (e.g., ERP, mobile system), and several approaches can be used to model IT and business strategy. One of the most influential approaches to creating strategy maps is the Balanced Scorecard (BSC) (Kaplan and Norton, 1996). It is based on the premise that the financial perspective of the organizational performance is not sufficient for efficient monitoring. Furthermore, different organizational objectives drive IT investments and "new strategies for performance measurement in order to justify claims regarding value delivery" are suggested (Wilkin and Chenhall, 2020).

Each stakeholder may have a unique perspective on IT Value. A possible solution to deal with this problem is to rank the IT goals, for example, using a Multi-Criteria Decision Making (MCDM) technique like the Analytic Hierarchy Process (AHP) (Saaty, 1990). AHP can be integrated with the BSC, allowing the user to attribute weight to the strategic objectives. Approaches integrating both tools inspire our research and have been used in different fields like supplier selection (Verdecho et al., 2021). Prominent frameworks for value creation in the IS field suggest "continuous monitoring and proactive adaptation" (Grover, Chiang, Liang, and Zhang, 2018) but empirical studies showing how it can be done in practice are still rare.

Research Approach

Design science research aims to create knowledge by designing innovative artifacts (March and Smith, 1995). Theory and artifact are deeply intertwined in this popular IS research approach (Baskerville et al., 2018). On the one hand, the theory is necessary since the initial stages of DSR to inform the design process. On the other hand, DSR aims to extend our knowledge in the selected topic "for continuous improvement of the application design context and growth of the design knowledge bases" (Baskerville et al., 2018).

DSR evolves in a cyclic nature with research activities of building, evaluation, and theory development, producing different outcomes (e.g., constructs, models, methods, or instantiations) (March and Smith, 1995). According to Peffers et al.'s (2007) methodology, DSR starts with the problem identification and motivation, then the proposal of the objectives for a solution. DSR evolves iteratively by design and

development, demonstration (artifact adoption), evaluation, and research communication (Peffers et al., 2007). There are also guidelines for reporting DSR studies (Gregor and Hevner, 2013). Table 1 summarizes the research using the DSR grid (vom Brocke and Maedche, 2019).

Problem	***Research Process***	***Solution***
There is a lack of methodological guidance to continuously assess IT value; longitudinal analysis is not usual practice in organizational settings.	Methodological proposal for continuous assessment; IT value assessment in an actual project; Evaluation.	Framework for continuous IT value assessment. Step-by-step contextualization guidance; Three-fold perspective for IT value.
Input Knowledge	***Concepts***	***Output Knowledge***
Exploratory interviews; Literature review; IT project documentation.	Balanced Scorecard, Analytic Hierarchy Process, Risk-based thinking; IT value.	Examples and recommendations to continuously assess IT value.

Table 1. DSR presentation.

This study was conducted over eight months with a municipality-owned water supplier. Their main activities include planning and operating water distribution to the population, infrastructure maintenance, wastewater, and rainwater drainage. The company is located in Portugal and reported annual gross revenue of over $27 million. The company's investments in IT are increasing, they are implementing a critical tool for their operational teams relevant to the DSR demonstration phase, and the disclosure of public investments requires an effective communication strategy.

ITVA4 Proposal

This paper proposes an alternative to the traditional static approach of IT value assessment. First, the contextualization (Gellweiler and Krishnamurthi, 2021) is instantiated with tools to (1) identify critical goals, (2) prioritize them, and (3) incorporate risk-based thinking in IT value assessment. Second, IT value is evaluated according to three complementary perspectives, extending the means-end logic proposed in Töhönen et al. (2020) with strategic goals identified with a combination of BSC and AHP, and risk-based thinking in the early stages of IT value contextualization. The traditional "net comparison" of costs and (tangible and intangible) benefits is extended with goal achievement and perceived value. Third, the assessment on a continuous basis hypothesizes that (1) IT value changes over time and (2) monitoring IT value is an opportunity to identify improvement opportunities in various stages of the investment lifecycle. The literature review that guided the framework's first proposal and identified its elements' causal logic is presented in Lemos et al. (2021). The current version of ITVA4 is outlined in Figure 1.

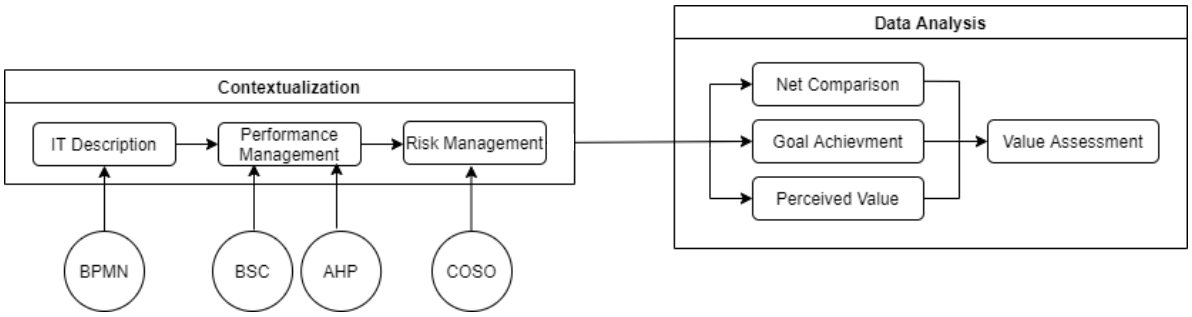

Figure 1. ITVA4 framework.

The first step of ITVA4, "contextualization", is to develop a clear view of IT. Formal specifications of IT and business processes are essential at this stage (e.g., Business Process Model and Notation (BPMN) is an example we used in our fieldwork). First, to support communication with different stakeholders (e.g., suppliers, end-users, administration). Second, to establish the baseline for future IT changes. Third, to

identify features that affect business performance. The proposed framework considers a shared organizational view of organizational strategy and IT strategy (Chen, Mocker, Preston, and Teubner, 2010).

Key performance indicators are set at this stage. Performance management requires a precise specification of goals and metrics. Among the multiple tools available, the team decided to use BSC to align IT and business goals because it was already familiar to the CIO. A strategy map is an interesting solution to explain the cause-and-effect relationships of the means-end logic (Töhönen et al., 2020). However, BSC is a descriptive tool and does not provide a method to determine the importance of each indicator. AHP was used to rank these objectives according to the stakeholder's perspective.

The last step of contextualization is risk management. Risk analysis can shift a mere "monitoring" effort into a proactive approach to mitigate potential barriers to value achievement. This step is not common in holistic IT value assessment literature but is aligned with the BSC. Additionally, the case company is ISO 9001-certified and already adopts risk-based thinking. The Committee of Sponsoring Organizations of the Treadway Commission (COSO) framework (COSO, 2017) guided the research team in this phase.

Data analysis is a continuous endeavor that integrates three different perspectives to achieve a comprehensive value assessment. First, "Net Comparison", where the verified costs and outcomes are listed and, if possible, quantified. Second, "Goal Achievement", where the objectives and metrics defined in the contextualization phase are assessed. Finally, "Perceived Value", addresses aspects such as usability, IT relevance, and improvements. ITVA4 adheres to digital transformation's emergent, co-creative, and long-term nature (Vial, 2019). IT value changes over time (e.g., IT value in the initial phases of use may be affected by the lack of training), suggesting that data must be constantly collected and analyzed to support actions. Extending IT value assessment to decision support using risk-based thinking from the early stages and anticipating adverse events may reduce the gap between the potential and the practical IT value. The case company tested the proposed framework with real data and continuously refined it.

ITVA4 Contextualization: Insights from the First Case

IT Description

The process of customer support was problematic in the case organization. It starts with a customer request and a ticket opened by a support team member that gathers the necessary information from the local database (e.g., infrastructure details). Then, the maintenance team will proceed to the field intervention. Incomplete information requires constant contact with the customer support staff. When the problem is solved, the maintenance team leader needs to fill a paper form by hand with information on the situation. Afterward, the support team needs to insert the handwritten information into a database using a web-based app. Sometimes works from other teams are required, such as infrastructure renovation, after the administrative support receives all the data, which only happens after the end of each shift.

The company identified several problems in this process configuration. First, there are no standards for filling the documents. These forms are handwritten, leading to ambiguous, inconsistent, and inaccurate information. Improving data quality is a concern for the company's stakeholders since regulators and certification entities are constantly auditing them. Second, contacts are made through phone calls. Therefore, much time is spent communicating between the administrative support department and the maintenance team on the field. Third, the time spent communicating and filling documents increases the service's response time. Surprisingly, the time spent solving the problem is sometimes lower than the time consumed on administrative tasks. Therefore, a new cloud-based, mobile IT system was developed. We found this case interesting and sufficiently documented to the first adoption of ITVA4 in the organization.

Performance Management

The BSC perspective of learning and growth includes four goals. Interoperability: Improve the connections between different systems and databases. Decentralization: Make the different process participants more independent in their tasks. Digitization: Convert physical resources into a digital format improving efficiency. Real-Time Capability: Allow data to be available immediately on multiple devices. The internal perspective includes enhanced data management and process improvements. In terms of data management, the main objectives are reducing the time spent accessing the data, reducing the time spent analyzing and presenting data, and finally, the increase of the data quality. The reduction of time

communication and the improvement of its quality are the objectives of this implementation in managing operations. In addition, the reduction of the paper resources spent in the process is mandatory. According to the company CIO, customer service is critical. For example, the new IT system could save time and reduce the average response time, critical for customer satisfaction. Finally, the leading financial benefit from the strategy of IT implementation is expected to arise from cost savings. The budget constraints make this a priority of most IT investments in this company. The BSC extract is represented in Figure 2.

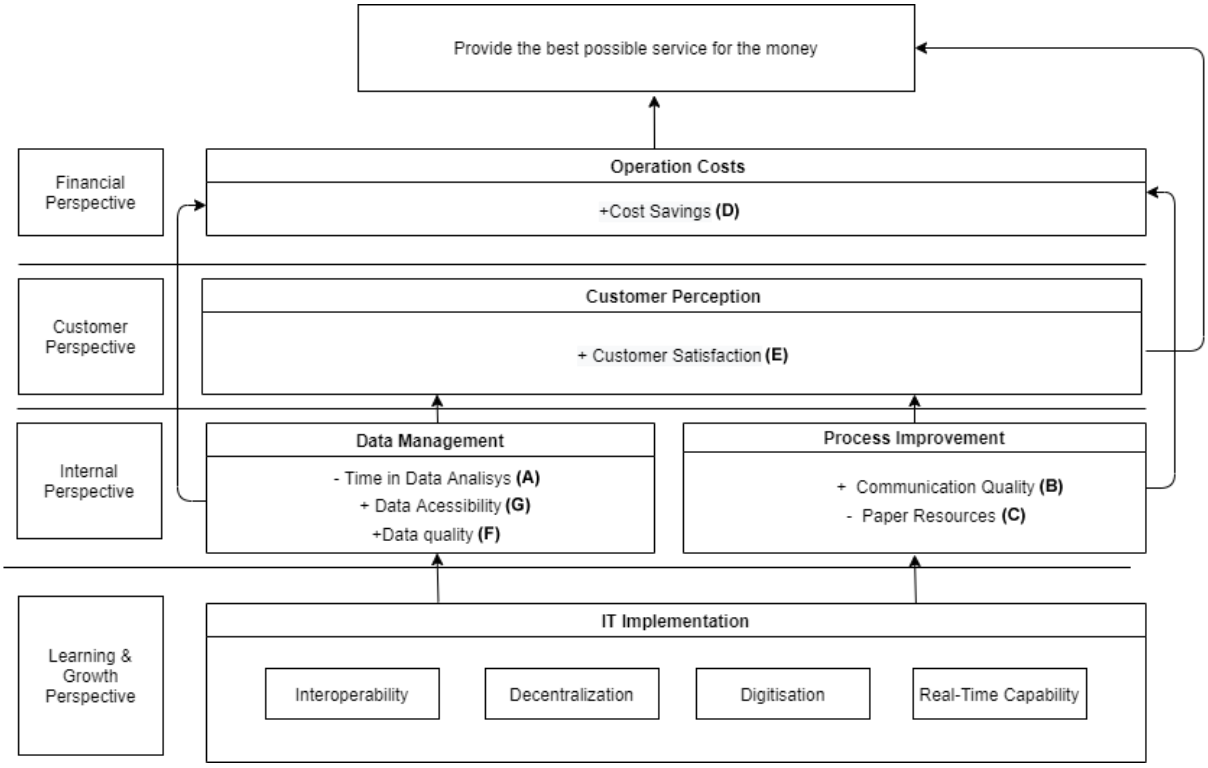

Figure 2. BSC representation of the key goals for the selected IT system.

Each goal represented in the BSC is analyzed with AHP to weight the metrics (Table 2).

Metric	Description	Importance
(A) Data Analysis	Reduce time in making reports in 60%	6%
(B) Communication Quality	Improve communication quality in 1	6%
(C) Resources	Reduction of paper resources in 100%	24%
(D) Financial	Cost saving equal to the initial investment (45000€)	3%
(E) Customer Satisfaction	Improve customer satisfaction in 0, 5	12%
(F) Data Quality	Reduce number of faults with forms in 80%	24%
(G) Data Accessibility	Reduce time spent obtaining information in 35%	24%

Table 2. IT Value metrics defined by the CIO.

The company attributed the higher ratings to data quality, accessibility, and resource reduction (>20%). Customer Satisfaction follows with 12%. Data analysis and communication quality reach 6% each. Finally, although this IT system focuses on resource efficiency, reducing the financial costs of operation is not a top priority. Different perspectives play a key role when evaluating IT priorities.

Risk Management

This step of ITVA4 identified a set of events that were prone to happen and affected the implementation and efficiency of the new IT system. The case company initially recognized seven risks along with a mitigation plan (both must be continuously monitored and adapted):

- Risk 01 - Lack of IT skills: The company has recently implemented a policy of minimum tech skills for new employees, but part of the workforce was recruited previously. Therefore, some workers may have difficulties dealing with the new IT. Training and diversifying teams' composition (mixing more skilled members with the less skilled ones) need to be planned.
- Risk 02 - Staff resistance to changes: Some staff members react negatively to changes. A communication plan must be prepared to inform the staff about the benefits of this IT system.
- Risk 03 - Software development faults: Even though the software development process includes a testing phase, this is not 100% effective. Some faults may only be noticed later, harming the implementation. The new IT system is outsourced, requiring provider support.
- Risk 04 - Network problems: The new solution relies widely on network connection; connection problems will severely affect performance and customer service. It is crucial to guarantee the most reliable network connection and to have a routine prepared to check and immediately repair hardware and software faults.
- Risk 05 - Inadequate training: Lack of training can lead to unsuccessful implementation, reducing IT value. Effective training plans must be prepared.
- Risk 06 - Hardware faults: Multiple servers and mobile devices are included in the investment. Any fault on hardware, mainly on the central assets, can make IT unavailable. Extra hardware and adequate support are necessary.
- Risk 07 - Bad coordination between parts: The primary users of the IT system (maintenance team and support team) must be involved in the development process.

ITVA4 Data Analysis: Discussing Holistic IT Value

The results of the data collecting process for ten weeks are presented and analyzed in this section. Moreover, the lessons learned for continuous IT value assessment are summarized after the case discussion.

Goal Achievement

Figure 3 depicts the results of goal achievement over time.

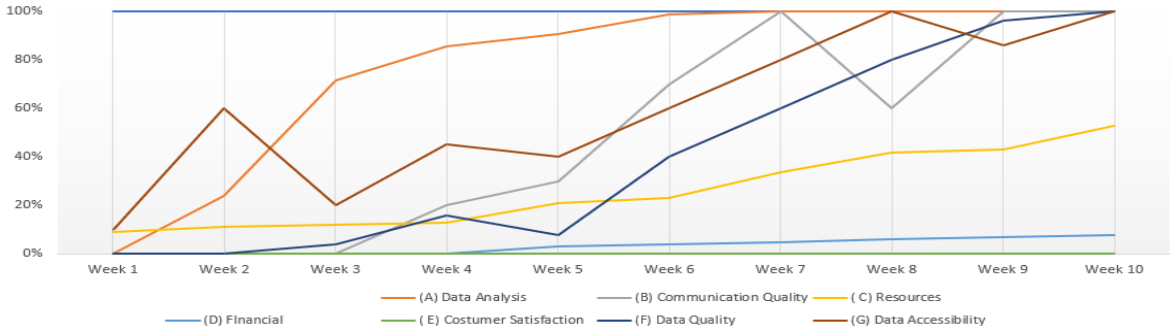

Figure 3. Goal achievement.

The research team formulated the following conclusions:

(A) Weekly measurements of the time consumed in reporting activities were conducted. According to the results presented in Figure 3, reducing the time making reports was achieved at week 6. The main reasons were the well-developed and easy-to-use features of the IT system and the acquisition of IT skills from the support team members.

(B) The end-users of the IT system were asked to answer a brief survey at the end of the week. During the first three weeks, no improvement was reported in communication quality. On the contrary, workers

rated communication quality lower than before. After questioning members of both teams, it was found that they were afraid that IT was another way to control their work. The communication plan was not effectively presenting the type of data collected by mobile devices and the importance of the tool, requiring more meetings and feedback on the data collected during interventions.

(C) The primary indicator of paper reduction was the percentage of the cases where the paper was not received. The problem in (B) also contributed to this metric's stagnation during the first three weeks.

(D) The financial savings were calculated by evaluating the time saved by human resources applied in data access, making reports, and migrating data from paper to databases. The objective of equaling the financial investment is far from being achieved. Nevertheless, savings are visible and expected to increase during the next three years of the contract.

(E) The company usually makes a follow-up call to the customer to obtain an evaluation. The service is rated using a 5-point rating scale. Despite the reduction of response time and the capacity of the support team to provide a more accurate estimation of the intervention, the impact on customer satisfaction was inexistent.

(F) The chosen indicator for data quality was the average number of faults in each intervention form (e.g., vague or imprecise information). As expected, the standardized answers prevent problems of information misunderstanding and reduce contacts for clarifying the customer problem. The slow start on the improvement was due to Risk 02 identified in (B).

(G) The measurements were performed with and without the use of IT. Even though it successfully reduced the time accessing data by 35%, some problems were identified. Risk 01 (Lack of IT skills) was identified as the leading cause. The solution was to ask the more experienced team members to perform the required tasks with the team leader to help them develop their skills.

The perspective of goal achievement is critical and reveals the dynamics of IT value assessment. Risk-based thinking can be integrated with well-known strategic goal formulation techniques to increase the chances of success. Moreover, the results presented in Figure 3 are clear about the need for multiple measurements and contrast the results obtained in different goals.

Perceived Value

The overall evaluation of perceived value was calculated by the multiplications of rating obtained from the AHP to a metric by its result on the weekly goal achievement, according to the formula:

$$Perceived\ Value\ on\ week\ x = (AHP_{(A)} * GoalAchievement_{(A)X}) + (AHP_{(B)} * GoalAchievement_{(B)(X)}) + \cdots$$

The advantage of AHP is to incorporate a weight factor to understand how each goal is perceived (it may differ according to each stakeholder). For example, in week 4, the percentage of goal achievement of data analysis was 80% (see Figure 3), and the metric importance for the CIO perspective was 6% (Table 2). The perceived value result is a weighted average exploring the results obtained in performance management and goal achievement steps. The results are presented in Figure 4, highlighting the different perceptions of the CIO and the Chief Financial Officer (CFO).

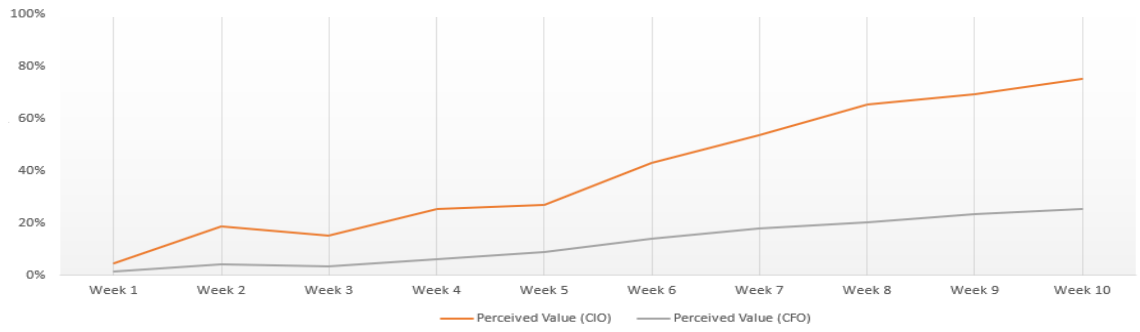

Figure 4. Perceived value (CIO vs. CFO) weighted with AHP.

Figure 4 reveals a positive trend in the perceived value of IT (much lower in the CFO case). However, there are differences when contrasting these results with the insights collected by the support and maintenance teams. On the one hand, the support team also reveals higher satisfaction with the tool. On the other hand, they were not satisfied with the process changes. Therefore, even if the IT successfully achieves most strategic goals, the fact that the perceived value of certain users is low can lead to problems in the future and needs to be addressed. This evidence reveals (1) the importance of combining perspectives of value and (2) the consequence of contrasting results to assist in decision-making processes over time.

Net Value Assessment

The items selected for net value analysis are presented in Table 3, supporting team meetings during the entire project lifecycle, (1) justifying the investment, (2) steering IT adoption, (3) performing an overall evaluation at the end of the implementation, and (4) provide feedback during the maintenance phase. There are costs/benefits associated with BSC metrics (e.g., resources savings), risks (e.g., costs of resistance), and others only indicative of IT investment control (e.g., software costs).

Type	Description
Cost of IT resources (quantitative)	Costs of Hardware; Costs of Software; Costs of Mobile internet
Cost of IT capabilities (qualitative and quantitative)	Costs of Training; Costs of Resistance (Risk 01); Costs of management; Costs of redefining roles (Risk 02)
Societal benefits (qualitative and quantitative)	Environmental benefits (C); Public service quality improvement (E)
Process benefits (qualitative)	Data accessibility improvement (G); Data quality improvement (F); Data analysis improvement (A); Resource savings (C); Communication quality (B)
Organizational benefits (qualitative)	Decentralization (BSC); Digitization (BSC); Real-Time Capability (BSC); Interoperability (BSC)

Table 3. List of benefits and costs of IT.

Some elements in Table 3 can be easily quantified (e.g., IT resources), while others are more unpredictable and difficult to measure. The costs of resistance and redefining roles are two examples of costs that were qualitatively assessed by the team through the continuous monitoring of metrics. The monitoring process also pointed out cases where predicted benefits were not realized, such as customer satisfaction (E). Therefore, the net value analysis in this first DSR cycle was only partially quantitative, requiring regular meetings to assess the results.

Lessons Learned for Continuous IT Value Assessment

The study presented in this case company extended recent conceptual proposals for holistic IT value assessment (Töhönen et al., 2020) with a step-by-step guide for continuous assessment of value. The results and insights collected in the case company were generally positive. The company stakeholders considered the principles proposed in this framework to be innovative and accessible to their IT team. Three primary benefits were identified: the comprehensive evaluation of how the investment evolved - not only in specific moments such as the investment justification stage, or at the end, as usually happened in their practice; the support to managerial decisions in uncertain and dynamic environments; and the creation of new visualizations that capture the all-inclusive value of IT. The outputs were considered suitable to present to the board, improving the communication between business and IT departments.

Continuous IT value assessment requires multidimensional gap analysis. This lesson is aligned with IS studies like the work of Heeks (2006), suggesting design-reality gap analysis. Our approach is inspired by their vision and adds the contrast of stakeholders' perceptions to the equation. Conflicting perceptions of value need to be openly discussed to identify barriers to IT adoption, as we found in this case, and understand personal priorities that may be naturally different in organizations (e.g., CIO-CFO gap; users-CIO; administration-CIO). The proposed artifacts can be a starting point for identifying the causes of conflicting perspectives, extracting benefits from those gaps, and proposing improvement actions.

IT value assessment is not an indicator, a metric, or an index. It is a journey. More specifically, the team found enormous difficulties measuring IT value, even when a three-fold perspective is used. One of the most challenging problems is the gap between the lifecycle of IT adoption and its outcomes. Curiously, the motivation to measure value decreases after the investment when more data is available to produce reliable measures. We could refer to this evidence as *the paradox of continuous IT value assessment: as the conditions to accurately measure IT value improve, measurement interest reduces*.

Conclusion

This paper presented the results of a DSR project aiming to improve methodological guidance of holistic IT value assessment (Davern and Wilkin, 2010; Töhönen et al., 2020). First, our contribution integrates different tools for detailed contextualization. Second, it suggests artifacts to support continuous value assessment incorporating risk-based thinking. Third, it presents a longitudinal analysis of holistic IT value in a sector struggling with constant policy changes, complex regulations, and demanding disclosure requirements of their investments.

Some limitations must be stated. The first is related to the case setting and the scope of the IT investment. The framework is the result of a single DSR iteration. Second, the team selected popular tools for contextualization (e.g., BSC, AHP), but there are alternatives available to set strategic goals. Third, the artifacts seemed interesting for complex organizations struggling with communication issues with their stakeholders. However, the approach and the selected artifacts may be difficult to adopt in smaller organizations (e.g., no IT department and less developed governance practices). Fourth, we have selected specific stakeholders for the evaluation stage, but it was interesting to include other C-level executives, contributing to contrast the practitioners' perspectives. Finally, the Hawthorne effect may occur in social interventions, suggesting that participants' behavior may differ when observed (French, 1953). Aiming to minimize this problem, we collected different data sources (e.g., documents, interviews).

Future work opportunities are now open. The most important is the adoption of ITVA4 in a multi-project scenario. For example, we address the entire IT portfolio investments in a specific period. One possibility could be to start the year with the IT function contextualization and continue with the longitudinal measurements. This first DSR cycle selected a specific (controlled) IT investment context, but the complexity is expected to increase significantly when multiple investments are competing for resources and priorities. The three-fold perspective seems robust to be tested in this scenario. However, it will be possible to incorporate new tools in the contextualization or performance management (e.g., testing alternatives or adaptations to the BSC). Moreover, supporting the contextualization and data analysis with a tool could make the approach more accessible to smaller organizations. Future work may provide design principles to guide the practitioners in different sectors of the economy. Finally, we did not explore how ITVA4 can contribute to the creation of IT value capabilities, particularly the impact on the process (e.g., business case management) and relational types of practices (e.g., top management commitment, effective communication, training) (Maes, De Haes, and Van Grembergen, 2015). Action design research (Sein et al., 2011) can be adopted in further cycles to deepen our understanding of ITVA4 social implications. Multi-perspective assessment of IT value over time will be a priority in the changing role of the CIO.

Acknowledgements

This work is funded by national funds through the FCT-Foundation for Science and Technology, I.P., within the scope of the project CISUC-UID/CEC/00326/2020 and by European Social Fund, through the Regional Operational Program Centro 2020.

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