A value chain development model for the public sector

Anne Cardoso and Thais Fernanda Bueno da Silva
Project and Process Office, Federal University of Mato Grosso, Cuiabá, Brazil
Nilton Takagi
Institute of Computing, Federal University of Mato Grosso, Cuiabá, Brazil and ALGORITMI Research Centre, University of Minho, Guimarães, Portugal
Cleiton Silva
Project and Process Office, Federal University of Mato Grosso, Cuiabá, Brazil, and
Alessandro Micelli
BPM Masterclass, São Paulo, Brazil

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Abstract

Purpose – The value chain is an essential management tool for the elaboration of strategic organizational planning. However, there are few published works providing methods for the development of value chains. This research aims to present a model to develop the value chain for the public sector.

Design/methodology/approach – Action research was used with case study in the evaluation step.

Findings – This research presents a model for value chain development along seven steps, covering data collection planning to the formalization of final product acceptance. The model suggests executing these seven steps in three iteration levels: operational, tactical and strategic. Through case studies, six practical insights were also highlighted in this work.

Research limitations/implications – Given the absence of related work, one of the limitations is the lack of comparison with other methods of value chain development in the public sector.

Originality/value – There are practical guides to value chain development in the public sector; however, to the best of authors' knowledge, such guides have not been developed using research methods. In the literature, no works provide details on how value chain can be developed in the public sector. In addition, the constraints of face-to-face contacts during the COVID-19 pandemic led the research team to conduct remotely the model's development and evaluation in the case studies. The model presents elements that enable value chain development without face-to-face contact between the execution team and public institution's stakeholders.

Keywords Value chain, Business process management, Public administration, Public sector, Public management, Strategic planning

Paper type Research paper

1. Introduction

The current social-economic scenario requires the public administration to act diligently to fulfill its constitutional mission. The desires of society are increasingly patent, and public institutions responsible for developing and implementing public policies must be prepared to solve society's problems efficiently and effectively (Araújo, 2007). In this sense, the working methods of public institutions should avoid self-referentiality and start focusing on meeting the needs of society (Bruno, 2018). According to Nassuno (2000), the guidelines concerning the user-citizen dimension include the development of new forms of citizen involvement and the adequacy of public services to users' needs.

The citizen is gradually stimulated to exercise social control, that is, to be participative in public administration (Loureiro *et al.*, 2012). Such participation is considered an international principle of public management in the post-new public management era (Cavalcante, 2018).

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This stimulus is even prompted by making information available to society by legal requirement [e.g. as per Brazilian Law No. 12,527, Access to Information Law (LAI)]. Citizens are also motivated by facilitated access to regulator channels, which aim to gather critics, requests, suggestions and compliments regarding public services and agents (Homrich, 2018).

Additionally, greater citizen involvement, managing increasing budget-strapped public institutions constraints (Paula *et al.*, 2018) and meeting the requirements of the control agencies for the improvement of public management (Assis *et al.*, 2016) are some of the challenges that public managers face nowadays. Control agencies focus not only on the legal compliance of processes, but also on institutional governance itself (Nogueira and Gaetani, 2018). An example is the survey conducted by the Federal Audit Court (TCU) on governance and management in Brazilian public institutions. In this survey, the TCU calculates the integrated governance and management index (TCU, 2020).

In this context, when ensuring legal compliance and improving institutional governance, the public administration must be knowledgeable on its processes and how they relate to each other, so that the services provided by these institutions can meet the expectations of the customer-citizen. To achieve this, public institutions have resorted to the managerial discipline known as business process management (BPM) (Marques, 2015). BPM addresses the continuous improvement of processes and values customer focus (Maldonado *et al.*, 2020). Thus, organizations, even comprising hierarchical organizational structures, should seek the effectiveness of the end-to-end process and avoid the functional vision by area or department. Most organizations working with BPM still maintain the organizational structure by functional area, but manage the multifunctional processes from end-to-end, from the supplier to the customer (Paim *et al.*, 2009). This way, decisions are directed to improve the product or service delivered to the citizen.

One of the initiatives of process management is the development of the value chain, which refers to the representation of the macro processes of the institution and how they are organized to generate value for the customer (Sikdar and Payyazhi, 2014). The value chain represents the entire set of activities required to design, execute and deliver a product or service to the customer (Kaplinsky and Morris, 2001). The information described in the value chain is central to support the development of strategic planning. For this reason, in the Brazilian federal public administration (FPA), for example, the value chain is required by the normative instruction as an integral part of the institutional strategic plan (ME, 2020b).

Despite the importance and mandatory nature of value chain development in the public sector, few works address this topic in the scientific literature. There are works that compare models of the value chain in the private and public sectors (Rapcevičienė, 2014) and present how the value chain can bolster citizens' trust and confidence (Bouckaert *et al.*, 2005; Heintzman and Marson, 2005). However, there are no works detailing how the value chain can be developed in the public sector. Furthermore, the context of the restrictions caused by the COVID-19 pandemic adds another ingredient to be considered when developing a value chain. Among these constraints is the need for physical isolation, a situation that makes face-to-face activities, especially collective ones, unfeasible. In light of this, the present research focuses on two main questions. The first one focuses on how to develop the value chain in the public sector. The second question focuses on how to accomplish this development remotely. To contribute to these research questions, this research presents a model to develop remotely a value chain in the public sector. The action research method was used, with the action-taking step conducted in case studies in Brazilian public institutions. As a result, it was developed a model consisting of seven steps executed through iterations by considering the various decision layers of the business processes of public institutions (i.e. operational, tactical and strategic).

This paper is organized as follows. The ensuing Section 2 briefly describes BPM, value chain and business process on public administration. Section 3 describes the research method. Section 4 presents the method to develop the value chain. Section 5 provides insights from the evaluation step in the case studies. Finally, Section 6 closes this work with expected contributions, limitations and guidelines for further work.

2. Background

2.1 Business process management

By definition, a process is a set of interrelated, defined, repetitive and measurable activities that add value by transforming inputs into outputs and to create value and support the business strategy (Pereira and Varajão, 2018; Pereira *et al.*, 2020); in other words, it is an arrangement of activities that transforms inputs into products/services in order to satisfy customer needs and meet the organization's policies/goals (Campos, 2010). Institutions are composed of several processes, regardless of their characteristics or area of operation, either public or private (AlShamy *et al.*, 2012).

Given this context, the need arises to apply the discipline of BPM. This discipline focuses on continuously improving processes to optimize their performance and thus improve product/service quality (Gulledge and Sommer, 2002) via controls, agility in implementing changes, visibility of execution and optimization through continuous improvement (Rosa *et al.*, 2021). BPM comprises three major tasks: designing processes, managing everyday processes and promoting process-related learning (Paim *et al.*, 2008). The analysis of business processes provides stakeholders with insights into the efficiency and effectiveness of organizational processes (Rosa *et al.*, 2021). Via BPM, an organization can create efficient processes that are resource-efficient, generate greater speed, greater accuracy, enhanced use of assets and greater flexibility (Brocke and Rosemann, 2003).

Moreover, the organizational culture – such as shared knowledge, values and beliefs – is considered a strong determinant of BPM success. The organizational values of customer orientation and teamwork are also related to the success of a BPM initiative (Benraad *et al.*, 2022). Establishing the right organizational culture is necessary for supporting the realization and maintenance of efficient and effective business processes (Turra *et al.*, 2018).

There are several BPM life cycle models, but in general, the following stages are standard: analysis, design and modeling, implementation and monitoring and control (Morais *et al.*, 2014). Nevertheless, there is still little emphasis on the alignment of process management with the organization's strategy and definition of the process architecture (Morais *et al.*, 2014), both of which should be incorporated in alignment with the strategy and goals phase of the cycle proposed by the BPM common body of knowledge (BPM CBOK) (ABPMP, 2019).

2.2 Value chain

The value chain stands out among the tools used for the alignment between BPM and the organization's strategy. The term "value chain" was introduced by Porter (1985) as a business model that describes all the actions or processes required to generate or deliver products or services to a beneficiary (Alijoyo and Norimarna, 2021; Torres *et al.*, 2013). The value chain seeks to describe the organization as interrelated activities that add specific value to the customer (Souza and Mello, 2011). The value chain is also a way to visually analyze an organization's activities to assess how competitive advantage can be created. The aim is to increase the effectiveness and efficiency of the business process (Alijoyo and Norimarna, 2021).

The value chain acts as a true statement by the organization regarding which sets of activities are necessary to fulfill its mission (Toledo *et al.*, 2007), which entails verifying which

activities are relevant and how to combine them together to strategically focus on achieving competitive advantage (Alijoyo and Norimarna, 2021). This set of activities is presented in the value chain in the form of macro processes. Macro processes are understood as the grouping of processes that have the same theme within the organization. Thus, all processes should be linked to a specific macro process so that all organizational activities are included in the value chain (Moori and Zilber, 2003). Macro processes are classified into three types: (1) primary – those that deliver value directly to the customer; (2) support – designed to support primary processes, usually management of resources and infrastructure required by primary processes; (3) management – used to measure, monitor and control business activities (ABPMP, 2019). Primary macro processes may also be known as essentials or business processes; and management processes, as strategic or governance, depending on the author.

Thus, the value chain should minimally feature the macro processes that represent the organizational activities, but other accessory elements are becoming increasingly present in the representations. Among these elements are the inputs, products or services and customers.

The inputs are information and elements necessary for executing organizational processes, while the outputs are externalized through information, products and services (Romano *et al.*, 2001). The customer represents organizations or people internal or external to the institution that are impacted by the products (Kotler *et al.*, 1999). An example of the use of the elements that commonly compose the value chain can be seen in Figure 1.

2.3 Business process in public administration

In Brazil, the model for public organizational structures is usually classic, with very complex forms and several hierarchical levels. Another striking characteristic is that they are perennial structures that can withstand the ever-constant changes occurring in society (Rossetto, 1999). Thus, structures based on functional areas are commonly used in public administration. In functional structures, people are distributed by functional departments responsible for the sector's activities, grouped among peers and in teams with well-defined roles (Nicoluci and Ferreira, 2012). This definition by functions is easily identified in the organizational charts of public institutions. Functions such as procurement, human resources and information technology are present in almost all organizations associated with public administration.

Hierarchical distribution is another factor that is linked to the functional structures of public organizations. This hierarchy represents the organizational levels – i.e. within an organization, employees can be located in one of the three organizational levels: (1) institutional or strategic, the highest administrative level, comprising the chairman and directors who make up the senior management and make the strategic decisions of the organization; (2) intermediate or tactical, the administrative level that internally articulates the institutional level with the operational level and comprises the managers of the

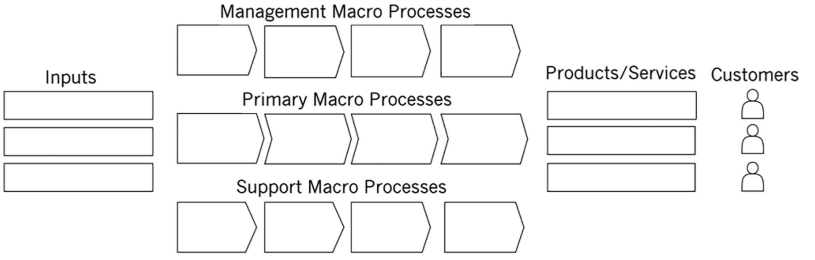

Figure 1.
Commonly used elements to represent the value chain

organization; (3) operational, the lowest level of all, responsible for performing the tasks and daily activities (Chiavenato, 2014).

Despite these functional structures being obstacles to BPM (Gulledge and Sommer, 2002), the current Brazilian public administration has developed many BPM practices, which have contributed to disseminating this knowledge at all government levels (Ribeiro *et al.*, 2015). One example is the incentive to improve strategic management and corporate governance, such as mapping the value chain of the units linked to the Ministry of Economy (ME, 2021). For example, on the Brazilian public sector, the value chain is presented as essential key element for the institutional strategic plan of the FPA (ME, 2020a).

Given all this, there is a constant improvement of management practices adopted by public organizations. This improvement enables timely delivery of products and services to satisfy the needs of the customer-citizen. Finally, the use of the discipline of BPM and the value chain brings safety and stability to institutions by enabling them to know their processes and how they impact their performance and relationship with society.

2.4 Opportunities for research

The value chain is the object of several works, but few of them detail how to apply this strategic tool in the context of public organizations. Williams and Lewis (2008) apply the value chain to seven United Kingdom (UK) public sector strategic projects. Some details were presented in each project, but their article does not propose criteria for applying or adapting the value chain. According to the authors, this tool must allow significant adaptation for application in the context of public administration.

A generic value chain model for the public sector is proposed by Heintzman and Marson (2005). The model presented has three building blocks: employee satisfaction and commitment, citizen satisfaction, and citizen trust in public institutions. In addition, their study presents a set of drivers for each of the blocks. However, the study does not address the method to develop an organizational value chain, as required, for example, for Brazilian public institutions (ME, 2020b).

Waldt (2016) proposes a value chain network model for the South African public service. The model aims to bridge the gap between policies and projects. This value chain network model comprises the value chain of the policy-making process, project management and the organizational value chain. Despite mentioning that each public institution must have its own organizational value chain, his study does not present a method to guide this development.

The transformation of the private into the public value chain is presented by Rapcevičienė (2014). Based on a literature review, Rapcevičienė (2014) state that in the context of the public sector, the focus is on the customer, and the central components are people, services and trust. However, the private sector focuses on profit, and the main components are customer loyalty, profitability and growth. Their research presents generic value chain models that other authors had developed for the public sector.

A public value chain model and its importance are presented by Alberto (2013). The model comprises primary activities (service concept and design; physical resource acquisition; human resources selection and management; service creation and delivery; and customer service and recovery) and support activities (strategic planning; financial management; development of information, and communication technology; and management accounting and control). The author describes elements of the value chain, but does not describe steps for its development.

The literature addresses generic value chain models applied to the public sector and their importance. However, it does not describe how public institutions can develop the value chain. This article proposes a model that describes the step-by-step process for developing the value chain for the public sector.

3. Research method

3.1 Action research

Gregor (2006) proposes a taxonomy regarding information systems research according to five types: I-Analysis; II-Explanation; III-Prediction; IV-Explanation and prediction; V-Design and action. The result of the present work is related to type V "Design and action", because it presents a method that shows how to develop an artifact – in this case, a value chain in the public sector. Among the various candidate research methods included in type V "Design and action" [e.g. design science research (Kuechler and Vaishnavi, 2008; Peffers *et al.*, 2007)], action research is one of Gregor's (2006) recommendations. Action research was selected because it deals with real-world problems, and fosters changing the organization while expanding scientific knowledge (Lim *et al.*, 2018). In other words, action research focuses on change and reflection, with the active participation of practitioners and researchers, while changes in the organization happen in parallel with contributions to theory and knowledge (Sundarakani *et al.*, 2021).

Action research combines the generation of theory with the researcher's action in the social system; i.e. it generates critical knowledge through changes in the environment (Baskerville, 1999). Action research has four common characteristics: action and change-oriented; problem-focused; process involving systematic and iterative stages; and collaboration among participants (Baskerville, 1999). Action research is characterized by intervention experiments that operate on perceived problems or issues within a specific context while generating knowledge generally applicable in other contexts. Also, according to Baskerville (1999), the ideal domain of the action research method is characterized by a social environment that has the following characteristics:

(1) The researcher is actively involved in the research. The research must bring benefits to both the researcher and the target organization of the research;

(2) Knowledge gained during the research must be able to be applied immediately, with no focus on observation, but rather on active participants using the knowledge generated during the research; and

(3) Research is a (usually cyclical) process that combines theory and practice.

3.2 Research method steps

Based on Baskerville (1999) and Susman and Evered (1978) works, five action research steps were defined in the present research. These steps include a cycle of planning, action and fact-finding about the outcome of the action. These steps are as follows:

(1) Diagnosis: identifying the primary problems; characterizing the problem and research question;

(2) Action planning: specifying, in a collaborative way between researchers and research, the organizational actions that should mitigate or improve these primary problems;

(3) Action taking: implementing the actions planned in the previous step; changes can be executed in a directive or nondirective way (when the change is indirectly sought);

(4) Evaluating: verifying whether the problems defined in the first step were solved; when the action did not succeed, it is necessary to define changes that must be made in the next cycle of the research;

(5) Specifying learning: this step, despite being part of the cycle, should be carried out continuously, with the restructuring of the organizational standards serving to reflect the new knowledge gained by the organization during the research. If the changes

made during the cycle were not considered successful, all the knowledge gained from this cycle can provide the basis for the diagnosing actions during the subsequent cycles of the research. It is important to emphasize that the success or failure of the theoretical framework provides critical knowledge for the scientific community to deal with future research scenarios.

The action research process for the definition and validation of the value chain development model was done in two cycles in different public institutions. As the focus was to validate the value chain development model, each cycle generated a product for each public institution (client).

The definition and analysis of the value chain directly influence the organizational strategy (Porter, 1985). To be useful, value chain analysis must be a valid method of breaking down the company into activities to understand their impact on the business unit (Ensign, 2001). Despite its importance in organizational strategy, few works are found in the literature on value chain development in public administration. In these few works, no details are provided on how to develop value chain in the public sector. The research question of the present work is focused on defining a model to develop a value chain in this context (diagnosing step). Due to the constraints brought about by the COVID-19 pandemic, the challenge was to develop the model remotely. This way of development can help public institutions to build the value chain without meeting all stakeholders face-to-face.

In the Brazilian public administration, for example, the definition of macro processes is commonly associated with the constitutional mission of public institutions (TCU, 2015). An extensive review of best practices and analysis of value chains in public institutions was the basis for planning the design of the value chain development model (action planning step). BPM references such as the CBOK (ABPMP, 2019) and value chains of Brazilian public institutions were considered to define, for example, the representation and nomenclatures to be used. As examples of value chain nomenclature for public institutions, we have the Federal Revenue of Brazil, which organizes itself in primary macro processes (management and support), and a set of values delivered to society (RFB, 2021). The value chain of the Federal Regional Court of the 1st Region represents the inputs, the values generated for justice and the values generated for society (TRF1, 2021). In the judiciary, for example, it is common to divide macro processes into jurisdictional (primary function of the judiciary) and nonjurisdictional (intermediate activities), as seen in the value chain of the Regional Labor Court of the 13th Region (TRT13, 2021). In Brazil, other examples of value chain development guides in public institutions come from the Court of Justice of the state of Parana (TJPR, 2019) and the state government of Espírito Santo (ELPI, 2020).

The development of the model was designed to follow two flows, one horizontal and one vertical. The horizontal flow was based on steps to consider when defining the work plan, collecting data, defining the value chain elements, validating the product and formally closing the work done. This sequence of steps is based on project management methods, such as the Project Management Methodology (PM2) (EU, 2018) and Projects in Controlled Environments (PRINCE2) (AXELOS, 2017). The vertical flow consists of interactions between hierarchical levels expected in the context of public administration. It considers the development and evolution of the value chain, starting from the analysis at the operational level and then proceeding to the strategic level. Public administration faces the challenge of high turnover of people (Collins *et al.*, 2000), especially at the strategic level when there are changes in government. The order of the vertical flow focuses on minimizing this turnover impact, first realizing the basis of the processes of the institutions (operational level).

The performing step (action-taking step) was carried out as a case study in two different areas of public institutions in Brazil. The first is an area within a higher education institution

with approximately a dozen civil servants. The second area is a National Secretariat of an important segment in the country. A Secretariat has approximately 60 employees. The validation stage of the model took place in the first area within approximately one month. At the Secretariat, this step took approximately three months. The support of top management, one of the success factors in projects (Iriarte and Bayona, 2020), was essential for developing the value chains and consequently for validating the model.

The final step of the proposed model is the validation and acceptance of the value chain. In both case studies, the results were positive (evaluation step). All learning was recorded by the research team members in a collaborative tool. In both cycles of the case studies, improvements to the proposed model were detected and applied to generate the final version of the value chain of public institutions (specifying learning step). The final result of the value chain development model is presented in the next section. The action research steps were adapted from Baskerville (1999) and Susman and Evered (1978), and the main questions/activities associated with these steps to develop and validate the proposed model are presented in Figure 2.

4. Value chain development model in the public sector

The model of value chain development in the public sector consisted of seven steps performed in three levels of iteration (Figure 3): operational, tactical and strategic. These

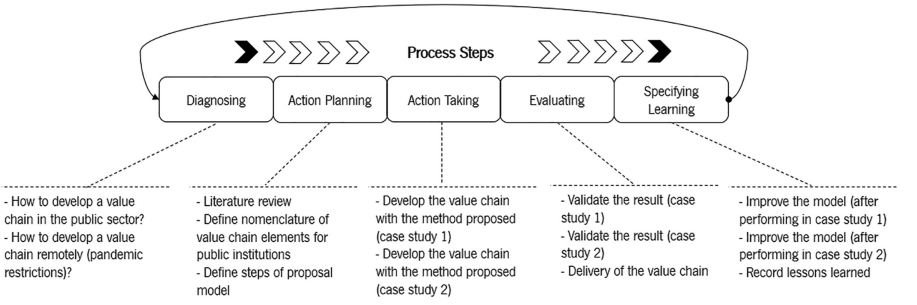

Figure 2.
Action research steps and related questions/activities of the proposed model

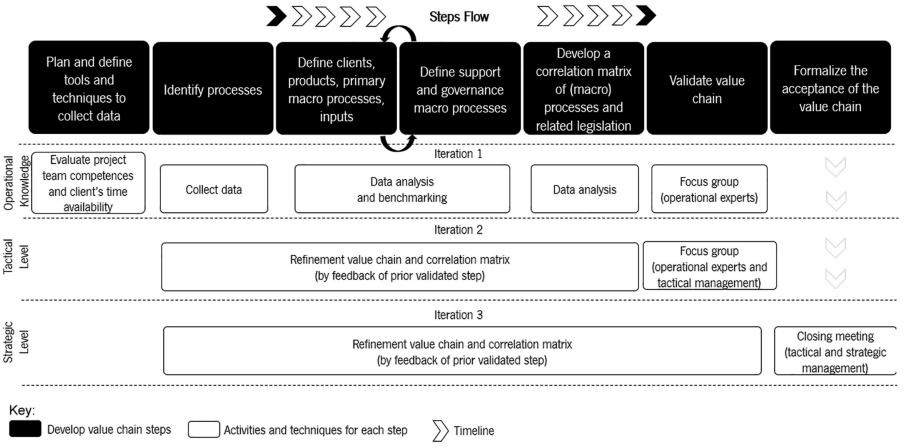

Figure 3.
Value chain development model in the public sector

steps are formed by the following: plan and define tools and techniques to collect data; identify processes; define clients, products, primary macro processes and inputs; define support and governance macro processes; develop a correlation matrix of (macro) processes and related legislation; validate value chain; and, finally, formalize the acceptance of the value chain.

The iteration levels represent the position in the organizational structure of the public servants involved in executing the activities to build the value chain. The bottom-up approach is suggested regarding the order of these iterations, from the operational to the strategic level. In each iteration, the groups are enlarged – i.e. only the operational level is involved in the first iteration; in the second iteration are involved the public servants that belong to the tactical and operational level; and in the last iteration, all the levels (operational, tactical and strategic) are involved. The focus of this approach is the gradual evolution of the value chain proposal. Another factor is a greater involvement of the operational level collaborators so that all processes are identified and contemplated in the macro processes represented by the value chain.

The managerial discipline of BPM advocates that organizations should be process-oriented and not follow the traditional hierarchical structure (Van Looy and Devos, 2019). However, Brazilian public institutions, for example, are mainly traditionally organized due to legal regulations (Santos *et al.*, 2012). This situation should be considered when defining strategies to implement process management initiatives in other countries. In this context, the model works with hierarchical levels, but in a more integrated way, with the involvement of everyone within the organization. It has even been mentioned the need for grouping the processes identified in the data analysis activity to minimize the effects of these views by functional area; this activity should be detailed in the description of the steps regarding defining customers, products, primary macro processes, inputs and definition of support and governance macro processes.

The model is specifically tailored to public institutions due to the development phase of the correlation matrix of the macro processes and processes with the related legislation. In Brazil, for example, the constitutional requirement is that public administration must comply with the principle of legality (Brazil, 1988). This principle restricts the actions of the public administrator to what the law expressly authorizes, unlike private organizations, which have greater discretion since they can do everything that the law does not prohibit (Meirelles *et al.*, 2016).

Table 1 indicates possible techniques and tools for each step, as well as possible inputs and outputs. These techniques and tools (as well as the inputs and outputs) listed in Table 1 are not intended to restrict or encompass the totality of options. The model is a starting point for the definition of the value chain construction process, and it can be adapted to the specifications of each public institution.

4.1 Step 1: Plan and define tools and techniques to collect data

The planning and definition of tools and techniques for data collection is the first step. This step is performed at the operational level, with project members and technical representatives from each functional unit who know about the institutional processes. It is critically important to consider existing constraints, including those related to these employees, such as the time available to collect data and develop the value chain. The involved employees must be knowledgeable on the organizational processes. In this sense, the selection for data collection with newly hired employees must be carefully evaluated because they may find it difficult to collaborate in identifying processes. The observed constraints help define the tools and techniques to be used.

Steps	Inputs	Tools and techniques	Outputs
Plan and define tools and techniques to collect data	Information about client's time availability; Assessment of project team's knowledge of the client; Organization's processes and data collection tools and techniques; Organizational chart and number of public servants	Meetings; Document analysis	Planning for data collection; Data collection techniques defined; Tools for data collection defined
Identify processes	Planning for data collection; Internal rules of procedure; Rules and legislation related to the competencies of the public institution	Spreadsheet; Interview; Workshop; Focus group; Document analysis; Questionnaire; Business Process Model and Notation	List of identified processes
Define client, product, primary macro processes, inputs	List of identified processes	Software for making the value chain diagram; Data analysis; Benchmarking; Business Process Model and Notation	Partial value chain proposal; Correlation matrix of the identified processes with the defined macro processes
Define support and governance macro processes	List of identified processes	Software for making the value chain diagram; Data analysis; Benchmarking; Business Process Model and Notation	Preliminary value chain proposal; Correlation matrix of the identified processes with the defined macro processes
Develop a correlation matrix of (macro) processes and the related legislation	List of processes and macro processes; Rules and legislation related to the competencies of the public institution	Spreadsheet; Data analysis; Document analysis	Matrix of (macro) processes and the related legislation; List of suggestions for rule and value chain proposal changes
Validate value chain	Value chain proposal	Meetings; Focus group; Email; Questionnaire	Validated value chain
Formalize the acceptance of the value chain	Validated value chain proposal	Meetings; Email; Questionnaire	Accepted value chain

Table 1.
Suggestions of inputs, tools, techniques and outputs by each step

The definition of the tools and techniques to be used for data collection must be consistent with the competence of the project team. For example, if the team is not prepared to conduct a workshop, and does not have the time to learn about this technique, a possible solution could be to select another technique, such as interviews. Furthermore, the technique selection depends on the organizational context, staff time availability and project scheduling. The process of data collection aims to identify the processes to support the definition of the macro processes. Therefore, it can be characterized as specific to qualitative research, since – unlike

quantitative research –, it does not work with numerical data and statistical analysis, but seeks more subjective answers (Dias, 2000). Among the possible forms of data collection, the following are highlighted:

(1) Interviews, either individually or collectively. They can also be structured, semi-structured and unstructured: the first modality is based on questionnaires with more closed questions and including pre-established alternatives for answers; the semi-structured ones also use a questionnaire, but include more open questions; whereas the unstructured ones contain only one theme to be discussed (Olsen, 2012);

(2) Structured workshops are data collection techniques conducted in groups. One advantage is to collect data from several people at once. Experts and other stakeholders are brought together to develop a model (ABPMP, 2019) – for example, the value chain. A disadvantage is the potential risk of some participants getting intimidated while others dominate the process of data collection. Given this, the moderator needs to be experienced to mitigate such situations;

(3) The focus group discusses and captures feedback from the expert participants regarding the subject matter. The purpose of the focus group is to identify the opinions of the participants regarding a topic, product or activity (Dias, 2000);

(4) Document analysis is an essential technique for data collection in public institutions. In Brazil, for example, the public institutions are governed by the principle of transparency, and therefore many of their processes and related information are made public;

(5) Questionnaires can be applied in situations of public servant unavailability to participate in meetings at predefined times. The disadvantage is the risk that some participants may fail to understand the questionnaire and proceed to answer inadequately. Therefore, it is suggested to adopt pretest procedures to evaluate and evolve the questions (Buschle *et al.*, 2022).

After defining the data collection techniques, it must be established which tools will be used. Some constraints should be considered at this point, as they may influence the selection of tools; for example, budgetary constraints may direct the choice to open-source tools. The team's experience with one or another tool or technique can also help in this decision.

4.2 Step 2: Identify processes

The identification of processes should occur from the planning of data collection. This step aims to enable the project team to know which processes are performed by the institution. Equipped with this knowledge, they will then be able to effectively contribute to the development of the value chain. It is possible to proceed directly to a workshop to develop the value chain with representatives of the functional areas that are knowledgeable on the processes. However, the team responsible for conducting the project may find it difficult to collaborate effectively. As a result, the workshop may be poorly conducted and result in lengthy discussions, where each participant seeks to represent his unit in a more preponderant way.

The developed model recommends that the team perform the process identification step before defining the value chain elements. According to Table 1, institutional processes can be identified, for example, through interviews, structured workshops, questionnaires, document analysis and focus groups. These techniques can be applied in person or remotely, depending on the existing constraints. Several techniques can be used in combination. For instance, document analysis can be done beforehand, based on the internal regulations and norms.

This analysis can serve to support interviews, workshops, questionnaires or focus groups. Before applying data collection techniques to identify the processes concepts about processes and the value chain must be presented to the participants. This leveling of concepts is necessary so that employees can understand the objective of this step and the importance of the value chain. In addition to senior management support, the motivation of all involved is a relevant factor for project success (Iriarte and Bayona, 2020).

After applying the data collection techniques, a list of processes related to the functional areas responsible for their identification is expected as a final result of this step. This list, built in operational iteration, should be refined via the tactical and strategic levels.

4.3 Step 3: Define client, product, primary macro processes and inputs

The step to define clients, products, primary macro processes and inputs refers to the partial value chain proposal. The project members should elaborate this proposal based on the analysis of the processes identified in the previous step, the structuring documents (e.g. internal rules, laws) and benchmarking with other public institutions.

The elaboration of this preliminary version by the project team is intended to optimize the discussion among public servants rather than limit them. It is a necessary starting point for the validation phase. The execution team must encourage the participants to propose adjustments and be receptive to suggestions for change (the employees know how their organization generates value).

First, the team must analyze the structuring documents, even if they have already been considered in the previous step for process identification. At this step, this analysis will focus on identifying customers, products, end-to-end macro processes and their inputs. These documents may differ between organizations, but in general, internal regulations and strategic planning can contribute to the definition of these elements.

Next, benchmarking is suggested, which refers to the search for good practices adopted by other organizations (Anand and Kodali, 2008). For example, if the construct refers to the value chain of a public university, one can analyze that of other public institutions of higher education and even that of the higher agency. In Brazil, for example, the technical guide for strategic management of the Ministry of Economy (ME, 2020a) presents a generic value chain model applied to the FPA that can be used as a basis when dealing with a federal public body.

Subsequently, the team should analyze the relationship between the processes identified in the previous step. These processes should be consolidated to minimize problems of understanding regarding the institution's overview caused by responses limited to the functional vision. These groupings can be arranged by specificity, organizational area or geographical location (Cruz, 2015). In addition, the groups can also be organized by categories, such as primary, support and governance or by macro process of the value chain of the higher public institution. At this stage of analysis and grouping, the repeated processes that were identified by more than one functional area should be excluded, and others may be reclassified as to their hierarchy. In this sense, what had previously been registered as a process may be changed into a sub-process.

Based on these analyses (preliminary groupings and benchmarking), first the customers in the value chain should be defined; then the products and services delivered to customers should be defined; next, the macro processes required to deliver those products and services to customers (i.e. the primary macro processes); and finally, the inputs that initiate these macro processes.

4.4 Step 4: Define support and governance macro processes

The definition of support and governance macro processes follows the same activities as in the previous step: analysis of the structuring documents (e.g. internal rules, laws), identified

processes and benchmarking. The compilation of both steps at the operational level generates a preliminary version of the value chain that will be refined and validated by the public organization's employees before final acceptance.

Usually, the support macro processes are more related to the functional units; for example, the human resources sector may be responsible for the execution of the people management support macro process. The transversal processes, i.e. those cross-functional areas, are the primary macro processes, in which the activities are performed sequentially to deliver a product or service to the customer (Paim *et al.*, 2009).

For example, governance in Brazilian public administration is oriented by legal regulations (Brazil, 2017). Consequently, there is a similarity in federal public agencies' governance or management macro processes. Moreover, the technical guide for strategic management of the Ministry of Economy (ME, 2020a) mentions that the support macro processes are also common to the entities of the FPA. Therefore, the primary macro processes, as they are directly related to the legal competencies of the institutions, are the ones that change among Brazilian public agencies. This situation is even confirmed by the value chain of the Ministry of Education (MEC) (MEC, 2020), which presents governance and support macro processes similar to the model proposed for the FPA (ME, 2020a), as shown in Table 2:

After finalizing this preliminary version of the value chain with the definition of all macro processes, it is suggested to relate the processes identified in the first step to the defined macro processes. This association aims to check the consistency of the preliminary version. During this verification, adjustments should be made whenever necessary, including the elements established in the previous step, since the defined macro processes must contemplate all processes.

4.5 Step 5: Develop a correlation matrix of (macro) processes and related legislation

The next step consists in developing a correlation matrix of the defined macro processes and identified processes together with the related legislation, especially legislation that establishes the institution's responsibilities, competencies and objectives. The natural flow would be for the organization to first establish the value chain and subsequently plan its strategy (Ensign, 2001). However, it is possible to find institutions with approved strategic planning and no defined value chain. In this case, strategic planning should be incorporated into the matrix to achieve traceability of strategic objectives with (macro) processes.

From the data analysis, first a traceability matrix must be generated by a standard or structuring document to identify which points were not considered in the value chain

Governance – FPA	Governance – MEC	Support – FPA	Support – MEC
Strategic management	Strategic management	Corporate information management	Information management
Communication and institutional relations	Communication in institutional relations	ICT management	ICT management
Planning and budgeting	Planning and budgeting	People management	People management
Organizational upgrading	Organizational upgrading	Financial, accounting and cost management	Financial, accounting, cost and transfer management
Participation and social control	Participation and social control	Logistics management	Public logistics management
Internal control	Controls	Transfer of resources	
Legal consulting			Legal consulting and advisory services

Table 2.
Macro processes of the FPA and MEC value chain

proposal. An example of the matrix structure can be seen in Table 3. Each article or information found in this matrix can have a direct or indirect relationship with more than one (macro) process. During the preparation of this matrix, it is essential to register suggestions for changes, including standardizing nomenclatures.

Subsequently, it is recommended to elaborate a consolidated matrix based on the process listing. An example of the structure of this matrix can be seen in Table 4. Unlike the previous verification, the focus is now on identifying processes not associated with the structuring documents. More specifically, it is necessary to verify the existence of primary processes unrelated to the legal responsibilities and competencies, or even those that may not contribute to the execution of the institutional strategy.

This alignment can make a threefold contribution: to identify the need to update the regulations in order to regulate the processes in such a way as to deliver the products or services to their customers; to adjust the value chain being developed to the legal requirements and to align the processes to the organizational strategy after it has been defined.

4.6 Step 6: Validate value chain

The model presents two formal moments and a final refinement (by top management) for the gradual validation of the value chain. The first validation occurs at the operational level, and the second validation at the tactical level. This double verification aims to evolve the proposal via the participation of more public servants in each iteration. At the operational level, the civil servants who know the institutional processes should participate and represent the functional areas, regardless of whether they hold commissioned positions. At the tactical level, participation is broadened to include the managers responsible for each sector. Despite the importance of pursuing a process-based vision, the hierarchy derived from the functional organization of the institutions cannot be ignored.

At this step, in both iterations, the use of a focus group is suggested. The value chain development model is adaptable and can be adjusted according to the organization's complexity and the project team's experience. Table 1 presents other possibilities for this validation, such as meetings and questionnaires. Among the advantages of the focus group is the sharing of suggestions and questions among the participants, since this can generate

Table 3.
Traceability by structuring document with (macro) processes identified

Legislation	Related macro process	Suggestion
Article 1	Process 1 Process 2 Macro process 1 Macro process 4	Adjust process 2 nomenclature
Article 2	Unidentified	Implement process or update norm/planning
Article 3	Macro process 5	No suggestion

Table 4.
Traceability of macro processes identified with the structuring documents

Macro process category	Macro process	Process	Direct relation – Rules of procedure	Direct relationship – Planning
Primary	Macro process 1	Process 1	Article 1	No relation
Primary	Macro process 1	Process 2	Article 1	No relation
Primary	Macro process 2	Process 3	Article 18	Strategic Goal 5
Primary	Macro process 3	Process 4	Article 7	Strategic Goal 2
Primary	Macro process 4	Process 5	No relation	No relation
Support	Macro process 5	Process 6	No relation	Strategic Goal 4

meaningful discussions for the evolution of the proposal. However, in the event of constraints regarding employee time availability to schedule meetings, it may be necessary to use other validation techniques.

The focus group should be planned considering issues such as the number and selection of participants; start, end and break times; location (face-to-face or remote); list of guiding questions and moderator. The selection of the moderator is important because this person must know the aim of the research and lead the discussion dynamics without inducing preconceived ideas into the participants (Dias, 2000). In this sense, the moderator cannot defend the value chain proposal presented; but rather conversely, the moderator should encourage debate and criticism and, whenever possible, make very clear to the participants that the proposal under debate is just a reference and a starting point, and can and should be evolved.

When conducting the focus group, it is suggested to present the method used to develop the value chain, so that participants understand the importance of the step of the project in which they are participating. Next, basic concepts about the value chain and process management should be presented to increase knowledge and stimulate participation. The discussion can be divided into blocks with fixed-time intervals, in the following order of the validation: the customers; the products or services delivered to these customers; the macro processes necessary for the execution of the service or product; the inputs that initiate the macro processes; the governance macro processes and finally the support macro processes. The definition of these blocks will also depend on the structure of the value chain to be developed, because they will not always feature all the above-mentioned elements.

After validation at the tactical level, the value chain and the traceability matrix between the elements of the value chain and related legislation are presented to the top management. The top management evaluates, aligns the suggestions with the tactical management level and presents the updated requests to the execution project team. The final version then undergoes the formalization and acceptance step regarding the public institution's value chain.

4.7 Step 7: Formalize the acceptance of the value chain

The last step occurs in the strategic level iteration. At this point, it is suggested to involve the employees who participated in the operational and tactical level iterations and the manager responsible for the institution. The developed model recommends holding a closing meeting (face-to-face or remotely) to formalize the delivery and acceptance of the value chain. However, according to Table 1, other means can be used, such as emails. Upon selection of the closing meeting option, the method used to build the version and all elements it comprises should be presented in the following logical order: customers, products, primary macro processes, inputs, governance and support macro processes.

All employees should be present at this closing meeting to clarify possible doubts by the institution's manager regarding the information represented in the value chain. In addition, this is a crucial moment to recognize the work done by everyone and close the project. From this moment on, the organization should consider the value chain to perform or update the strategic plan.

5. Insights from case studies

The validation of the value chain development method was carried out in two case studies in different public institutions. Based on the characteristics of public administration, the assumptions and restrictions were defined to plan the actions to be executed. In both case studies, there was a need to remotely perform the work due to the health situation triggered

by the COVID-19 pandemic. In this process, via the use of a developed value chain method, some insights emerged (Figure 4). In this context, and considering the amount of information related to the processes and the value chain, one of the challenges faced consisted in collecting norms, legislation and operational procedures. Schedule availability for employee participation in the actions implemented to build a value chain was another challenge. The research team was keen on using as little of the client institutions' staff time as possible. Another issue was related to budget constraints regarding the acquisition of information technology tools to carry out the project. Given this constraint, it was decided to resort to open-source tools for requirement gathering, meetings, dynamics of the proposed model (e.g. focus group), and diagramming and making the value chain available.

Insight 1. Be aware of the available time of public servants.

Insight 2. If you are not going to develop a value chain all the time, open-source tools are valid alternatives.

In organizations, knowledge is represented by routines, processes, practices and organizational norms (Davenport and Prusak, 2003). Aiming to understand the organizational structure of the client public institution, the research team performed document analysis of the norms related to existing processes and semi-structured interviews. The focus was to learn about the processes, customers and products generated by the client public institutions. To support the interview script, document analysis was previously carried out. The goal was to help the researchers conduct the questions and allow questioning focused on essential points for elaborating the value chain.

Insight 3. Document analysis is a great tool to prepare for contact with public servants in the data collection step.

In the process identification stage (step 2 of the value chain development model), the research team presented basic concepts about processes, value chain and benefits of process management before starting the interviews. The goal was to mitigate the risk of interviewees reporting activities or tasks instead of processes. In the first case study, because it was a smaller organizational unit, most of the interviews with employees were conducted individually (more than 50%). In the second case study, because it was an institution with more employees, business processes and variables involved, the research team was selected for interviews by functional area to include participation from all areas. About 30% of the

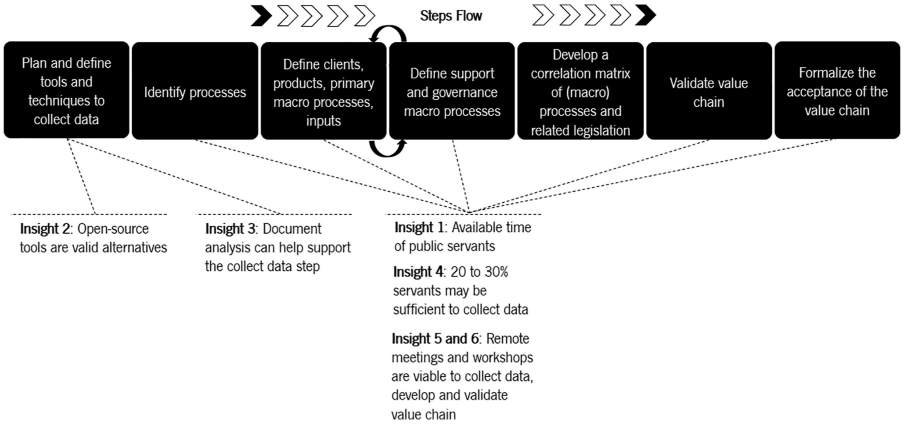

Figure 4.
Connection of insights with value chain development model steps

employees from the several functional areas were interviewed. All interviews were conducted remotely and lasted an average of 1h15m. During the interviews, the project team shared the screen of a "sticky notes board" system where the processes, macro processes and improvement opportunities identified during the interviews were registered.

Insight 4. Carefully evaluate the number of public servants for data collection. In large institutions, 20–30% may be sufficient.

Insight 5. Remote meetings and workshops are a viable alternative to collect data.

In the step of defining the elements of the value chain (steps 3 and 4 from the value chain development model), the workshop of the first case study was conducted in two four-hour sessions. Upon completion, the research team considered that it could be conducted in a shorter time. However, since the second case study of a public institution was more extensive (and with more time constraints regarding the participation of those involved), it was weighed whether to keep or reduce the workshop time. The research team developed a preliminary draft of the value chain elements and adopted the following strategy for the two sessions of the second case study:

Session 1 (four hours): The value chain was refined through an operational focus group with representatives of the functional units (and some members of these units). In this step, it was observed the need to verify the relationship of the macro processes and processes with the legal responsibilities of the organization in order to align nomenclatures, identify processes outside the scope of responsibility or defined by legislation that had not been detected in the interviews. Given this need, the project team developed a correlation matrix between identified processes and related legislation. In the second case study, the need for step 5 of the value chain development model emerged.

Session 2 (four hours): The value chain was validated and refined by the tactical focus group, which, besides the participants of the operational staff, also included the coordinators, directors and the assistant secretary of the public institution. As in the previous step, the research team sought to provide a favorable environment for adjustment requests. All the changes made with the focus group were reflected in the list of processes and responsible units that were elaborated in the collect data step.

The workshop divided into two four-hour moments proved to be adequate in the case of larger public institutions. The next step (step 7 from the value chain development model) consisted of the meeting to formalize the delivery of the product to the top management of the organizational units. In the first case study, the products were delivered in digital format, in a restricted and remote ceremony with the execution team and the client's top management. In the second case study, the contracting institution's top executive (along with the director of the project and process office, the project manager and the technical team responsible for value chain development) and the client's top executive (together with the project manager and the consultant assigned to the project) were present during the delivery of the value chain. It was performed in a face-to-face ceremony, and the value chain was posted in a visible area in the client's physical infrastructure. The project was completed on schedule, within the expected quality standards, within budget, and with customer satisfaction (among other confirmed success criteria). Success was managed via specific activities included in the project management method (Takagi and Varajão, 2019, 2022; Takagi *et al.*, 2019, 2021).

The project execution team is experienced in conducting face-to-face interviews and workshops. One of the differences in the remote conduction of these techniques is the difficulty in perceiving signs of fatigue and distraction in the participants. However, the workshop sessions, for example, were planned to include breaks to mitigate such situations. The end result of the client's remote interactions was similar to previous experiences conducted face-to-face by the execution team.

Insight 6. Remote meetings and workshops are a viable alternative to develop a value chain. The final result (value chain) would probably not be different if the meetings were held face-to-face.

6. Conclusions

6.1 Theoretical contribution

The public sector has been seeking to improve its services due to several factors, such as budget constraints (Loureiro *et al.*, 2012), requirements from control bodies (Assis *et al.*, 2016) and citizen participation in the administration (Paula *et al.*, 2018). One way to transform these services is through the BPM discipline, which focuses on the product or service (added value) and the continuous improvement of business processes. As a process management initiative, the value chain represents the macro processes and how they are organized to deliver value to the citizens. The value chain is critically central for the development of strategic planning and is even required as a mandatory element of the institutional strategic plan – for example, for agencies and entities of the Brazilian public administration (ME, 2020a).

To the best of our knowledge, no work in the literature details how the value chain can be developed in the public sector. Given the importance of the value chain and the low number of works related to its adoption in the context of the public administration, this paper contributes to the theory by presenting a model for value chain development in the public sector. Given the constraints regarding face-to-face contact due to the COVID-19 pandemic, all research was conducted remotely, including the evaluation step. This pandemic context has provided a further contribution to the theory via insights into remote development of the value chain.

6.2 Managerial and education implications

As a practical contribution these insights, the detailing of each step and the models described can assist public managers in developing the value chain and evolving organizational strategic planning. The model presented was developed following action research, and it can be incorporated into practical guides for many different public institutions [e.g. Courts (TJPR, 2019), Federal Government (ME, 2020a)] to assist in the development of the value chain. As an education contribution, this work can support management academies in the training of public managers.

6.3 Limitation and future work

One of the limitations of this work is the lack of comparison with other methods of value chain development in the public sector. The evaluation of this value chain development model was carried out in the context of national-level public institutions. The future work of this research is to validate this model in the context of local and regional public institutions. Another future work is the development of the model to build a global value chain (Antràs and Chor, 2021; Gereffi *et al.*, 2005) for the public sector (rather than just for one public institution).

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Corresponding author
Anne Cardoso can be contacted at: anne.cardoso@ufmt.br