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Promoting Public Procurement For Innovation And Circular Economy In Chile: DCCP Challenges And Limitations

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LIST OF ABBREVIATIONS

DCCP	Dirección de Compras y Contratación Pública, ChileCompra (DCCP).
CE	Circular Economy
CORFO	Coorporación de Fomento de la Producción/ Chilean Economic Development Agency
CPP	Circular Public Procurement
GDP	Gross Domestic Product
IDB	Interamerican Bank of Development
LabGob	Laboratorio de Gobierno
MdH	Ministerio de Hacienda de Chile/Ministry of Finance (Chile)
MinEcon	Ministerio de Economía, Fomento y Turismo/ Ministry of Economy, Development and Tourism (Chile)
MP	Mercado Público, Central Public Procurement Portal
OECD	Organisation for Economic Co-operation and Development
PCP	Pre-commercial Procurement
PP	Public Procurement
PPI	Public Procurement of Innovation
R&D	Research and Development
SoCh	State of Chile

ABSTRACT

Public procurement has become a significant tool for governments to promote innovation and address environmental challenges. In Chile, public procurement represents 4,5% of the GDP in public contracts, which highlights its potential to influence the development of markets and achieve social, economic, and environmental goals. Despite the promotion of public procurement of innovation initiatives, there is a lack of continuity and no records of circular economy criteria. The State of Chile has developed initiatives to promote public procurement of innovation and sustainability, but there is a need for further research on the implementation of instruments. A qualitative design will be applied to conduct semi-structured interviews with public servants of ChileCompra and its policymakers to understand their perspective on the implementation process of procurement instruments that promote innovation and circular economy.

Keywords: Public procurement; Innovation; circular economy; implementation

1. INTRODUCTION

Currently, the challenges related to the environment have encouraged States to modernize their public procurement systems and processes (Grandia et al., 2015) and reconsider how they encourage the production and consumption of services and products.

1.1 Relevance

In this sense, public procurement acquires relevance since they represent, globally, an average of 12% of the Gross Domestic Product (GDP) in public contracts (OECD, 2023), which shows their potential to influence the development of markets and achieve social, economic, and environmental objectives. Regarding the scenario in Chile, during 2022, the amount traded in MercadoPúblico -a transactional platform made available by the institution that leads public procurements in Chile, Dirección de Compras y Contratación Pública (DCCP) - was 13.280.197.207 million dollars (Dirección de Compras y Contratación Pública, 2023).

Considering the above, public procurement presents the opportunity to promote innovation, and this opportunity means a phenomenon that has gained strength in recent years worldwide. For example, according to the OECD (2016), countries promoted public procurement of innovation to meet the needs and demands for new products, goods, or services, making purchasing processes more effective and thus improving performance.

However, the public procurement of innovation requires other criteria that make it possible to address environmental challenges adequately. In this sense, public procurement has advanced towards a multi-criteria approach, which means that in addition to the price that ensures efficiency and probity, among others, sustainability emerges as a fundamental criterion (IDB, 2017). Furthermore, consequently, circular public procurement is positioned as an effective practice that encourages new production models focused on ethics and environmental efficiency and the impact

of the life cycles of products or services (Alhola et al.,2019; Sönnichsen & Clement, 2020; Kristensen et al., 2021).

In this sense, the State of Chile (SoCh) has developed initiatives to advance in this direction. For example, in 2018, a pilot program led by the Ministry of Economy, Development and Tourism (MinEcon), Laboratorio de Gobierno (LabGob), and DCCP was developed, promoting public procurement of innovation. However, despite the promotion of the initiative, it did not have continuity over time. Secondly, in 2017, a working group led by the Division of Innovation of MinEcon was convened in order to generate proposals focused on the procurement of innovation and sustainability (Ministerio de Economía, Fomento y Turismo, 2018). Lastly, and perhaps the most critical effort, has been promoting changes to Law 19,886 in 2020, a project that seeks to create a new institutional framework for public procurement (Espacio Público, 2021). However, there are currently no records of these approximations regarding circular economy criteria due to their absence in the public procurement regulations, which is the regulatory framework by which public procurers are governed.

Reviewing recent literature, we found that public procurement related to innovation and circular economy concepts has gained relevance (Geissdoerfer et al., 2017; Sönnichsen & Clement, 2020). In addition and in general, the emphasis has been related to analyzing the impact of this type of acquisition (Brammer & Walker, 2011). To a lesser extent, studies have been conducted on implementing these instruments. For instance, according to the study by Sönnichsen et al. (2020), there are three aspects related to implementing circular economy criteria or practices in public procurement. The first is related to organizational aspects; the second to aspects of individual behavior; and the third to aspects of operational tools. Along the same lines, Grandia et al. (2015), Grandia (2016), and Testa et al. (2016) argue that the implementation of this type of approach is directly related to the behavior of individuals who lead public procurement within state agencies. On the other hand, Ntsondé and Aggeri (2021) state that public procurement of this nature lacks observation regarding the design of their mechanisms.

Despite these studies and according to Morales (2021), research on the implementation of instruments has been little exploited and represents an opportunity. Last but not least, no particular study was identified that reveals the experience of participation in the implementation of public

procurement instruments for innovation and circular economy from the perspective of DCCP, the institution that leads public procurement within SoCh.

Consequently, considering the relevance of DCCP within the Chilean public procurement ecosystem, and to meet the objectives of the study, a qualitative design will be applied. It will be conducted through semi-structured interviews with DCCP public servants and policymakers to obtain their perspectives regarding the design process and implementation of public procurement instruments that promote innovation and a circular economy. **The study will seek to identify, from the perspective of DCCP, what role do the cornerstones of public procurement of innovation and circular economy play regarding their implementation in the context of Chilean public procurement?**

The main objectives of this study are: The general objective is to analyze the current institutional context of DCCP regarding the implementation and dissemination of the public procurement of innovation and the circular economy in Chilean state agencies. The specific objectives are; first, understand in-depth capabilities, foundations, and bases related to implementing and adopting public procurement instruments for innovation and the circular economy; second, compare opportunities and resistance in foreign institutions with experience in the implementation of public procurement of innovation and circular economy; and last but not least, analyze DCCP's institutional context through the perceptions of its public servants and its policymakers regarding the aspects of implementation and adoption for the public procurement related to innovation and the circular economy.

The structure of this research is as follows. First, the literature review considers the main aspect of public procurement, focusing on innovation and circular economy. Second, the identification of the main cornerstones regarding the implementation of PPI and CPP. Third, The description of the applied methodology and the collection of information. Fourth, the analysis of the information collected and the results and considerations for implementing approaches of innovation and circular economy criteria within the SoCh.

2. THEORICAL FRAMEWORK

In the first place, this chapter intends to offer a review of the literature associated with the public procurement of innovation and its most relevant characteristics. Secondly, describe the intersection between PPI and circular economy and its result (CE). Thirdly, it highlights the crucial aspects involved in the implementation of these two approaches. Finally, we offer the context of PPI and CE in Chile, specifically from the perspective of DCCP.

2.1. PUBLIC PROCUREMENT OF INNOVATION: FUNDAMENTALS

The relevance of public procurement (PP) is not an uncommon issue for governments. Currently, the PP of OECD member countries represent 12% (on average) of the GDP in contracts with the public sector (OECD, 2023).

These purchases are generally guided by standards and regulatory frameworks that promote efficiency, effectiveness, and transparency. This means that public spending is used with high standards (OECD, 2021, 166) to obtain products or services that governments require to develop their administrative activities. However, the power of PP not only allows the needs of PIs to be met but also represents a political tool that can promote other more significant and strategic objectives.

Various tools are used to satisfy the needs of governments and their administrations to carry out PP. The application of public procurement as a promoter of innovation has been extensively studied (Lember et al., 2014). Innovation tools designed from both the supply and demand sides (pending reference) have been included to promote innovation in PP. Specifically, from the side of demand, the potential of a particular acquisition mechanism stands out. This is called public purchasing of innovation (PPI), a phenomenon that has gained strength worldwide in recent years.

According to the OECD (2016), countries promoted PPI to meet demand for new products, goods, or services, execute more efficient purchasing processes, and improve the performance of their procurement processes. It could also happen that the needs of public organisations are related to improving the performance of existing products and services. This also gives space to innovation promoted by the State (Edquist & Zabala-Iturriagagoitia, 2020).

2.1.1. Relevance

As discussed above, PPI is increasingly recognised as an important public policy instrument. Due to its great potential, the interest aroused by this concept is neither strange nor novel (Lember et al., 2014). Likewise, a wide variety of definitions and references state the correlation between PP and innovation. For instance, PPI can be defined as utilising public procurement capacities to foster innovation in the market (Edler & Georghiou, 2007, 949). Along these same lines, Edquist and Zabala-Iturriagagoitia (2012, 1766) argue that PPI is:

> 'the process by which public organizations place an order for the fulfillment of certain functions by a new product (good, service, and system) that does not yet exist, and whose development and diffusion will influence the direction and rate of technological change and other innovation processes'.

Consequently, its result is expected to disrupt the market and create a demand for innovative products and services. In this way, the PPI is consolidated as the most powerful instrument available to promote innovation (Aschoff & Sofka, 2009; Edquist, 2013, 2015; Edquist & Zabala-Iturriagagoitia, 2012; Georghiou, Edler, Uyarra, & Yeow, 2014).

This means that PPI is a high-impact policy tool that seeks to drive the development of new technologies and business models, which can lead to job creation, greater competitiveness and economic prosperity.

2.1.2. Dimensions and mechanisms

The study by Edquist and Zabala-Iturriagagoitia (2012, 1759) clearly describes the characteristics of PPI depending on the outcome of the purchasing process (Table 1).

First, regarding the *PCP dimension*, Research and Development (R&D) is a key component. In this dimension, authorities act as clients that stimulate innovation activities and satisfy their own demands or act on behalf of other public institutions. To achieve this "client" role, they can act as themselves or through public agencies, research centres, or companies (Edler & Georghiou, 2007; Edquist et al., 2015). Under this logic, public institutions have promoted the development of innovations through public resources. A clear example of this is innovation promotion in the military sector. Probably the most accurate example is the Defense Advanced Research Projects Agency (DARPA), a military agency that depends on the U.S. Department of Defense. The U.S. government, through DARPA and applying R&D, developed technologies such as microchips, semiconductors, and the internet that profoundly impacted the economy (Mazzucato, 2013).

According to Edquist (2015), a public tender can trigger the PCP process. The objective of the tender is declared by a public institution and may address a specific need of the institution or a broader, more impactful aspect. For this to occur, Edquist also points out that the need must have been identified prior to activating the PCP process.

Table 1. PPI Dimensions from Edquist and Zabala-Iturriagagoitia (2012)

Dimension	Description
Pre-commercial procurement (PCP)	refers to the procurement of (expected) research results and is a matter of direct public R&D investments, but no actual product development. Moreover, it does not involve the purchase of a (non-existing) product, and no buyer of such a product is therefore involved. This type of procurement may also be labeled “contract” research, and may include development of a product prototype.
Adaptative PPI	is when the product or system procured is incremental and new only to the country (or region) of procurement. Hence, innovation is required in order to adapt the product to specific national or local conditions. It may also be labeled ‘diffusion oriented’ or ‘absorption oriented’ PPI.
Developmental PPI	implies that completely new-to-the-world products and/or systems are created as a result of the procurement process. It can be regarded as ‘creation oriented’ PPI and involves radical innovation.

Source: Edquist and Zabala-Iturriagagoitia (2012)

Second, the *Adaptive dimension* allows for promoting innovation from PP. When PP requires making a purchase that involves the acquisition only by specifying a problem, mission or general function, this results in the creation of new products or services and, consequently, opens spaces for innovation.

Finally, the *Developmental PPI* dimension considers the creation of new products, which results in innovation (Edquist & Zabala-Iturriagagoitia, 2020). Products that already exist and are available for PP, if they are adapted for a specific context and the purpose for which they were designed differs from the initial one, could not be considered in this dimension.

So, on the one hand, PCP justifies R&D implementation only when the problem is anchored in the absence of research due to the high investment required. On the other hand, PPI (Adaptative and Developmental) acts when the problem or need is outside the scope of PP or does not exist (Borrás & Edquist, 2013).

A particular aspect to consider in the application of those dimensions is the legal aspect. It is known that PP is ruled and regulated by law and, in most cases, also by normative frameworks with explicit rules and norms about how to use public procurement mechanisms. In that sense, the mechanisms necessary to carry out a PPI may vary depending on the context and regulations of each country (Edquist, 2023). Some of the common approaches include:

- Competitive dialogue: Public entities and suppliers have interactive discussions to explore possible innovative solutions before final offers are submitted. This allows for closer collaboration and a deeper understanding of both parties' needs and capabilities (Georghiou et al., 2013).

- Innovation Partnerships: Innovation Partnerships: In this procedure, PIs have to identify their needs and associate them with an innovative product or service that is unavailable in the market. This procedure can also include R&D results “as well the purchase of resulting products, services or works” (Edquist, 2023, 15) and create a fertile space to establish a relationship between PIs and prospects suppliers far beyond the short term.

2.2. INTERSECTION BETWEEN INNOVATION AND CIRCULAR ECONOMY IN PUBLIC PROCUREMENT

The PPI is particularly effective in providing PIs with a space for exploration to promote innovation. At the same time, it is increasingly recognised as an important policy instrument to boost economic growth, promote sustainability, and achieve social objectives (Edquist & Zabala-Iturriagagoitia, 2012; Borrás & Edquist, 2013; Edquist, 2015; Wesseling and Edquist, 2018).

Although PPI opens the door to creating new products or services, it can also exacerbate some social and environmental problems with their production (Rainville, 2017). To mitigate this impact, PPI requires complementary approaches that allow for relevant government challenges and the development of solutions. In that sense, progress has been made towards a multi-criteria approach, which means that sustainability emerges with relevance in addition to criteria such as efficiency and probity (IDB, 2017). Consequently, the circular economy (CE) is positioned as a concept that strengthens PPI in that area.

Circular economy

As with the PPI definition, the precise definition and scope of CE continue to be topics of discussion in the academic community and among professionals in the field, reflecting its inherent complexity. Despite the debate, the general consensus on CE is associated with the implications of making changes in the forms of consumption and production (Cecchin et al., 2021). Thus, CE is presented as an actual means to face production challenges and get closer to sustainable procurement of goods.

CE in public procurement

In the public arena, there are concrete expectations regarding CE. These are installed to facilitate the efficient and effective face of the challenges currently related to climate change. Along these lines, for Stamm et al. (2018), administrations interested in addressing this problem see in CE the opportunity to design and promote production chains with more sustainable standards. In this way,

CE is positioned as an effective practice that encourages new production models focused on ethics and environmental efficiency and the impact of the life cycles of products or services (Alhola et al., 2019; Sönnichsen & Clement, 2020; Kristensen et al., 2021). This means considering economic models that respect the environment to promote balanced and harmonious human development.

This strategic approach is called Circular Public Procurement (CPP). Its objective is to promote sustainability within PP from design to disposal. Due to its relevance, several studies have highlighted CPP's importance in promoting sustainable production and consumption patterns (Sönnichsen & Clement, 2020; Grandia et al, 2015). To do this, it is necessary to exercise practices that prioritise the efficient use of resources, minimise waste and support the transition to a circular economy when desired.

However, innovation is not intrinsic to CPP. While innovation can occur depending on the purpose of CPP, it can also happen that CPP is diffused and incorporated to support and improve compliance with circular principles by public buyers and suppliers (Geissdoerfer et al., 2017; Sönnichsen & Clement, 2020). Here arises the opportunity for governments to leverage CPP from the path of innovation to stimulate the development of sustainable solutions and create market demand for new environmentally friendly products and services (Yeow, Uyarra and Gee, 2015)

Consequently, CPP could be understood as a subset of PPI that promotes innovation and environmental sustainability by creating new products or services. This approach represents significant potential to generate innovative solutions that not only meet the needs of public agencies but also effectively address the potential adverse effects arising from the production of such solutions. These effects could worsen over time (Edquist & Zabala-Iturriagagoitia, 2020, 596). Integrating a circular approach into PPI processes drives innovation while creating market demand for environmentally friendly products and services.

2.3. PPI and CE: Key cornerstones for implementation

The roles in charge of public procurement are especially relevant, as they are the ones who must implement procurement policies. These roles are configured as primary figures to develop the necessary actions to integrate innovation in public procurement processes. From this perspective,

for innovation to be promoted as a valid criteria when defining how the resources of each organisation will be used, it is necessary to strengthen specific capacities in the institutions, such as obtaining political support and managing aversion to risk, among other aspects (Uyarra et a., 2020).

In implementing both Public Procurement of Innovation (PPI) and Circular Public Procurement (CPP), a series of fundamental skills and resources are required. These capabilities are essential to maximise the impact of public procurement in terms of efficiency, innovation and sustainability. This chapter highlights the main capabilities necessary for the successful implementation of CPP and, additionally, they are complemented from the perspective of PPI to recognise synergies and differences.

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The following table shows the main cornerstones identified in the CPP and PPI literature. It provides a general understanding of the different aspects that PPI and CPP share regarding their implementation.

Table 2. The main cornerstones of PPI and CPP.

Aspects	Author(s)
Technical Knowledge	Brammer & Walker, 2011; Rainville, 2017; Sönnichsen & Clement, 2020; Kristensen et al., 2021; Ntsondé & Aggeri, 2021
Adoption	Cheng et al., 2018; Grandia, 2016
Collaboration	Kristensen et al., 2021; Ntsondé & Aggeri, 2021; Edler and Georghiou 2007; Liu e al., 2021;
Risk behaviour	Grandia, 2016; Sönnichsen & Clement, 2020
Finance and resources	Brammer & Walker, 2011; Cheng et al., 2018; Zijp et al., 2022

Leadership	Brammer & Walker 2011; Grandia, 2015; Obwegeser & Müller, 2018
Policy support	Kristensen et al., 2021
Evaluation	van der Zande, Vervoordeldonk and Thorin, 2019; Larusse & Van de Walle, 2021

Source: Author (2024)

a) Technical capabilities

The ability to correctly identify the needs or problems of a PI is a critical aspect of PPI implementation. This allows an appropriate process to be carried out and mechanisms to be applied effectively. Furthermore, prioritising the identified problems and considering reasonable times and costs for the institution (Edquist, 2015) is critical to managing budgets and political expectations.

Another fundamental capacity, identifying opportunities for improvement in acquisition processes, goes hand in hand with the above. As Edquist (2015) states, organisations must be able to critically analyse their needs and look for ways to improve them by integrating innovative and circular solutions. This requires a proactive approach to identifying areas of opportunity and developing effective strategies.

Although identifying the needs of PIs is also essential in the CPP, the focus is on determining whether that need can be met with the available resources. When the purchase is essential, it must be carried out considering the flow of the PI's resources, such as reuse, repair, renewal and remanufacturing, and finally, recycling what is being acquired (Kristensen et al., 2021). Furthermore, the ability to stimulate sustainable innovation through procurement is linked to design activity and creating opportunities for collective innovative practices (Ntsondé & Aggeri, 2021). This suggests that organisational and individual factors must complement technical knowledge to implement CPP effectively.

In the case of CPP, technical capabilities are also related to managing ecological labels or certifications that contain standard environmental attributes and evaluating the life cycle of the product or service and its costs (Sönnichsen & Clement, 2020; Rainville, 2017). In addition to

those “eco-labels”, there is an additional criteria in the predominant rationale related to cost-benefits, and it is the life-cycle costing (Edler and Geroghiou (2007, 960), and the specific knowledge related to its calculation. Specifically, the calculation also allows to trigger a evaluation process

Technical capabilities are not only necessary for the correct implementation of the CPP but also for its adoption. Lack of technical knowledge is identified as a barrier to CPP adoption, as procurement departments may find CPP principles vague and perceive them as “new and difficult” (Kristensen et al., 2020).

b) Adoption

According to Cheng et al. (2018), having relevant information about the CPP approach is an important aspect of its adoption. The information, regulations, and standards can also be accompanied by formal training instances that, eventually, will strengthen the PI's capabilities and knowledge. Also, collaboration between smaller PIs and other public institutions opens the space to adopt and reinforce knowledge about this approach.

On the other hand, adoption has the mission of clearly conveying the benefit of this approach. The study by Grandia (2016) reflects that the most significant aspect that promotes the implementation of CPP is not the pressure that public servants perceive from their peers or concern about sanctions but rather their personal perception of the benefit and impact that this approach can generate, intensifying its adoption. Along the same lines, it is equally relevant to consider the beneficial aspects of adoption for suppliers (Cheng et al., 2018).

c) Leadership

Knowledge about sustainability and the environment has been shown to influence the application of sustainable procurement practices (Grandia, 2016). In this sense, the relationship between technical knowledge and leadership is closer when the relevant actors in the adoption of CPP and PPI have the ability to promote processes supported by their technical capabilities.

One critical capability that both PPI and CPP share is the ability to lead effectively within to inspiring change and mobilising different actors towards common goals. This leadership is necessary to establish a clear vision of the objectives of the PPI and CPP and to foster an organisational culture that values innovation and sustainability in public procurement. In consequence, leadership should consider senior management roles at the central and local levels of government (Cheng et al., 2018). From the perspective of PIs, this aspect lies in creating concrete strategies and plans so that other PIs can meet CPP objectives correctly (Brammer et al., 2011). It is also relevant to promote training for specific personnel, differentiated from the rest of the organisation, promoting the champion figure (Rolfstam et al., 2011).

On the other hand, however, Grandia et al. (2015) suggest that leadership influences CPP processes but with lesser relevance. For them, transformational leadership does not represent a fundamental aspect for public servants to modify their commitment and incorporate the approach, nor does it change the willingness to adopt changes

d) Political support

Another critical aspect of implementation that appears in the CPP literature is political support. In their study on Danish municipalities, Kristensen et al. (2021) highlight that political support emerges transversally and is key to successful implementation. This aspect is necessary to influence the purchasing areas of the PIs and thus develop a "wider network of internal and external stakeholders" (Kristensen et al., 2021,11).

Likewise, from the perspective of PPI, Edquist (2015) emphasises that political support is also essential to make PI budgets more flexible, expand the space for action, and promote decision-making. Not considering this aspect may result in PIs resorting to using the usual mechanisms. Furthermore, he emphasises the protection of the PI and the public procurement authority to promote the application of this approach since experimentation is usually insufficient to justify the risk that this implies.

e) Collaboration

Collaboration with different actors and stakeholders is central to achieve success on these initiatives including the private sector, the public sector and civil society. Considering the network of stakeholders mentioned by Kristensen et al. (2021), in addition to participating through political support, this network enables the transfer of knowledge to PIs.

This need for collaboration includes both the public and private sectors. A study by Ntsondé and Aggeri (2021) presents the case of Aalborg Municipality and describes how cooperation between different institutions occurs. Given the lack of knowledge within the municipality about CE, a cooperative relationship is established between academic institutions and the private sector to create a CPP tender appropriately. However, cooperation between institutions from different sectors entails the challenge of the complexity of these interactions. As Edler and Georghiou (2007) note, "innovative procurement is a complex interaction between public and private sector organisations, involving multiple stakeholders, including suppliers, intermediaries, and customers" (p. 950). In that sense, the influence of external roles like stakeholders provide a a beneficial relationship (Liu et al., 2021) where they act in as mediator regarding CPP knowldege. For this reason, both CPP and PPI require strong coordination between stakeholders and constantly knowledge sharing.

f) Financing and resources

Successful implementation of both PPI and CPP requires several shared organisational capabilities, including effective leadership, identifying opportunities for improvement, effective supply chain management, and collaboration with different stakeholders. These capabilities are essential to improving efficiency, promoting innovation, and encouraging more sustainable practices in public procurement. As previously noted, PPI and CPP elements are directly linked to cooperation and technical capabilities, which require institutional resources.

In their study, Chang et al. (2018) identify that smaller PIs may not have the resources or intention to hire a profile or develop a technical department based on this approach. In this sense, it is the cooperation of initiatives with other PIs that makes it possible to address possible gaps in this area.

g) Risk Behavior

While technical knowledge is essential, it is not the only determinant of successful CPP implementation. The literature indicates that public servants' perceived beliefs, values, and commitment to change play an important role in implementation (Grandia, 2016; Sönnichsen & Clement, 2020).

Confidence is crucial to dealing with uncertainty and risks effectively. A public servant who is confident in their competence and knowledge regarding these aspects will demonstrate safer behaviour and will be able to make better decisions. Likewise, recognising the benefits of CPP strengthens commitment, provides better insight into purchasing mechanisms, and mitigates resistance to change (Grandia, 2016).

Risk-averse public organisations need direct incentives that make transparent the benefit of exploring this type of mechanism. Although the benefit to citizens, or even to the organisation itself, may be evident, it must be evident for public servants, who may suffer public scrutiny for their decisions. In this sense, it is relevant to consider incentive mechanisms, such as salary increases for compliance with institutional goals or individual/group recognition, to highlight exemplary implementations of this type of purchase. This may positively influence the conservative inclination of some public buyers.

Balancing efficiency and cost-benefit while considering innovation as a process can lead to a conflict situation where both approaches are incompatible (Obwegeser & Müller, 2018). This is because the regulation and control mechanisms in public Procurements can limit the freedom of action of buyers: while in the private sector, the trial and error method is sometimes followed, in public spending, there is regulatory rigidity and accountability that generates more significant challenges for policymakers to want to invest in innovation. Another example is when procurement rules may require that contracts be awarded to the lowest bidder rather than the most innovative solution, which can create a barrier to entry for small, innovative companies (Rolfsman et al, 2011)

h) Evaluation

Another relevant side is the need for more effective monitoring and evaluation of the CPP's impact on environmental outcomes. This is demonstrated by the mixed results in the Netherlands, where only a third of tenders with CPP criteria led to a reduction in environmental impact (Zijp et al., 2022). According to Lerusse and Van de Walle (2021) also identify that declaring an evaluation process is not sufficient; it is also necessary to offer training for managerial roles to develop a critical and objective evaluation of those processes.

The basis for implementing CPP is to access a clear conceptualisation of this approach (Kristensen et al., 2021). According to Simard (2011), the same happens with PPI, and effective conceptualisation allows for an objective subsequent evaluation. According to Simard (2011), "there is a lack of agreement on what is meant by innovative procurement and how it can be effectively measured and evaluated" (p. 67). This lack of agreement can make it challenging to evaluate the effectiveness of PPI programs and design new initiatives tailored to specific contexts and objectives. In this sense, the adoption of both CPP and PPI must necessarily consider a clear conceptual definition, which allows for subsequent monitoring and evaluation.

2.3. Role of DCCP in promoting innovation and circular economy in public procurement

The Public Procurement Law indicates that the Public Procurement and Contracting Directorate (DCCP) is a public service which main functions are to advise PIs in the planning and management of their purchasing and contracting processes; put out to tender the operation of the information system and means for electronic procurement and contracting of public organizations; tender goods and services through framework agreements; manage the registry of public buyers and suppliers; and promote the maximum possible competition in hiring.

In Chile, the amount traded in DCCP (that is, public spending allocated to public procurements through the DCCP), according to the open data available on the MercadoPúblico platform, as of April 2022 amounted to $4,357,051,449 (USD$5,474,920,532)) (Ministry of Finance, Development and Tourism, 2018). This highlights the high potential that public procurement has to encourage the innovation market and the circular economy. The above is, in turn, linked to the

capacity of public procurement to create new markets, promote innovation and test innovative products (Moñux and Uyarra, 2016).

In the current Chilean context, the new Public Procurement Law represents important opportunities regarding innovation in the way of purchasing inputs and services. An example of this is the health sector, where the importance of moving from a model based on production to one that focuses on health results has been raised (Adimech, 2023). The new Law also incorporates "Contracts for Innovation", which aim to acquire goods or contract services to respond to needs or problems for which there are no adequate or available products or services on the market. Contracts for Innovation involve bidding for the problem or need, establishing requirements to be met by suppliers, and may include research and development stages and generation of prototypes. The new Law also regulates the circular economy in the State's procurement of goods and services, promoting the efficient use of resources and care for the environment. Based on this, State agencies are allowed to transfer the use or ownership of assets in use to other public organisations or the public. It also allows the use of services and media shared between public organisations. On this point, it will be up to the DCCP to have the means to sell or transfer unused goods through an electronic catalogue.

Another relevant aspect regarding the new Public Procurement Law is that it establishes that the director of the DCCP will be the technical secretary of the "Public Procurement Committee for Innovation and Sustainability." This is an organisation created by the new law, which primary function will be to advise the State and the DCCP in public procurements of innovation and in the determination of public needs that could be satisfied through goods or services that incorporate innovation or criteria of sustainability. Additionally, the Committee must evaluate the operation and results of the special procedures for innovation contracts, the incorporation of sustainability in goods and services acquired by the State, and the circular economy law in acquiring goods and services from the State. Finally, the Committee is responsible for approving the Public Innovation Procurement Policy.

It is possible to highlight two examples regarding the initiatives promoted until this date. Firstly, the 2014-2018 Innovation Plan was an instrument that aimed to coherently and forcefully resolve the obstacles and disincentives that drive market, coordination and cultural failures. At the same time, it sought to massify innovation processes in companies, strengthen research capabilities,

establish a connection between the creation and valuable use of knowledge, and promote a culture of innovation and creativity (Ministry of Finance, Development and Tourism, 2018). Secondly, a pilot was recently launched within the framework of the implementation of the new Public Procurement Law, opening the call “Innovation Challenge: Public Procurement Pilot Las Higueras Hospital Challenges”. The purpose of this initiative is that, through a public innovation procurement pilot, projects that compete for the development of service platforms are presented. This pilot is underway and will provide learning for the implementation of the new Public Procurement Law. Among the public organisations that are part of this pilot, the DCCP is one of those that leads this process.

In this context, the SoCh faces important opportunities and challenges with the upcoming entry into force of the new Public Procurement Law in December 2024. This new regulatory framework involves modernising public procurement, new procedures and mechanisms, and guidelines for public procurements of innovation and the circular economy in the acquisition of goods and services from the State. The role of the DCCP will be fundamental in implementing these elements, which will require institutional capacities that will be analysed in the following sections.

3. METHODOLOGY

As previously stated, this research aims to identify challenges and barriers in the design and implementation of public procurement of innovation associated with circular economy criteria from the perspective of DCCP public servants. For this reason, an exploratory deductive methodology fits the objectives of this research (Bryman, 2012).

3.1. Research design

A qualitative approach has been chosen to meet the objectives of the study. This approach will allow us to study the perceptions of its DCCP public servants and its policymakers regarding the aspects of implementation and adoption for the public procurement of innovation and the circular economy (VanderStope & Johnson, 2009: Hernández Sampieri, Fernández-Collado, Baptista Lucio, 2014) and to survey their patterns and experiences (Patton, 2002)

3.1.1. Qualitative data collection technique

We will conduct a series of in-depth interviews to collect qualitative data. This is because this collection technique seeks to reveal the information's richness, quality, detail, and specificity, not quantity or standardization (Hernández Sampieri et al., 2014; VanderStope & Johnson, 2009). According to Starr (2014), if the intention is to carry out a large number of interviews to ensure comparability, it is suggested to choose the semi-structured (or structured) interview as the research instrument.

The first step in conducting interviews is to contact people. Then we will explain the study's objectives and the research instrument, and later, we will conduct the interview considering what was agreed with the interviewee. At the time of the interview, the interviewee will be given the "informed consent" document, which specifies in detail the process and the relevance of their participation in the research.

To ensure the preservation of the information and expedite its classification and subsequent analysis, we will ask the interviewees for the possibility of recording the interviews (only those who give their written consent will be recorded), and, in addition, notes will be taken in each one. In cases where the interviewee does not want it, notes will be taken and analyzed as soon as possible to safeguard the data obtained (Starr, 2014).

3.1.2. Sample selection

According to Patton (2002), there is no rule for choosing the sample size in qualitative studies. This will depend on what the researchers want to investigate and for what purpose the data will be used.

In this study, we have chosen a Purposeful random sample. This sample, even if small, will increase the credibility of the results and reduce questions about why the cases have been chosen (Patton, 2002).

3.1.3. Qualitative data analysis

A series of in-depth semi-structured interviews (7) were conducted face-to-face, remotely via video call, and by telephone. The people interviewed are DCCP public servants who currently work at the institution. In addition, interviews were conducted with key stakeholders, such as modernisation advisors to the Ministry of Finance and management roles from previous periods. All those interviewed have participated, in one way or another, in different stages (preliminary, current processes or projects committed to 2025) of implementing PPI and circular economy.

The interviews were conducted between March and April 2024 and lasted an average of 90 minutes. The interviewing process stopped when reaching the saturation criteria, where the interviews stopped providing new additional information. To analyse the collected information, it is necessary to transcribe the semi-structured interviews through the HappyTranscribe application, which encodes the auditory information and presents it as text. Next, it was necessary to review each text (by the researcher) to verify that the written content is accurate to the auditory content. Finally, we analysed the information once we have available both sources of information confirmed: recordings and transcripts.

3.1.4. Qualitative data limitations

This study is not without limitations. Next, we will detail the limitations of this study:

1. The qualitative approach to research allows the researcher to participate closely in the field of study, which could obstruct the validity of the results (Van Thiel, 2014).

2. On the other hand, the information collected through the semi-structured interviews will allow us to know in depth the perceptions of its DCCP public servants and its policymakers regarding the aspects of implementation and adoption for the public procurement of innovation and the circular economy. However, this instrument does not allow generalization to the rest of the population (VanderStope & Johnson, 2009). Moreover, since it is not based on a random sample, neither its heterogeneity nor representativeness can be assured (Hernández Sampieri et al. 2014).

3. This research will be developed in the context of Chilean public procurement of innovation and circular economy. For this reason, its results must be carefully manipulated if it is to be applied or adjusted to other contexts.

4. RESULTS AND DISCUSSION

4.1. Results

The application of PPI and CPP within the DCCP presents both challenges and opportunities. This chapter aims to examine the crucial factors that affect the implementation in DCCP, concentrating on determining requirements, selecting approaches, fostering inter-agency cooperation, securing political and financial backing, demonstrating strong leadership at the organizational level, and evaluating the impact of PPI and CPP. By investigating these aspects, we hope to gain a deeper comprehension of the key cornerstones playing within DCCP to enhance the execution of innovation and circular economy.

Technical Knowledge

Some people interviewed stated that they had never heard of PPI or CPP before being in their current role, and if they had, it was only very lightly. Furthermore, they recognise that how they have acquired specific knowledge (when it has happened) has been autonomously or by their peers who were previously in their role.

> *"I was telling you that one of the main challenges is that we do not have people who are experts in innovation or sustainability. And it has been a super important gap at the level of the people who have had to lead this, how to take charge of the implementation of This because they do not know about innovation or the other concept, so they have had to study a lot to be able to understand it and face it. It is entering a completely different world from our square world of procurement governed by regulations".* **Interviewee #2**

On the contrary, other profiles are fully aware of these approaches and handle specific technicalities. Regarding specific knowledge about the topics and approaches, more needs to be known about what PPI or CPP explicitly implies, and the complementarity between the two needs to be mentioned. Furthermore, they reinforce that it is difficult to see the connection because the law specifically states what is what and does not mention at any point that PPI and CPP could be intertwined.

In a transversal way, it emerges that the baseline knowledge of DCCP public servants lies in the Procurement Law and is then reinforced with the content available in the purchasing regulations, which allows the law to be applied in a concrete way. This means these two normative resources are the main sources of information about these mechanisms. For this reason, it is not strange that public servants fail to associate these concepts. They comment that innovation and the circular economy are entirely new fields that require thinking differently and that in the public sector, it is a challenge to think differently because everything is regulated).

Adoption

Perspectives in this area are divided. On the one hand, some people claim that DCCP's only role is to provide the mechanism within its e-platform ratherv than to promote these approaches. They mention that another PI should carry out the adoption, highlight the PI's technical knowledge, and add that it is also the committee's responsibility, which is constituted by law.

> *"We only have to have the platform in charge, available for public institutions to make this type of purchases through Mercado Público platform (...) We are not going to make other organizations carry out the purchases (innovation or circular economy or both). We have to have the mechanism in MP so that the organizations that are going to use this type of purchases can do so, and well, perhaps at some point, we, as a public institution, are still going to invest, hopefully we have money to invest, perhaps to look for some innovative solution, but our role more than anything is that the platform has the appropriate mechanism so that organizations can make their innovative purchases or those circulars through MP"*
>
> *"The thing is that... the LabGob will tell you when to use one or not, when it is an innovation purchase or not".* **Interviewee #1**

> *"There are also other organizations that are specialists in the subject (innovation), there is CORFO as well. So what we do as ChileCompra is do our part, which is the technological part. We as ChileCompra are not the ones called to make that definition. "Here the public procurement law that was approved last year precisely establishes the formation of expert committees on the matter"***.** **Interviewee #3**

"Chile Compra's role is to have the mechanisms available on the Public Market platform and nothing more I think". **Interviewee #5**

On the other hand, other interviewees consider that DCCP should take the lead in implementing these approaches and declare that one of DCCP's roles should be to offer support and accompaniment to the rest of the PI in adopting any element related to purchasing. These same people declare that DCCP is an expert institution in public procurement, and therefore, it is part of their job to promote this adoption.

"(...)Because many times it happens to us that since we define the rules, we have the system, we carry out the regulations, finally we can end the discussion with what we say and not listen to anyone else. Exaggeration, but if we tell you that you have to jump on one foot to buy, you have to do it. But that is not the idea in any case. The idea is working with users and accompanying them, helping and supporting them in understanding these approaches, so that they see the importance of this, understand it, incorporate it and receive our recommendations". **Interviewee #2**

"From my perspective, it's two things. One, the ability to develop a platform or a solution that allows this to be simple. That is, there has to be a flow that is relatively simple and clear. And the second thing, (ChileCompra) has to be able to get the institutions to adopt the system and these processes, and for that it has to be able to train, monitor, give feedback, support. **Interviewee #4**

Collaboration

An aspect that is frequently mentioned is collaborative and interdisciplinary work at different levels. Internally, people declare that since being assigned to the projects, they have worked closely with different areas and profiles of DCCP. Likewise, they mention that the preparation of these approaches has also been addressed in conjunction with other PIs and consulting firms. They also mention LabGob as a key ally in the implementation and convey their expectation of the role that this agency can fulfil regarding the adoption of these approaches.

"I imagine that they (LabGob) could help in detecting pains because I see these forms of purchase a little further away from Chilecompra, let's say. I imagine this thing as inter-

ministerial, although all this is the Treasury (LabGob and Chilecompra), but finally, I imagine that they should help as in other previous instances". **Interviewee #4**

With less recurrence, the question arises about the PPI or CPP's value and how that value is transmitted to the rest of the PI. The distribution of these capacities is also mentioned in this question.

"(ChileCompra) basically has to convince other institutions, so to speak, because the ones who have to go out and buy here are the institutions and that makes it more complex. Because if you, perhaps, had the purchase of innovation or a centralized circular economy in Chile, would you buy or delegate that purchase? I hire a team that is well-managed and ready! But no, you have to ensure that these capacities are distributed in the State. That is the challenge! Therefore, having a solution that is implemented in a simple way, that is easy to use, intuitive, that guides you, that is what ChileCompra has to do. And of course, then you have to take that and promote it so that the capabilities are installed in the State. The public buyers has to percieve the value". **Interviewee #6**

Risk behaviour

This aspect appears transversally and is connected with the expectation of having a specific profile within DCCP to better manage the resistance of the PI to these approaches. They also mention that more disciplined PIs are more likely to use these approaches. In addition, reference is made to the rigidity of the regulations and that this generates resistance because people know what they can do and what they cannot do, explicitly.

"Always the aversion to change. If in the end public organizations and suppliers are characterized by being very adverse to changes, then everything that is change management is going to be super complex initially (...) I believe that the fears are among both buyers and suppliers. So, yes, indeed, that is like the greatest, let's say, risk that could happen or more than risk, deep down it is concern in the sense that at the moment of starting to spread the word we will not have support and everything will be rejection and discomfort". **Interviewee #1**

"It's going to be complex, because they (public organisations) are going to have to, effectively... because all of this is going to be regulated, they are going to have to create and indicate what was monitored, what the results were, how they evaluated the processes, if It was effective or it was not effective. To also see that the money that was invested was really used well...So, as everything has to go, that is, all of that is going to go, clearly each organization is also going to be responsible for its own evaluation". **Interviewee #7**

Financing and resources

The IDB is the most mentioned resource source. The interviewees emphasised the importance of this financing to implement these approaches and hire more people; otherwise, they believed that all the progress would not have been achieved. Another aspect that appears is the lack of knowledge of the people interviewed about future funding sources for these approaches and the different beliefs in this regard. Some people believe that it has already been defined, others believe that another ministry will do it, and others who are more sceptical believe this discussion has yet to exist.

"I believe that the money that the Inter-American Bank, the IDB, lent, because with that we have the resources, with that we were also able to hire external people who come for four years, if I remember correctly. To help us endure the monster that we are going to start moving,".

Interviewee #1

"We were also short of personnel, and for the same reason, thanks to the bank (IBD) we have the resources to be able to hire. A lot of people have already arrived who are going to be there for these four years, who are going to be implementing both the new law and the other projects that have been dragging on". ***Interviewee #5***

Specifically regarding resources, some interviewees mention that the institution needs to strengthen some teams. They justify these new hires by enhancing what they are already doing well and improving what they are not doing. However, they then associate this need with the budget barrier. On the other hand, some interviewees mentioned that it was relevant to have a profile that knew these approaches. They associate this hiring with the institution's responsibilities and how such a role can help disseminate approaches inside and outside the institution.

"You need a person who can generate networks, who knows how to relate to other public organizations, who generates a relationship of trust so that the organization listens to them" **Interviewee #2**

"There has to be someone who becomes an expert, that is, who understands the process of purchasing innovation very well, that is, who understands any process, but in this case innovation, and who is capable of disseminating it. **Interviewee #4**

"One of the problems we have, and that happens a lot in the supply areas (in the public sphere), is that we do not necessarily have specialists. We have (public) buyers, but not specialized ones (in categories), so people are not necessarily specialists in what they have to buy, not even us!". **Interviewee #6**

Leadership

As indicated above, perspectives are divided regarding leadership in adoption processes. On the one hand, some people claim that DCCP's only role is to provide the mechanism within its platform and not to promote these approaches. They mention that another PI should lead the adoption.

On the other hand, other profiles consider that DCCP should take the lead in implementing these approaches, given its expertise in public procurement. In this sense, they declare that one of DCCP's roles is to offer support and accompaniment to the rest of the PI in adopting any element related to public procurements. The role of management is mentioned repeatedly and is associated with the responsibility of leading dissemination and adoption, generating bridges with other PIs and looking for spaces where this approach can be implemented.

"In other words, everyone has to be here, from the captain to the cadet involved, each one in their role. In other words, the person who leads Chilecompra today has his/her turn now, but it will always be the role of the management that should present, defend and spread these mechanisms because it is well known that in the state where the captain rules, no the sailor does not, so if someone with power does not spread it, it is difficult".

Interviewee #7

Political support

This concept is rarely mentioned and is indirectly associated with adopting the approaches. Although political support has resulted in this first stage of implementation, there are doubts as to

whether this support will be maintained when the general dissemination of these approaches is carried out.

> *"The Treasury also tries to encourage us to have a more leading role, either directly or with its related services in this process"* **Interviewee #2**

> *In other words, the Treasury has to put here, perhaps some requirement, say "Hey, for example, if in this project you do it with one of these concepts or both, maybe a prize"...I don't know, you have to get creative, that is, you also have to push a little. Perhaps there is the Treasury or Economy (ministries), which can have some role in the sense... of providing some incentive for the institutions.* **Interviewee #6**

Evaluation

Aspects associated with the evaluation appear at specific moments and are associated with data monitoring. However, the interviewees do not know what can be measured and how and again, they mention the committee and other PIs to resolve this aspect.

> *We have that idea and can implement it and disseminate it to the rest of the organizations through the platform. The key is that for this to happen, we can continue operating correctly and continue generating good, quality information now from these new mechanisms to make good decisions, and not only generate it, but also be able to communicate it and be in close communication and coordination. with the organizations that are finally going to be in this"* . **Interviewee #5**

> *"We have departments that are in charge of being able to design what data needs to be constructed, what data needs to be recorded, how it should be recorded, why it should be recorded. We have departments that are precisely in charge of all this lifting. And not only the data collection, but also the processing, the purification of it, and this department is our study department".* **Interviewee #6**

An emerging aspect is the transfer of knowledge. One of the interviewees reflects on this experience and raises the question of where this acquired knowledge remains. The interviewee

emphasises that seeing how the knowledge being developed can be disseminated within DCCP is necessary.

4.2. Discussion

Implementing PPI and CPP effectively necessitates a thorough identification of requirements and problems, as Edquist (2015) emphasises. Unfortunately, in the case of DCCP, the scarcity of specialised knowledge to support this identification process within other public institutions presents a significant obstacle. Interviewees express the opinion that this responsibility should fall to another public institution, highlighting a gap in DCCP's ability to cater to the needs of other public organisations.

The adoption and relevance of PPI and CPP approaches are also of paramount importance. The confinement of knowledge to the bounds of procurement law and regulations restricts the consideration of the relevance of these approaches, making their adoption a difficult task. However, collaboration emerges as a crucial component in the implementation process. Its importance cannot be overstated, as it is the key to managing the complexity that arises from the diversity of participants and conflicting interests.

Political endorsement is indispensable for the implementation of PPI, as it can significantly influence the allocation of financial and budgetary resources. The role of politics in this process is crucial, as it can determine the fate of PPI initiatives. Concerns about the continuity of financing, especially from the IDB, pose a significant challenge to the sustainability of PPI initiatives in DCCP. Leadership, particularly that of DCCP leadership, plays a pivotal role in promoting innovation and the success of PPI initiatives.

Evaluation and monitoring are essential to comprehending the impact of the PPI and CPP initiatives and identifying areas for refinement. However, the lack of knowledge about specific evaluation criteria underscores the need for greater clarity and training in this area.

CONCLUSION

The integration of Public Procurement of Innovation (PPI) and Circular Public Procurement (CPP) within the DCCP presents both opportunities and limitations. Our research has explored the key factors affecting their adoption within DCCP, focusing on requirements determination, approach selection, inter-agency cooperation, political and financial backing, leadership, and evaluation.

Our findings reveal a landscape where knowledge about PPI and CPP varies greatly among public servants, with some being entirely unaware. This stark gap in knowledge underscores the urgent need for comprehensive training initiatives to equip stakeholders with the necessary expertise. Additionally, the fragmented nature of procurement law and regulations restricts the consideration of innovative approaches, emphasizing the importance of fostering collaboration and cross-disciplinary work.

On the one hand, opinions on adoption are diverse, with some advocating for DCCP to simply provide the e-platform while others argue for a more proactive role in promoting these approaches. However, it is crucial to recognize that political backing and leadership, particularly within DCCP, are not just important but are the driving forces in advancing innovation and facilitating the adoption of PPI and CPP. Moreover, evaluation and monitoring are essential for assessing the impact of these initiatives and refining strategies moving forward.

The successful implementation of PPI and CPP within DCCP hinges on addressing knowledge gaps, fostering collaboration, gaining political support, demonstrating strong leadership, and establishing robust evaluation mechanisms. Some of those aspects are already there, but they are imperative considering DCCP's current scenario. By embracing these challenges and opportunities, DCCP can play a transformative role in advancing innovation and sustainability within public procurement practices, ultimately contributing to broader societal goals of economic growth and environmental stewardship.

LIST OF REFERENCES

Ahsan, Kamrul, and Shams Rahman. 2017. “Green Public Procurement Implementation Challenges in Australian Public Healthcare Sector.” Journal of Cleaner Production 152 (152): 181–97. https://doi.org/10.1016/j.jclepro.2017.03.055

Alberto Huerta Morales. 2021. “Circular Economy and Public Procurement: Dialogues, Paradoxes and Innovation.” Aalborg Universitetsforlag. https://doi.org/10.54337/aau470869913.

Alhola, Katriina, Sven- Olof Ryding, Hanna Salmenperä, and Niels Juul Busch. 2018. “Exploiting the Potential of Public Procurement: Opportunities for Circular Economy.” Journal of Industrial Ecology 23 (1): 96–109. https://doi.org/10.1111/jiec.12770.

Borrás, Susana, and Charles Edquist. 2013. “The Choice of Innovation Policy Instruments.” Technological Forecasting and Social Change 80 (8): 1513–22. https://doi.org/10.1016/j.techfore.2013.03.002.

Borrás, Susana, Stine Haakonsson , René Taudal Poulsen, Trine Pallesen, Christian Hendriksen , Lucas Somavilla, Susanna Kugelberg, Henrik Larsen, and Francesco Gerli . 2023. “The Transformative Capacity of Public Sector Organizations in Sustainability Transitions: A Conceptualization.” Http://Wp.circle.lu.se/Upload/CIRCLE/Workingpapers. Lund University, CIRCLE-Centre for Innovation Research. February 1, 2023. http://wp.circle.lu.se/upload/CIRCLE/workingpapers/202302_borras.pdf.

Brammer, Stephen, and Helen Walker. 2011. “Sustainable Procurement in the Public Sector: An International Comparative Study.” International Journal of Operations & Production Management 31 (4): 452–76. https://doi.org/10.1108/01443571111119551.

Bryman, Alan. 2012. Social Research Methods. 4th ed. Oxford: Oxford University Press.

Cecchin, Andrea, Roberta Salomone, Pauline Deutz, Andrea Raggi, and Laura Cutaia. 2021. “What Is in a Name? The Rising Star of the Circular Economy as a Resource-Related Concept for Sustainable Development.” Circular Economy and Sustainability 1 (1). https://doi.org/10.1007/s43615-021-00021-4.

Cheng, Wenjuan, Andrea Appolloni, Alessio D’Amato, and Qinghua Zhu. 2018. “Green Public Procurement, Missing Concepts and Future Trends – a Critical Review.” Journal of Cleaner Production 176 (176): 770–84. https://doi.org/10.1016/j.jclepro.2017.12.027.

Dirección de Compras y Contratación Pública, ChileCompra. 2022. “Cuenta Pública 2022.” Www.chilecompra.cl. May 26, 2022. https://www.chilecompra.cl.

———. 2024. “Qué Es ChileCompra.” Www.chilecompra.cl. February 2024. https://www.chilecompra.cl/que-es-chilecompra/.

Edler, Jakob, Charles Edquist, Nicholas S. Vonortas, and Jon Mikel Zabala-Iturriagagoitia. 2015. "Conclusions: Lessons, Limitations and Way Forward." In Public Procurement for Innovation, Chapter 11: Conclusions: lessons, Limitations and Way Forward:299–306. Edward Elgar Publishing. https://doi.org/10.4337/9781783471898.00018.

Edler, Jakob, and Luke Georghiou. 2007. "Public Procurement and Innovation—Resurrecting the Demand Side." Research Policy 36 (7): 949–63. https://doi.org/10.1016/j.respol.2007.03.003.

Edquist, Charles. 2013. "Systems of Innovation Approaches—Their Emergence and Characteristics." In Systems of Innovation : Technologies, Institutions and Organizations, 1–35. Routledge.

———. 2015. "Innovation-Related Public Procurement as a Demand-Oriented Innovation Policy Instrument." Papers in Innovation Studies CIRCLE - Centre for Innovation Research 2015/28 (28).

———. 2023. "Functional Public Procurement and Innovation – the Concepts." Lund University, CIRCLE, Centre for Innovation Research 2023/04 (4).

Edquist, Charles, and Jon Mikel Zabala-Iturriagagoitia. 2012. "Public Procurement for Innovation as Mission-Oriented Innovation Policy." Research Policy 41 (10): 1757–69. https://doi.org/10.1016/j.respol.2012.04.022.

———. 2020. "Functional Procurement for Innovation, Welfare, and the Environment." Science and Public Policy 47 (5): 595–603. https://doi.org/10.1093/scipol/scaa046.

Espacio Público. 2021. "Moderniza La Ley N°19.886 Y Otras Leyes, Para Mejorar La Calidad Del Gasto Público, Aumentar Los Estándares de Probidad Y Transparencia E Introducir Principios de Economía Circular En Las Compras Del Estado".

Geissdoerfer, Martin, Paulo Savaget, Nancy M.P. Bocken, and Erik Jan Hultink. 2017. "The Circular Economy - a New Sustainability Paradigm?" Journal of Cleaner Production 143 (1): 757–68. https://doi.org/10.1016/j.jclepro.2016.12.048.

Geissdoerfer, Martin, Paulo Savaget, and Steve Evans. 2017. "The Cambridge Business Model Innovation Process." Procedia Manufacturing 8 (8): 262–69. https://doi.org/10.1016/j.promfg.2017.02.033.

Georghiou, Luke, Jakob Edler, Elvira Uyarra, and Jillian Yeow. 2014. "Policy Instruments for Public Procurement of Innovation: Choice, Design and Assessment." Technological Forecasting and Social Change 86 (86): 1–12. https://doi.org/10.1016/j.techfore.2013.09.018.

Grandia, Jolien. 2016. "Finding the Missing Link: Examining the Mediating Role of Sustainable Public Procurement Behaviour." Journal of Cleaner Production 124 (124): 183–90. https://doi.org/10.1016/j.jclepro.2016.02.102.

Grandia, Jolien, Bram Steijn, and Ben Kuipers. 2015. “It Is Not Easy Being Green: Increasing Sustainable Public Procurement Behaviour.” Innovation: The European Journal of Social Science Research 28 (3): 243–60. https://doi.org/10.1080/13511610.2015.1024639.

Hernández, Roberto, Carlos Fernández, and Pilar Baptista. 2014. Metodología de La Investigación. 6th ed. México, D.F.: Mcgraw-Hill Education.

Hommen, Leif, and Max Rolfstam. 2008. “Public Procurement and Innovation: Towards a Taxonomy.” Journal of Public Procurement 8 (3): 17–56. https://doi.org/10.1108/jopp-08-03-2008-b001.

Inter-American Development Bank (IDB). 2017. “Innovación En Los Métodos de Contratación Pública En América Latina Y El Caribe: Casos de Estudio.” Inter American Development Bank.

Kristensen, Heidi Simone, Mette Alberg Mosgaard, and Arne Remmen. 2021. “Circular Public Procurement Practices in Danish Municipalities.” Journal of Cleaner Production 281 (281): 124962. https://doi.org/10.1016/j.jclepro.2020.124962.

Lăzăroiu, George, Luminița Ionescu, Cristian Uță, Iulian Hurloiu, Mihai Andronie, and Irina Dijmărescu. 2020. “Environmentally Responsible Behavior and Sustainability Policy Adoption in Green Public Procurement.” Sustainability 12 (5): 2110. https://doi.org/10.3390/su12052110.

Mazzucato, Mariana. 2013. “State of Innovation.” New Scientist 219 (2931): 26–27. https://doi.org/10.1016/s0262-4079(13)62088-6.

Michael Quinn Patton. 2001. Qualitative Research & Evaluation Methods. 3rd ed. SAGE Publications.

Ministerio de Economía, Fomento y Turismo de Chile. 2018. “Mesa Interinstitucional Compra Pública de Innovación.” Chile: Ministerio De Economía, Fomento Y Turismo De Chile.

Ministerio de Hacienda. 2022. “Proyecto de Ley Que Moderniza La Ley N°19.886 Y Otras Leyes, Para Mejorar La Calidad Del Gasto Público, Aumentar Los Estándares de Probidad Y Transparencia E Introducir Principios de Economía Circular En Las Compras Del Estado.” Chile: Subsecretaría De Hacienda.

Ntsondé, Joël, and Franck Aggeri. 2021. “Stimulating Innovation and Creating New Markets – the Potential of Circular Public Procurement.” Journal of Cleaner Production 308 (308): 127303. https://doi.org/10.1016/j.jclepro.2021.127303.

Obwegeser, Nikolaus, and Sune Dueholm Müller. 2018. “Innovation and Public Procurement: Terminology, Concepts, and Applications.” Technovation 74 (74): 1–17. https://doi.org/10.1016/j.technovation.2018.02.015.

OCED. 2023. “Contratación Pública.” OECD - Contratación Pública. March 2023. https://www.oecd.org/gov/contratacion-publica.

OECD. 2017. “Procurement for Innovation. Good Practices and Strategies.” OECD Public Governance Reviews. Vol. OECD Publishing, Paris. https://doi.org/10.1787/22190414.

———. 2021. “Government at a Glance.” Https://Www.oecd-Ilibrary.org/. OECD Publishing Paris. https://doi.org/10.1787/1c258f55-en.

Rainville, Anne. 2017. “Standards in Green Public Procurement – a Framework to Enhance Innovation.” Journal of Cleaner Production 167 (167): 1029–37. https://doi.org/10.1016/j.jclepro.2016.10.088.

Rainville, Dr. Anne. 2021. “Stimulating a More Circular Economy through Public Procurement: Roles and Dynamics of Intermediation.” Research Policy 50 (4): 104193. https://doi.org/10.1016/j.respol.2020.104193.

Rolfstam, Max, Wendy Phillips, and Elmer Bakker. 2011. “Public Procurement of Innovations, Diffusion and Endogenous Institutions.” International Journal of Public Sector Management 24 (5): 452–68. https://doi.org/10.1108/09513551111147178.

Rullan, Samantha, Edgar Saucedo, and Jordi Bacaria. 2012. “‘Public Procurement for Innovation: Challenges and Prospects for Latin America.’” In 2012 International Symposium on Management of Technology (ISMOT), 599–601.

Sandra Van Thiel. 2014. Research in Public Administration and Public Management: An Introduction. 1st ed. London; New York: Routledge/Taylor & Francis Group.

Sönnichsen, Sönnich Dahl, and Jesper Clement. 2020. “Review of Green and Sustainable Public Procurement: Towards Circular Public Procurement.” Journal of Cleaner Production 245 (3): 118901. https://doi.org/10.1016/j.jclepro.2019.118901.

Stamm, Andreas, Luise Dietrich, Heike Harling, Laura Häußler, Florian Münch, Jana Preiß, and Jan Siebert. 2019. “Sustainable Public Procurement as a Tool to Foster Sustainable Development in Costa Rica: Challenges and Recommendations for Policy Implementation.” The Studies 100 (ISBN 978-3-96021-102-0). https://doi.org/10.23661/s100.2019.

Starr, Martha A. 2012. “Qualitative and Mixed-Methods Research in Economics: Surprising Growth, Promising Future.” Journal of Economic Surveys 28 (2): 238–64. https://doi.org/10.1111/joes.12004.

Testa, Francesco, Eleonora Annunziata, Fabio Iraldo, and Marco Frey. 2016. “Drawbacks and Opportunities of Green Public Procurement: An Effective Tool for Sustainable Production.” Journal of Cleaner Production 112, Part 3 (112): 1893–1900. https://doi.org/10.1016/j.jclepro.2014.09.092.

Testa, Francesco, Paolo Grappio, Natalia M. Gusmerotti, Fabio Iraldo, and Marco Frey. 2015. “Examining Green Public Procurement Using Content Analysis: Existing Difficulties for Procurers and Useful Recommendations.” Environment, Development and Sustainability 18 (1): 197–219. https://doi.org/10.1007/s10668-015-9634-1.

Uyarra, Elvira, Jon Mikel Zabala-Iturriagagoitia, Kieron Flanagan, and Edurne Magro. 2020. "Public Procurement, Innovation and Industrial Policy: Rationales, Roles, Capabilities and Implementation." Research Policy 49 (1): 103844. https://doi.org/10.1016/j.respol.2019.103844.

VanderStoep, Scott W., and Deirdre D. Johnston. 2009. Research Methods for Everyday Life : Blending Qualitative and Quantitative Approaches. San Francisco: Jossey-Bass.

Wesseling, Joeri H, and Charles Edquist. 2018. "Public Procurement for Innovation to Help Meet Societal Challenges: A Review and Case Study." Science and Public Policy 45 (4): 493–502. https://doi.org/10.1093/scipol/scy013.

Yeow, Jillian, Elvira Uyarra, and Sally Gee. 2015. "Closing the Loop: Examining the Case of the Procurement of a Sustainable Innovation." In Public Procurement for Innovation, edited by Charles Edquist, Nicholas Vonortas, Jon Mikel Zabala-Iturriagagoitia, and Jakob Edler, 235–62. Edward Elgar Publishing.

Yu, Zhao. 2019. "Research and Implications on OECD Governments' Procurement Policy to Promote Technology Innovation." International Journal of Sustainability Management and Information Technologies 5 (1): 15. https://doi.org/10.11648/j.ijsmit.20190501.13

Zijp, Michiel, Erik Dekker, Mara Hauck, Arjan De Koning, Marijn Bijleveld, Janot Tokaya, Elias De Valk, Anne Hollander, and Leo Posthuma. 2022. "Measuring the Effect of Circular Public Procurement on Government's Environmental Impact." Sustainability 14 (16): 10271. https://doi.org/10.3390/su141610271

APPENDICES

Appendix 1. Interview guidelines

- **Introduction and presentation**
  Greet and briefly present the purpose of the interview and the objective of the research.

- **Informed consent**
  Send/Deliver informed consent, request reading, identification selection and signature.

  - Do not test the knowledge of the people interviewed; give the context before asking or clarify if there are doubts, but only if requested.
  - *Participation in research shall be voluntary. All subjects have the right not to participate in research or reconsider their participation in the course of the research process. Their decision shall be respected.*

Questions

1. What is your role and responsibility within/with ChileCompra? In which department/division do you perform your role?

2. Could you briefly describe your main functions?

3. Perceptions on the public procurement of innovation with circular economy criteria within ChileCompra

   3.1 Currently, efforts are being made to promote a new approach to public procurement called "public procurement of innovation." Could you tell me what you know about it or what you imagine it could mean?

   3.2 How do you think ChileCompra public servants perceive these new purchasing approaches? And how do you personally perceive them?

   3.3 This approach also implies considering other aspects, such as the "circular economy." What do you know about this topic, or what do you imagine it could mean?

3.4 And regarding the “circular economy” approach, how do you think ChileCompra public servants specifically perceive this approach? Personally, how do you perceive it?

3.5 When you think about both concepts and public procurement, how do you imagine they complement each other? How do you think they can be applied?

4. Knowledge and competencies: The bases related to implementation
   Context: These new approaches require new efforts to implement...

   4.1 What are the key resources that ChileCompra public servants need to successfully implement the concepts reviewed above? Reinforce if the interviewee doesn’t remember. Clarify if necessary, only if requested.

   4.2 What capabilities do you consider fundamental in ChileCompra to implement the public purchase of innovation in conjunction with the circular economy? (Explain if requested or in doubt)

   4.3 What actions do you know are being carried out to strengthen these capabilities within ChileCompra? And in other institutions?

   4.4 What specific areas require further strengthening in terms of capabilities to move in this direction? Explain.

   4.5 And which ones require less attention? Why?

5. Leadership
   5.1 How is leadership currently managing the implementation of these public procurement approaches? what do you know about it?

   5.2 What aspects or elements related to leadership do you consider key to implementing these approaches? Which one(s) do you think is(are) fundamental?

   5.3 From your perspective, how should leadership be developed to implement these public procurement approaches?

6. Risk
   6.1 When thinking about challenges that may arise, what are the most significant barriers that ChileCompra’s public servants face (or could face) when trying to implement these approaches in public procurement?

   6.2 What challenges do you think must be overcome by ChileCompra's public servants? Which ones do you think should be delegates?

   6.3 What challenges can ChileCompra public servants overcome more successfully than others? Which ones represent the greatest effort?

7. Adoption of public innovation purchasing instruments
    7.1 In your opinion, what human resources are needed to promote the adoption of these new approaches (innovation and the circular economy) in public institutions? Why?

    7.2 And regarding economic resources? (state the specific name of the budget gloss and see if the question is understood)

    7.3 Is there a training program for the public servants in charge of managing/supervising the implementation of this new approaches? What's your opinion about it?

8. Cooperation
    8.1 How is collaboration between different public institutions facilitated to guarantee the effective implementation of these new approaches? Is it enough?

    8.2 Have alliances been established with external actors, such as academic institutions or private companies, to strengthen these capacities? What is your opinion? It's enough?

9. Monitoring
    9.1 What mechanisms are used to evaluate the effectiveness of the implementation of these approaches in public procurement? Are they enough?

    9.2 What forms of evaluation do you consider essential to implement? Why?

    9.3 How is the implementation process given feedback in general? Emphasise adoption and implementation capabilities

10. Final questions
    10.1 Are there any aspects that I have not addressed that you consider relevant?

    10.2 Is there anything else you would like to mention or add?

11. Closing

Thank you again for your time and exceptional willingness to participate.

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