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Political determinants in the strategic planning formulation of smart initiatives

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ABSTRACT

Governments increasingly promote the adoption of smart initiatives based on the intensive use of information and communication technologies (ICTs) to face urban challenges and improve the quality of life of citizens. Multiple styles of smart initiatives have been developed, depending on the government leadership, the level of participation, collaboration, and involvement of stakeholders and institutions in public decision-taking processes. In this respect, this paper identifies patterns of public strategies in their strategic planning approaches focused on political attributes, analysing 1635 smart initiatives disclosed on internet by 12 Spanish Smart Cities. Findings reveals that formal strategic planning is mainly performed in Smart Cities with conservative and coalition governments and where the predominant scope of strategy is global.

1. Introduction

The urban population growth has fostered the development of cities to become smart (SC) with the aim at facing new complex urban challenges through the taking public policies in different domains and reforming governance structures supported by Information and Communication Technologies (ICTs) (Rodríguez Bolívar, 2021). These public policies and governance models require holistic smart city strategic planning processes (Mega, 2022; Mora & Deakin, 2019; Nica, 2021) entailing a high level of complexity (Komninos, Kakderi, Panori, & Tsarchopoulos, 2019).

This strategic planning complexity implies that SCs must harmonise the long-term desired urban outcomes with short-term political interests (Cugurullo, 2013) which requires the implementation of politically neutral area in the strategic planning sphere (Angelidou, 2015a). Also, it makes necessary the implementation of inclusive management (Bryson, Crosby, & Bryson, 2009) and formal strategic planning processes (Pfeffer & Salancik, 2003), which have allowed the better involvement of stakeholders into this process and the successful implementation of strategic decisions for improving public-sector performance (Andrews, Boyne, Law, & Walker, 2009; Jung & Lee, 2013; Poister, Pasha, & Edwards, 2013; Steiner, 1979).

Despite the opponents indicate that formal strategic planning can inhibit innovative strategic planning (Quinn, 1978) and organizational changes (Feldman, 1986), formal strategic planning processes make activities and objectives clearer (Boyne, 2010) translating strategy into shorter-term goals (Alcaide Muñoz, Bello-Pintado, & de Cerio, 2018) and including strategic performance measures to align individual behaviours with public-service effectiveness (Poister et al., 2013; Pollanen, Abdel-Maksoud, Elbanna, & Mahama, 2017).

Indeed, recent research demonstrates that both creativity and innovation only seem to have a good ground on formal strategic planning processes (George, Walker, & Monster, 2019), which makes the formal strategic planning to have a positive impact on organizational performance (George et al., 2019). In brief, more formal procedures in strategic planning processes seems to lead to more successful implementation (Miller, 1997).

Nonetheless, there have not been any/many local governments with official and publicly available smart city policy documents up to the last five years, in which local governments have started to formalize their overall smart city perspectives through official policy documents (Micozzi & Yigitcanlar, 2022), perhaps motivated by the EU funding possibilities, for which having a strategic plan is a mandatory condition (Hințea, Profiroiu, & Țiclău, 2019).

In addition, recent research has indicated both the lack of political agreement with all stakeholders in governance (Nica, 2021) and the shaping of strategic plans primarily by the political approach or ideology not only of the local government releasing them (Ikizer, 2022), but also

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at national level due to a general "urban consciousness" and the need of the state to play a key role in policy implementation (Andersen & Damurski, 2022; Hu, 2020). Indeed, a research stream has considered that political factors influence the preparation and implementation of strategic planning (Chowdhury, 2017; Sager & Sørensen, 2011).

This way, Sharifian and Rezaei (2016) found political strength as an essential propellant to develop future scenarios about renewable power and strategic plan creation, whereas the European Union points out its relevance for determining sustainability transitions processes (Kelemen, 2020). In addition, attaching a dimension of power and political ideology to urban concepts is a significant part of making more informed, normative decisions in the development of cities (Hatuka, Rosen-Zvi, Birnhack, Toch, & Zur, 2018).

Finally, research indicates that strategic planning is more effective whether managers (Elbanna, Andrews, & Pollanen, 2016) and political elites (Moore, 1995; Panday & Chowdhury, 2020) are involved in the process of developing strategies, providing signals to decision makers of a way of knowing helpful (Bryson et al., 2009; Johnsen, 2018) and contributing to strategic-decision quality (Choi & Song, 2020).

Considering the confusing findings of prior research concerning the influence of politics on the strategic planning process in which planning scholars have not paid much attention to political strength and political ideology reflections on planning practices (Xue, 2022), this paper contributes to identifying their impact on the different aspects that characterise these strategic planning processes in SC initiatives including vertical/transversal, collaboration/no collaboration and bottom-up/top-down approaches as well as some characteristics of SCs (Correia, Marques, & Teixeira, 2022). Also, based on the three different strategy formulation approaches designed by Favoreu, Carassus, and Maurel (2016) -rational approach, political approach, and collaborative approach-, it could be interesting to analyse not only the causal effect but also the joint effect of some main attributes of strategic planning process, including that determined by political approach of SCs.

Therefore, based on prior research that has highlighted the political attributes as crucial factors in the adoption of new technologies (Alcaide Muñoz, Rodríguez Bolívar, & López Hernández, 2017; Gasco-Hernandez & Gil-Garcia, 2018), the objective of this paper is to analyse both the causal and the joint effect of some main attributes of strategic planning process in SC initiatives considering the political approach of these SCs and, in particular, the political strength and political ideology. To achieve this aim, this paper provides insights from empirical research focused on large-population SCs in Spain running a total of 1635 smart initiatives.

The remainder of this paper is as follows. The background of our study and the hypotheses formulation are described in the next section. Afterwards, the sample selection, the methods applied, as well as the smart initiatives attributes and the variables examined in this research are explained. Then, main results of our study are presented and, lastly, the discussion and conclusions.

2. Influence factors on strategic planning in SCs. Hypothesis formulation

2.1. Strategic planning patterns for SC initiatives and its impact on disclosing and developing formal strategic planning processes

Because of growing demands of citizens, governments put more efforts into adopting smart initiatives to improve the quality of life of citizenry (Rodríguez Bolívar, Alcaide Muñoz, & Alcaide Muñoz, 2020). The design and adoption of SC initiatives have been very different depending on the interpretation and consideration that governments have made (Caragliu, Del Bo, & Nijkamp, 2011; Meijer & Rodríguez Bolívar, 2015). Moreover, these initiatives encompass a high volume of processes, procedures, tasks, and stakeholder involvement, which makes it necessary for the formalization of strategic planning processes as a roadmap for achieving societal goals (Alcaide Muñoz et al., 2018). Indeed, the development and application of smart strategic planning requires the allocation of resources and the performance of tasks efficiently, to achieve the higher ambitious targets concerning several city areas (European Energy Research Alliance, 2018). Therefore, we are going to present the hypotheses considering the approaches that the design and planning of SC strategies can be adopted -see Table 1.

2.1.1. Scope of smart initiative (SSI)

The way/approach in which SCs initiative has been adopted by local government does vary. Some cities have led SCs projects individually (vertical approach), focusing their efforts on the strengthening of a certain city area (projects focused on a specific dimension of the city). However, others have forged a global strategy (transversal approach) with different action plans that groups multiple city areas (projects that have a whole approach involving several dimensions of the city), so government avoids chaotic market transactions caused by fragmented and independent efforts (Komninos et al., 2019). This type of approach needs a coordination mechanism to introduce coherence among the involved functional areas and to lead the decision-making process building the foundation of trading off and selection options (Alcaide Muñoz et al., 2018; Bryson, 2012). Therefore, a strategy involving several departments within the municipality and bringing together multiple stakeholders will require a formality so that all those involved know what resources they have, the objectives they must meet, the lines of action, etc. Taking this into account, we will test the hypotheses H_1 -see Table 1.

2.1.2. Collaboration

Although recent research emphasized that formalization of a project is not perceived useful for strategic planning purposes when several stakeholders are involve in its elaboration (Johnsen, 2018), formalized strategic plans seem to offer not only a guide for decision-making process (Bryson, 2012) but also to improve the coherence between operations decisions in different functional areas and the efficient allocation of resources among them (Albrechts & Balducci, 2013; Alcaide Muñoz et al., 2018). In short, they suppose a structured guide of all the processes, line of action, objectives, etc. that the stakeholders involved must consider for the project to reach its successful conclusion.

In this sense, it takes on special relevance on cross-sector collaboration and public-private organizations to tackle public issues (Kettl, 2015), since it is a complex process with multiple stakeholders involved, where each one has self-interest (Bryson, Crosby, & Stone, 2015). In this complex atmosphere, the formal strategic planning is highly beneficial, given that it guides the decision-making process, tasks, resources, and underrepresented groups. Hence, the higher collaboration in strategic planning processes, the higher probability of developing formalized strategic plans (Bryson et al., 2015). Taking this into account, we will test the hypotheses H_2 -see Table 1.

2.1.3. Strategic planning approach

Nonetheless, in prior research we can find a division of opinion concerning the most effective approaches to be taken in strategic planning processes. Some studies claim that the adoption of certain SC initiatives without further involving citizens and other local stakeholders in decision-making, often performed in approach of top-down planning, is obsolete (Gooch, Wolff, Kortuem, & Brown, 2015; Lange & Knieling, 2020). By contrast, others emphasized the need of a formalized and centralized top-down strategy aligned with the city's priorities to ensure the successful development of SCs.

Top-down approach has a long-term vision and a strategic framework for the governance of SC development (Cocchia, 2014). In this approach, the government adopt an authoritarian role, where all responsibilities and decision-making rest upon it. So, the only way to know what is going, what government is doing, how and where, is via a disseminated formal strategic planning, where all aspects of projects are described. Therefore, when citizens are not a proactive part of the

Table 1
Analysed variables, tested hypothesis and descriptive results.

	Variables	Sign	Acronym	Description	Calculation	Mean	Median	Std. dev.	Min.	Max.
	Type of Strategic Planning		FSP[a]	Approach used for strategic planning into the Smart City	0 = Informal 1 = Formal	0.738	1	–	0	1
	Independent Variables									
SC initiative approach Factors	Scope of Smart Initiative	+	SSI[a]	Smart initiatives can involve 1 department (vertical) or, 2 or more department (transversal)	0 = Vertical 1 = Transversal	0.734	1	–	0	1
	H_1. According to the information disclosed, the development of transversal approach in SC initiatives has positive influence on the probability of developing formal strategic planning.									
	Collaboration	+	COB[a]	Responsible body of the smart initiative (City government/private sector or public-private partnership)	0 = No collaboration 1 = Collaboration	0.069	0	–	0	1
	H_2. According to the information disclosed, the public-private collaboration in SC initiatives has positive influence on the probability of developing formal strategic planning									
	Strategic Planning Approach	+	APP[a]	Strategic planning approach when a Smart City initiative is implemented	0 = Top-Down 1 = Bottom-Up	0.012	0	–	0	1
	H_3. According to the information disclosed, the implementation of top-down approach in SC initiatives has positive influence on the probability of developing formal strategic planning.									
	Political ideology	+	IDE[b]	Political ideology of the ruling party	0 = Progressive 1 = Conservative	0.320	0	–	0	1
	H_4. According to the information disclosed, the conservative ideology has positive influence on the probability of developing formal strategic planning.									
Political Factors	Political Strength	+	STR[c]	Numerical variable that reflects the local governments' level of political strength (in percentage) – Herfindahl index	$\sum_{i=0}^{n} s_i^2 / s^2$ Where: S = Total councillors in municipality *Si* = Councillors in political party "*i*"	31.768	30.770	4.765	25	42.850
	H_5. According to the information disclosed, the political strength has positive influence on the probability of developing formal strategic planning. *H_6. According to the information disclosed, the political strength leverages the effects of developing vertical SC initiative on the probability of developing formal smart strategy.* *H_7. According to the information disclosed, the political strength leverages the effects of developing public-private collaboration on the probability of developing formal smart strategy.* *H_8. According to the information disclosed, the political strength leverages the effects of developing bottom-up approach on the probability of developing formal smart strategy.*									
Control Variable	Ln_population		LNPOP[b]	Population residing in the municipality.	Logarithm of inhabitants	12.918	12.515	0.750	12.285	14.973

Source: Own elaboration.
[a] Local Government Website.
[b] INE (National Statistical Institute) www.ine.es.
[c] Herfindahl index is used.

development of SCs, they are more insistent to demand information and transparency in SCs initiatives. That is, when citizens are not involved in the project, they become information seekers to monitor the decisions of public managers and, therefore, they need structured and detailed information on the project. Taking the preceding ideas into consideration, we will test the hypotheses H_3 displayed in Table 1.

Taking the preceding ideas into consideration, it suggests that SCs with a global strategy, collaboration between public and private institutions and top-down approach are most likely to develop and disclose formalized strategic plans. So, we will test the hypotheses H_1, H_2 and H_3 displayed in Table 1.

2.2. The casual and joint effects of political approach in SC initiatives

Prior studies have shown the influence of political approach on the development and implementation of new technologies (Rodríguez Bolívar, 2015) and the disclosure of financial, and organizational information (Alcaide Muñoz et al., 2017; Serrano, Calvet-Mir, Ribera-Fumaz, Díaz, & March, 2020). Indeed, the managerial leadership and political support within local government have been identified as key factors for the successful adoption of government initiatives (Rodríguez Bolívar & Alcaide-Muñoz, 2018), since political makers set the visions and goals of projects (Axelsson & Granath, 2018).

2.2.1. Political ideology

The role of policy makers has changed from solving cities' issues to promote smart projects with the aim at building capacities in urban systems to face urban challenges and improve the access to public values (Landry, 2006; Rodríguez Bolívar & Alcaide-Muñoz, 2018). According to Guenduez, Singler, Tomczak, Schedler, and Oberli (2018), policy makers must be totally engaged and committed into both the strategic process and the smart projects from the beginning, due to the competition of these projects with other initiatives to receive financial and personnel resources. So, it is interesting to identify the effects of some political attributes such as political strength and political ideology in SCs initiatives, mainly because these two attributes have demonstrated to be more favourable to influencing both sustainable policies and the development of SCs (Zhao & Fan, 2021).

Political ideology has a significant influence on the style of public administration management (Ribeiro & Scapens, 2006; Rodríguez Bolívar, 2015). Based on the partisan politics matters (PPM) thesis, left-wing parties tend to adopt social policies and carry out initiatives which increase in public spending and public investments (Ashworth, Geys, & Heyndels, 2005). Hence, Meijer (2012) claims that progressive governments are more inclined to develop initiatives in favour of civil society meanwhile conservative governments establish less market restrictions and uphold corporate interests as a form of citizens interests. In other words, the latter are more pro-active to include business values as philosophy in the public sector management; however, the former are linked to prioritize public values and civil initiative. Although, Rodríguez Bolívar (2015) highlights that both lines of thought perceive web 2.0 technologies as a great channel to disclose information, just conservative governments embrace them as potential tools for enhancing citizen engagement, participation, and knowledge sharing. Therefore, conservative governments are mostly prone to disclose information in detail.

Based on previous comments, cities with conservative government are expected to develop and disclose formal strategic planning. Therefore, we will test the hypotheses H_4 displayed in Table 1.

2.2.2. Political strength

As for political strength, it has significant influence on political decision-making (Geys, 2007). Based on the goal setting theory (Locke & Latham, 2002), weak governments may not establish clear goals and may try to satisfy all demands with the aim at winning the next electoral campaign. In other words, coalition government must achieve political agreement, which leads to internal conflicts and coordination problems (Roubini & Sachs, 1989). Moreover, coalition governments have more problems establishing clear and challenging goals (Rodríguez Bolívar, 2015). In consequence, coalition government is less effective in making decisions and undertaking political reforms, which affects the implementation of e-government technologies (Rodríguez Bolívar, 2015). Similarly, it can negatively affect not only the development of smart initiatives, but also its implementation. Thus, coalition government will be unable to undertake strategic and operations planning, and least of all the development of formalized strategic planning. Considering the above, we will test the hypotheses H_5 displayed in Table 1.

Policy makers usually ignore their prelection promises and prioritize their own interests rather than citizens' demands (Alcaide Muñoz et al., 2017). However, when the politicians elected face strong opposition these owned interests are mitigated because they are forced to justify their actions and, in turn, disclose information (Serrano et al., 2020). As a result, governing party develops initiatives in consistency with their prelection promise (meeting citizens' demands due to pressure from opposition parties); in addition to monitoring the implementation of their initiatives, in doing so, they ensure their continuity in office (Gandía & Archidona, 2008). This environment favors transparency, since governing party want voluntary to show its commitment to efficient management and the improvement of public services delivery (Alcaide Muñoz et al., 2017). It is the opposite of what happens in coalition environment, where there is usually no strong opposition party. Therefore, the difficulty of agreeing on an economic and political issues for all citizens in combination with the coalition government's inability to establish specific goals, will lead coalition government to focus on the development of individual strategies (vertical approach) instead of global strategies (transversal approach). Also, it is expected that the lower political strength, the less probability to undertake formal strategic planning by government (top-down approach).

Following this line of thought, prior research emphasizes that coalition governments are less inclined to contract out local public services and, thus, collaborate with private sector due to the political instability, common features of this type of government (De la Higuera-Molina, Plata-Díaz, López-Hernández, & Zafra-Gómez, 2019; Zafra-Gómez, López-Hernández, Plata-Díaz, & Garrido-Rodríguez, 2016). Therefore, it is expected that cities with coalition government do not favour public-private collaboration, the formulation of global strategies and the development of SC initiatives by government (top-down approach) due to as its inability to establish specific goals as well as political uncertainty that characterizes this type of government. So, we will test the hypotheses H_6, H_7 and H_8 displayed in Table 1.

In brief, the theoretical hypotheses to be tested in this research are shown below in Fig. 1, which displays a diagram of our model.

3. Methodology applied

3.1. The selection of cities under study

As Spain is one of the main European countries that lead the development and implementation of SCs initiatives (Alcaide Muñoz & Rodríguez Bolívar, 2021; Collins, Leonard, Cox, Greco, & Torrisi, 2017), it would be interesting to know how the strategic planning of these initiatives are formulated and implemented. The empirical evidence of this research could therefore reveal significant findings for other countries related to the strategic planning of SCs initiatives, exploring the SC's profile and political approach in the management and dissemination of strategic information on these projects.

This study is focuses at the local level and large-population cities, whose economies are highly competitive, which makes them more flexible in their governance models, provides them a better overview of urban challenges and allows them to follow an imitation process of novel smart solutions implemented in other cities (Angelidou, 2015b). It helps them to achieve an innovative development for planning, design, governance, and operations of urban infrastructure and services (Harrison & Donnelly, 2011).

As for the procedure used to gather data, it was developed in two stages. First, the authors identified the large-size Spanish smart cities.

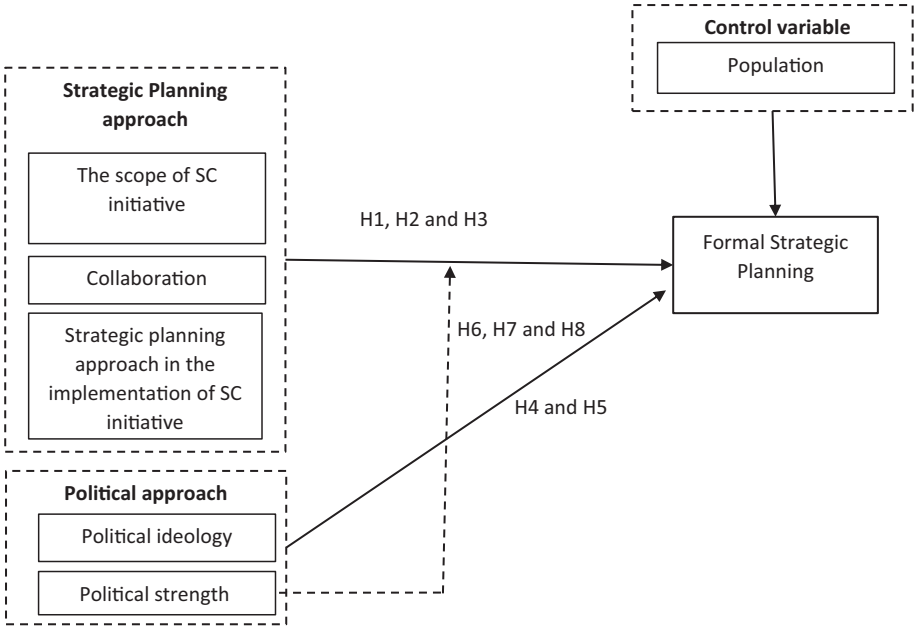

Fig. 1. The isolate and joint effects of urban context and political approach on the formalization of smart strategy.

These sample smart cities were collected from those with a population between 200,000 a 4 million inhabitants included into two widely accepted smart cities world rankings. The first one, a European project sponsored by Asset One Inmobilienentwicklungs AG (see http://www.smart-cities.eu), requiring cities some attributes to be considered as "smart" (Giffinger & Gudrun, 2010), provided us seven Spanish SCs to the sample selection. The second one, the EUROCITIES network (http://www.eurocities.eu), are composed by local governments of the major European SCs with the aim at strengthening their smart governance structures. In doing so, five new Spanish SCs were also included in our research. In a nutshell, a total of twelve large-size Spanish SCs makes up our sample.

The second stage consisted in the identification of strategies undertaking in these SCs, following the specific selection criteria by Yigitcanlar (2018) framework. The authors checked out the official website of each city to gather the strategy or policy which aims at improving the quality of life for citizens, in a nutshell, developing them as SCs. In doing so, this research collected data for each smart initiative about the department responsible of the project, stakeholders involved, the smart city domain, vision, strategic objectives, and policies on the smart city transformation of the city.

This search was conducted in January–February 2022, just considering policies online disclosed until this date. In accordance with the preceding selection criteria, a total of 1635 smart initiatives were examined. As we can observe in Table 2, the cities with most smart initiatives undertaken are Terrassa (32.52%), Gijon (15.42%), Malaga (12.48%), Seville (8.07%), Zaragoza (8.07%), A Coruña (7.77%) and Madrid (6.29%).

A glance at Table 2 reveals that Madrid and Barcelona are the two Spanish cities with the largest population (3,182,981 and 1,620,809 inhabitants, respectively) and their government got a progressive ideology. However, there is a higher political strength in Madrid. Although, in general, most of cities under study have a great political strength, Bilbao, Málaga and Murcia have the highest values (around 40); in addition to be led by conservative governments.

3.2. The definition of smart initiatives attributes and variables used, and mathematical formulation of the models

As noted in preceding sections, this study focuses on the analysis of political attributes of SCs to identify patterns in the development of smart strategies. To achieve this aim, we analyse whether cities under study formulate formal or informal strategic planning in conjunction with the approach developed in each smart initiative (transversal or vertical). In other words, we figure out whether the scope of the smart project application (transversal/vertical pattern) (SSI) (H_1), the responsible body of the smart project (the city government or the city government jointly with other stakeholders) (COB) (H_2) and the project development approach (bottom-up/top-down) (APP) (H_3) can sway the formal/informal formulation of strategy and its dissemination by governments. These variables obtained from the information on smart policies and strategies published by Spanish SCs on their official web pages, have been defined as dichotomous variables (see Table 2).

Table 2
Characteristics of sample selection.

City	% Smart initiatives	Population	Political ideology	Political strength
Terrassa	30.52%	216,428	Progressive	30.77
Gijon	15.42%	272,365	Conservative	26.92
Málaga	12.48%	569,002	Conservative	40
Seville	8.07%	689,434	Progressive	33.33
Zaragoza	8.07%	664,938	Progressive	26.67
A Coruña	7.77%	244,099	Progressive	34.62
Madrid	6.29%	3,182,981	Progressive	35.08
Barcelona	3.43%	1,620,809	Progressive	25
Valladolid	2.87%	299,715	Progressive	25
Bilbao	2.45%	345,110	Conservative	42.85
Murcia	1.71%	443,243	Conservative	37.03
Valencia	0.92%	787,808	Progressive	25.8

Source: Own elaboration.

As for political variables, we included political ideology (IDE) (H_4) and political strength (H_5). The first one is defined as a dichotomous variable, where if government led city under studies got a conservative ideology, it is labelled by 1, but if government got a progressive ideology, it is labelled by 0 (see Table 1). The second one reflects the local governments' level of political strength. In this sense, the greater value of this variable is, the greater political strength is. In other words, high values of this attribute mean the need of coalition to govern. In our study, the casual effect of each political attribute is estimated. Also, we analysed the joint effects of political strength with the scope of the smart project application (transversal/vertical pattern) (H_6), the responsible body of the smart project (H_7) and the project development approach (bottom-up/top-down) (H_8).

Finally, we have included the natural logarithm of the population as a control variable. According to EU (European Parliament, 2014) the effect size may lead to different patterns in government SCs. Prior studies have offered significant evidence on the positive effects of population on both the adoption of new technology and the innovation of city governments to provide public services and promote transparency (Rodríguez Bolívar & Alcaide-Muñoz, 2018; Bonsón, Torres, Royo, & Flores, 2012). In this sense, larger SCs involve a considerable number of stakeholders with different competing interests into the public sector delivery. They put intensive pressure on disclosing information about smart initiatives, resulting in a growing committed to favouring the development and implementation of public services by these SCs (Rodríguez Bolívar & Alcaide-Muñoz, 2018). By contrast, smaller cities often possess their own powerful sense of place and identity, resulting in simple consensus and collaboration (Bradford, 2004). Therefore, formalized strategic planning would be more needed and useful in large cities, given that it may help to coordinate tasks, areas, institutions, and people, in addition to promoting transparency.

The conceptualization of the theoretical models can be formulated as follow:

$$FSP=\alpha+\beta_1{}^*SSI_i+\beta_2{}^*COB_i+\beta_3{}^*APP_i+\beta_4{}^*IDE_i+\beta_5{}^*STR_i+\beta_6{}^*LNPOP_i+\varepsilon i \quad (1.1)$$

$$FSP=\alpha+\beta_1{}^*SSI_i+\beta_2{}^*COB_i+\beta_3{}^*APP_i+\beta_4{}^*IDE_i+\beta_5{}^*STR_i+\beta_6{}^*LNPOP_i+\beta_7{}^*STRxSSI_i+\varepsilon i \quad (1.2)$$

$$FSP=\alpha+\beta_1{}^*SSI_i+\beta_2{}^*COB_i+\beta_3{}^*APP_i+\beta_4{}^*IDE_i+\beta_5{}^*STR_i+\beta_6{}^*LNPOP_i+\beta_7{}^*STRxCOB_i+\varepsilon i \quad (1.3)$$

$$FSP=\alpha+\beta_1{}^*SSI_i+\beta_2{}^*COB_i+\beta_3{}^*APP_i+\beta_4{}^*IDE_i+\beta_5{}^*STR_i+\beta_6{}^*LNPOP_i+\beta_7{}^*STRxAPP_i+\varepsilon i \quad (1.4)$$

where i is the number of SC initiatives analysed and ε the unobservable information. FSP is the dependent variable "the type of strategic planning", the acronymous of "the scope of smart initiatives", "public-private collaboration" and "the approach of strategic planning" are SSI, COB and APP, respectively. IDE and STR concern "political ideology" and "political strength" whereas LNPOP is the control variable "population".

3.3. Technique applied in this study

The probit regression model has been applied for testing the hypotheses posed, given the dichotomous nature of the explicative variable (Ai & Norton, 2003). In this study, four models were estimated: the first

one shows the causal effects of smart initiative approach with whole of variables (testing from H_1 to H_5), and the rest of models analyse interaction effects between political variables and the type of strategic planning (testing from H_6 to H_8).

Some scholars have highlighted the need to pay special attention to the results interpretation in non-linear models, particularly, the joint effects (Ai & Norton, 2003; Anzola-Román, Bayona-Sáez, & García-Marco, 2018) since the estimation on the estimated coefficients might lead to misleading analysis. The parameters of the probit model are not the marginal effects, so analysing the significance and level of non-linear models' coefficients do not offer useful information. In addition, the coefficient of the interaction terms cannot be interpreted as meaningful concerning the magnitude as well as the sign, as the interaction effect may be significant even if the coefficient of the multiplicative variable is not significant (Anzola-Román et al., 2018). Hence, our study is focused on the estimated marginal effects of the independent variables. In the probit model, there are not constant values in the marginal effects along the whole range of values of the dependent variables. It makes the effect of the change in one independent variable to change based on the value adopted by the other variables in the model.

The effect of the variable average across the sample is explained by Average marginal effects (AMEs), providing the marginal effects of a given variable setting the rest at the values obtained for each of the responses in the sample and them averages the results. The methos used to obtained AMEs has been referred to as the 'observed value' approach (Hanmer & Ozan Kalkan, 2013). In fact, Ai and Norton (2003), in a seminar work, emphasize the real importance of its use to obtain a better understanding of causal effects and joint effects in non-linear models. Indeed, multiple studies have found novel insights concerning the use of this methodology (Brambor, Clark, & Golder, 2006; Karaca-Mandic, Norton, & Dowd, 2012). This technique is not so popular in this field under study, although it is highly used in others such as those related to innovation management, (Anzola-Román et al., 2018; Hecker & Ganter, 2016).

4. Main findings and discussions

Descriptive statistics of each variable under study are displayed in Table 1. We can observe that governments seem to mainly promote the development of formal and transversal strategies (their medians are 1). Additionally, public-private collaboration and the involvement of citizens as leaders in the formulation of initiatives (Bottom-up) are weakly promoted. Therefore, the responsibility in the formulation and adoption of projects rests on governments. Concerning the political attributes, the initiatives have primarily been developed under a progressive and coalition political environment (political strength is below 50%).

The pairwise correlation coefficients (containing significant level) of each variable under study are displayed in Table 3. In general, we can observe that correlation values among explicative variables (independent variables) are low (far below 0.75) (Tsui, Ashford, Clair, & Xin, 1995). Besides, the values of the variance of inflation factors (VIF) are so far <10 (Kennedy, 1985; Neter, Kutner, Wasserman, & Nachtsheim, 1996). So, our data do not present no multicollinearity problems in the models posed.

Table 4
Probit regression for formal/informal strategic planning with political strength interaction.

	Model 1.1	Model 1.2	Model 1.3	Model 1.4
SSI	2.677***	12.395***	2.701***	2.678***
COB	0.219	0.325	3.348	0.206
APP	−1.089*	−1.036*	−0.931	−2.024
STR	−0.363***	−0.325***	−0.358***	−0.363***
IDE	1.895***	3.870***	1.881***	1.889***
Moderating effects				
STR X SSI		−0.286**		
STR X COB			−0.089	
STR X APP				0.024
Control variable				
LNPOP	−1.089***	−2.041***	−1.861***	−1.812***
Constant	35.000***	36.585***	35.411***	34.962***
Pseudo R^2	0.556	0.567	0.579	0.556
Log likelihood	−115.990	−112.809	−115.326	−115.716

Source: Own Elaboration with data from Stata * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

As for the analysis of the casual effects, Table 4 offers relevant information about the direct and joint effects of variables concerning smart initiatives approaches and political attributes. The first model (model 1.1.) exhibits significant and positive estimated coefficients of the explanatory variables SSI and IDE, which confirms H_1 and H_4. The confidence intervals of the estimation of the AMEs for TPS and IDE confirms this result since they show values above zero (see Fig. 2). Hence, local government with a conservative ideology and favouring holistic smart initiatives have a positive impact on the probability of developing and disclosing formal strategic planning.

These findings are in accordance with prior literature. Conservative

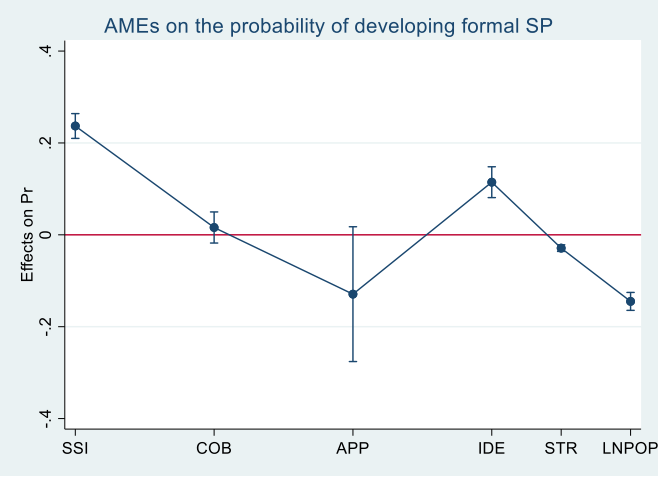

Fig. 2. AMEs for smart initiative approach and political approach.

Table 3
Correlation's matrix.

	FSP	SSI	COB	APP	IDE	STR	LNPOP	VIF
FSP	1							
SSI	0.288***	1						1.08
COB	−0.041	0.035	1					1.06
APP	−0.110***	−0.016	0.150***	1				1.04
IDE	0.287***	0.264***	−0.130***	−0.048	1			1.19
STR	0.132***	0.058	0.031	0.019	0.288	1		1.24
LNPOP	−0.684***	0.048	0.023	0.061*	−0.066**	0.191***	1	1.16

Source: Own Elaboration with data from Stata * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

governments are more willing to disclosure relevant information and implement new technologies as means of improving public services and encouraging citizens engagement and participation (Meijer, 2012; Rodríguez Bolívar, 2015). In this case, a formulated strategic planning is needed since citizens cannot be active part of a project if they do not know it in detail.

Regarding APP and STR, their estimated coefficients are negative and significant; however, both H4, and H5 are rejected. The first one is due to the non-significant of estimated AMEs for APP. In other words, the findings of the confidence intervals for the estimation of the AMEs of theses variables (90% confidence level) just confirms the significant value for STR, but it is below zero (see Fig. 2). Therefore, contrary to prior research (Rodríguez Bolívar, 2015; Roubini & Sachs, 1989), the pressure from opposition parties to fulfil citizens' demands and disclosure information does not require strategic planning to be formal. The agreements reached in non-coalition environment are informal because the few individuals involved share common values and interests. However, in a coalition environment, many parties are involved and, therefore there are conflicts of interests, which hinders the possibility of coming to agreements. Those agreements, finally reached, are laid down

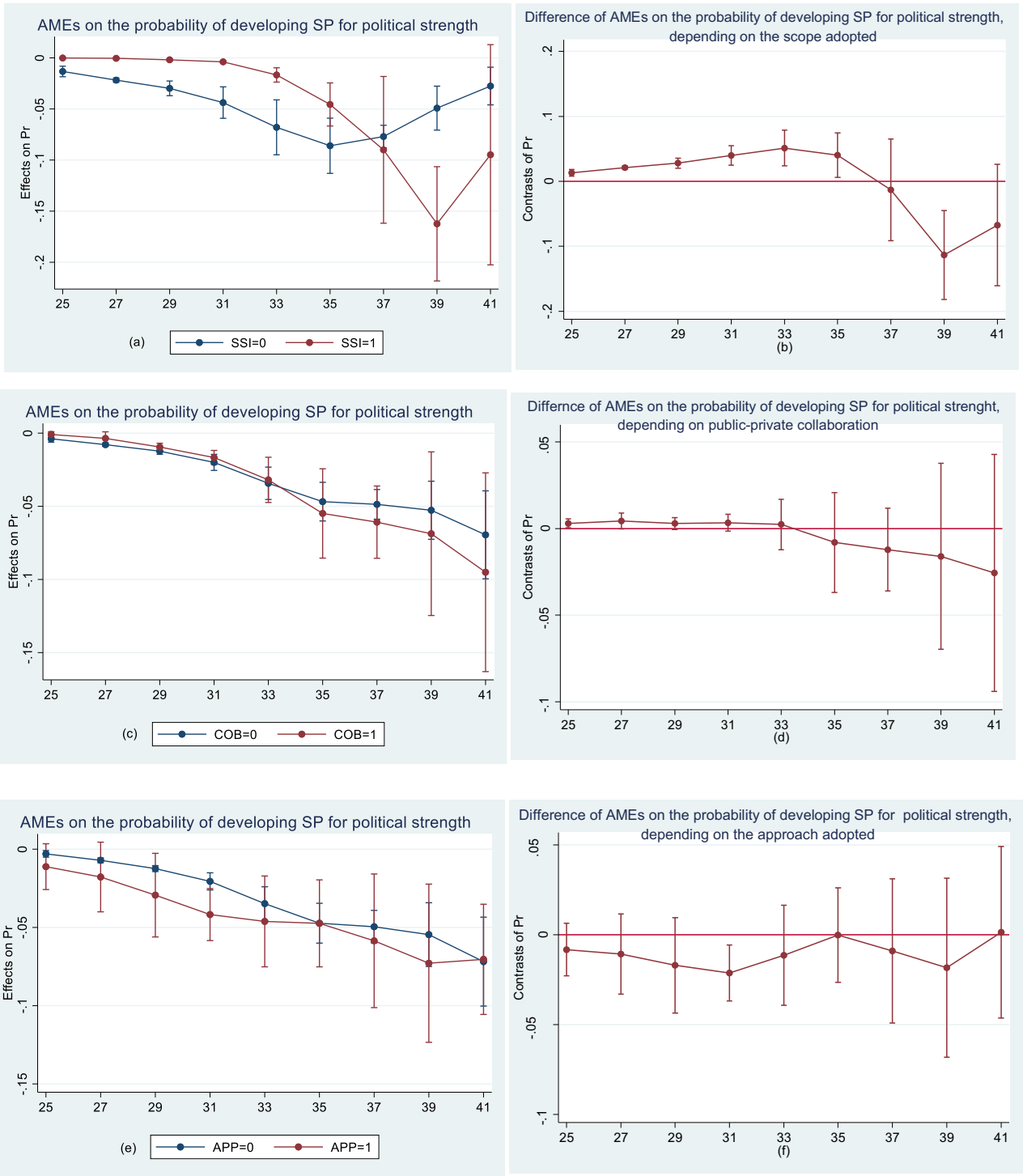

Fig. 3. AMEs of the smart initiative approach, depending on the value of political strength.

in a formal way, that is, in formal strategy plans, where each phase of strategy, its goals, funds and available resources are described in detail.

Concerning the population size of the city, its influence is also negative and significant (LNPOP). Contrary to prior research (Alcaide Muñoz et al., 2017; Rodríguez Bolívar & Alcaide-Muñoz, 2018; Saez-Martin, Caba-Perez, & Lopez-Hernandez, 2017), these findings suggest that large-sized cities are less likely to develop and disclose formal strategic planning. Perhaps, the strong sense of place and identity of citizens in smaller-sized cities exert positive effects on governments to disclosure full, documented, clear and accessible information.

STATA 14.1 program was used to estimate the preceding models.

To analyse the potential of moderating effects of political attributes, models 1.2, 1.3 and 1.4 were estimated (see Table 4) and AMEs are calculated for SSI, COB and APP, considering the multiplicate effects of the political strength in the local government (see Fig. 3). In this regard, findings reveal that in cities with coalition governments, the probability of developing and disclosing formal strategic planning is higher when a transversal strategic scope is adopted. However, no-coalition governments seem to be more prone to formalize strategies when just one department is involved. We can observe it in Fig. 3a and b. The first one shows the AMEs on the development of formal strategic planning for political strength on both vertical and transactional scopes, and the second one reveals that there is significant difference between AMEs obtained in Fig. 3a. So, this finding supports H_6. In other words, in a coalition environment, a formal strategic planning is really a must, particularly with multiple involved areas or departments since it is properly a communication and coordination mechanism. It is consistent with prior research on strategic planning, which highlight the benefits of formal strategic planning as a source of explicit knowledge and a powerful tool for getting greater involvement of stakeholders into decision making process, minimizing conflicts, and adopting strategies successfully (Alcaide Muñoz et al., 2018; Jung & Lee, 2013; Poister et al., 2013).

As for public-private collaboration, the differences of AMEs are not significant (see Fig. 3d and c). It shows that the probability of developing and disclosing formal strategic planning decreases in both the presence and absence of public-private collaboration. Similarly, the probability of developing formal strategic planning decreases according to the type of approach adopted (see Fig. 3e and f). Prior studies have revealed a negative influence of coalition government on political decision-making, since they are less effective in taking decisions and undertaking political reforms (De la Higuera-Molina et al., 2019; Geys, 2007; Rodríguez Bolívar, 2015). However, from a strategic point of view, it appears more than likely that the formalized strategic planning is developed when different parties are involved, since each interest of respective parts must be reflected in writing. That is the only way that projects may be adopted successfully in a coalition environment.

5. Conclusions and future research

City governments must constantly face multiple challenges to deliver public services that improve the quality of life of citizenry. Special attention must be paid to strategic planning and public management in urban environments with the aim at integrating the different public services into a holistic view of the city which could have an impact on improving the citizens' quality of life (Rodríguez Bolívar et al., 2020). Although, a few studies have analysed the implementation of strategies on SCs (Cowley, Joss, & Dayot, 2017; Mora & Deakin, 2019; Schiavone, Appio, Mora, & Risitano, 2020), no great attention has been put on the importance of integrated strategies, on the strategic approach adopted and on the influence of political attributes on the different strategy implementation. This study brings novelty insights concerning the identification of patterns of strategic planning approaches concerning the main political attributes (political strength and political ideology) presented in the formulation and adoption of SCs initiatives.

This research highlights the importance of formal strategic planning as coordination mechanism, especially when multiple initiatives and city areas (transversal approach) are involved, so governments can integrate and unify efforts to pull them in the same direction and avoid chaotic market transactions caused by fragmentated and independent efforts (Komninos et al., 2019). Formal strategic planning as a key tool to allocate resources and developed tasks efficiently results in the achievement of the higher ambitious objectives in different city areas (European Energy Research Alliance, 2018).

The enormous resources required to develop SC initiatives encourage government to cooperate with private sectors and citizens, in general. Even, some researchers have claimed the importance of involving citizens in decision-making process to solve public issues and offer, in an efficient way, public services (Meijer & Rodríguez Bolívar, 2015; Rodríguez Bolívar, 2015). So, both top-down and bottom-up initiatives are developed for co-creating strategies (Mayangsari & Novani, 2015; Mora & Deakin, 2019; Polese, Barile, Caputo, Carrubbo, & Waletzky, 2018). In this sense, governments should favour citizens' participation and cooperation and, also, "educate" citizens to take part in public life and decision-making process, motivating discussions through new technologies. However, our models do not bring empirical evidence in this issue, since the cooperation and involvement of citizens, either by collaborative efforts between public and private sectors or SC initiatives driven mainly by citizens (bottom-up approach), are not significant. So, we cannot provide empirical evidence to the related literature on what collaborative approaches are most likely to support SC developments (Schiavone et al., 2020). This way, future research should evaluate the new collaborative approaches risen in SCs.

Furthermore, conservative governments are more pro-active to develop formal strategic planning in SCs. It may be due that conservative governments are prone to embrace new technologies as potential tools for enhancing citizen engagement, participation and knowledge sharing and, promoting the business values as philosophy in the public sector management (Meijer, 2012; Rodríguez Bolívar, 2015). It confirms the significant influence of leadership not only in the formalization of strategy, but also in the successful implementation of strategies (Alcaide Muñoz, 2019). The role of leaders and, hence, their ideology and philosophy in the adoption of strategy is crucial, since they influence subordinates implicated on the daily implementation of policies and practices within organizations (Gopal and Chowdhury, 2014).

Additionally, it stresses the importance of political strength on the development and disclosure of SC initiatives and the probability of developing formal strategic plans. In this respect, as prior research indicates, coalition governments create an atmosphere of uncertainty and are totally unproductive (De la Higuera-Molina et al., 2019; Geys, 2007), since they are unable to reach agreements and approve proposals caused mainly by conflicts of the self-interest in each party. So, it can be concluded that the formalization of strategy is more essential in this type of environment, where a coordination mechanism is, more than ever, a need for alleviating the risk of conflicts of interest as well as for implementing strategy successfully.

Our research also found out that political strength has influence on the way in which the strategies are developed. When the responsibility and decision-making rests upon one party, the probability of developing formal strategic planning is higher in a vertical approach. In other words, non-coalition governments mainly favour the development of isolated strategies, where just one area or department is involved. However, when several parties are involved (coalition environment), the strategies formally developed address issues from multiple areas or departments (transversal strategy). It may be due to each part involved in the agreement has its own interests for strengthening one/more areas, resulting in the development of strategies with diverse and different actions plans.

In brief, our research confirms current studies on the evolution of SC initiatives promoted, where governments increasingly favour the participation and cooperation of citizens in decision-making process via new technologies (Komninos et al., 2019). This way, it seems to suggest

that varying patterns of public strategies in SC strategic planning processes leads to different governance models, from bureaucratic or hierarchical ones to networked ones. In this regard, future research could investigate if the implementation of different governance models into the SCs could influence on the strategic planning process and their outcomes.

Additionally, our research highlights the significant influence of political attributes on the formulation of SC strategies. Therefore, future research could investigate this issue on SCs in different stages of maturity as well as the influence of others political attributes on the adoption of SC initiatives. In addition, our results are obtained in a specific Spanish context. As prior research has indicated, cities are context-dependent (Komninos et al., 2019). Therefore, it could be relevant that future research to analyse this problem in other institutional contexts.

In brief, this is a novel study which opens new research stream for future research on strategic planning process in SCs. It should be focused on the identification of key factors that influence patterns of public strategies and guarantee the successful of strategy implementation. In addition, it would be important to get a greater understanding of stages of maturity of strategic planning process into SCs.

Author statement

The smart city strategic plans analysed are available on the official websites of the analysed municipalities and are freely available.

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