

ANTECEDENTS OF VALUE CO-CREATION ACTIVITIES IN SUSTAINABLE DEVELOPMENT-DRIVEN COMMUNITIES OF PRACTICE

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ABSTRACT

This research studies the antecedents of participation by municipal managers in value co-creation activities in sustainable development-driven communities of practice (CoPs). Research results have important practical and academic implications. From a practical perspective, inter-municipality CoPs are needed to face the complex challenges posed by sustainable development, as has been shown by the experience of LA21 implementation in Europe. Although CoPs may be promoted by higher levels of government, it is unclear how to drive effective CoPs. From an academic perspective, a great deal of research has been devoted to explaining the antecedents of participation in teams and virtual communities. However, quantitative research on CoPs is very scarce, and we do not know any previous research that studies the antecedents of sharing knowledge in CoPs within complex environments where the participation of actors in co-creation activities (in our case, participation by municipal managers') is affected by their own beliefs, their social context, the momentum of the institution they work for (municipality) and the momentum of CoP promoters (in our case, higher levels of government). We propose a model that provides the basis for identifying the appropriate set of CoPs design features. The study hypotheses are tested using data collected from 156 municipal managers who are members of a Local Agenda 21 (LA21) CoP in Barcelona. The results offer strong support for the model.

Keywords:

Communities of practice (CoPs), sustainable development, social capital, co-creation, co-decision.

1. Introduction

Diverse forms of multi-actor collaboration - in the shape of innovation teams, virtual communities and communities of practice - have gained a great deal of attention from practitioners and scholars alike. They are viewed as an effective way to face the complex challenges that organisations, institutions and modern societies have to face today. Specifically, sustainable development complex issues are an increasing concern. And sustainability is not the responsibility of any single country, region or group, but a responsibility shared by all. In order to address sustainability issues (such as climate change), the day-to-day activities of individuals, families, firms, communities, and governments at multiple levels must change substantially (Ostrom 2010). Municipalities, in particular, have a central role in promoting sustainable development, given their closeness to the causes and solutions of many of the problems associated with this major goal (Evans et al., 2005; Krueger and Agyeman, 2005). Take communities that have established power networks, for instance, that enable households to invest in solar power to be used for household energy needs, and reduce local energy costs and greenhouse gas emissions. Furthermore, as the level of governance that is closest to people, local councils play a vital role in educating, mobilising and responding to the public concerning issues that promote sustainable development.

In consequence, diverse international forums have emphasised the need to promote long-term participatory strategic planning processes that address local sustainability. A specific example is provided by the countries that participated in the Rio de Janeiro World Summit (Brazil, June 1992) and subscribed, at least nominally, to the United Nations proposal to promote the devising and implementation of local sustainable development strategies, known as Local Agenda 21 (LA21). LA21 is understood as a municipality-led, community-wide participatory effort to establish a comprehensive medium-term local strategic plan for tackling environmental, social, economic and cultural issues (Hamdouch and Depret, 2010) that lead to quality-of-life improvement (Meister and Japp, 1998; O'Riordan and Voisey, 1998). By 1996, most local authorities in each country ought to have undertaken a first consultative process with their populations and achieved a consensus on LA21 for the community. Nevertheless, 15 years after the proposed deadline the response of local authorities is far from generalised. So, research efforts addressed at indicating possible paths towards a more across-the-board diffusion of locally-based sustainable development strategies are needed. This research seeks to respond to this need by analysing the experience of a specific province in Europe, Barcelona, which has developed a successful experience.

Previous research has studied LA21 processes in Europe and concluded that when LA21 is considered to be the sole responsibility of municipalities, higher levels of LA21 dissemination are unlikely to be achieved (Coenen et al., 1999; Echebarria et al., 2009). A lack of resources and capacities in the area of SD experience and knowledge in relation to the new tool has been considered an important brake on the spread of LA21 (Echebarria et al., 2009). In spite of these difficulties, however, diverse empirical evidence regarding LA21 seems to indicate that, in territories where communities of practice (CoPs) have emerged, LA21 dissemination tends to be higher. CoPs seem to constitute a launch pad for the explosion of initiatives of this kind, as illustrated by the cases of Italy (Sancassiani, 2005), Sweden (see the case of eco-municipalities in Eckerberg and Dahlgren, 2007) and Spain (Echebarria et al., 2004, 2009). Municipal governments participating in CoPs appear to obtain important benefits from the transmission of experiences and inter-municipal collaboration (Echebarria et al., 2009). It is not entirely clear what features these CoPs should have to succeed. This research attempts to find answers in relation to the mechanisms that must be implemented so that these CoPs may operate. We address a key question: Why do municipalities – and more specifically LA21 municipal managers – participate in value co-creation activities?

The Barcelona experience of inter-municipal collaboration is studied under the lens of various research traditions. We build on the Uses and Gratifications Paradigm (Katz et al., 1974), the Social Capital Theory (Coleman, 1990; Nahapiet and Ghoshal, 1998), CoP literature (Wenger,

1998; Wenger et al., 2002) and LA21 literature (Coenen et al., 1999) to propose an integrated framework for understanding the motivational levers that lead to the participation of municipal managers in LA21 CoPs. By using a multidisciplinary perspective we are able to explain a complex reality and at the same time offer some new insights to extend each specific research tradition.

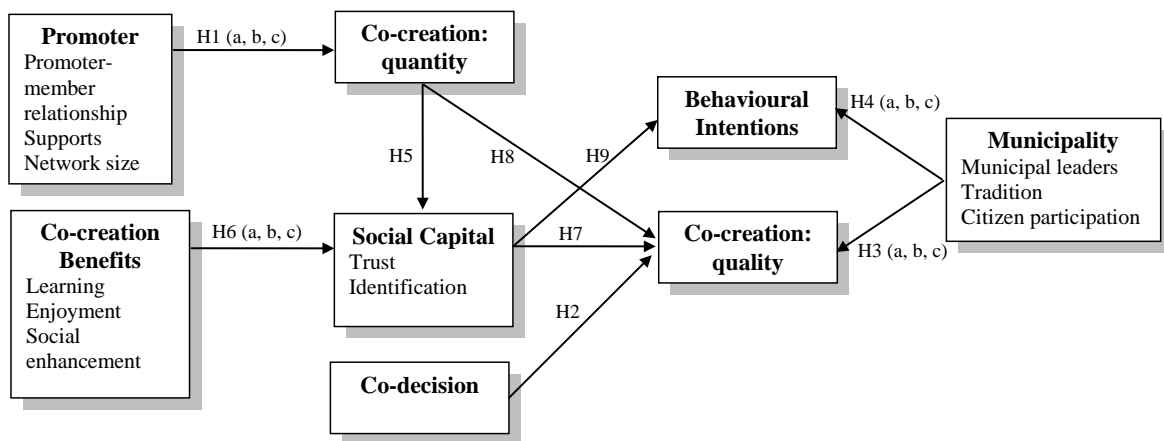
The remainder of the paper is structured as follows. The next section refers to the conceptual background that serves as a basis for this research, and develops the model and hypotheses that were quantitatively tested. The third section deals with the results of the empirical test. The fourth section presents discussion and conclusions. The final section refers to future research.

2. Conceptual background and hypotheses development

The model to be tested is depicted in figure 1. It explains the antecedents of municipal managers' current participation in co-creation activities in CoPs and their behavioural intentions. We consider three levels of analysis for examining antecedents of co-creation in CoPs: member level, concerning the specific motivations of community members; municipality level, concerning the municipal specifics that affect the current participation and behavioural intentions of LA21 municipal managers; and promoter level, concerning the relevant characteristics of the organisation which promotes the CoP. This view includes the two levels previously considered in models of team efficiency (i.e. individual and organisation) (McGrath, 1964) and in previous research regarding company-hosted CoPs (Zboralski, 2009). An additional level of analysis (i.e. the promoter) is needed to understand the complex process underlying CoPs promoted by higher levels of government. All three groups of antecedents and their impact on CoP interaction are discussed in more detail in the remainder of this section.

Participation in co-creation activities is considered in terms of quantity and quality. This differentiation is crucial, because participation of municipal managers in the CoP is not fully voluntary. It is affected by rewards offered by the higher level of government and the momentum of the municipality members work for. As we explain below, diverse motivational levers have different effects on the quantity and quality of participation in CoPs.

Figure 1. Antecedents of co-creation and behavioural intentions: an integrative framework



2.1. Promoter level

The CoP is depicted as being promoted by an entrepreneurial organisation (in our case the Barcelona Provincial Council). Initially, LA21 is viewed as a complex tool and generates a strong sense of insecurity and uncertainty in the local authorities, making it very difficult for them to get the process going. Many municipalities are small and may not be able to call on the necessary human and knowledge resources. Furthermore, they are afraid of participation from civil society (Coenen, 2009). They wonder what would happen, for instance, if they were not able to meet the commitments undertaken. As a consequence, the perception of benefits has to

be reinforced in the municipalities, and becomes a crucial factor in policy success. The promoter is viewed as a mobiliser and facilitator of LA21 CoPs. Its role is to motivate and facilitate the process of value co-creation, as a means of achieving LA21 embrace. On the basis of previous research we firstly focus on three of the promoter's characteristics that have a relevant effect on CoP success: member-promoter relationship, complements to the focal LA21 tool, and communication regarding CoP.

Promoter-member relationship refers to the way CoP members perceive the promoter in terms of accessibility, collaboration and quality (Frels et al., 2003; Carson et al., 2007). As the promoter acts as the leader of the CoP, the perception LA21 municipal managers have of the promoter will be a main factor in explaining the decision they take regarding possible participation in the CoP. The promoter-member relationship has been found to be a relevant explanatory factor of the diffusion of LA21 processes in different countries (see, e.g., Sancassiani, 2005). Complements concerns financial support, training and human resources provision, a hot line and so forth. They have been traditionally considered as main motivating mechanisms for participation. Social exchange theory (Blau 1964), for instance, suggests that expectations of rewards motivate actor participation. Marketing literature has considered that complements may add value to the tool in isolation (e.g. Frels et al., 2003). The conclusion marketing literature arrives at is consistent with studies of LA21 implementation in Europe, which point towards the need for support from the higher levels of government (see, e.g., Lindström and Johnsson, 2003, regarding Sweden; Coenen, 2001, regarding Holland; Kern et al., 2004, for Germany; Sancassiani, 2005, for Italy; and Echebarria et al., 2004, in relation to Spain). Building on the work by Frels et al. (2003), we defined LA21 network size as the extent to which municipalities consider that the present and the expected dimension of the LA21 network is high. We believe that an important role of promoters is communication regarding network size. The relevance of network size is supported by social network theory, which argues that the number and prestige of present users should be a key factor for new adopter value perception (Scott, 1991). Taking this argument as a point of departure, institutional theory has demonstrated that wide adoption of tools such as LA21 confers legitimacy within the institutional sphere, which contributes to speeding up their diffusion (Di Maggio and Powell, 1991). The network externalities theory reinforces these ideas, in suggesting that network size is the most important factor among those to be weighed up by new adopters when taking their decision (Katz and Shapiro, 1985). The assertions made above are also borne out by the European experience of LA21, which shows us some countries, on the one hand, such as Switzerland and Portugal, where the presence of LA21 processes is only anecdotal, due to not having achieved a minimum critical mass, and other countries where, although time was required for the process to root, the spread of processes began to be progressive as higher levels of implantation were reached (as occurred in Spain and Italy). From an innovation adoption perspective, network size (via legitimacy-searching) has been considered a main predictor of e-government adoption (Jun and Weare, 2010). So we hypothesise that:

Hypothesis 1 (a, b, c): The member-promoter relationship (H1a), the complements to the focal LA21 tool (H1b), and perception regarding CoP size (H1c) will directly and positively affect the participation of municipalities in co-creation activities (in terms of quantity).

Another factor affected by the promoter view of the CoP, but with different implications, is co-decision. Co-decision also has to do with the characteristics of the municipalities and LA21 municipal managers. Co-decision occurs when inputs from members of the network are assembled to generate a decision that holds for the CoP as a whole (Malone et al., 2009). Benefits for people participating in decisions that affect them have been highlighted by diverse literatures. From a participative leadership point of view, Yukl (1981) argues that potential benefits of participation include better decisions and greater acceptance of decisions by people who will implement them or be affected by them. By participating, people feel that decisions match the desired goals. In this regard, public-private partnership and collaborative management literatures have emphasised the relevance of sharing a commonly accepted vision, objectives

and tasks to explain network success (Agranoff and McGuire, 2003; Barrutia and Echebarria, 2011). Marketing literature has considered participation in decisions from various perspectives. It has been shown, for example, that sales force participation in decision making may have a positive direct impact on sales force job satisfaction (Teas, 1983; Brown and Peterson, 1993). Integrating the consumer in the decisions that affect the tool and the complements needed to adopt it (i.e. the 'augmented tool') makes it possible to adapt the product to adopter demands and increase the chance of adoption (Prahalad and Ramaswamy, 2004). Research in business-to-business contexts shows co-decision leads to effective solutions (Cova and Salle, 2008). LA21 literature shows that some complements can sometimes go against the objective of LA21 dissemination processes, even though their producers maintain this is not their aim. This happens because the promoters do not take municipal opinion sufficiently into account when they define the value complements, or try to fulfil several objectives. Fudge and Rowe (2001) and Eckerberg and Dahlgren (2007) contribute an interesting Swedish experience. The Government decided to support infrastructure projects (a new park, say) rather than processes or plans (such as LA21) and, as a consequence, municipalities concentrated on designing projects instead of plans. So, we expect that:

Hypothesis 2: Co-decision will directly and positively affect participation in co-creation activities (in terms of quality).

2.2. Municipality level

On the basis of previous research we focus on three of the promoter's characteristics that have a relevant effect on the current participation of LA21 municipal managers in CoP activities (in terms of quality) and in their behavioural intentions: the sustainable development tradition of the municipality, the presence of process leaders in the municipality, and the propensity of the municipality to citizen participation.

Some authors consider that a sustainable development tradition constitutes a precursor for LA21 processes. Eckerberg and Dahlgren, (2007) for instance, with regard to Sweden, and Gram-Hanssen (2000), in the Danish context, refer to a wide range of experiences and projects developed in the 1960s and 1970s respectively that might appear crucial for explaining the adoption of LA21 in these countries. The absorptive capacity theory (Cohen and Levinthal, 1990) provides additional support for this idea. It argues that in order to grasp/understand innovative approaches some previous knowledge base is necessary. Fidélis and Pires (2009) view learning effort as an element consubstantial with LA21. Several authors have emphasised the presence of municipal leaders who can act as LA21 key agents in municipalities. The European research project DISCUS (Evans et al., 2005), in particular, shows that numerous cases can be found where mayors or other agents endowed with sufficient charisma and commitment have acted as drivers for the promotion of LA21s, and have even adopted unpopular decisions, on frequent occasions, in order to prioritise long-term sustainable development targets. That is to say, particular key individuals in the municipalities will go for the tool even without in-depth knowledge of it, either because of its aims (driving local sustainable development), the means employed (strategic planning and citizen participation) or the institutions that promote it (United Nations, regional governments, etc.). In the context of social marketing, Wymer (2004) states that social marketers' effectiveness in recruiting a political champion also influences their successes in gaining government support. A popular, influential political leader who works to further the cause facilitates social marketing efforts. A singular component of LA21 is citizen participation (Coenen, 2009). Municipalities are closest to the citizen but have not always incorporated citizen participation as an element for integrating political management. For some municipalities, its introduction may constitute an element of rupture with practices that have become customary. Consequently, a lack of effective citizen participation has repeatedly appeared in the literature as one of the weak points in experiences of implementing LA21 and is one of the areas to which researchers have recently devoted their efforts (Coenen, 2009; Kazana and Kazaklis, 2009). As Coenen (2009), among others, states, citizen participation may be the most differentiating component of LA21 and one of the main factors driving or putting a brake on its adoption. The expected outcome, therefore, is that:

Hypotheses 3 and 4 (a, b, c): The sustainable development tradition of the municipality (H3a, H4a), the presence of LA21 believers in the municipality (H3b, H4b), and the propensity of the municipality to citizen participation (H3c, H4c) will have a direct positive effect on the current participation of municipal managers (in terms of quality) in CoP activities (H3) and on their behavioural intentions (H4).

2.3. Individual level member

To understand the individual motives of CoPs participants, we draw upon the well-established Uses and Gratifications paradigm (Katz et al., 1974), originally developed and employed by communications researchers to understand people's motivations for using different media, and later to explain participation in virtual communities (Dholakia et al., 2004; Nambisan and Baron, 2009). We complement this view with the Social Capital Theory (Nahapiet and Ghosal, 1999). This theory has also been used in the context of participation in virtual communities (Chiu et al., 2006).

The Uses and Gratifications paradigm lead us to consider three broad types of benefits that individuals can derive from participation in CoPs: (1) cognitive or learning benefits from information acquisition and a strengthening of their understanding of the environment; (2) hedonic or affective benefits such as those that strengthen pleasurable experiences; and (3) social enhancement benefits due to a strengthening of the credibility, status, and confidence of the individual. The three benefit categories can be interpreted in the context of the present study as follows. Cognitive or learning benefits reflect LA21-related learning, that is, a better understanding and knowledge about the design of LA21, its underlying processes, and its implementation. The LA21 CoP holds valuable collective knowledge on the LA21 and its implementation that is generated and shared through continued member interactions (Wasko and Faraj, 2000; Nambisan and Baron, 2009). Social enhancement benefits (or personal integrative benefits) stem from gains in reputation or status and the achievement of a sense of self-efficacy (Katz et al., 1974). CoPs serve as a venue for individual customers to exhibit their LA21-related knowledge and problem-solving skills (Nambisan and Baron, 2009). By contributing to LA21 support, municipal managers can enhance their expertise-related status and reputation among peer municipal managers as well as vis-à-vis the CoP promoter (Wasko and Faraj, 2000; Dholakia et al., 2004). Through their contributions, LA21 municipal managers influence the behaviour of peer members towards LA21 as well as the promoter's improvement plans for LA21. Customer interactions in CoPs could also be a source of enjoyment or hedonic benefits, providing highly interesting as well as mentally stimulating experiences. Studies on brand communities show that customers derive considerable pleasure from conversing with one another about the product, features, and the idiosyncrasies of the usage context (Muniz and O'Guinn, 2001). The problem solving that underlies many of the interactions in a LA21-support focused CoP can also be a source of mental or intellectual stimulation that forms another aspect of hedonic benefits (Nambisan and Baron, 2009).

In our view, the Uses and Gratifications paradigm does not sufficiently explain what resources are embedded within a social network and how they affect the behaviour of a LA21 CoP member. Consequently, the Social Capital Theory is introduced to supplement this paradigm and address our research question. The tenet of the Social Capital Theory is that social relationships among people can be productive resources (Coleman, 1990). Putnam (1995) suggested that social capital facilitates coordination and cooperation for mutual benefit. Nahapiet and Ghoshal (1998) define social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit" (p. 243). They contend that social capital is necessary for the development and dissemination of knowledge within organisations. Tsai and Ghoshal (1998) empirically show that social capital facilitates resource exchange and production innovation within organisations. Nahapiet and Ghoshal (1998) define social capital using three distinct dimensions: structural, relational, and cognitive. This research focuses on the relational dimension (i.e. the quality of personal relationships people have developed with each other through a history of interactions). Relational capital exists when members have a strong

identification with the collective (Lewicki and Bunker, 1996) and trust others within the collective (Putnam 1995). As a consequence, social capital is considered in this research as a second order construct that is composed of the first order constructs trust and identification. Trust is viewed in management literature as a set of specific beliefs dealing primarily with the integrity, benevolence, and ability of another party (Mayer et al., 1995). As noted by previous studies (see, e.g., Chiu et al., 2006), this research focuses on integrity, which concerns an individual's expectation that members in a virtual community will follow a generally accepted set of values, norms, and principles. Identification with the group captures the idea that the person comes to view himself or herself as a member of the community, as belonging to it (Dholakia et al., 2004). In this study, identification is about an individual's sense of belonging and positive feeling toward a virtual community, which is similar to emotional identification as proposed by Ellemers et al. (1999).

The level of interaction in the CoP (Inkpen and Tsang, 2005) and the functionality of the CoP (Hogg and Abrams, 1988) are considered main antecedents of social capital. The frequency of interaction influences the development of trust between community members. Similarly, the frequency of interaction influences the feeling of sympathy between members of a group and, thereby, cohesion (Zboralski, 2009). Furthermore, interacting frequently over time will give community members the chance to articulate their expectations and demands for a fruitful communication. In sum, the two dimensions of social capital are positively influenced by participation in co-creation activities in terms of quantity (Zboralski, 2009). From a sociological perspective, Putnam (1993) argues that high levels of civic participation are typically linked to high levels of social capital. So, we expect that:

Hypothesis 5: Co-creation quantity will have a direct positive impact on social capital.

Functionality means that CoP membership allows individuals to meet their needs and desires. Social identity theorists posit that identification with social groups is derived, first and foremost, from their functionality (Hogg & Abrams, 1988) (i.e. individuals identify with groups to the extent that groups fulfil important needs of the individuals concerned). While some needs may concern the self alone, others may also be group-referenced. So, we hypothesise that:

Hypothesis 6 (a, b, c): Higher levels of value perceptions, in terms of learning (H6a), enjoyment (H6b) and social enhancement (H6c), will lead to stronger social capital.

Social capital has been shown to be an important antecedent of the quality of knowledge sharing in virtual communities (Wasko and Faraj, 2005; Chiu et al., 2006). Social capital affects willingness to spend time, effort, and energy on interacting with other community members. Likewise, previous research on work teams has emphasised the importance of strong intergroup relations on team effectiveness (e.g. Guzzo and Shea, 1992; Holland et al., 2000). The individual components of social capital considered in this research (i.e. trust and identification) have also been recognised as an important antecedent of the quality of knowledge sharing. Nahapiet and Ghoshal (1998) suggested that when trust exists between parties, they are more willing to engage in cooperative interaction. Nonaka (1994) indicated that inter-personal trust is important in teams and organisations for creating an atmosphere for knowledge sharing. An important characteristic of informal interactions is that individuals' contributions are difficult to evaluate (Bartol and Srivastava, 2002). Trust, therefore, is particularly important in volitional behaviours such as knowledge sharing in a virtual community. According to Blau (1964), trust creates and maintains exchange relationships, which in turn may lead to sharing good quality knowledge. Identification is also useful in explaining individuals' willingness to maintain committed relationships within communities (Bagozzi and Dholakia, 2002). Nahapiet and Ghoshal (1998) argued that identification acts as a resource influencing the motivation to combine and exchange knowledge. In contrast, distinct and contradictory identities within groups constitute significant barriers to information sharing, learning, and knowledge creation. Given that valuable knowledge is embedded in individuals and people usually tend to hoard knowledge, a person would not contribute their knowledge unless another individual were recognised as a group-mate and the contribution were conducive to the first person's welfare

(Chiu et al., 2006). Perception of social unity and togetherness of a community will elevate one's activeness to share knowledge and increase the depth and breadth of shared knowledge. Previous research on CoPs has also shown that trust and identification are main antecedents of 'good' interaction within a group of people (Zboralski, 2009). Based on this discussion, we hypothesise that:

Hypothesis 7: Social capital will be positively associated with participation in co-creation activities, in terms of quality.

Social capital is considered in this research as a main prerequisite of co-creation, in terms of quality. But interaction frequency, or co-creation in terms of quantity, is also needed. Interaction frequency is a main characteristic of interaction processes in CoPs. Previous research has shown that interaction frequency affects high-quality knowledge sharing in CoPs (Zboralski, 2009). So, we hypothesise that:

Hypothesis 8: Participation in co-creation activities, in terms of quantity, will be positively associated with participation in co-creation activities, in terms of quality.

Finally, social capital is viewed in this research as a main determinant of behavioural intentions of future participation in CoPs. Trust and identification create a lasting desire to interact with members of the CoP. This desire for interaction goes beyond present needs to be extended to any other form of collaboration. So, we hypothesise that:

Hypothesis 9: Social capital will be directly and positively associated with the behavioural intentions of CoP members.

3. Data collection and measures

The empirical test involves 156 surveys conducted with municipal managers of LA21 in the province of Barcelona (Catalonia) that are members of a CoP. The CoP is called Xarxa (Network in the Catalan language) and has 231 members comprising 74% of the municipalities in Barcelona. The municipalities analysed comprise 67.5% of those belonging to the CoP (231). When the survey design reached completion, LA21 managers in the municipalities became acquainted with the study at a joint meeting. The meeting served to encourage the involvement of those present and to guarantee the confidentiality of the responses. In addition, the web page of the institution responsible for promotion of the processes in Barcelona (Barcelona Provincial Council) published notification of the project along with an explanatory document seeking collaboration from the municipalities. A specialised firm carried out the surveys by telephone. All 231 municipalities within the CoP were contacted several times. The researchers were able to monitor the telephone interviews.

The measures for the study constructs were either adapted from existing scales (to fit the study context) or created based on prior studies and on interviews with municipal managers. We conducted in-depth interviews with a set of 5 municipal managers. The interview questions related to their experiences in the CoP (e.g., the nature of their participation and interactions) as well as their perceptions about the promoter, LA21, and community. Description of their interaction experience brought out several of the perceived benefits; these benefits were followed up by them being requested to comment, for example, on their learning and social relationships. The member interviews were used to generate an initial set of items for the new scales that were created for this study. The items were then refined based on prior related studies (where relevant). Tables 1 and 2 list the measures used and their sources for all the study constructs. The survey questionnaire, thus developed, was then subjected to a pilot test using a sample of 14 CoP members. Analysis of the pilot test data provided preliminary support for the reliability and validity of the scales. The pilot test subjects also provided descriptive comments on the survey (e.g., on the ambiguity of item descriptions) that were used to further refine the item wordings.

We also assessed the factorial validity of the variables through confirmatory factor analysis (CFA). EQS 6.0 structural equations software was used. Due to limited sample size, and the

conventional requirement that the ratio of sample size to number of estimated parameters be at least 5:1 (Shook et al., 2004), we ran two separate CFAs: one with the promoter-related constructs (member-promoter interaction, support, network size), the municipality constructs (municipality entrepreneurs, sustainable development tradition and citizen participation), co-creation, in terms of quantity, and behavioural intentions; and the other with learning, enjoyment, social enhancement, trust, identification, co-decision, and co-creation, in terms of quality. Each item was modelled as a reflective indicator of its latent construct. The 15 constructs were allowed to co-vary freely in the CFA model. Model estimation was done using the maximum likelihood approach, with the item correlation matrix as input.

| Table 1. Measurement Instrument: CFA for the First Set of Constructs | | | |
|--|------------------------------|------|------|
| $\chi^2/df = 194.6/142 = 1.37$; CFI = 0.96; IFI = 0.96; RMSEA = 0.049 | | | |
| Constructs/Sources/Items | Std. items | CR | AVE |
| Promoters [Prom] (adapted from Frels et al., 2003, and Carson, Tesruk and Malone 2007) I have fluid relationships with organisations that promote LA21 Institutions whose quality I respect, promote LA21. Institutions that are a benchmark for me, promote LA21. I collaborate with institutions that promote LA21. | .804 .903 .827 .793 | .902 | .673 |
| Support [Sup] (adapted from Frels et al., 2003) We have a lot of support The support is easily accessible The support we receive is of high quality | .852 .965 .927 | .923 | .766 |
| Network size [NetS] (adapted from Frels et al., 2003) LA21 is the most widely used planning tool for promoting Sustainable Development In the future, LA21 will be the planning tool most commonly used by municipalities | .750 .865 | .791 | .632 |
| Co-creation: quantity [Co-quan] (adapted from Frels et al., 2003) Sometimes we meet people from other municipalities to discuss issues related to the LA21 Long conversations about LA21 with people from other municipalities Our relationship with other municipalities with regard to LA21 is very fluid | .877 .965 .927 | .946 | .821 |
| Reference models [Ref] (Barrutia and Echebarria, 2011) In this City Council there are / have been people with influence that have opted particularly heavily in the LA21 Relevant people in this City have been great supporters of the LA21 | .981 .878 | .928 | .752 |
| Tradition [Trad] (Barrutia and Echebarria, 2011) In comparative terms, the City Council has traditionally been a benchmark in the implementation of actions for the environment This City Council has a long history (in comparative terms) of implementing actions for the environment | .889 .933 | .907 | .761 |
| Citizen participation [CitP] (Barrutia and Echebarria, 2011) Citizen participation in the definition of strategies and actions clearly has more benefits than costs for a municipality Citizen participation is worthwhile. | .866 .938 | .898 | .753 |
| Behavioural Intentions [BehI] (adapted from Dwyer, Schurr and Oh, 1987) We intend to continue working with Local Agenda 21 We will intensify LA21 over the coming years | .850 .959 | .901 | .769 |
| Note: χ^2 = Satorra-Bentler scaled chi-square. All constructs were measured using 11-point Likert-type scales (0 = strongly disagree; 10 = strongly agree) | | | |

A preliminary analysis consisted of verifying the normality of the data, revealing that the individual values of asymmetry and kurtosis for some items were unsatisfactory. Likewise, the normalised estimate for the Mardia coefficient was 21.1 in the first CFA and 43.6 for the second CFA, indicative of the existence of a multivariate kurtosis (Bentler, 2005, recommends a cut value of 5). It was necessary, therefore, to consider the robust fit measures (specifically, Satorra and Bentler's scaled Chi-square test, 1994).

The results of the two CFAs show satisfactory overall model fit (see tables 1 and 2). For a measurement model to have sufficiently good model fit, the Satorra-Bentler scaled Chi-square by degrees of freedom (χ^2/df) should not exceed 5 (Bentler, 1989) and the Comparative Fit

Index (CFI) should exceed 0.9. For the current CFA model, χ^2/df was, at most, 1.45 and CFI was, at least, 0.95, suggesting adequate model fit.

| Table 2. Measurement Instrument: CFA for the Second Set of Constructs | | | |
|--|------------------------------|------|------|
| $\chi^2/df = 216.5/149 = 1.45$; CFI = 0.95; IFI = 0.95; RMSEA = 0.054 | | | |
| | Std. items | CR | AVE |
| Co-decision [Co-dec] (adapted from Hackman and Oldham, 1974; Teas, 1983; and Carson et al., 2007) Those who want their opinion in relation to LA21 to be taken into account, find ways to do it There are forums for participating in decisions that affect everyone Participation in decisions that affect everyone is encouraged Those who want to participate in decision-making are supported | .831 .783 .928 .853 | .912 | .732 |
| Co-creation: quality [Co-qual] (inspired by the work of Podsakoff, MacKenzie, Moorman & Fetter, 1990) I am recognised as an active member of this community Other members of this community value my participation positively Policy-makers in this province make me feel recognised for my participation in this community. I get positive comments about my contributions to this community. | .906 .943 .821 .804 | .917 | .734 |
| Trust [Trust] (adapted from Chiu et al., 2006) The members of this community behave consistently The members of this community are trustworthy | .905 .956 | .928 | .866 |
| Learning [Lear] (adapted from Nambisan and Baron, 2009) Being a member of this community I get important information Being a member of this community I learn | .953 .946 | .948 | .901 |
| Enjoyment [Enj] (adapted from Dholakia et al., 2004, and Nambisan and Baron, 2009) It's nice to share aspects of LA21 It is exciting to share aspects of LA21 It's fun to solve problems and generate ideas relating to LA21 | .919 .962 .827 | .931 | .818 |
| Social enhancement [SocEn] (adapted from Dholakia et al., 2004, and Nambisan and Baron, 2009) Providing others with ideas and experiences reinforces my reputation It is satisfying to be able to influence others to move forward the goals of sustainable development | .822 .841 | .817 | .691 |
| Identification [Ident] (adapted from Chiu et al., 2006) I feel close to people who are part of the Xarxa (the community) I have a positive feeling towards the Xarxa People who are part of the Xarxa share many points of view | .811 .944 .839 | .751 | .900 |
| Note: χ^2 = Satorra-Bentler scaled chi-square. All constructs were measured using 11-point Likert-type scales (0 = strongly disagree; 10 = strongly agree) | | | |

The convergent validity of the scales was verified using three criteria suggested by Fornell and Larcker (1981): (1) all indicator loadings should be significant and exceed 0.7, (2) construct reliabilities should exceed 0.8, and (3) average variance extracted (AVE) by each construct should exceed the variance due to measurement error for that construct (i.e., AVE should exceed 0.50). For the current CFA models, all loadings were above the 0.7 threshold. The composite reliabilities of the constructs ranged between 0.79 and 0.94. AVE ranged from 0.67 to 0.90. Hence, all the three conditions for convergent validity were met (see Tables 1 and 2).

Finally, the discriminant validity of the scales was assessed using the guideline suggested by Fornell and Larcker (1981): the square root of the AVE from the construct should be greater than the correlation shared between the construct and other constructs in the model. Table 3 lists the correlations among the constructs, with the square root of the AVE on the diagonal. All the diagonal values exceed the inter-construct correlations; hence the test of discriminant validity was acceptable. Therefore, we conclude that the scales should have sufficient construct validity.

A second order measure was created to proxy social capital. All the three conditions for convergent validity were met. Both loadings (trust and identification) were above the 0.7 threshold (.75 and .82 respectively). The composite reliability of the second order construct was 0.76 and AVE was 0.59.

Table 3. Indicators: descriptive statistics and correlations

| Variable | Obs. | Mean | Std. Dev. | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 | V13 | V14 |
|----------------------------|------|------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| V1: Co-creation: quantity | 156 | 4.73 | 2.61 | <i>.906</i> | | | | | | | | | | | | | |
| V2: Prom.-memb. relat. | 156 | 6.79 | 1.74 | .430 | <i>.820</i> | | | | | | | | | | | | |
| V3: Support | 156 | 5.63 | 1.97 | .430 | .520 | <i>.875</i> | | | | | | | | | | | |
| V4: Network size | 156 | 6.31 | 1.69 | .280 | .270 | .180 | <i>.795</i> | | | | | | | | | | |
| V5: Social capital | 156 | 6.89 | 1.47 | .360 | .480 | .240 | .470 | <i>.857</i> | | | | | | | | | |
| V6: Learning | 156 | 7.14 | 1.82 | .250 | .510 | .280 | .310 | .780 | <i>.949</i> | | | | | | | | |
| V7: Enjoyment | 156 | 7.36 | 1.60 | .280 | .460 | .160 | .330 | .720 | .750 | <i>.904</i> | | | | | | | |
| V8: Social enhancement | 156 | 7.27 | 1.57 | .200 | .410 | .200 | .350 | .690 | .630 | .720 | <i>.831</i> | | | | | | |
| V9: Co-creation: quality | 156 | 6.37 | 1.75 | .300 | .470 | .360 | .500 | .620 | .590 | .470 | .530 | <i>.857</i> | | | | | |
| V10: Co-decision | 156 | 6.49 | 1.77 | .210 | .410 | .360 | .320 | .370 | .450 | .310 | .340 | .670 | <i>.856</i> | | | | |
| V11: Municipal leaders | 156 | 6.65 | 2.21 | .220 | .280 | .270 | .450 | .440 | .290 | .310 | .330 | .480 | .270 | <i>.867</i> | | | |
| V12: Tradition | 156 | 6.57 | 2.08 | .200 | .290 | .200 | .300 | .440 | .370 | .270 | .460 | .400 | .330 | .540 | <i>.872</i> | | |
| V13: Citizen participation | 156 | 7.31 | 1.98 | .250 | .320 | .220 | .450 | .490 | .500 | .400 | .470 | .560 | .440 | .310 | .360 | <i>.868</i> | |
| V14: Behavioural int. | 156 | 7.21 | 1.87 | .160 | .200 | .270 | .490 | .460 | .380 | .370 | .390 | .460 | .320 | .510 | .470 | .450 | <i>.877</i> |

Note: Diagonal elements (in italics) are the square root of the average variance extracted (AVE). Off-diagonal elements are the correlations among constructs. For discriminant validity, diagonal elements should be larger than off-diagonal elements. Obs = Observations. Correlations greater than .23 are significant at $p < .05$

4. Model specification

We used three-stage least squares (3SLS) estimators to test the proposed model. This procedure is ideal for dealing with the simultaneous effects in our model because it handles both the endogeneity of the variables considered and the possibility of correlated errors between variables (Aiken and West, 1991). This method is adequate for this research due to the above mentioned 5:1 ratio requirement. We modelled promoter-level constructs (i.e. promoter-member relationship [Prom], supports [Sup] and network size [NetS]) as determinants of co-creation quantity. We also modelled the three individual-level co-creation benefits (i.e. learning [Lear], enjoyment [Enj] and social enhancement [SocEn]), and co-creation-quantity (Co-quan) as determinants of social capital [SC]. The two outcomes of the previous regressions, co-decision [Co-dec], and the three municipal-level constructs (i.e. municipal leaders [MunLead], tradition [Trad] and propensity to citizen participation [CitP]) were in turn modelled as determinants of co-creation quality [Co-qual]. Finally, social capital [SC] and the three municipal-related constructs were modelled as determinants of behavioural intentions [BehI]. Our model specification was as follows:

$$\begin{aligned}
 (1) \text{ Co-quan}_i &= \alpha_1 + \beta_{11} (\text{Prom}_i) + \beta_{12} (\text{Sup}_i) + \beta_{13} (\text{NetS}_i) + \varepsilon_{1i} \\
 (2) \text{ SC}_i &= \alpha_2 + \beta_{21} (\text{Lear}_i) + \beta_{22} (\text{Enj}_i) + \beta_{23} (\text{SocEn}_i) + \beta_{24} (\text{Co-quan}_i) + \varepsilon_{2i} \\
 (3) \text{ Co-qual}_i &= \alpha_3 + \beta_{31} (\text{Co-quan}_i) + \beta_{32} (\text{SC}_i) + \beta_{33} (\text{Co-dec}_i) + \beta_{34} (\text{MunLead}_i) + \beta_{35} \\
 &\quad (\text{Trad}_i) + \beta_{36} (\text{CitP}_i) + \varepsilon_{3i} \\
 (4) \text{ BehI}_i &= \alpha_4 + \beta_{41} (\text{SC}_i) + \beta_{42} (\text{MunLead}_i) + \beta_{43} (\text{Trad}_i) + \beta_{44} (\text{CitP}_i) + \varepsilon_{4i}
 \end{aligned}$$

5. Findings

Stata 11 statistical software was used to analyse the causal model. Table 4 summarises the 3SLS model estimation results. Overall, the data support the model. Most of the hypotheses are supported. Promoter-member relationship (Hypothesis 1a; $\beta = .31$; $p < .01$), supports (Hypothesis 1b; $\beta = .36$; $p < .01$) and network size (Hypothesis 1c; $\beta = .36$; $p < .01$) have a positive effect on co-creation in terms of quality (R-sq = 27%; Chi-sq = 61.5; $p < .01$). Co-creation: quantity (Hypothesis 5; $\beta = .14$; $p < .01$), learning (Hypothesis 6a; $\beta = .37$; $p < .01$) and social enhancement (Hypothesis 6c; $\beta = .24$; $p < .01$) have a direct, significant and positive effect on social capital (R-sq = .69; Chi-sq = 357.0; $p < .01$). The expected positive effect of enjoyment on open innovation strategy is supported, while no significant effect is detected (Hypothesis 3; $\beta = .09$; $p > .05$). A plausible explanation is that enjoyment could have a more relevant effect in non-professional communities than in CoPs oriented towards the achievement of work-related goals. Co-decision (Hypothesis 2; $\beta = .40$; $p < .01$), municipal leaders (Hypothesis 3a; $\beta = .15$; $p < .01$), propensity to citizen participation (Hypothesis 3c; $\beta = .12$; $p < .05$) and social capital (Hypothesis 7; $\beta = .43$; $p < .01$) have a direct, significant and positive effect on co-creation: quality (R-sq = .65; Chi-sq = 303.6; $p < .01$).

.01). The expected positive effect of co-creation: quantity on co-creation: quality is supported, while no significant effect is detected (Hypothesis 5; $\beta = .06$; $p > .05$). A plausible explanation is that co-creation in terms of quantity is partly explained by external rewards. As a consequence, for some members of the CoP, having a physical presence in the CoP could be a means to obtain the support provided by the promoter or the requirements of the municipality in which they work. The more surprising result is the negative, although very small and not significant, effect of sustainable development tradition on co-creation: quality. However, it is not worrisome because tradition has a significant and high correlation with co-creation quality (.400, see table 3). A plausible explanation is that this variable also shows a relatively high correlation with other predictors in the regression (see table 3). Municipal leaders (Hypothesis 4a; $\beta = .23$; $p < .01$), tradition (Hypothesis 4b; $\beta = .14$; $p < .05$), propensity to citizen participation (Hypothesis 4c; $\beta = .19$; $p < .01$) and social capital (Hypothesis 9; $\beta = .26$; $p < .05$) have a direct, significant and positive effect on behavioural intentions ($R\text{-sq} = .40$; $\text{Chi-sq} = 106.8$; $p < .01$).

The explanatory power of the research model is shown in Table 4. The R-square values show that predictors account for 27% of variance of co-creation: quantity, 69% of social capital, 65% of co-creation: quality and 40% of behavioural intentions.

Table 4. Three-Stage Least Squares Estimation for Hypotheses Testing

| | Coefficient | Standard Error | P>z |
|---|-------------|----------------|---------|
| Co-creation: quantity | | | |
| <i>(R-sq = .27; Chi² = 61.5; p = .000***)</i> | | | |
| Promoter-member relationship (H1a) | .31 | .118 | .008*** |
| Support (H1b) | .36 | .103 | .000*** |
| Network size (H1c) | .36 | .106 | .001*** |
| Constant | -1.73 | .878 | .048** |
| Social capital | | | |
| <i>(R-sq = .69; Chi² = 357.0; p = .000***)</i> | | | |
| Co-creation: quantity (H5) | .14 | .053 | .009*** |
| Learning (H6a) | .37 | .054 | .000*** |
| Enjoyment (H6b) | .09 | .070 | .135 |
| Social enhancement (H6c) | .24 | .059 | .000*** |
| Constant | 1.02 | .335 | .002*** |
| Co-creation: quality | | | |
| <i>(R-sq = .65; Chi² = 303.6; p = .000***)</i> | | | |
| Co-decision (H2) | .40 | .053 | .000*** |
| Municipal leaders (H3a) | .15 | .046 | .001*** |
| SD tradition (H3b) | -.04 | .049 | .324 |
| Propensity to citizen participation (H3c) | .12 | .052 | .012** |
| Co-creation: quantity (H5) | .06 | .074 | .418 |
| Social Capital (H7) | .43 | .097 | .000*** |
| Constant | -1.19 | .473 | .012** |
| Behavioural Intentions | | | |
| <i>(R-sq = .40; Chi² = 106.8; p = .000***)</i> | | | |
| Municipal leaders (H4a) | .23 | .065 | .000*** |
| SD tradition (H4b) | .14 | .069 | .040** |
| Propensity to citizen participation (H4c) | .19 | .071 | .005*** |
| Social Capital (H9) | .26 | .128 | .042** |
| Constant | 1.44 | .652 | .027** |

Note: ***Significant at the 99% confidence level (one-tailed test); **Significant at the 95% confidence level (one-tailed test); *Significant at the 90% confidence level (one-tailed test).

6. Final discussion and implications

The research question of this study is: why do LA21 municipal managers spend their valuable time and effort on strongly participating in co-creation activities with other members in CoPs? We seek a response to the research question in the context of LA21 implementation. In such a context participation is affected by three levels of analysis: (1) the characteristics and activities of the promoter of the network; (2) the momentum of the municipality the CoP member

(municipality manager) works for; and (3) the benefits the member perceives as a consequence of her/his participation on the CoP. Two measures of participation in co-creation activities are considered: participation, in terms of quantity; and participation, in terms of quality.

Research results have important practical and academic implications. From a practical perspective, inter-municipality CoPs are needed to face the complex sustainable development challenges in which modern societies are involved, such as the implementation of LA21-like tools. CoPs may be promoted by higher levels of government; but it is unclear how to drive effective CoPs. From an academic perspective, a great deal of research has been devoted to explaining antecedents of participation in teams and virtual communities. However, quantitative research referring to CoPs is very scarce; and we do not know any previous research that studies the antecedents of sharing knowledge in CoPs, in the context of complex environments in which actor participation in co-creation activities (in our case municipal managers' participation) is affected by their own beliefs, their social context, the momentum of the institution they work for (municipality) and the momentum of the CoP promoters (in our case, higher levels of government). As a consequence, our research faces a higher level of complexity than previous research into participation in virtual communities and teams. In the context of virtual communities a suitable level of analysis is the individual and her/his social network. In the context of teams it is also necessary to consider the organisation level. Finally, in the more complex context studied in this research a third level of analysis needs to be added: the CoP promoter.

Research results show that promoters have a main role to play in driving participation in co-creation activities, in terms of quantity. To drive participation promoters should take care of their relationships with municipal managers, develop co-decided supports to the focal LA21 tool and communicate the idea that the number of CoP members is increasing and that CoP participation will become a norm. A second main role of promoters is driving co-decision. Interestingly, participation, in terms of quality, is only indirectly affected by promoters. Municipalities, as the closest environment of the LA21 municipal managers, have a main role to play in driving manager participation in co-creation activities, in terms of quality. LA21 municipal managers are shown to share knowledge of better quality, when they are surrounded by municipalities that have a reasonable level of sustainable development tradition and leaders who are more prone to LA21 and citizen participation. Municipalities also have an important role in explaining behavioural intentions. The research results also demonstrate that getting people to work together may be a powerful tool to achieve complex goals in provinces, regions, and countries. Interaction between LA21 municipal managers creates individual benefits, in terms of learning and social enhancement, that affect the perception of social capital (in terms of trust and social identity or identification). Social capital, in turn, has a significant power to affect co-creation, in terms of quality, and behavioural intentions. The other main force that explains co-creation quality is co-decision. Co-decision strongly affects the quality of the contribution made to the CoP by LA21 municipal managers. Co-decision is affected by the mindset of LA21 municipal managers, promoters and municipalities. But the role of the promoter in explaining co-decision is especially important. LA21 municipal managers should participate in decisions regarding the complements that should be offered to the focal LA21 tool. The promoter should see itself as a facilitator, rather than as a decision maker where the appropriate complements to LA21 are concerned.

As a consequence this research suggests to higher levels of government a form of policy making for achieving complex goals that require the collaboration of diverse institutions and individuals. The research identifies the role of promoters as facilitators and drivers of co-creation and co-decision. Higher levels of government should, then, propitiate interaction by creating forums for interaction and offering support for the needs identified in such forums. They should then communicate the idea that forums work and will be a norm in the future in the geographical space. Finally, they should rely on the benefits that individuals obtain from co-creation and the main contribution of leaders in municipalities.

7. Future research

The results of our study are conditioned by its context. They refer to a single regional context in which many of the elements may be relatively homogenous. Future investigations are required in broader geographical contexts in order to either corroborate these results, or find anomalies in them. It must be pointed out that the study is cross sectional, covering only one point in time, and we cannot assess the evolution in time of the perceptions of the LA21 municipal managers.

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