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# Interorganizational network portfolios and social media adoption by nonprofit organizations

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## **Abstract**

While a rich literature investigates how and why NPOs use social media, research on why they differ in their social media adoption (SMA) is limited. In this paper we examine how NPOs' interorganizational partner portfolio characteristics can enable or constrain their adoption of social media, including blogs and videos, conventional social media (Facebook, Twitter...) and crowd-based platforms (crowdfunding and petitions). Based on a survey distributed to a sample of environmental NPOs in France, results indicate that NPOs having open networks, whose partners are physically distant, and that have more cross-sectoral partners have higher SMA. Network portfolio management can thus make up for a shortage of financial resources to invest in social media.

**Keywords:** collaboration, social network analysis, network portfolio, social media, digital platform

## **1. Introduction**

In recent years, social media adoption (SMA) by NPOs has increasingly attracted the attention of both academics and practitioners. Social media facilitates interactive engagement and disclosure of information about finances, goals and programs (Saxton and Guo 2009; Bortree and Seltzer 2009) and helps NPOs achieve their goals by providing means to mobilize external and internal resources.

Much research has been conducted on social media and digital technology adoption by NPOs (Guo and Saxton 2014, 2018; Nah and Saxton 2012; Saxton and Guo 2009, 2020; Xu and Saxton 2018; Zhou and Ye 2021; Young, 2017). Most of this research investigates how and why social media is used (Lovejoy and Saxton 2012). Limited research on the antecedents of SMA highlighted the role of age and size (Wallace and Rutherford 2020; Campbell and Lambright 2019), culture (Ihm and Kim 2021), financial strength (Hackler and Saxton 2007), and environmental as well as institutional factors (Zorn et al. 2011; Zhou and Pan 2016).

As a contribution to this literature, we argue in this paper that some NPOs can have an advantage over others not only because of the previously explored factors, but also due to the characteristics of their interorganizational partnership portfolios. The management of collaborations is one of the main dimensions of NPO management. However, managers are often preoccupied with the immediate and tangible benefits and costs of individual collaborations while ignoring the implications of overall partner portfolio in organizational decisions (Parise and Casher 2003; Hoffmann 2007). Overseeing partnerships as a portfolio helps an organization align its collaborations with various strategic priorities. One of these is the adoption of novelties like technologies, systems, programs, or behaviors. We argue and find empirical evidence that some types of portfolios are better aligned with having an active SM profile for three reasons. The first one takes an efficiency perspective. When partners are physically distant, social media can facilitate interactions as they are essentially communication technologies. In this way, NPOs can wage higher visibility returns with reduced effort and cost. The second reason relates to the role of partners' portfolio in NPOs' adaptation to their environment (Koza and Lewin 1998;

George et al. 2002; Sussman 2003), as organizations that can better adapt to their environment are also more likely to adopt innovations that will enhance their performance (Aldrich and Pfeffer 1976). When an NPO operates in an open network (Burt 1992), when it has a higher proportion of cross-sectoral partners, and when partnerships are used to obtain information and knowledge, its SMA will be higher because such a partner portfolio supports organizational learning and helps build adaptive capacity. The third reason relies upon the institutional perspective (DiMaggio and Powell 1983). When a partner portfolio consists of partners that pressure NPOs to strengthen their legitimacy, like public partners, SMA could be higher (Zorn et al. 2011). We analyze the interorganizational partners of a sample of French environmental NPOs through a network portfolio approach, and investigate their role in explaining how NPOs differ in their SMA.

A second contribution of this paper lies in our approach to social media.

Organizations' adoption of innovative solutions consists of decisions to initiate and implement a novelty by incorporating it into organizational routines (Damanpour 1991). The adoption of internet technologies concerns a range of different platforms. Considering only a few of these, which occurs in many studies, risks providing a partial picture of NPOs' digital activities. To limit this risk, we distinguish between three types of social media: conventional ones (Facebook, Instagram, Twitter, LinkedIn), broadcasting platforms requiring less frequent updates (blogs, videos), and crowd-based platforms that mobilize audiences (crowdfunding, petition). We take SMA as the aggregation of these social media and present results for each type separately.

These contributions are guided by the following research question: *How are NPOs' interorganizational network portfolio characteristics associated with their SMA?*

The paper is organized as follows. Section 2 presents the background literature and hypotheses. Section 3 presents the data and methodology, followed by an analysis of the results in Section 4. The final section provides a discussion of results, the limitations and future research avenues, and key managerial implications for NPOs.

## **2. Background**

### **2.1. Interorganizational partners and the network portfolio approach**

Interorganizational partnerships consist of a vast array of collaborative relations such as information exchange relationships (cooperation, communities of practice), resource exchange relationships (philanthropy, space sharing), or integrative relationships (joint R&D, integrated service delivery) (Shumate et al. 2018).

Formally, they are open-ended agreements between two or more organizations enabling cooperation for mutual benefit in achieving organizational objectives (Parise and Casher 2003). Through partnerships, NPOs can better manage the risks and uncertainties in their environment, conform to the expectations of stakeholders, gain legitimacy (Galaskiewicz et al. 2006; Fu and Cooper 2020; Shumate et al. 2016), increase community visibility (Austin and Seitanidi 2012), build adaptive capacity (Sussman 2003), or access complementary resources and capabilities (Guo and Acar 2005).

In the network portfolio approach, the partners of a focal organization and the ties between them are analyzed as a network (Lavie 2007). This approach is helpful because it provides a holistic view of all partners, including their synergistic effects,

and enables studying the effect of various characteristics of partners on organizational outcomes (George et al. 2002). While the study of portfolios is more common for business firms, some studies were conducted for NPOs as well (Fu and Cooper 2020; Shumate et al. 2016).

An interorganizational network portfolio is an “egocentric network” composed of a focal organization (“ego”), its partners (“alters”), and the links between partners (cf. Figures 1 & 2).

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Insert Figure 1 here  
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## **2.2. What is SMA?**

Adoption is an organizational decision to initiate and implement a new technology, product or process, service, system, plan, program or behavior that is new to the adopting organization and contributes to its performance or effectiveness (Damanpour 1991). Initiation phase consists of all activities like problem perception, information gathering, attitude formation, and resource attainment. Implementation phase consists in all activities that lead to routinization, like modifications in organizational routines or the regular use of novelty (ibid.). In line with this definition, we take SMA as an organizational decision, which refers not only to opening an account in a social media platform, but also to its incorporation in regular activities.

Adopting internet technologies consists of decisions regarding a “package” of innovations (Del Aguila Obra and Padilla Melendez 2006; Young 2017). While Facebook, Twitter, and Instagram are the most common ones, there are other platforms in this package whose omission risks giving a partial picture of SMA. Kaplan and Hainlein (2010) define social media as “a group of Internet-based

applications that build on the ideological and technological foundations of Web 2.0, and that allow the creation and exchange of User Generated Content" (p. 61). These applications differ according to the level of exchanges between parties and whether users can disclose information about their identity to others (Kietzmann et al., 2011; Kaplan and Hainlein, 2010). Based on these characteristics, we focus on the platforms most often used by NPOs that fit the above definition (Solidatech 2016). Firstly, we take conventional social media (Facebook, Instagram, etc.). In addition, we include platforms with a high degree of information disclosure yet with fewer exchanges compared to the first group (blogs, videos). Finally, we include crowd-based applications (petition sites and crowdfunding), which help access the ideas and solutions of many users through open calls for projects and proposals. These platforms enable exchanges between project owners and supporters and help participants disclose information about themselves through the projects they create and/or support.

### **2.2.1. SMA from an efficiency perspective: The role of interorganizational partners**

Social media is a tool to increase efficiency since it enables NPOs to communicate with stakeholders (beneficiaries, volunteers, donors, partners) using minimal resources (Mcnutt et al. 2018; Zorn et al. 2011). Efficiency gains depend on the physical proximity of partner organizations. Since digital technologies help overcome barriers related to physical distance (Cairncross 1997), they tend to benefit NPOs having geographically distant partners, compared to NPOs having proximate partners.

**Hypothesis 1:** NPOs whose partners are geographically distant have higher SMA.

### **2.2.2. SMA and organizational adaptation: The role of partners**

Research on NPOs highlights the role of competitive pressures in their environment, notably to obtain funding and attract volunteers (Andersson et al. 2016; Burt and Taylor 2003; Sanzo Perez et al. 2017; Zorn et al. 2011). Such pressures increase imperatives for adaptation to changes in the external environment, as they impose constraints on organizations and create opportunities (Aldrich 1979; Cyert and March 1963; Lawrence and Losch 1967). This view takes an open system approach to organizational evolution, as studied in relation to NPOs' capacity building (Andersson et al. 2016). Organizational adaptation can be defined as “intentional decision making undertaken by organizational members, leading to observable actions that aim to reduce the distance between an organization and its economic and institutional environments” (Sarta et al., 2021). Organizations that successfully adapt to changes in their environment can leverage opportunities to enhance effectiveness and deliver performance improvements, especially when adopting novel solutions.

One of the ways for adaptive capacity building is working in sync with others and forming various relationships (Sussman 2003). Indeed, interorganizational collaborations are a capacity building instrument (Gazley and Guo 2020; Guo and Acar 2005; Kapucu and Demiroz 2015), in which “external focus” and “networking connectedness” are key ingredients (Koza and Lewin 1998; Kraatz 1998; Strichman et al. 2018; Sussman 2003, Letts et al. 1999). Adopting a technology or novelty first requires identifying a need and understanding how it can enhance performance. In other words, for adoption to occur, organizations should know what to adopt and how to align it with their goals. Organizations learn about such opportunities and best practices mainly through their collaborations.



Cross-sectoral partnerships are valuable since they enable accessing knowledge and resources from various sectors (Austin and Seitanidi, 2012). Having partners in diverse sectors enables an organization to observe, learn, and explore how technologies can align with different types of organizational goals. This is one of the reasons why the sectoral diversity of NPOs' partners increases their resilience and adaptive capacity (Pape et al. 2019; Waerder et al. 2021). Diversity in the network portfolio enables some NPOs to better use technological opportunities compared to NPOs whose partners are less diverse in terms of sectoral composition.

**Hypothesis 2:** A high rate of cross-sectoral partnerships in NPO network portfolios is associated with higher SMA.

An organization's absorptive capacity is a central element of organizational adaptation and learning (Van den Bosch et al. 1999; Zahra and George 2002), which is critical for NPOs' performance (Lee and Chandra 2019). Initially developed for for-profits (Cohen and Levinthal 1990), absorptive capacity refers to “the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends” (Cohen and Levinthal 1990). Previous literature established that firms with high absorptive capacity were more likely to successfully adopt social media (Schlagwein and Hu 2013; Bharati et al. 2014), which has also been evidenced for NPOs (Setti 2016).

One of the prerequisites to building absorptive capacity is acquiring knowledge and skills from the external environment (Cohen and Levinthal 1990; Koza and Lewin 1998). Porous boundaries permitting information, ideas and perspectives to find their way into the organization are critical resources to build absorptive capacity (Sussman 2003). Organizations that are good at acquiring knowledge are also better at diffusing

it (Darroch 2003). Therefore, we hypothesize that the more NPOs acquire knowledge and skills from their partners, the more likely they are to build absorptive capacity, leading them to have higher SMA.

**Hypothesis 3:** NPOs acquiring knowledge and skills from their partners have higher SMA.

Another concept related to the adaptive capacity of an organization is its position in its network portfolio. In a longstanding literature, two network positions have been distinguished as sources of social capital: network closure (Coleman 1990) and structural holes (Burt 1992). Network closure refers to the extent to which an organization's partners are also connected, forming dense networks surrounding the focal organization (cf. Figure 2).

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Insert Figure 2 here  
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On the other hand, filling structural holes in a network occurs when partners of a focal organization are less connected, forming sparse networks, as illustrated in Figure 1. Supporters of closure maintain that frequent (often face-to-face) interactions facilitate rich knowledge exchanges and build trust as parties develop a common language, increasing efficiency in terms of the time and cost of negotiation (Uzzi 1997). On the other hand, too much embeddedness can have counter-effects (ibid.). This highlights the paradox of embeddedness: “the same processes by which embeddedness creates a requisite fit with the current environment can paradoxically reduce an organization’s ability to adapt” (Uzzi 1997: 57), mainly by decreasing diversity, non-redundant ties, and sometimes causing over-embeddedness. Therefore, high network closure can

render actors vulnerable to external shocks or insulate them from novel knowledge sitting in other parts of the network (Uzzi 1997). Consequently, proponents of structural holes argue for a need of actors acting as bridges to connect otherwise disconnected organizations (Burt 1992).

Bridging positions can create access to novel knowledge from diverse sources, where organizations can easily obtain information about novelties and technologies (Peng and Mu 2011; Burt 2000), and where they are exposed to nonoverlapping insights and are not bounded by a specific view of the world (Ozman 2017). Previous studies detected a positive impact of bridging positions on technology adoption (Peng and Mu 2011) and on organizations' capacity to adapt to their external environment (Gargiulo and Benassi 2000). Ties to diverse sources of knowledge also increase their capacity to convey ideas to heterogeneous audiences (Reagans and McEvily 2003).

**Hypothesis 4:** NPOs with more open networks have a higher rate of SMA.

### **2.2.3. SMA as a source of legitimacy: The role of partners**

NPOs face increased pressure for greater accountability and transparency from various stakeholders (Sanzo Perez et al. 2017). Institutional pressures could intensify public relations activities, and “dependence on donors appears to push organizations to use social media more heavily” (Nah and Saxton 2012). Indeed, using digital technologies tends to legitimize an NPO in its community and constitutes a “symbolic resource to establish legitimacy” (Zorn et al. 2011: 5; Zhou and Pan 2016). First, NPOs with public partners can have higher SMA because public funding agencies can increase their accountability when the NPOs they support are more visible (Thatcher et al., 2006). Therefore, to secure funding NPOs are likely to increase SMA.

Secondly, having a public organization as a partner can increase the legitimacy of an

NPO towards stakeholders by improving prestige and visibility (Podolny 2008). As a result, NPOs can use social media to publicize their partnerships with public organizations.

**Hypothesis 5:** A high proportion of public sector partners in the interorganizational partner portfolio is associated with higher SMA.

### **3. Data and methodology**

#### **3.1. Context: The nonprofit sector in France**

1.5 million NPOs are estimated to be active in France (Tchernonog and Prouteau 2019). The sector comprises many small NPOs with a few hundred euros of annual resources and relying on volunteer work, since only 11 % of French NPOs have paid employees (Tchernonog and Prouteau 2019). French associations employ 1,776,000 people, namely 9.2% of all private sector employees in the country (Bazin et al. 2021). Concerning sources of income, on average 66% come from NPOs' services, 20% from public subsidies, 9% from membership fees, and 5% from donations and sponsorship (Tchernonog and Prouteau 2019).

In recent years, the formation of environmental NPOs has accelerated. Bazin et al. (2021) underlined that the three years between 1 July 2018 and 30 June 2021 witnessed the creation of 3,786 NPOs tackling environmental issues (6% of all NPOs created during that period). These organizations are involved in various fields such as biodiversity, recycling, water, agriculture, education, sustainable finance or shared gardens.

Regarding their level of digital maturity, most NPOs have a website (71%) and use social media (67%) (Bazin et al. 2019). On the other hand, only 21% of environmental NPOs think that they are digitally mature. However, most wish to

expand their digital presence to increase their visibility, animate their community by interacting with stakeholders, improve efficiency and mobilize volunteers and members, develop new services and innovate, and raise funds (ibid.).

### **3.2. Sample**

All NPOs in France are recorded in the National Directory of Nonprofit Organizations (“RNA”). The declarations of creation are published in the “*Journal Officiel des Associations et Fondations d’Entreprise*” (JOAFE), which is freely available and gives information on foundation year, contact address, e-mail address where applicable, and fields of activity. Our analysis is based on a survey distributed to environmental NPOs active in the region of Île-de-France, which includes Paris plus seven surrounding departments. These organizations were identified using JOAFE. Île-de-France is among the most active regions in terms of NPOs’ formation rate. About 10 NPOs for 10,000 inhabitants are created each year in the region, which is among the highest rates in France (Bazin et al. 2021).

The survey was distributed in March 2021 through a personalized e-mail invitation via Qualtrics to the managers of some 1,600 environmental NPOs headquartered in the region. We obtained 237 responses, a 16% response rate. The survey collected information about the structural characteristics of the organization, its SMA, and its partners. Seventy respondents filled out the survey only partially without completing the partnership section. Figure 3 gives information about our sample.

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Insert Figure 3 here  
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### 3.3. Variables

To investigate the relationships between the interorganizational network portfolios of NPOs and their SMA, a regression analysis was carried out to test our hypotheses.

#### 3.3.1. Dependent variables

For SMA, the survey asked respondents whether and how often they used the following social media, which are commonly used by NPOs (Solidatech 2016): (1) Maintaining a blog; Posting on (2) Facebook, (3) Twitter, (4) Instagram, (5) LinkedIn; Using (as project owners or supporters) (6) crowdfunding platforms, (7) petition platforms; and (8) Publishing videos through platforms (YouTube, Vimeo...). We were only interested in capturing regular users. For each item, respondents had three options: “Never use” (0), “Use at least once a month” (1), “Use weekly” (2). This variable is a count variable, where the minimum value would be zero if the respondent had never used any of the eight types of social media, while the maximum value could be 16 if the respondent had actively used all types of social media and updated them weekly. In addition to aggregated SMA, we report results for three other dependent variables, which are conventional social media, blogs and videos, and crowdfunding and petition platforms.

#### 3.3.2. Control variables

We employed control variables found to influence SMA in previous research. Larger and younger organizations tend to have high SMA (Campbell and Lambright 2019; Wallace and Rutherford 2020; Eimhjellen et al. 2014). **Age** was calculated based on the founding year of the organization. **Size** was calculated using the number of paid employees. Since an NPO's **program activities** can impact its SMA, we included information about five typical program activities (Brown 2017). Respondents were asked to grade the importance of the following program activities on a scale ranging

from 1 to 5: (1) Advocacy activities (**Advocacy**), (2) Conceiving novel solutions to address specific issues (**Innovation**), (3) Community animation (**Community**), (4) Service provision (**Services**), and (5) Intermediation (**Intermediation**).

### **3.3.3. Independent variables**

Egocentric data collection methods were employed for the questions related to the interorganizational network portfolios of NPOs (Perry et al. 2019). In egocentric network analysis, an “ego” is a focal node (the NPO) directly connected to “alters” (interorganizational partners), as illustrated in Figures 1 & 2.

Respondents were asked to fill up information about the five partners they deemed most important to them in the past two years,<sup>1</sup> consistent with the methodology used to collect organizational egocentric network data (Perry et al. 2019). The specific names of these partners were not collected, as we are not interested in building a whole network but focus on the individual network portfolios of NPOs.

The number of alters in a survey can be capped by limiting a time frame to draw the boundaries of a network. For each partner, we asked the following six name interpreter questions, which include information on partners’ attributes, details of the relation between each partner and the NPO, and respondents’ estimate of the existing relations between these partners (Perry et al. 2019).

**(1) Cross-sector partnerships of the NPO (CrosssectoralP):** The number of partners of the NPO in different sectors (research organization, for-profit organization, public organization, others).

**(2) Information and resources gained from partners (KnowledgeAcq):** The proportion of partners from which the NPO indicated to have obtained

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<sup>1</sup> Partners include the following relationships: service delivery, resource and skills sharing, resource provision, joint programs, and similar activities.

information, knowledge and skills.

**(3) Public partners (PublicPartners):** The proportion of partners from national and local administrations.

**(4) Proximity of interorganizational partners (Proximity):** The proportion of partners located in the same municipality as the NPO.

**(5) Scope (Scope):** Dummy variable indicating whether NPOs' activities' scope is primarily local or global.

**(6) Ego network density (EgoDensity):** NPOs were asked to estimate which of their partners (numbered from 1 to 5) also had relations between themselves. Ego network density ( $egonet_i$ ) was calculated from this data. It measures the extent to which the partners ( $j$  and  $k$ ) of a node  $i$  are connected. It is given by:

$$egonet_i = \frac{\sum_j \sum_k a_{jk}}{n_i(n_i - 1)} \quad \forall j, k : a_{ij} = 1, a_{ik} = 1$$

where  $n_i$  is the number of partners of node  $i$ . Here,  $n_i(n_i - 1)$  measures the maximum possible number of ties that can exist in  $i$ 's network, if all its partners are connected. The numerator measures the actual number of ties between alters. The higher the ego network density, the greater the number of ties between  $i$ 's alters, reducing opportunities for brokering across disconnected parts of the network. This variable is between 0 and 1; lower values indicate higher network brokerage opportunities.

Table 1 provides some descriptive statistics of the sample, and Table 2 Spearman rank correlations between variables to assess the extent to which the relationship between two variables can be described using a monotonic function.

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Insert Table 1 here

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Insert Table 2 here

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### 3.4. Methodology

The dependent variable SMA is a count variable. In this case, Poisson regression or negative binomial regression can be used (Gardner et al. 1995). The choice between the two depends on whether there is overdispersion in the dependent variable (ibid.). The hypothesis of zero dispersion was rejected for the aggregated SMA, and thus negative binomial regression was employed. Poisson regression was used for some of the other dependent variables representing different social media types.

### 4. Analysis

Results are provided in Table 3. **Model 1** is about the efficiency hypothesis (H1); **Model 2** includes results on adaptation hypotheses (H2, H3, H4); **Model 3** includes the institutional pressures hypothesis (H5); and **Model 4** includes all variables. For each model, we use the dependent variable SMA and report separate results for three types of social media.

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Insert Table 3 here

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The dependent variable SMA is a count variable, capturing both the number of different social media used and their frequency of use. Its value ranges between 0 and 16. Therefore, one “unit” increase in SMA corresponds to a 6.25% increase

( $1/16 \cdot 100$ ). It either corresponds to an increase in the frequency of use of one social media (from monthly to weekly updates) or to the use of a new social media (with monthly updates). In our sample of NPOs, the most widely used social media were blogging platforms and Facebook: 49% had a website (through a blogging platform), which 27% updated weekly, and 66% had a Facebook account, which 43% updated weekly. Besides, 32% used a video editing platform like YouTube, 29% had a Twitter or Instagram account, 17% used petition platforms, and 15% crowdfunding platforms. Our results for **Model 1** reveal that the physical proximity of partners tends to reduce the likelihood of SMA, confirming H1, albeit only at a 90% confidence level and excluding the second type of social media (Blogs & videos).

The hypotheses regarding organizational adaptation are corroborated by **Model 2**. The number of partners from different sectors contributes positively to all kinds of SMA, except crowd-based platforms. If an NPO gains one additional partner from a different sector than the one of existing partners, its SMA increases by 0.19 unit, namely by 1.19% ( $0.19 \cdot 6.25$ ). Besides, an additional partner supplying knowledge and information to an NPO is likely to increase its SMA by 0.16 unit ( $0.80/5$ ), which is significant for all types of social media and thus indicates an effect of absorptive capacity.

The ego network density variable ranges between 0 and 1 and reflects the extent to which the partners of an NPO are themselves connected. If all five partners of an NPO were connected, there would be a maximum of 10 ties ( $5 \cdot 4/2$ ), and the variable would be 1. On the other hand, if none of the partners had a tie to another, the variable would be 0. The coefficient of -0.48 reveals that an additional tie between two of the partners of an NPO would reduce its SMA by 0.048 units ( $0.48/10$ ), namely by 0.3%.

Hence, NPOs whose partners are disconnected tend to use social media more. This is valid for all social media but for blogs & videos.

Finally, our results for **Model 3** also provide some support (at a 90% confidence level) for the role played by public partners in SMA. One additional partner from the public sector is likely to increase SMA by 0.076 units (0.38/5), a 0.48 % increase. For the second type (Blogs & videos), its effect (0.47) is significant, but not for the two other types of social media.

## **5. Discussion**

According to theories explaining the antecedents of technology adoption, the adaptive capacity of organizations plays a vital role in their ability to respond to changes in their environment. In adaptation, partners are an essential source of information to learn about best practices and how technologies can be used to achieve organizational goals. Research about inter-organizational partnerships underlines critical factors such as the sectoral diversity of partners for resilience, knowledge and information acquisition from partners for increasing absorptive capacity, and open networks for protecting organizations from external shocks or enabling access to novelties. While such portfolio features are essential for technologies in general, in this paper we focused on the case of social media, taking it as an important technology to dialogue with various audiences. We further argued that some partner portfolios could give NPOs an advantage because of the intrinsic characteristics of social media as communication technologies: they help communicate with distant partners and can occasionally be used as public relations tools to increase legitimacy.

Our results provide empirical evidence that some NPOs have an advantage over

others because their network portfolio is better aligned with SMA. NPOs with cross-sectoral partners, NPOs that access knowledge and information from partners, and NPOs with open networks, have higher SMA. In addition, NPOs whose partners are physically distant use more social media. We also found some support for the role of institutional pressures to gain legitimacy, in the case of organizations having more partners from the public sector. This is especially the case when using blogs & videos. Intuitively this is understandable, as they provide visibility like conventional social media, but they are less interactive and require less cost and effort to update. In addition, having cross-sectoral partners does not seem to be associated with the adoption of crowd-based platforms.

Our analysis differs from past research in various ways. Firstly, most studies take into account a single social media. In this study, we considered the adoption of social media as a package and distinguished between three types: conventional social media (Facebook, Instagram...), blogs & videos, and crowd-based platforms. We found that most of our results about aggregated SMA apply when considering each type of social media separately. Secondly, literature about the role of adaptive capacity in technology adoption is scant when it comes to NPOs. Studies point to factors like age, size and context as antecedents of adoption. However, they neither explore adaptive capacity nor analyze the role of partnership portfolios, while the latter can have important implications for a range of organizational decisions, such as the adoption of novelties.

These results underline the broader impacts of network portfolios, going beyond the tangible and immediate benefits and costs of individual partners. While collaborations are essential to organizational strategies, a portfolio approach is often lacking.

Organizations learn how to align portfolios with other organizational decisions by developing portfolio management capabilities. An organization cannot recognize the opportunities in the environment without proper means to get information about the outside world. Here, it is critical to acknowledge the need to adopt a novelty and understand how it can enhance performance. After all, for the environment to influence an organization's decisions and actions, its actors must acquire knowledge of it. From a portfolio perspective, closed networks, the lack of partner diversity, and locally embedded networks can inhibit the capacity to access this knowledge.

Some limitations of our research can be underlined. Firstly, while cross-sectional analysis enables highlighting correlations among variables, it is not a suitable methodology to infer causalities. In other words, if our study shows that NPOs with specific partnership profiles are more likely to adopt social media than others, it does not imply that SMA results from NPOs' partnership portfolios. Organizations adopt social media to communicate with the public, and a refined understanding of causalities, to reveal drivers of SMA, would require a longitudinal analysis. Secondly, our survey does not account for the differences in the frequency of use of some types of SM. For example, crowd-based platforms are used less often than others, especially if an NPO uses them *only* as project owners rather than as project support or information disclosure. Such differences between social media types raise the question of whether our results would differ under alternative aggregation scenarios. However, we do not think this is the case, as the results for different social media types are similar. For one thing, there is a high correlation between NPOs' adoption of conventional and other types of social media. In addition, the significance of explanatory factors for different social media is similar. Nevertheless, future research

could consider alternative methods of aggregation to address interesting research questions, such as how NPOs differ from each other according to the structural characteristics of different social media or the frequency of use. Finally, we believe that the results are applicable to NPOs in different countries as well. However, they could be further tested in other contexts in the future. In addition, detailed case studies could enable a more refined understanding of the reasons behind these results in different contexts and sectors.

Overall, our results imply that managers who want to be more active in social media should first ask themselves whether their partner portfolio is aligned with their capacity to adapt to their environment. To increase their adaptive capacity, managers should widen their networks, not necessarily by increasing the number of partners per se, but by making their portfolio more efficient in terms of diversity. In addition, to recognize and leverage opportunities suitable for their objectives, NPO managers should use their limited resources to build open networks instead of remaining embedded in closed ones. On a more practical level, they should consider whether their digital activities and partner portfolios mutually benefit each other. In addition to numerous benefits like interactive engagement with the public, social media can help communicate with distant partners, signal legitimacy to attract funding and reduce the costs and efforts required to dialogue with partners from diverse fields and sectors.

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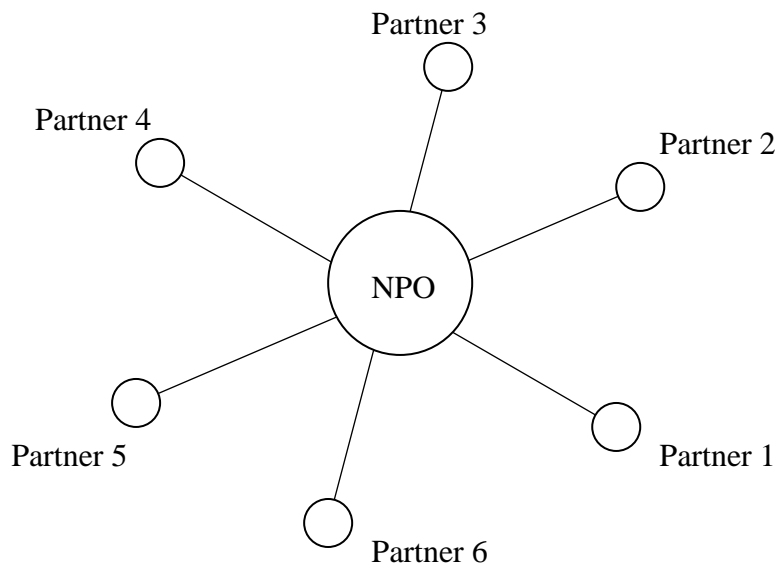


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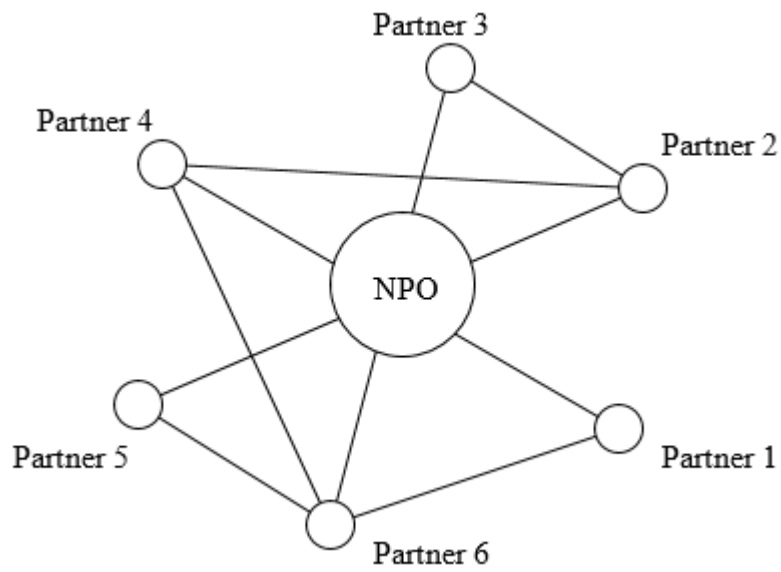
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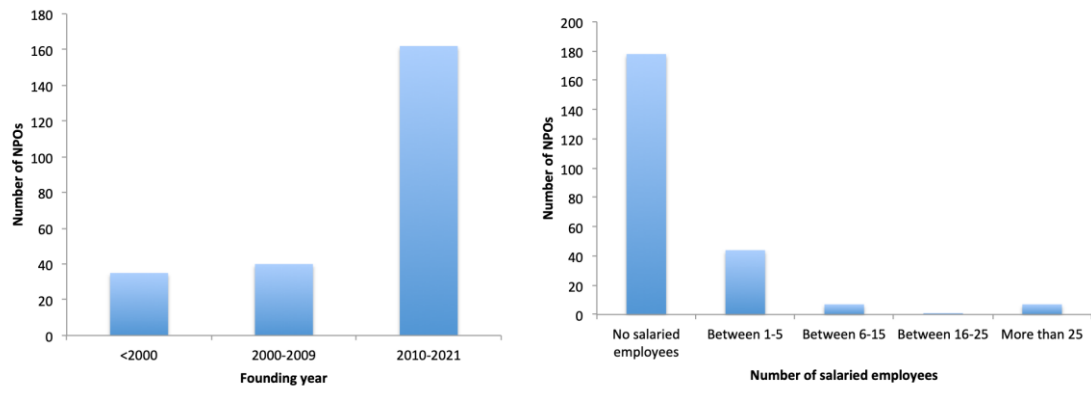
**Figure 1. Illustrative egocentric network (high openness)**



**Figure 2. Egocentric network with high closure**



**Figure 3. Information about the sample**



**Table 1. Descriptive statistics**

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std</b>	<b>Min</b>	<b>Max</b>
SMA	237	3.86	3.19	0	15
Social media	237	2.12	2	0	6
Blogs & videos	237	1.13	1.14	0	4
Crowd-based platforms	237	0.38	0.68	0	4
Age	237	12.13	14.36	0	109
Size	237	1.37	0.82	1	5
Advocacy	237	3.04	1.49	1	5
Intermediation	237	3.24	1.33	1	5
Services	237	2.69	1.51	1	5
Community	237	3.68	1.21	1	5
Innovation	237	3.57	1.34	1	5
CrossSectoralP	185	1.81	0.68	1	4
KnowledgeAcq	167	0.43	0.32	0	1
Scope	237	1.87	0.32	0	1
Proximity	237	0.70	0.37	0	1
EgoDensity	167	0.39	0.26	0	1
PublicPartners	237	0.17	0.24	0	1

**Table 2. Spearman rank correlations**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. SMA	1																
2. Age	-0.06	1															
3. Size	0.29*	0.17*	1														
4. Advocacy	0.22*	-0.01	0.05	1													
5. Intermediation	-0.09	-0.12	-0.06	0.06	1												
6. Services	0.12	-0.04	0.27*	0.06	0.17*	1											
7. Community	0.19*	-0.14	0.02	0.11	0.18*	-0.07	1										
8. Innovation	0.17*	-0.13	0.03	0.39*	0.06	0.10	0.22*	1									
9. Scope	-0.12	-0.09	-0.17	-0.02	-0.05	0	-0.05	-0.15	1								
10. Proximity	-0.21	-0.09	-0.18	-0.11	-0.08	0.00	-0.09	-0.19	0.44*	1							
11. CrossSectoralP	0.16*	-0.11	0.04	0.11	0.01	0.19*	0.15*	0.19*	-0.09	-0.043	1						
12. KnowledgeAcq	0.34*	0.05	-0.04	0.23*	0.00	-0.05	0.21*	0.15	-0.04	-0.11	-0.13	1					
13. EgoDensity	-0.16*	0.04	-0.00	0.18*	-0.02	0.06	-0.09	0.11	0.02	0.10	-0.02	0.02	1				
14. PublicPartners	0.08	0.07	0.00	0.09	-0.06	0.06	0.10	0.02	-0.04	0.07	0.47*	-0.05	-0.03	1			
15. Social media	0.87*	-0.14	0.29*	0.18	-0.09	0.11	0.24	0.14	-0.10	-0.2	0.13	0.23	-0.16	0.00	1		
16. Blogs & videos	0.66*	0.06	0.09	0.15	0.06	0.08	0.13	0.14	-0.07	-0.09	0.12	0.30*	0.03	0.13	0.33*	1	
17. Crowd-based platforms	0.49*	-0.11	0.05	0.14	0.01	0.03	-0.00	0.12	0.03	-0.14	-0.04	0.18	-0.09	-0.05	0.29*	0.22	1

**Table 3. Regression results**

	Model 1 (efficiency)				Model 2 (adaptive capacity)				Model 3 (institutional pressure)				Model 4 (all variables included)			
	SMA	Conven- tional	Blogs & videos	Crowd- based	SMA	Conven- tional	Blogs & videos	Crowd- based	SMA	Conven- tional	Blogs- videos	Crowd platform s	SMA	Conven- tional	Blogs & videos	Crowd- based
Constant	0.84** <i>2.36</i>	0.07 <i>0.16</i>	-0.55 <i>1.13</i>	-1.32 <i>1.68</i>	0.20 <i>0.69</i>	-0.42 <i>1.2</i>	-1.33 <i>3.02**</i>	-1.38 <i>1.88*</i>	-0.26 <i>0.98</i>	-1.09** <i>3.42</i>	-1.26** <i>3.87</i>	-2.25** <i>4.21</i>	0.51 <i>1.20</i>	-0.00 <i>0.02</i>	-1.06** <i>1.67</i>	-1.84* <i>1.69</i>
Age	-0.00 <i>0.47</i>	-0.00 <i>0.81</i>	-0.00 <i>0.06</i>	-0.00 <i>0.16</i>	0.00 <i>0.76</i>	0.00 <i>1.04</i>	0.00 <i>0.31</i>	0.00 <i>0.47</i>	0.00 <i>0.36</i>	0.00 <i>0.52</i>	0.01 <i>1.25</i>	0.00 <i>0.4</i>	-0.00 <i>0.92</i>	-0.01 <i>1.27</i>	-0.00 <i>0.37</i>	-0.01 <i>0.53</i>
Size	0.16** <i>2.41</i>	0.19** <i>2.56</i>	0.02 <i>0.23</i>	0.18 <i>1.41</i>	0.21** <i>3.62</i>	0.24** <i>3.55</i>	0.06 <i>0.69</i>	0.24** <i>1.9</i>	0.24** <i>3.65</i>	0.26** <i>3.59</i>	0.07 <i>0.98</i>	0.34** <i>3.34</i>	0.18** <i>3.20</i>	0.21** <i>3.58</i>	0.05 <i>0.6</i>	0.21* <i>1.69</i>
Advocacy	0.08** <i>1.88</i>	0.08* <i>1.68</i>	0.06 <i>1.03</i>	0.13 <i>1.39</i>	0.06 <i>1.5</i>	0.07 <i>1.52</i>	0.03 <i>0.54</i>	0.15 <i>1.51</i>	0.11** <i>2.79</i>	0.11** <i>2.47</i>	0.05 <i>1.01</i>	0.25** <i>2.97</i>	0.06 <i>1.52</i>	0.08 <i>2.00</i>	0.02 <i>0.34</i>	0.14 <i>1.38</i>
Innovation	0.02 <i>0.44</i>	-0.01 <i>0.21</i>	0.07 <i>0.97</i>	0.12 <i>1.03</i>	0.03 <i>0.67</i>	-0.00 <i>1.07</i>	0.07 <i>1.09</i>	0.15 <i>1.23</i>	0.12** <i>2.63</i>	0.08 <i>1.54</i>	0.19** <i>3.33</i>	0.17 <i>1.65</i>	0.02 <i>0.44</i>	-0.02 <i>0.40</i>	0.06 <i>0.93</i>	0.13 <i>1.1</i>
Community	0.13** <i>2.65</i>	0.20** <i>3.37</i>	0.1 <i>1.51</i>	-0.1 <i>0.9</i>	0.07 <i>1.59</i>	0.16** <i>2.83</i>	0.01 <i>0.2</i>	-0.17 <i>1.5</i>	0.12** <i>2.54</i>	0.22** <i>3.84</i>	0.04 <i>0.76</i>	-0.04 <i>0.4</i>	0.07 <i>1.54</i>	0.15** <i>2.8</i>	0.02 <i>0.28</i>	-0.16 <i>1.44</i>
Services	0.04 <i>1.03</i>	0.05 <i>1.23</i>	0.05 <i>0.93</i>	-0.06 <i>0.73</i>	0.02 <i>0.6</i>	0.03 <i>0.8</i>	0.03 <i>0.57</i>	-0.05 <i>0.58</i>	0.04 <i>0.96</i>	0.06 <i>1.45</i>	0.03 <i>0.71</i>	-0.11 <i>1.3</i>	0.08 <i>0.74</i>	0.04 <i>0.9</i>	0.03 <i>0.63</i>	-0.05 <i>0.58</i>
Intermediation	-0.08 <i>1.63</i>	-0.09 <i>1.62</i>	0.00 <i>-0.07</i>	-0.05 <i>0.47</i>	-0.07 <i>1.54</i>	-0.08 <i>1.64</i>	0.01 <i>0.12</i>	-0.05 <i>0.44</i>	-0.06 <i>1.27</i>	-0.07 <i>1.43</i>	-0.00 <i>0.06</i>	-0.07 <i>0.74</i>	-0.07 <i>1.53</i>	-0.10** <i>2.19</i>	0.02 <i>0.36</i>	-0.06 <i>0.54</i>
CrossSectoralP					0.19** <i>2.6</i>	0.17** <i>1.93</i>	0.23** <i>2.14</i>	-0.08 <i>0.42</i>					0.18** <i>2.42</i>	0.19** <i>2.39</i>	0.19* <i>1.72</i>	-0.02 <i>0.22</i>
KnowledgeAcq					0.80** <i>4.68</i>	0.59** <i>2.92</i>	1.02** <i>4.01</i>	1.07** <i>2.58</i>					0.77** <i>4.41</i>	0.61** <i>3.34</i>	0.95** <i>3.72</i>	0.98** <i>2.33</i>
PublicPartners									0.38* <i>1.79</i>	0.30 <i>1.24</i>	0.47** <i>2.01</i>	-0.22 <i>0.5</i>	-0.03 <i>0.15</i>	-0.27 <i>1.28</i>	0.24 <i>0.85</i>	-0.18 <i>0.24</i>
Scope	-0.05 <i>0.28</i>	-0.05 <i>0.23</i>	-0.13 <i>0.57</i>	0.49 <i>1.18</i>									0.03 <i>0.21</i>	-0.08 <i>0.50</i>	-0.08 <i>0.37</i>	0.44 <i>1.03</i>
Proximity	-0.30* <i>1.91</i>	-0.32* <i>1.78</i>	-0.09 <i>0.41</i>	-0.59* <i>1.76</i>									-0.20 <i>1.37</i>	-0.18 <i>1.22</i>	-0.04 <i>0.17</i>	-0.41 <i>1.16</i>
EgoDensity					-0.48** <i>2.41</i>	-0.68** <i>2.83</i>	0.01 <i>0.03</i>	-0.84* <i>1.71</i>					-0.41** <i>2.07</i>	-0.55** <i>2.42</i>	0.02 <i>0.05</i>	-0.84* <i>1.69</i>
Chi2	31.17	31.73	10.6	12.5	56.37	46.97	30.09	21.17	55.46	52.11	31.45	32.48	54.59	76.05	25.50	21.29
Chibar	29.84	7.53			15.01	3.56			87.44	27.44			11.80			
N	237	237	237	237	162	162	162	162	237	237	237	237	162	162	162	162

Standard errors are in *italics*.

\*\* indicates a significance of 5% or higher. \* indicates a significance of 10% or higher & up to 5%.

Chibar statistic indicates that the dispersion parameter is non-zero, suggesting a negative binomial model rather than Poisson regression. The absence of Chibar indicates that Poisson regression was used.