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The mediating role of the creation knowledge process in the relationship between Social Media and Open Innovation --Manuscript Draft--

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Abstract:	<p>Purpose</p> <p>The purpose of the study is empirically examine the role of the absorptive capacity, as process of creation of knowledge, in the relationship between social media and open innovation in the family firms context. In addition, the impact of social media use as an antecedent of open innovation in the firms.</p> <p>Methodology</p> <p>The sample amounts to 113 responding family firms in Spain. The model was estimated through PLS-SEM with smartPLS software 3.3.3.</p> <p>Findings</p> <p>The results confirm the key role played by absorptive capacity in the relationship between social media use and open innovation and highlighting also how social media use appears as a relevant enabler of open innovation practices. Moreover, the results confirm the importance of social media use for acquiring external information and knowledge which in turn can help family firms gain more innovative opportunities.</p> <p>Practical implications</p> <p>Our paper suggests that managers of family firms should foster an appropriate culture of learning in their firms and provide specific training to develop the staff ability to acquire, integrate and use information captured in digital platforms.</p> <p>Originality</p>

	<p>Social Media has totally transformed the way firms relate to the market and provides a useful tool to collect external knowledge and information. These tools are used by family firms as a new form to connect and collaborate with different stakeholders, so they have the potential to enhance open innovation activities. However, empirical research on the topic remains scarce, and is challenging for managers to benefit from all the potential that social media can bring in fostering innovation and to develop dynamic capacities of knowledge management in the family firms context. This work shed light on this topic.</p>
Suggested Reviewers:	

The mediating role of the creation knowledge process in the relationship between Social Media and Open Innovation

Abstract

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Keywords: Social Media, Open Innovation, Absorptive Capacity, Family Firms, Knowledge Management

Paper type: Research paper

1. Introduction

A relevant paradigm emerges in the family firms as the open innovation to welcome and develop the figure of innovation in the companies. In the last decades, it has become one of the most relevant concepts in innovation management, and it basically involves opening up the innovation process to collaborate with external agents or outsiders (Huizingh, 2011). In current dynamic, complex and globalized business environment, family businesses need to rely more on external resources of information to generate and sustain competitive advantages (Popa et al., 2017; Jalilvand et al., 2017). Innovation is seen as the outcome of an interactive process between the firm and its environment, as a result of the collaborations among a wide range of actors (Mention, 2011).

Social Media is also having a transformative impact in their innovation processes (Aral et al., 2013; De Zubieta et al., 2019). Those platforms foster communication and connections, creating new channels of information exchange with different stakeholders, and thus, they have the potential to facilitate innovation efforts in an open and collaborative environment (Mention et al., 2019). Consequently, they are considered as a key tool to facilitate Open Innovation, but due to the relative novelty of the phenomenon, empirical research on the impact of topic is still limited (Dahlander and Gann, 2010; Torres de Oliveira et al., 2019).

Absorptive capacity is also recognized as a key topic in the Strategic Management literature, and it is considered a basic driver of Open Innovation practices (Spithoven et al., 2010). It is defined as the firm's ability to recognize the value of new information from the environment, assimilate it, and apply it to commercial ends (Cohen and Levinthal, 1990). As Zahra and George (2002) highlighted, Absorptive Capacity involves a set of organizational routines and processes through which firms acquire, assimilate, transform and exploit knowledge in order to create value and obtain a competitive advantage. Absorptive Capacity has been recognized as a relevant prerequisite to develop Open Innovation activities (Huizingh, 2011). Consequently, as prior literature highlights (Spithoven et al., 2010), in order to understand how to develop successful Open Innovation processes it is key to examine the specific role played by Absorptive Capacity.

Family businesses are the most importance in the economy of a country and their significance becomes even greater if the consequences of their entrepreneurial work on the overall growth of a society are analysed. (Basco, 2010). The most respected authors have identified a set of characteristics in family businesses, such as: the family's

1 involvement in the ownership and management of the company; the family's involvement
2 in the ownership and management of the business; that there is an interdependence of
3 ownership and control; and of ownership and control; and that the firm is passed on from
4 generation to generation with a desire for continuity (Ruiz, Sessarego and Guzmán-Sanza,
5 2010). As Brumana et al. (2017) point out, family firms adopt strategic behaviour
6 conditioned by their idiosyncratic characteristics (e.g. family ownership, management
7 and involvement) and motivations (e.g. transgenerational succession). As highlighted by
8 Moss et al. (2014), family businesses have continuity as a principle in the way they
9 operate, i.e. a culture focused on keeping the future in mind and reinforcing constancy.
10 These points mentioned above are directly related to Knowledge Management,
11 Innovation and Social Media.
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20 In recent times social media is being used as a facilitator of open innovation (Mount
21 and García, 2014). Recent empirical studies have examined the impact of social media in
22 knowledge creation and innovation processes (Papa et al., 2018; Pérez-González et al.,
23 2017); its impact in fostering incremental and radical innovations (Torres de Oliveira et
24 al., 2019); Following and Open Innovation perspective, De Zubielqui et al. (2019)
25 empirically observed that external knowledge flows from market-based actors sourced by
26 social media enhanced innovation, and they noted that it was necessary to better examine
27 specific organisational mechanisms facilitating effective knowledge transfer in this
28 process (Keegan & Rowley, 2017). Absorptive Capacity is going to play a key role also,
29 as these capabilities are considered as organizational precondition to develop Open
30 Innovation activities (Ooms et al., 2015). However, despite their relevance, the combined
31 effect of social media use and Absorptive capacity on enhancing Open Innovation has not
32 been properly examined in the literature.
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44 The purpose of our study is to extend knowledge on the topic, by empirically
45 examining the relationship between social media use, Absorptive Capacity and Open
46 Innovation. Specifically, we address the following research questions:
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50 How does social media use enhance Open Innovation practices and Absorptive
51 Capacity in family firms? Is there a mediating effect of Absorptive Capacity of the impact
52 of social media use on Open Innovation?
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57 The contributions of the study are twofold. First, considering that research on the topic
58 was limited, it contributes to the literature by providing empirical evidence of the impact
59 of social media use on enabling Open Innovation practices. Second, findings show that
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Absorptive Capacity effectively mediates the impact of social media use on Open Innovation. Consequently, Absorptive Capacity appears as a necessary condition in order to leverage external knowledge captured via social media to enhance Open Innovation activities.

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2. Research model and hypotheses

2.1 Social Media and Open Innovation

In recent years, scholarly attention has been focus on better understanding the role of social media in creating and managing knowledge flows both within the firm and across organizational boundaries, which can transform in new ideas for product and service development (Bhimani et al., 2019). There is a growing interest, both in the business and in the academic world, in examining how social media use can enhance open innovation activities in the family firms.

The use of these tools offers family business an emerging opportunity to source new ideas and co-create those ideas with customers, so it has a great potential to improve organizational innovation processes and outcomes (Torres de Oliveira et al., 2019; Casprini, et al., 2017). Drawing on the dynamic capabilities theory, those authors confirmed that the use of social media tools enables the development of sensing and seizing capabilities. By using these platforms, firms can first identify emerging opportunities related with customers' needs (Sashi, 2012), and seize co-creation processes to produce specific innovations (Parveen, Jaafar, & Ainin, 2016). Moreover, in the context of Open Innovation, the application of social media for exploration and exploitation activities specifically enhances creativity, expertise and collective intelligence, supporting firm ambidexterity during new product ideation (Mount and Garcia, 2014).

It has been recognized that, in current hyper-competitive environments, social media platforms enable faster information flow and better knowledge sharing across their internal and external stakeholders, allowing firms to capture valuable ideas to become more innovative (Lam et al., 2016). Particularly, social media tools are being used to facilitate diverse activities in the innovation process: information and knowledge sharing in idea generation and new product development; employee collaboration and internal communication; inter-firm cooperation and supply chain management (De Zubielqui et al., 2019; Lam et al., 2016).

It is well documented how firms from different sectors are using these tools to generate new ideas and enhance co-creation with customers. A well-known example is the case of Inditex Group. Inditex is the largest and most important Spanish family business and one of the most important at a global level.

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2 Specifically with its main brand, Zara, it has been developing and investing heavily in
3 online platforms for years, and has a global e-commerce platform in operation, integrating
4 all the markets, countries, and social networks in which it is present and through which it
5 interacts with its customers and allowing customers to provide direct feedback on current
6 offerings and submit new ideas for product or service development (Gallaughier and
7 Ransbotham, 2010). Many of the family businesses due to the pandemic have had to boost
8 their digital path in order to adapt to the big changes and follow the path of big companies
9 like Inditex.
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12 Different studies in the literature have confirmed a positive effect of social media use
13 on enhancing family firm innovation activities. García-Morales et al. (2018), observed
14 how social media use enhanced knowledge competences and innovation capabilities,
15 translating also into improved business performance. Similarly, Palacios-Marques et al.
16 (2015) focusing on data from the hotel sector, confirmed a statistically significant positive
17 relationship between online social networks and innovation capacity in the examined
18 firms. Moreover, De Zubielqui et al. (2019), using a large-scale survey of SMEs from
19 different sectors, observed a significant positive relationship between knowledge sourced
20 via social media from market-based actors, and innovativeness. Based in all the above,
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34 H1. Social Media use positively affects Open Innovation activities.
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37 38 **2.2 Social Media and absorptive capacity** 39

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41 Within the knowledge management, absorptive capacity is one of the most important
42 research constructs which have emerged in recent decades, and it has been particularly
43 used in Information Systems literature. It refers to the firm's ability to identify, assimilate
44 and exploit knowledge from the environment, through a continual learning process (Lane
45 et al., 2006). As Zahra and George (2002) highlighted, Absorptive Capacity can be
46 considered as a key dynamic capability that enables the creation of other organizational
47 competences and can provide the firm with multiple sources of competitive advantage in
48 high-changing environments. We followed Zahra and George (2002) conceptualization
49 and assume that Absorptive Capacity is composed by two subsets and four dimensions.
50 These subsets are Potential Absorptive Capacity which involves the acquisition and
51 assimilation of knowledge; and Realized Absorptive Capacity, which comprises the
52 firm's capacity to transform and exploit assimilated knowledge by incorporating it into
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1 the firm's operations. These four dimensions enable firms to reconfigure its resource base
2 and be able to adapt it to changing markets conditions to achieve thus a competitive
3 advantage (Spithoven et al., 2010).
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6 In current turbulent markets, family firms need to make use of internal and external
7 information movements, to be able to build knowledge-based advantage over their
8 competitors (Lam et al., 2016; Weimann et al., 2020). Prior studies suggest that, firms'
9 exposure to external knowledge sources can be considered an effective antecedent of
10 absorptive capacity, and the diversity of these sources can significantly enhance their
11 acquisition and assimilation capabilities (Moilanen et al., 2014; Zahra and George, 2002).
12 In this context, the use of social media tools appears as a valuable means to foster
13 knowledge exchange both inside and across family firm boundaries, enhancing also
14 organizational learning. These platforms facilitate family firm's interactions with their
15 stakeholders (customers, suppliers, partners), as they have become a suitable environment
16 to share information, collaborate and build relationships (Palacios-Marques et al., 2015).
17 Consequently, social media use is going to play a key role in building absorptive
18 capacities in firms (Ooms et al., 2015).
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22 In this vein, Schlagwein and Hu (2017) conducted an extensive analysis of the social
23 media literature and conclude that the use of these platforms effectively increases an
24 organization's absorptive capacity. First, social media use supports the family business'
25 ability for exploratory learning (understanding and acquiring external knowledge), as it
26 allows to take up market information and patrol user-generated content more quickly and
27 effectively. Second, social media also enhances transformative learning (interpreting and
28 assimilating knowledge) because it fosters crowdsourcing processes and can help to
29 leverage collective intelligence for the organization. And finally, these authors indicate
30 that social media may also support the family firm' ability for exploitative learning,
31 allowing new business applications or business processes to be created more effectively.
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35 In this vein, it has been stated in prior literature that social media use enhances
36 absorptive capacity in family firms. Scuotto et al. (2017) examining a sample of
37 knowledge-intensive and labour-intensive SMEs, confirmed that the use of social
38 networking platforms exerted a positive influence on the absorptive capacity of those
39 family business. Moreover, Ooms et al. (2015) also explored the topic in a qualitative
40 way, through explorative case studies conducted in high tech companies. Their results
41 note that social media can be considered boundary-spanning tools, and show how their
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1 use adds transparent and multidirectional interactions that can help to build and maintain
2 absorptive capacity. Thus, based on prior evidence, the following hypothesis is proposed:
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4 H2. Social Media use positively affects Absorptive Capacity.
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8 **2.3 Absorptive Capacity and Open Innovation** 9

10 Absorptive capacity has been widely recognized in the literature as a key precondition
11 for Open Innovation success (Naqshbandi and Tabche, 2018; Rangus et al., 2017;
12 Spithoven et al., 2010), in fact, open innovation is a great tool for the family business to
13 face the market (Baron, 2021).
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17 To survive in current turbulent environments, family firms need to implement diverse
18 knowledge-enhancing practices to enhance their ability to quickly create new products
19 and services (Ali and Park, 2016; Chaudhary and Batra, 2018). As we previously
20 explained, absorptive capacity stimulates the acquisition, assimilation, transformation
21 and exploitation of external knowledge, and also enables the establishing of valuable
22 synergies with internal generated knowledge in the family firm (Chaudhary and Batra,
23 2018). Both ways of acquiring knowledge are complementary and are going to effectively
24 support innovation activities (Garcia-Morales et al., 2007). Likewise, Moilanen et al.
25 (2014) sustain that absorptive capacity not only acts as a tool for processing external
26 knowledge, it is also considered as a conduit for transferring knowledge within the family
27 firm, so it going to play a key role in facilitating innovation. (Sirmon & Hitt, 2003)
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39 Research results show a close relationship between absorptive capacity and open
40 innovation not only in manufacturing and high-tech firms, but also in a service context
41 (Garcia-Morales et al., 2007). In fact, absorptive capacity has been conceptualized as a
42 dynamic capability that allows a family firm to transform knowledge into new products,
43 services or processes to support innovation (Ali and Park, 2016; Cepeda-Carrion et al.,
44 2012; Chaudhary and Batra, 2018). Consequently, from the own definition of the concept
45 we can derive its key role in enabling firms' innovativeness. (Sirmon & Hitt, 2003)
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52 As we explained before, absorptive capacity has been frequently recognized as a
53 crucial source of innovation success (Cepeda-Carrion et al., 2012) and several studies
54 have empirically examined the phenomenon. Moilanen et al. (2014), drawing on an
55 extensive sample of SMEs, from manufacturing and service sectors, confirmed how
56 absorptive capacity relates positively to innovation performance in all the firms of the
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1 sample. Scuotto et al. (2017) also confirm empirically this positive relationship and
2 concluded that absorptive capacity enable firms to acquire, assimilate and transfer
3 external knowledge, helping firms to generate new ideas and enhancing their
4 innovativeness. Additionally, Ali and Park (2016) developed a disaggregated analysis of
5 the issue, building on a sample of manufacturing firms, from different subsectors and
6 sizes. They operationalize the two dimensions of absorptive capacity (Potential versus
7 Realized Absorptive Capacity) separately and examined the specific impact of both
8 variables on organizational innovation. Results confirm that Potential and Realized
9 Absorptive Capacity works sequentially and directly influenced Open Innovation in
10 family firms (which included product, process and management innovation).
11 Consequently, we assume that Absorptive Capacity will play a key role in fostering
12 innovation activities, and we formulate the following hypothesis:
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22 H3. Absorptive Capacity positively affects Open Innovation.
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26 **2.4 The mediating role of Absorptive Capacity**

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28 By accessing external information sources, organizations gain more opportunities to
29 obtain valuable knowledge and integrate it into their innovation processes (De Zubieta
30 et al., 2019). As we previously explained, the use of social media tools provides
31 companies with enormous potential and possibilities for initiating open innovations
32 (Torres de Oliveira et al., 2019). However, not all the external information companies
33 have access is necessary, timely or appropriate (Cegarra-Sánchez, Bolisani, Cegarra-
34 Navarro, & Martínez Caro, 2018; Sánchez-Casado, Cegarra-Navarro, & Tomasetti-
35 Solano, 2015a). In fact, special attention is required because social media can amplify the
36 negative effects of misunderstandings, created via gossip, lies or fake news (Thompson,
37 2008). In order to address this issue, we suggest that absorptive capacity will mediate the
38 relationship between the use of social media and open innovation, as we explain below.
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49 Since the open innovation paradigm relies on capturing knowledge from external
50 relationships, an appropriate internal environment is thus a must before building
51 relationships with external partners (Naqshbandi and Tabche, 2018). It should be note
52 here that one thing is to have access to external information, quite another is to learn and
53 create knowledge to innovate and seize opportunities (Ooms, Bell, & Kok, 2015;
54 Martinez, Lazzarotti, Manzini, & García, 2014;). By using social media tools, family
55 firms have access to large amounts of information from different sources, but this
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2 information need to be processed, integrated and shared to transform it into valuable
3 knowledge, which transforms into innovative ideas. Consequently, without an
4 appropriate absorptive capacity, external knowledge has little value for the firm
5 (Moilanen et al., 2014).
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8 It is clear that open-innovation involves acquiring external information to foster
9 organizations' outcomes (West, Salter, Vanhaverbeke, & Chesbrough, 2014; Hoy &
10 Sharma, 2010; Miller & Le Breton-Miller, 2005). However, despite the predominant role
11 of social media in sharing information, the relationship between these two dimensions
12 has not been researched adequately (Ngai, Tao, & Moon, 2015). For example, the
13 alternative of considering absorptive capability like a moderator would mean that for the
14 better but sometimes for the worse all the external information provided by the social
15 media may be used for innovations (i.e. the moderator effect of absorptive capacity
16 accelerates and decelerates this process). However, the partial mediation model shown in
17 Figure 1 points to absorptive capability as a mechanism for acquiring, assimilating,
18 transforming and exploiting the information provided by social media by setting standard
19 operating procedures, structural artefacts and mental models which can lead both
20 mitigation of unverified information and application of new knowledge. Therefore, in line
21 with previous studies, this research highlights the importance to encourage managers of
22 family firms to support absorptive capability for obtaining, contrasting, filtering and
23 updating information provided by social media (Limaj, Bernroider, & Choudrie, 2016;
24 Ooms, Bell, & Kok, 2015).
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39 Literature has demonstrated that absorptive capacity may be useful to channel external
40 information by improving its transformation into knowledge and enhancing the
41 innovation potential of the company (Chun- Yao, 2011; Cohen & Levinthal, 2006;
42 Escribano, Fosfuri, & Tribó, 2009). In this vein, Scuotto et al. (2017) empirically
43 observed that the process of creating new knowledge to promote innovation cannot be
44 efficient without the use of social media and a solid Absorptive Capacity. Hence, drawing
45 on a sample of SMEs, they confirmed that higher levels of Absorptive Capacity through
46 the use of Social Networking sites positively influenced innovation performance.
47 Additionally, Moilanen et al. (2014) also found that the Absorptive Capacity of a firm
48 mediates the relationship between external knowledge inflows and innovation outcomes.
49 Their findings suggest that, to benefit from external knowledge flows, it is crucial that
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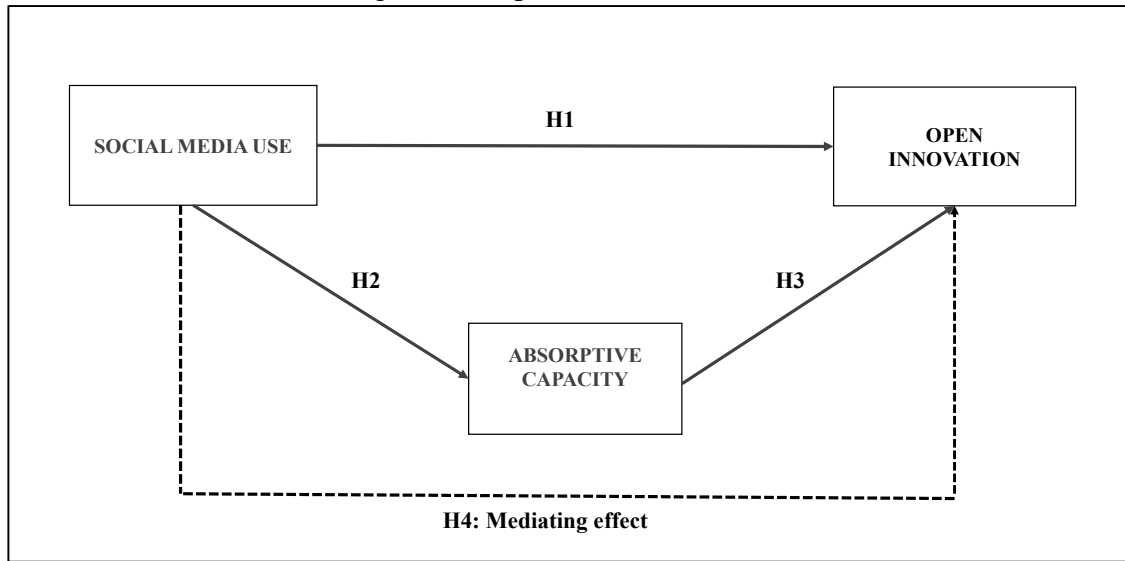
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the family firm possess the capability of identifying and evaluating the potential value of this external knowledge. Therefore, we suggest that:

H4. Absorptive Capacity mediates the relationship social media use and Open Innovation.

Figure 1 presents the proposed research model, including the hypothesized relationships between social media use, Absorptive Capacity and Open Innovation.

Figure 1. Proposed research model



3. Research methodology

3.1 Sample and data

The firms selected for this study were spanish family firms in the services sector located in Spain, with more than 10 employees and 5 years of age. These criteria were introduced to ensure that companies had a certain level of complexity which would require a high use of technological tools and the development of Open Innovation activities.

Additionally, we considered that the spanish family firms provides an appropriate context to empirically test the research hypotheses.

In addition to its economic relevance, the service sector is specifically appropriate to perform our study because services activities are the result of a co-production and interactivity, for to attempt achieve a superior value and experience, and they involve a high level of contact between customers and service providers (Mention, 2011).

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Moreover, the family business and the relation with the innovation has become an object of growing attention for management researchers and managers (Block, 2009; Hoy & Sharma, 2010; Miller & Le Breton-Miller, 2005; Sharma, Chrisman, & Gersick, 2012). The unique characteristics of family firms can affect the way in which they develop innovation activities (De Massis, Frattini & Lichtenthaler, 2013; Sirmon & Hitt, 2003). In addition, studies in different countries have demonstrated the important role played by family businesses in relation to economic growth and impact on the gross domestic product (GPD) of each country, as well as in the generation of employment (Barroso-Martinez, Sanguino Galván & Bañegil Palacios, 2013; Pistrui, Huang, Oksoy, Jing & Welsch, 2001; Anderson & Reeb, 2003)

The firms' contact data was extracted from the database SABI that is a database of 2.5 million of Spanish companies. As a result, 338 family firms with more than 10 employees and 5 years of age, were identified and selected. In total, 338 managers of family firms of services sector receive telephone and mailing invitations to participate in this study. The process yields a total of 113 valid questionnaires (33.43% response rate). A post analysis of power statistics on this sample reveals that estimations are not conditioned by the sample size.

3.2 Measures

The figure 1 show the proposed research model of the study. This work uses and adapts scales from previous studies in which the items and responses appear on a seven-point Likert scale ranging from 1: I completely disagree to 7: I completely agree.

In order to measures social media use (SM), the study adopt the one-dimensional scale of Tajvidi and Karami, (2017), which it had been tested in service firms in prior studies. In this scale, we had asked to firms about the level of use of several social networks. This scale presents 7 items. The study adopts a composite form for the all constructs in our model. Social media use (SM), was estimated as Mode B composite, and as Mode A for the rest two constructs (i.e. open innovation (OI) and absorptive capacity (AC)). The reasons by adopting a structure of composite for our model's construct is all of them has been considered as human design tools to measure or operationalize latent variable that is not easily measured in the nature (Henseler, 2017)

1 The SMU's indicators modelled as Mode B composites imply that do not necessarily
2 correlate; consequently, traditional reliability and validity assessments are inappropriate
3 and illogical for a Mode B composite (Bollen, 1989; Hair et al., 2019).
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5 To measure the open innovation, in the current work, we have adopted the scale of
6 Oltra et al. (2018). In this scale, we had asked to managers of our sample about the
7 innovation practices adopt in your companies in the last three years. This scale presents
8 8 items. Finally, to assess the absorptive capacity, in this study, we adopt the
9 multidimensional scale of Jansen et al (2005). This scale is based in the prior studies of
10 Zahra and George (2002) and the absorptive capacity is composed by PACAP (potential
11 absorptive capacity) and RACAP (realised absorptive capacity). This scale is a
12 multidimensional scale of 4 dimensions, two dimensions of PACAP: acquisition (AC)
13 and assimilation (AS) of new external knowledge, and two dimensions of RACAP: the
14 transformation (KT) and exploitation (KE) of new external knowledge.
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26 **3.3 Data analysis**

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28 In our model as we said, all measures are operationalized as composites (Rigdon, 2016;
29 Henseler, 2017), therefore, we decide using PLS-SEM to test our model and the
30 hypotheses. The reasons about this are the followings: (1) we used composites estimated
31 in Mode A and Mode B (Rigdon et al, 2017, Hair, et al, 2016); (2) we adopted an
32 explanatory approach following Henseler (2018). The composites are estimated in Mode
33 A when the indicators that compound the latent variable are correlated. A Two-step
34 process has been pointed out to assess models in an explanatory way with PLS-SEM,
35 (Hair et al, 2019): (1) assessment of measurement model and (2) assessment of structural
36 model.
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45 We used a bootstrap procedure (Chin, 1998), in order to find significance of indices.
46 With this bootstrapping, that is a resampling procedure, we are able to determinate the
47 significance of path coefficients and weights, and loadings of indicators for each
48 composites (i.e. latent variable). We use for data analysis the software package SmartPLS
49 3.2.6. (Ringle et al., 2015) and for mediation we follow the procedure described by Nitzi
50 et al (2016) and Cepeda-Carrión et al. (2017).
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56 A good measurement model should demonstrate sufficient reliability and validity.
57 According to Henseler et al, (2015), ρ_A , Jöreskog's rho and Cronbach's alpha are the
58 most suitable measures of the consistency reliability. Reliability values greater than 0.7
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1 indicate appropriate reliability in the prior phases of research and values higher as 0.8 or
 2 0.9 would be used in more advanced phases of the research (Nunnally, 1978), which are
 3 higher than the most usual values. As Fornell and Larcker (1981) argues, the score of
 4 average variance extracted (AVE) is a measure of unidimensionality. Finally, Fornell and
 5 Larcker's criterion provides evidence of discriminant validity of reflective constructs (i.e.
 6 Mode A composite) (Hair et al, 2014).
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10 The path is very important indicator in the structural model, and it is considered the
 11 most important result. Bootstrap percentile confidence intervals help in the generalisation
 12 from sample to population. (Cohen, 1988; Aguirre-Urreta and Ronkko, 2018).
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18 4. Results

19 4.1 Measurement model

20 On the measurement model, the results indicate that all the requirements usually
 21 established are checked. First, because all the value of standardized loadings (Mode A
 22 composites) are greater than 0.7 (Table 1) and therefore, the individual items are reliable.
 23 Second, all the consistent measures of model are greater than 0.8 (Table 1), this model
 24 meets the prerequisite of construct reliability. Additionally, the value of AVE (average
 25 variance extracted) exceed the limit of 0.5 (Table 1) for composites unidimensionality,
 26 and these latent variables therefore achieve convergent validity. Table 2 shows the
 27 weights and significance of the Mode B composite's indicators (social media use).
 28 Finally, all the Mode A composites attain discriminant validity, as the table of Fornell
 29 and Larcker criterion indicates (Table 3).
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43 Table 1: Indicators loadings of Mode A composites

44 Constructs	45 AC	46 OI
47 AC	0,912	
48 AS	0,910	
49 KE	0,938	
50 KT	0,930	
51 OI1		0,848
52 OI2		0,853
53 OI3		0,781
54 OI6		0,762
55 Mean	5,99	6,13
56 SD	1,17	1,01
57 CA	0,942	0,827
58 rho_A	0,943	0,833
59 CR	0,958	0,885

AVE 0,851 0,659

Notes: Mean = the average score for all of the items included in this measure; S.D. = standard deviation; CA = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted

Table 2: Indicators weights and significance of Mode B composite

Social Media Use	Weights	t-value	p-value
SM1	0,305	1,783	0,075
SM2	0,247	1,658	0,097
SM3	-0,065	0,642	0,521
SM4	0,145	1,813	0,070
SM5	-0,148	2,044	0,041
SM6	0,443	4,079	0,000
SM7	-0,169	2,338	0,019

Notes: The significance of the weights was carried out through a two-tail's bootstrap procedure of 5,000 subsamples

Table 3: Fornell-Larcker's criteria

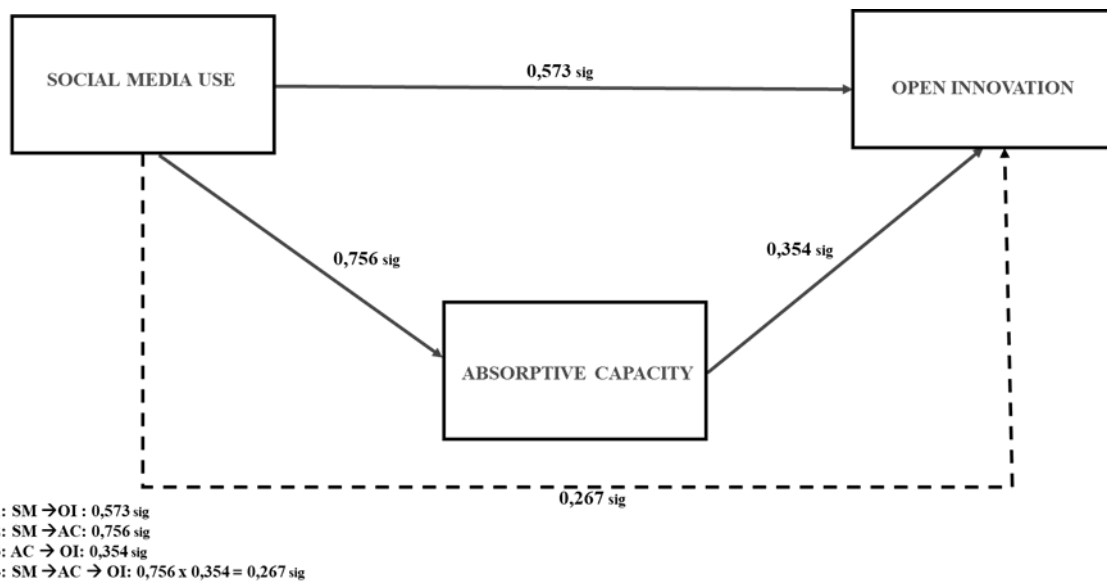
Constructs	AC	OI	SM
AC	0,923		
OI	0,787	0,812	
SM	0,756	0,840	n.a.

Notes: Diagonal entries are the square root of the average variance extracted. Off-diagonal elements are correlations among constructs

4.2 Structural model

The use of bootstrapping (5,000 resamples) generates standard errors and the value of t-statistics serve to assess the statistical significance of the path coefficients (Henseler et al, 2009). The percentile bootstraps at the 95% confidence interval are presented in table 4, where is possible that all the direct and indirect effects are supported. Figure 2 presents the final estimated model.

Figure 2: Proposed research model



The results show that the social media use is an antecedent of open innovation (H1) and absorptive capacity (H2), and therefore, the family firms that usually use social media to connect with their customer and stakeholders, they probably are more oriented to develop open innovation practices and absorption capacity tasks. The results also show when a family firm make absorption capacity tasks they probably could develop open innovation practices (H3) and to reach better performance. These results confirm the proposed direct relationships, and the H1, H2 and H3 are supported according to prior studies.

The study has also researched the indirect effect and it has been proposed the hypothesis 4 (H4), as a mediating effect of the absorptive capacity in the link between social media and open innovation. As Figure 2 and Table 4 show, the indirect effect of the social media on open innovation, via absorptive capacity is significant. In the research model, both the direct (0,573) and indirect (0,267) effect of SM and OI are significant. This means that exists mediator effect and H4 is supported. The type of mediation is partial, because both the indirect and direct effect are significant. (Nitzl et al, 2016; Cepeda-Carrion et al, 2017). In addition, the partial mediation is the type complementary because the direct effect (0,573) and indirect effect (0,267) point in the same (positive) direction. It indicates that a portion of the effect of SM on OI is mediated through absorptive capacity, while social media use still explains a portion of open innovation that is independent of the absorptive capacity. (Nitzl et al, 2016; Cepeda-Carrion et al, 2017).

Table 4. Construct effects on endogenous variables (incl. lower and upper limits of 95% confidence interval)

Effects on endogenous variables	Path coefficient	Confidence intervals (95%)		Significance of effect (p-value)	R ² of dependent construct
		5% CI _{lo}	95% CI _{hi}		
SM → OI (H1)	0,573	0,409	0,806	Yes (0,001)	0,759
SM → AC (H2)	0,756	0,693	0,852	Yes (0,000)	0,572
AC → OI (H3)	0,354	0,099	0,527	Yes (0,000)	
SM → AC → OI (H4)	0,267	-0,081	0,404	complementary partial mediation	

Note: SM: social media use; OI: open innovation practices; AC: absorptive capacity

5. Discussion

This study employed a quantitative approach which enables understanding better the specific impact of social media use on open innovation, exploring the mediating mechanism of absorptive capacity in this relationship. Since social media is not only the result of real-time news and using press releases, but it may also be the result of using unproven rumours, colloquial expressions or sayings (Cegarra-Sánchez et al., 2018; Echajari & Thomas, 2015; Thompson, 2008), the result from this research provided an opportunity to reflect on Gruner and Power (2018) findings of social media activity. They found out that in some cases, social media activity negatively affects a firm's marketing activity. One possible explanation this study offers for these findings is the fact that despite social media is helpful for establishing two-way communication between communities and organizations (Ngai et al., 2015; Stankovic-Rice, 2012), it is no less true that it can also manipulate information and generate misinformation (Sánchez-Casado, Cegarra-Navarro, & Tomaseti-Solano, 2015).

The findings of this study contribute to the current literature on social media, intended to be considered both together and separately in two important ways. First, the findings of this study contribute to expand what is known about the relationship between the use of social media and absorptive capacity. Results suggest that the use of social media is exogenous to absorptive capability. Second, results provide support for the theoretical proposition on the importance of absorptive capacity for contrasting and filtering external information (e.g. Costa & Monteiro, 2016; Nätti, Hurmelinna-Laukkanen, & Johnston, 2014; Zahra & George, 2002). Therefore, and considering that the relationship between the use of social media and open innovation remains unclear (Torres de Oliveira et al., 2019), our findings shed lights on the topic, in the specific context of family firms. In this

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vein, while not all the external information provided by the social media needs to be channelled (hypothesis 1), a portion of the external information received from social media needs to be filtered and adapted to the company context (hypotheses 2 and 3).

Moreover, this investigation also contribute of family firms literature, and it is consistent with the prior literature in family firms (Chaudhary and Batra, 2018), and has revealed that to reach sustainable competitive advantages, family businesses need to adequately combine and reconfigure their existing base of knowledge with new knowledge through interaction with the outside of firm, such as with social media users.

Regarding the first hypothesis, the results support that the higher the use of social media is, the more likely to benefit from the opening of new innovations. These results confirm the importance of social media for acquiring external information, which in turn can help companies gain more innovative opportunities in the family business. As Nambisan et al. (2017) highlighted, those digital platforms allow different collectives to openly collaborate, fostering knowledge sharing and crowdsourcing among them. This is fundamentally changing the way family firms innovate, shaping the scope and direction of the innovation processes. These findings are consistent with prior literature that suggest a facilitating role of social media tools on innovation (De Zubielqui et al., 2019; Mount and Garcia, 2014; Pérez-González et al., 2017).

The second hypothesis concerning the relationship between the use of social media and absorptive capacity was also confirmed. Findings show that the higher the use of social media, the more likely a company is to absorb external knowledge. Thus, the use of social media tools is going to support organizational learning abilities of the family firms to acquire, assimilate, transform and exploit external knowledge into the firms' operations (Schlagwein and Hu, 2017). Consistent with Ooms et al., (2015), results suggest that social media can be considered boundary-spanning tools, which enable multi-directional interactions and are going to play a key role on building absorptive capacity. In other words, the closer the company is to the network with social media communities, the more opportunities it has to access diverse information to initiate knowledge exchange with other stakeholders and innovators (Ooms et al., 2015).

Regarding the third hypothesis, results demonstrate how absorptive capacity appears as a key antecedent of open innovation practices. Thus, results support prior studies in the area which indicated that absorptive capacity is a key antecedent of innovation

1 activities (García-Morales et al., 2007; Cepeda-Carrión et al., 2012; Leal-Rodríguez et
2 al., 2014). Therefore, results confirm that to make full use of the external information
3 captured via social media, family firms need to have established appropriate
4 organizational processes and routines to transform this external information into
5 knowledge that reflects more effective products and services. This finding emphasized
6 the role of absorptive capacity as an important condition to transforming external
7 information into real innovations, highlighting also the relevance of knowledge
8 application and transformation in this process (Moilanen et al., 2014).
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15 The results support the hypothesis that absorptive capacity also mediates the impact of
16 social media use on open innovation (hypothesis 4). A possible explanation for these
17 findings may relate to the fact that only a part of the external media information is
18 valuable in itself (Thompson, 2008), another part needs to be filtered, updated and
19 adapted in order to respond to current company needs (Sánchez-Casado et al., 2015a).
20 For example, absorptive capacity may allow family business to capture the right
21 knowledge behind spam and fake news (Cegarra-Navarro, Eldridge, & Wensley, 2014),
22 which in turn can lead to make effective decisions on how to innovate (Martinez,
23 Lazzarotti, Manzini, & García, 2014). We think this is an important contribution because
24 were managers to innovate and seize opportunities, they could not be sure that the use of
25 social media is enough to satisfy new society demands. In fact, they should consider that
26 the use of social media may be most usefully considered in combination with absorptive
27 capacity.
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39 The characteristics of family firms such as family members' unwillingness to lose
40 control (e.g., Gómez-Mejía, Takács Haynes, Núñez-Nickel, Jacobson, & Moyano-
41 Fuentes, 2007), the resource constraints shaped by their governance structures and size
42 (e.g., Carney, 2005), the distinctive aspects of their social capital (e.g., Arregle, Hitt,
43 Sirmon, & Very, 2007), and long-term orientation (Miller & Le Breton-Miller, 2005),
44 contribute the collaborative innovation offered by social media can be a highly effective
45 means of overcoming barriers to innovation and an important source of competitive
46 advantage for innovation in family firms (De Mattos, Burgess, & Shaw, 2013; Feranita,
47 Kotlar & De Massis, 2017; Hitt et al. , 2000; Sirmon, Arregle, Hitt, & Webb, 2008).
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56 Thus, the results of the study offer relevant implications for managers in the family
57 firms, showing the pathway they need to follow to leverage social media use to become
58 more innovative and therefore more likely to reach competitive advantage and improve
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the performance. Results suggest that family firms should strategically use these tools to connect with different stakeholders to become more open to the environment, more responsive and capture also valuable ideas to develop new products and services which meet customers requirements.

In addition, absorptive capacity appears as essential and necessary in order to make external knowledge available in a timely and complete manner. Consequently, to take advantage of all the potential that social media use can bring in this area, family firms need to develop specific organizational routines and an appropriate culture to foster absorptive capacity. Our paper suggests that managers should foster an appropriate culture of learning in their firms and provide specific training to develop the staff ability to acquire, integrate and use information captured in digital platforms. Additionally, in order to leverage the potential of this information, it is necessary to establish adequate communication processes and systems, to share this information across the firm and to use it to improve customer experience and generate new service ideas. Due to the fact that family businesses seek continuity in their business and tend to have a long-term orientation, knowledge management across generations becomes a requirement for family businesses. (Moss et al., 2014; Chaudhary and Batra, 2018) for the innovation and improve the performance.

6. Conclusions, limitations and future research

Based on the above discussion, the paper offers two valuable contributions to the literature.

First, this research provides empirical evidence of the real impact of social media use in enhancing Open Innovation practices. Results demonstrate that these tools offer a valuable communication channel to connect with key stakeholders, like customers, supplier or business partners, and collaborate with them to develop new products and services. In current turbulent markets, with the current covid19 pandemic crisis, the capacity to innovate help family firms to quickly respond to market changes, so it has become a key driver of competitiveness. For example, the case of companies in the hospitality sector and how they must be able to do things differently and innovate in their business models, operations, products, and services (delivery services) so that they can continue to stay in the market and achieve sustainable competitive advantages.

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Considering that empirical research on the specific impact on social media use on innovativeness remains scarce, particularly in a service context in family firms, the findings of this study complements the existing literature and provide a basis for future studies. According to our results, social media tools appear as a basic enabler of open innovation, as allow family firms to create and capture valuable knowledge involving different stakeholders in the innovation process.

Second, findings confirm the key role played by absorptive capacity in this process. Results empirically demonstrate that, to fully benefit from external knowledge captured via social media, family firms need to possess specific organizational processes to acquire and assimilate external knowledge and need also to have implemented specific routines to exploit this knowledge and transform it into new service ideas. Consequently, absorptive capacity emerges as a necessary condition to leverage external knowledge captured via social media to enhance open innovation activities.

Finally, we acknowledge that this study presents some limitations, which could be addressed in future research. First, the analysis was based on cross-sectional data. As social media use and innovation are dynamic phenomenon in nature, a longitudinal analysis would be helpful to enrich the findings. Second, a key-informant method was used, and we draw on manager' perception for data collection. Although this method has been widely used and has its advantages, it also suffers from the limitation that could reflect the limited opinion of one person (Perez-Gonzalez et al., 2017). Future studies can include the vision of multiple respondents, to reinforce the obtained results. Finally, the sample examined was composed exclusively by spanish family firms in the service sector. Additional studies are needed, including international samples, to validate and extrapolate the results in different contexts.

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The mediating role of the creation knowledge process in the relationship between Social Media and Open Innovation

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