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FULL ARTICLE

Social media adoption in Italian firms. Opportunities and challenges for lagging regions

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Abstract

Social media are an important growth opportunity for firms, especially small-sized ones operating in peripheral and lagging regions. In this paper, we investigate not only whether firms are able to take this opportunity, but also if they are able to face the challenge of adopting social media at a professional level to obtain a significant economic impact, measured in terms of exporting activities. Exploring the Italian case, our empirical study indicates that smaller firms in lagging areas are more likely to adopt social media but at the same time less likely to use them at a professional level. This reflects poor strategic targets of social media adoption and lower probabilities of entering international markets.

KEYWORDS
social media, export, small firms, lagging regions, Italian firms

JEL CLASSIFICATION
D22; L26; O33; R10

1 | INTRODUCTION

The information and communication technology (ICT) revolution, started at the end of the 1990s, has introduced a set of tools and devices, both hardware and software (e.g., smartphones, computer, blogs, social media and other applications), which has changed the way people work, interact, make decisions and communicate (Babutsidze & Valente, 2018; Bailey et al., 2018; Dergiades et al., 2014; Jorgenson & Vu, 2016; Perez, 2010). This has made significant modifications not only in social but also in economic relations, facilitating the flow of information intra- and

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inter-firms, with suppliers and customers, and increasing access to potential markets (see Haller & Siedschlag, 2011). These new technologies are able to reduce spatial distances and help firms to gain visibility in cross-border markets through the use of Internet-based instruments such as, for example, websites and platforms (Bayo-Moriones & Lera-López, 2007; Cassetta et al., 2019; Galliano et al., 2001; Rasel, 2017). Nevertheless, the effect of the ICT revolution has been uneven both within countries and across borders and has increased divergence among economies (see Schivardi & Schmitz, 2020). This is due to the fact that not all firms have been able to exploit ICT, since important investment has often been necessary to adopt these technologies (e.g. Bloom et al., 2013, 2016; Pellegrino & Zingales, 2017).

However, there is a specific type of ICT characterized by low costs of adoption that may represent a golden opportunity for small firms as well as for lagging regions. This is the case of social media (SM), such as Facebook, Twitter, YouTube and Wiki. These technologies are usually classified as market-oriented ICTs[1] and can be useful to firms to increase reputation and profitability, receive feedback from customers and facilitate penetration into international markets (see Olanrewaju et al., 2020). However, the economic effects of social media may be insignificant without a specific strategic adoption. This is, for instance, the case of firms adopting social media at a basic level and/or only because they are fashionable (Cesaroni & Consoli, 2015). In other words, it is not sufficient for firms to take the opportunity of adopting social media, they also need to face challenges related to how to use it. On the same lines, from a regional perspective, Capello & Nijkamp (1996a, 1996b) already showed several years ago that lagging economies did not particularly suffer from the lack of ICT infrastructure but from a profitable adoption of them.

Focusing on Italy, a country with a well-known North–South divide, it would thus be interesting to explore whether firms in lagging regions – the South in this case – are not only able to take the opportunity of adopting SM but also to face the challenge of making this adoption profitable. To this end, we first assess whether firms in lagging regions are more or less likely to adopt SM. We especially focus on small firms since they are predominant in lagging regions and may have, compared to larger firms, higher returns in terms of visibility and profitability from these technologies. Second, we assess whether firms – especially those of small sized and in lagging regions – face the challenge of adopting social media at an advanced level. This could affect the targets pursued by SM users as well as the probability of being able to enter international markets. These represent the final aims of the investigation. We can summarize all these aims with four specific research questions.

The first question (RQ1) is: *Which firms are more likely to adopt social media?* To this end, we estimate a SM adoption function, building the empirical model on the *Technology-Organization-Environment*framework (see Tornatzky & Fleischer, 1990), and specifically assess the probability of social media being adopted by firms of small size and in lagging regions.

The second question (RQ2) is: *Which firms are more likely to remain basic social media users?* To this end, we compare firms adopting only Facebook (basic users) with those combining Facebook with other more professional social media like Twitter, YouTube and Wiki (advanced users). Also in this step, we specifically focus on firms of small size and in lagging regions.

The third question (RQ3) is: *Which social media users are more likely to pursue strategic targets?* This step of the analysis aims to assess whether firms that remain basic users are less likely to adopt SM for more strategic targets such as, for example, innovation or co-operation. We also assess whether these effects could be further influenced by the fact that a firm is small-sized and in a lagging region.

The final question (RQ4) is: *Which social media users are more likely to enter international markets?* In this final step, we investigate in particular the probability of entering international markets of firms that are basic social media users, small-sized, and located in lagging regions.

[1]The literature usually distinguishes between general-use ICTs (email, Internet, etc.), production-integrating ICTs (intranet, LAN, etc.) and market-oriented ICTs. The latter - that include, for example, SMs, websites and e-commerce – are together with general-use ICTs less costly than production integrating ones (see on this point Lucchetti and Sterlacchini, 2004).

Our results highlight that small-sized firms in southern regions are more likely to adopt SM but, at the same time, they are also more likely to remain basic users. This is reflected in lower probabilities of pursuing strategic targets as well as of entering international markets. In short, it seems that small firms located in southern regions understand the opportunity of adopting SM but they are still not able to gain significant economic results from these technologies.

2 | LITERATURE REVIEW

The literature on the economic impact of ICT has highlighted how these technologies have increased the economic divergence between developed and lagging economies, both at country and regional level. This depends on the fact that these technologies usually first require important investment to be adopted and then to become profitable. For instance, Schivardi and Schmitz (2020) provide an extensive analysis of the spread of ICTs across European countries, showing how these technologies contribute to amplifying the existing economic disparities. In short, southern European countries with their small family-owned firms, poor management practices and with few incentives to bear the costs of ICT adoption are lagging behind Northern European economies (see also Garicano, 2015; Pellegrino & Zingales, 2017). Similar disparities are found within countries. Fabiani et al. (2005) show that firms located in the Centre-North of Italy are more likely to adopt these technologies than those operating in the South. Haller and Siedschlag (2011), exploring Irish data, found that firms located in and around the capital city are more likely to use ICT than those in peripheral areas.

Lagging economies seem to be influenced by environments that are not only unfavourable to the adoption but also to an adequate use of these technologies. A stream of literature has focused on this aspect by searching potential obstacles that lagging economies face to make profitable the adoption of ICTs (for a literature review see Salemink et al., 2017). For instance, exploring the the Irish case, Grimes and Lyons (1994) suggest that information technologies may represent an opportunity for peripheral and rural areas, but only if associated with important policies to stimulate local entrepreneurship. Looking at some regions in Spain, Cuadrado-Roura and Garcia-Tabuenca (2004) assert that ICTs are not only contributing to improve the productivity of single production factors, but they may also be a source of innovation and new employment. Unfortunately, the authors find that small and medium enterprises located in less developed regions seem not always able to understand all these opportunities. Similarly, Camagni and Capello (2005) argue that ICTs may represent an opportunity to overcome geographical distances. However, a profitable adoption of these technologies may be hindered in lagging regions by lack of adequate learning processes. Along the same lines, Capello (1994) and Capello and Nijkamp (1996a, 1996b) show that it is not the simple adoption of information and communication technologies that improve either firm or regional performance but it is their intensive and strategic exploitation. Focusing on the Italian case, the authors underline how firms in southern regions, even if they widely adopt ICTs, suffer from a lack of awareness on the economic potential of these technologies. More recently, some studies have underlined that a modern technological infrastructure like broadband Internet connection may have an economic impact, both at firm and regional level, only if simultaneously supported by investments in software and digital competences by workers. For instance, Mack and Faggian (2013) find that broadband exerts a positive impact on productivity only in those US counties that can benefit from high levels of qualified and skilled human capital. Similarly, focusing on the UK, DeStefano et al. (2018, p. 127) argue that broadband is not '*a silver bullet*' (p. 127); in other words, the use of a broadband connection has an economic impact at firm level only if complemented by investments in software and skilled-employees.

While the previous findings may hold in the case of ICTs, which are in general costly and require high skilled employees and an efficient management system (see Bayo-Moriones & Lera-López, 2007; Fabiani et al., 2005; Haller & Siedschlag, 2011; Jorgenson & Vu, 2016), these may not be true in the case of SM that are, instead, low-cost technologies (Abed et al., 2015; Derham et al., 2011; Lucchetti & Sterlacchini, 2004). Social media are defined in the entrepreneurship and business literature by Kaplan and Haenlein (2010, p. 61) 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). They include tools that facilitate the flow of information and interactions between individuals and companies, such as social networking sites, blogs and micro-blogs, content community sites, consumer review sites and Internet forums (see Kaplan & Haenlein, 2010). Recently, a promising stream of research has started on the topic of social media adoption by firms,[2] and most of the studies have specifically focused on the comparison between SMEs (small and medium-sized enterprises) and larger firms (see, among the others, Abed et al., 2015; Cesaroni & Consoli, 2015; Fernandes et al., 2016; Fosso Wamba & Carter, 2014; Galati et al., 2017; Koski et al., 2019; Meske & Stieglitz, 2013). For instance, Meske and Stieglitz (2013) find that German SMEs largely adopt SM but often suffering from a lack of managerial strategy and this limits the economic potential of these technologies. Galati et al. (2017), looking at the Sicilian wine industry, find that smaller firms are more involved in the use of SM than larger ones; these latter instead invest more in traditional marketing channels (e.g. promotions, events, etc.). Exploring a sample of firms in Portugal, Fernandes et al. (2016) find that SMEs operating in the service industry are more likely to adopt SM. However, other studies find that the adoption of SM is related more to the age of managers than to the size of firms (Fosso Wamba & Carter, 2014; Koski et al., 2019). The debate on firms' characteristics and SM adoption remains still open and currently suffers from a lack of evidence based on larger samples.

Other studies have explored more closely the impact of SM on firm's performance. In this respect, Olanrewaju et al. (2020) provide an extensive literature review, underlining an increasing trend of studies that explore the impact on firms not only in terms of marketing but also in terms of economic outcome such as firms' internationalization (see Berthon et al., 2012; Alarcón-de Amo, 2015, 2018; Arnone & Deprince, 2016; Cassetta et al., 2019; Hagsten & Kotnik, 2017; Hassouneh & Brengman, 2011; Okazaki & Taylor, 2013). Overall, SM adoption seems to support smaller firms to enter international markets by reducing spatial distances.

Other important findings come from some studies on the entrepreneurial motivation for SM adoption. For instance, focusing on a small sample of Italian SMEs, Cesaroni and Consoli (2015) find that firms often introduce SM to keep up with competitors and because these technologies are fashionable, rather than to pursue strategic targets. This evidence is related, in our opinion, to the different types of social media used by firms. The general definition of SM usually puts together various technological instruments that, however, may be significantly different when used for business purposes. Specifically, social networks (e.g., Facebook) could be less effective for business purposes since they allow users to communicate, exchange contents and maintain existing relationships with other users with which there is usually a pre-established connection ('friends'). Differently, online communities (e.g. Twitter, YouTube and Wiki) bind together different groups of people that generally do not know each other but share a common interest or topic (see Constantinides & Fountain, 2008). Hence, the latter types of SM should be more effective in the promotion of products and services, as well as, in supporting networking activities with partners and customers. In the case of firms'internationalization, for example, some studies have already provided evidence on the fact that Twitter, YouTube and Wiki play a more relevant role compared to other SM (see, among the others, Bernoff & Li, 2008; Berthon et al., 2012; Fernandes et al., 2016).

Although SM may represent an opportunity not only for individual firms but also for entire peripheral and lagging areas, regional science literature on this topic is still very limited. Most studies on this topic are in entrepreneurship and business literature and mainly based on qualitative analyses or pilot studies (see, for example, Arnone & Deprince, 2016; Berthon et al., 2012; Cesaroni & Consoli, 2015; Durkin et al., 2013; Fischer & Reuber, 2011; Hassouneh & Brengman, 2011). Only a couple of studies adopt a quantitative approach (Cassetta et al., 2019; Koski et al., 2019). Exploiting a large sample of Italian firms, our study aims to contribute to filling this gap in the literature.

[2]Another recent promising stream of research in the topic on the economic impact of new technologies is that looking at the adoption of Artificial Intelligence and Big Data Analytics by firms (e.g. Obschonka & Audretsch, 2019; Prüfer & Prüfer, 2020).

3 | EMPIRICAL STRATEGY

3.1 | Data and variables

Our analysis exploits data from the 2015 Italian survey on "ICT usage and e-commerce in enterprises," collected by the National Institute of Statistics (ISTAT, 2015).[3] This survey collects information on the use of different types of ICT (website, email, social media, etc.), the endowment of human resources and ICT equipment, and some basic firm characteristics (e.g. size, sector, location).

Table 1 reports the list of variables selected for the analysis. The dependent variables used to model our research questions are: (i) *Social Media*, a dummy variable taking value 1 if the firm uses social media and 0 otherwise; (ii) *Basic_User* that is a dummy variable equal to 1 if the firm uses SM at "basic level" (i.e., only Facebook) and 0 if it uses them at "advanced level" (i.e. combining Facebook with other SM like Twitter, YouTube and Wiki); (iii) six binary variables indicating the targets of social media usage (*Marketing*, *Customers*, *Innovation*, *Co-operation*, *Recruitment*, *Employees*); and (iv) *Export* a dummy variable that assumes value 1 if the firm realizes web sales in Europe or in the rest of the world and 0 if the firm operates only in the domestic market.

The set of independent variables is selected on the basis of the technology-organization-environment (TOE) framework (Tornatzky & Fleischer, 1990), which is very popular in the literature on innovation and new technologies' adoption by firms.[4] This framework considers three groups of features that influence the innovation or new technologies adoption by firms: (i) the technology context; (ii) the organization context; and (iii) the environment context. Notwithstanding the limitations due to data availability, we try to capture information on all the three aspects.

The "technological context" refers to internal and external technological endowments useful to a firm for the adoption of new technologies, i.e. social media in our case. As suggested by Oliveira et al. (2014), we should include in this group all the technological infrastructures and specialized human resources needed for the technology adoption. Specifically, we consider thepresence in the firm of mobile connections for business (*Mobile*) and ICT specialists (*ICT Employees*) as measures of internal infrastructures and specialized human resources, respectively, and the availability of broadband at different download speed connections (*Broadband1*, *Broadband2*, etc.) as a measure of external infrastructures (see Bayo-Moriones & Lera-López, 2007; Doherty et al., 2016; Fabiani et al., 2005; Hagsten & Kotnik, 2017; Haller & Siedschlag, 2011).

The "organization context" should be measured by the characteristics of the firm that facilitate social media adoption. When one generally refers to new technologies adoption, firm size and top management support are among the most important factors and their effects are expected to be positive (see Oliveira et al., 2014). In our specific case, we mainly focus on firm size (*Small*), on which literature has still not reached a common opinion, as seen above. Specifically, we measure firm size by means of a dummy variable that is equal to 1 if the firm has 10–49 employees and 0 if the firm has 50 employees or more. We measure the top management support in terms of attitude of the firm to provide training activities to its employees by the following binary variables: *Training_1*(training activities for ICT specialists); *Training_2* (training activities for other employees). We obviously expect these variables to exert a positive effect on the adoption of social media.

The "environment context" refers, in the original view of the TOE framework, to the influence exerted by both the market and firm's competitors. For example, Oliveira et al. (2014) measure this aspect looking at the competitive

[3]Unfortunately, panel data are not available. Moreover, the different survey waves are not comparable over time. Indeed, questions related to social media changed over years. Data are collected using stratified random sampling techniques on a population of firms with more than 10 employees. Four strata were defined on the basis of sector of activity, ICT macro sector, firm size and geographical location at the NUTS 2 regional level. The response rate was 61%.

[4]See also Oliveira and Martins (2011), Oliveira et al. (2014) and Koski et al. (2019) for further details and applications. Other popular frameworks have been used in the literature to explain technology adoption by firms. For instance, the diffusion of innovation (DOI), which is mainly focused on the characteristics of the adopted technology, the resource based view (RBV), which explores the link between the adoption of new technologies and their value for firm competitive advantage, and the transaction cost theory, which has been used to explain the potential role of IT to reduce transaction costs and improve economic efficiency. See Olanrewaju et al. (2020) for a complete review of the existing theories. These valuable approaches go, however, beyond our scope. Moreover, we would not be able to apply them due to the unavailability of data.

TABLE 1 Variables definition

	Dependent Variables	Definition
RQ1	*Social Media*	Dummy variable equal to 1 if the firm uses social media, 0 otherwise.
RQ2	*Basic_User*	Dummy variable equal to 1 if the firm uses only Facebook-type social media; 0 if it uses other professional social media (Twitter-type, YouTube-type, Wiki-type), in addition to Facebook.
RQ3	*Marketing*	Dummy variable equals to 1 if the firm uses social media to develop the enterprise's image or market products (e.g., advertising or launching products, etc), 0 otherwise.
	Customers	Dummy variable equals to 1 if the firm uses social media to obtain or respond to customer opinions, reviews and questions, 0 otherwise.
	Innovation	Dummy variable equals to 1 if the firm uses social media to involve customers in the development or innovation of goods or service, 0 otherwise.
	Co-operation	Dummy variable equals to 1 if the firm uses social media to collaborate with business partners (e.g., suppliers, etc.) or other organizations (e.g., public authorities, non governmental organizations, etc.), 0 otherwise.
	Recruitment	Dummy variable equals to 1 if the firm uses social media to recruit employees, 0 otherwise.
	Employees	Dummy variable equals to 1 if the firm uses social media to exchange views, opinions or knowledge within the enterprise, 0 otherwise.
RQ4	*Export*	Dummy variable equal to 1 if the firm realizes web sales outside Italy, 0 otherwise.
Internal Technological Context (T)	*Mobile*	Dummy variable equals to 1 if the firm has a mobile connection to the internet for business purposes, 0 otherwise.
	ICT employees	Dummy variable equals to 1 if the firm employs ICT specialists, 0 otherwise.
External Technological Context (T)	*Broadband*	Categorical variable indicating the maximum contracted download speed of the fastest fixed internet connection: *Broadband1*-less than 2 Mbit/s *Broadband2*- at least 2 but less than 10 Mbit/s *Broadband3*- at least 10 but less than 30 Mbit/s *Broadband4*- at least 30 but less than 100 Mbit/s *Broadband5*- at least 100 Mbit/s
Organizational Context (O)	*Small Size*	Dummy variable equals to 1 if the firm is small size‟ i.e. 10-49 employees, and 0 otherwise.
	Training_1	Dummy variable equals to 1 if the firm realizes training for ICT specialists, 0 otherwise.

TABLE 1 (Continued)

	Dependent Variables	Definition
	Training_2	Dummy variable equals to 1 if the firm realizes training for other persons employed, 0 otherwise.
Environmental Context (E)	*Sector*	Categorical variable indicating the sector of activity: *Manufacturing, Energy, Building, Retail, transport and warehousing, Catering, accommodation and recreational activity, Professional and scientific activities and Other public administration services.*.
	South	Dummy variables equals to 1 if the firm geographical location is the South and 0 otherwise.

Source: ISTAT 2015.

pressure and the regulatory support in a study on cloud computing adoption. Koski et al. (2019), exploring the social media adoption by firms in Finland, look at the nature of a firm's clientele (business-to-business or business-to-consumers) to capture information on the environment context. The nature of clientele could affect not only the social media adoption but also the typology of social media adopted. Unfortunately, our data do not include this type of information. Therefore, we simply look at the sector of activity expecting that social media may be more likely to be adopted in leisure services (e.g., accommodation and recreational activities) where reaching consumers is more challenging. Specifically, we measure the sector of activity by seven binary dummies: *Manufacturing*(reference category); *Energy, Building, Retail Transport and Warehousing; Catering Accommodation and Recreational Activity; Professional and Scientific Activities; Other Public Administration Services*. Finally, we believe that social media adoption could be influenced by the geography. Specifically, we aim to assess whether the probability of adopting social media could be higher in the South (lagging regions) than in the rest of Italy. To this end we use a binary variable (*South*) that assumes a value equal to 1 if the firm is located in a southern region (Abbruzzo, Molise, Campania, Apulia, Basilicata, Calabria, Sardinia, Sicily) and 0 otherwise.

Our sample includes 19,248 firms each with more than 10 employees. Table A1 in the Appendix reports some summary statistics. We can observe that 41% of firms use social media, and almost half of them are basic users (i.e., 19% of firms in the full sample). As regards the targets of SM adoption, we note that it is used mainly for *Marketing* (80%) and to receive feedback from *Customers* (50%). However, many firms use SM for more than one target (the categories are not mutually exclusive). Among the 2,002 firms using web sales almost 50% are involved in exporting activity (*Export*). We can also observe that 66% of firms are small-sized (10–49 employees). Almost 80% of firms are in services (54%) and manufacturing (24%) industries, while 18% of firms are located in southern regions.

Table A2 shows that 1276 out of 3431 southern firms (37%) adopt social media, while the percentage of firms adopting SM is 42% (6,654 out of 15,817) for the rest of Italy. The difference is quite small, only 5%. From Table A3, we can see the predominance of SM users in the category of small firms (58%) compared to larger firms (42%). Obviously, this also depends on the predominance of small firms in the Italian economy (66%). For this reason, it is interesting to go beyond the simple adoption of SM, exploring, as we aim to do, the way and the effectiveness of this adoption.

In Table A4, we observe a particular vocation to adopt SM in the services industries: *Retail*, *Transport and Warehousing* (47%); *Catering, Accommodation and Recreational activity* (46%); *Professional and Scientific activities* (50%). Table A5 shows that most of SM users in the South remain at a basic level (59%), while we observe an opposite situation in the rest of Italy. Similarly, Table A6 shows that most of small-sized SM users remain at a basic level (58%), while larger-sized users exhibit an opposite situation. In Table A7, we note that in the sectors of *Manufacturing*, *Energy*, *Professional and Scientific activities*, most of SM users are at an advanced level (70%).

A brief glance at *Export* reveals that, of the 1,605 firms that both adopt SM and use the Web to commercialize goods and services, 53% are also exporters (Table A8). The distribution between exporters and non-exporters is similar within the macro-areas. Table A9 shows exporters that adopt SM are almost equally distributed by size (47% small and 53% large). In Table A10, we observe that about 74% of exporters that adopt SM are advanced users.

3.2 | Model specification

The first step of analysis aims to investigate how the adoption of SM is affected by firms characteristics and whether there are significant differences across firms by size and geographical location (*RQ1*).

Therefore, *RQ1* is answered by estimating the following Probit model, where the probability of adopting social media (SM) depends on three groups of determinants that respectively measure the technology context (T), the organization context (O) and the environment context (E), as well as on the location in lagging regions (*South*):

$$Pr(SM = 1) = T\beta + O\delta + E\gamma + \varphi\ South + \varepsilon, \tag{1}$$

where SM is the Social Media dummy variable described above and ε is the usual error term. The variable *Small*, on which we particularly focus the attention, is included in the group of "organization context." Moreover, we will include in the specification an interaction term between *South* and *Small*.

Thereafter, we extend the analysis to estimate the probability of adopting SM as a basic user (i.e. only Facebook) rather than as an advanced user (i.e., Facebook combined with other more professional social media)[5]. To this end, we estimate the following Probit model (*RQ2*):

$$Pr(Basic\_User = 1) = T\beta + O\delta + E\gamma + \varphi\ South + \upsilon, \tag{2}$$

where *Basic_User*, as described in the previous subsection, assumes the value 1 if the firm is a basic level social media user. The set of explanatory variables is the same as in Equation (1). Once again, the main point of interest is on small firms located in southern regions. To this end, we continue to include in the specification the interaction term mentioned above.

As argued at the beginning, very often firms use SM because they are fashionable rather than to pursue strategic targets, and consequently they risk having an insignificant economic impact on their performance. This aspect could be investigated comparing the type of user with the possible targets of social media usage. In other words, we want to understand whether basic users are associated with less strategic targets or, even more dramatically, with an absence of strategy. This event could be frequent in lagging regions where firms may decide to stop at a basic level of usage since passing to an advanced level may imply some additional costs. In exploring this aspect, we have to take into account that firms may pursue simultaneously different targets in order to fulfill their general strategic plan. Thus, the single targets are obviously correlated. Therefore, the following multivariate probit model is estimated (*RQ*3):

$$\begin{cases} Pr(Mark. = 1) = Basic\_User\lambda_1 + Small\tau_1 + South\varphi_1 + T\beta_1 + O\delta_1 + E\gamma_1 + u_1 \\ Pr(Cust. = 1) = Basic\_User\lambda_2 + Small\tau_2 + South\varphi_2 + T\beta_2 + O\delta_2 + E\gamma_2 + u_2 \\ Pr(Inn. = 1) = Basic\_User\lambda_3 + Small\tau_3 + South\varphi_3 + T\beta_3 + O\delta_3 + E\gamma_3 + u_3 \\ Pr(Coop. = 1) = Basic\_User\lambda_4 + Small\tau_4 + South\varphi_4 + T\beta_4 + O\delta_4 + E\gamma_4 + u_4 \\ Pr(Recr. = 1) = Basic\_User\lambda_5 + Small\tau_5 + South\varphi_5 + T\beta_5 + O\delta_5 + E\gamma_5 + u_5 \\ Pr(Emp. = 1) = Basic\_User\lambda_6 + Small\tau_6 + South\varphi_6 + T\beta_6 + O\delta_6 + E\gamma_6 + u_6 \end{cases}, \tag{3}$$

[5]The survey collects data on four types of social media (Facebook, Twitter, YouTube, Wiki). Of course, categories include both that specific social media and other similar types. We noted that the 50% of firms in the sample use only Facebook or similar types of social media. The rest of the firms use, together with Facebook, one or more of the other social media typologies. Thus, we decide to divide the users into two groups as described above. See Table 1 for more details on the variables.

In Equation (3), the probability of using SM for six different targets (*Marketing*, *Customers*, *Innovation*, – *Recruitment*, *Employees*) is estimated, under the hypothesis that the correlation between error terms *u* is not null. From this analysis, we could assess whether some firms, like those that are small and in lagging regions, are not able to face the challenge of a strategic and planned social media use, notwithstanding taking the opportunity of adopting these technologies. In this specification, we also include an interaction term between *Small*, *South* and *Basic_User*.

The final step of analysis focuses on the economic impact of social media in terms of firms' internationalization. Specifically, we look at the group of social media users and estimate the probability of exporting via the Web by means of the following probit model (*RQ*4):

$$Pr(Export = 1) = Basic\_User\lambda + Small\tau + South\varphi + Z\gamma + \omega, \quad (4)$$

where *Export* indicates if firms export via the Web in Europe or in the rest of world and ω is the usual error term. We exclude in this specification the set of variables *T* and *O* because these are strictly associated with technology adoption function while, in this case, we have only firms that have already decided to adopt social media. Unfortunately, we can only consider the binary choice to do or not web-sales as a measure of internationalization, due to data limitation. As in the previous equation, we pay most attention to the performance of the group of small-sized basic users who operate in southern regions, also by including an interaction term. We expect basic users to be less involved in internationalization via the Web. Indeed, previous studies[6] have already argued that social-oriented networks (e.g., Facebook) have a lower impact on business performance than knowledge-oriented communities (e.g., Twitter, YouTube, Wikis). We expect this negative effect to be even larger considering small firms in the South.

4 | RESULTS

In this section, we introduce the evidence obtained from the empirical analysis.[7] In Table 2, we first look at the probability of adopting SM in general (*RQ1*, column (1)) and then to that of adopting SM at basic or advanced level (*RQ2*, column (2)). It is worth remembering that basic users are firms that adopt only social media of Facebook-type, while advanced users adopt other more professional social media (Twitter-type, YouTube-type and Wiki-type) in addition to Facebook-type ones.

We first focus on the variables *Small* and *South*. The probability of adopting SM does not depend on the firm size and it is significantly lower for firms located in the South (column (1) in Table 2). However, the negative effect of *South* is more than compensated by the interaction effect (*Small#South*). This means that small firms located in the lagging regions of Italy (South) are those with the highest probability of adopting SM in general. In contrast, the probability of being a basic user is significantly higher in small firms, irrespective of geographical location, and in southern regions, irrespective of firm size (column 2 in Table 2).

Focusing on the other variables, we observe a significant and positive impact of "internal technological context" (*Mobile*, *ICT employees*) on the probability of adopting SM, while a negative effect can be seen on that of being a basic user.[8] Similarly, we find a positive effect of "external technological context" (*Broadband*)[9] on the probability of adopting SM, while a negative effects is found on that of being a basic user. To sum up, both internal and external technological contexts seem to positively influence not only the probability of adopting SM but also on becoming an advanced user. As for the "organizational context" (*Training1*, *Training2*) concerns, we also find a positive and

[6] See among the others Fernandes et al. (2016).

[7] We report the average marginal effects in the case of probit models (Tables 2 and 4), and the parameter estimates for the multivariate probit models (Table 3).

[8] We can find similar findings in Bayo-Moriones and Lera-López (2007), Haller and Siedschlag (2011), Abed et al. (2015) and Galati et al. (2017).

[9] A number of studies underline that broadband connection is also important for economic growth and business performance (see Castaldo et al., 2018; Czernich et al., 2011; Doherty et al., 2016).

TABLE 2 Social media adoption in Italian firms

Variables	Social Media (1)	SM Basic User (2)
Small#South	0.0981***	-0.0127
	(0.0197)	(0.0302)
Small	-0.0132	0.114***
	(0.00909)	(0.0132)
South	-0.0602***	0.0671***
	(0.0164)	(0.0246)
Mobile	0.111***	-0.118***
	(0.00852)	(0.0144)
ICT employees	0.143***	-0.121***
	(0.00905)	(0.0130)
Broadband2	0.0449***	-0.0188
	(0.0152)	(0.0259)
Broadband3	0.0701***	-0.0635**
	(0.0159)	(0.0267)
Broadband4	0.110***	-0.0912***
	(0.0177)	(0.0288)
Broadband5	0.127***	-0.125***
	(0.0188)	(0.0303)
Training_1	0.0806***	-0.0634***
	(0.0129)	(0.0173)
Training_2	0.0679***	-0.0558***
	(0.0105)	(0.0146)
Energy	-0.120***	0.0680***
	(0.0151)	(0.0256)
Building	-0.120***	0.156***
	(0.0121)	(0.0209)
Retail, transport and warehousing	0.0849***	0.0949***
	(0.00951)	(0.0140)
Catering, accomm. and recreat. activity	0.0965***	0.0385**
	(0.0117)	(0.0174)
Professional and scientific activities	0.0305**	-0.0192
	(0.0124)	(0.0185)
Other public administ. services	-0.134**	0.192**
	(0.0537)	(0.0821)
Obs	18,433	7,707

Notes: Probit models (equations (1) and (2). Average marginal effects. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

significant effect on the probability of adopting SM while it negatively affects the probability of being a basic user. Finally, we observe the role of 'environment context'. In line with previous findings, we note that firms in the service industries (in particular, *Retail, transport and warehousing*, *Catering, accommodation and recreational activity*, and *Professional and scientific activities*) are more likely to adopt SM than firms in the *Manufacturing* (reference category), while firms in *Energy* and *Building* industries present lower probabilities (see, for example, Koski et al., 2019). The probability of being a basic user is higher for firms in the sectors of *Energy*, *Building*, *Retail*, *transport and warehousing*,and*Other Public Administration Services*.

To sum up, we can conclude from a joint interpretation of the results in Table 2 that small firms in lagging regions of Italy have the highest probability of adopting SM but at the same time it is very likely that they may remain at a basic level of adoption. This could be associated with less strategic targets of this adoption as well as less relevant economic impacts. More than 20 years ago, the literature had already found a lack of economic impact of information and communication technologies in Italian southern regions (Capello & Nijkamp 1996a, 1996b). Therefore, this would be a tragic story that persists over time. We will assess these hypotheses in detail in the next steps of the analysis.

Table 3 reports the estimates from a multivariate probit model on the targets of social media adoption (*RQ3*). We consider six types of targets, which range from the *Marketing*, probably the least strategic target in terms of competitiveness, to *Innovation* and *Co-operation* which can be included among the most strategic targets since they enable the improvement of the products and processes of a firm. We introduce our results focusing on the basic users of small size in the South. We look first at the effect of each single characteristic and then at the interaction among these variables. Therefore, we note that being basic users reduces the the likelihood of adopting SM for all the targets considered. This means that basic users do not follow a particular strategy in adopting SM. Some interesting results emerge when we consider small firms but independently from fact of being located in the South as well as being basic users. Indeed, small firms seem more likely to adopt social media for *Innovation* and *Cooperation* than larger firms. A similar result is obtained for the firms located in the South but independently from other characteristics. In other words, southern firms seem more likely to adopt social media to obtain feedback from *Customers* as well as for *Innovation* and*Co-operation* than firms located in the rest of Italy. Unfortunately, as seen above, it is more likely that basic users are located in the South and this may negatively or insignificantly influence the economic impact of social media usage in this area. When we look at the interaction between basic users, small firms and South, we observe that this group of firms is more likely to adopt social media for *Marketing* targets. This may be alarming for the potential economic impact of social media in southern regions. We will explore this aspect in the Table 4. Before moving on, we devote a few words to the other evidence shown in Table 3. We find a certain degree of heterogeneity in the effects of internal technological factors. We do not find particular evidence on the role of the external technology context. Probably, this context affects the choice of adopting social media more than the targets of adoption. With regards to the organizational context, we find that training activities influence, in particular, the adoption of SM for *Cooperation*,*Recruitment* and *Employees* targets. Finally, firms operating in *Energy* and service industries — except for firms in *Other Public Administration Services* — seem to be more likely to adopt social media for highly strategic targets such as *Innovation* and *Co-operation* than firms in *Manufacturing*industries.

In Table 4, we carry out the last step of our analysis by looking at the economic impact of social media usage in terms of internationalization (*RQ*4). Specifically, we select the sub-sample of firms that use social media and make web-sales in domestic and foreign markets. In order to assess the economic impact of the group of small-sized basic users in southern regions, we start introducing the results of each of the three variables of interest and then look at their interaction. Therefore, we find that basic users are less likely to export their goods and services than advanced users. This is in line with previous findings (see, among the others, Berthon et al., 2012; Fernandes et al., 2016). This result is even stronger if we consider basic users of small size that operate in southern regions (interaction effect). We do not find significant effects of *Small* and *South*, if they are considered independently on *Basic User*. However, we have seen above that basic users are more likely to be of small size and in southern regions. We find that firms

TABLE 3 Social media targets in Italian firms

Variables	Marketing	Customers	Innovation	Cooperation	Recruitment	Employees
Basic User	-0.376***	-0.361***	-0.383***	-0.397***	-0.280***	-0.282***
	(0.0370)	(0.0331)	(0.0348)	(0.0376)	(0.0367)	(0.0366)
Small	0.0349	-0.0532	0.121***	0.168***	-0.332***	-0.0543
	(0.0418)	(0.0367)	(0.0382)	(0.0410)	(0.0400)	(0.0399)
South	-0.0897	0.160***	0.161***	0.118**	-0.0329	0.208***
	(0.0594)	(0.0532)	(0.0535)	(0.0575)	(0.0582)	(0.0558)
Small#South#Basic_User	0.319***	0.0738	0.110	0.0514	-0.0947	0.0530
	(0.0882)	(0.0788)	(0.0809)	(0.0881)	(0.0996)	(0.0860)
Mobile	0.0491	0.0147	0.0905**	0.0652	0.231***	0.215***
	(0.0464)	(0.0418)	(0.0439)	(0.0485)	(0.0523)	(0.0485)
ICT employees	-0.109**	-0.0439	0.0188	0.117***	0.265***	0.0608
	(0.0435)	(0.0387)	(0.0405)	(0.0430)	(0.0427)	(0.0424)
Broadband2	-0.0507	-0.0841	-0.169**	-0.138*	-0.0488	-0.0975
	(0.0812)	(0.0748)	(0.0749)	(0.0828)	(0.0868)	(0.0796)
Broadband3	0.0228	-0.0448	-0.0694	-0.0319	0.0760	-0.118
	(0.0841)	(0.0770)	(0.0770)	(0.0849)	(0.0885)	(0.0820)
Broadband4	-0.0371	-0.0745	-0.140*	0.0154	0.212**	-0.0275
	(0.0903)	(0.0826)	(0.0834)	(0.0906)	(0.0932)	(0.0877)
Broadband5	0.0460	-0.0253	-0.0468	0.0253	0.222**	0.00573
	(0.0954)	(0.0857)	(0.0864)	(0.0938)	(0.0966)	(0.0904)
Training_1	0.0630	0.0569	0.106**	0.131**	0.302***	0.164***
	(0.0541)	(0.0473)	(0.0491)	(0.0509)	(0.0489)	(0.0492)
Training_2	0.0553	0.0549	0.0165	0.123***	0.0880**	0.187***
	(0.0466)	(0.0406)	(0.0421)	(0.0441)	(0.0427)	(0.0426)
Energy	-0.228***	0.0238	0.294***	0.489***	-0.0463	0.0217
	(0.0774)	(0.0729)	(0.0763)	(0.0795)	(0.0856)	(0.0828)
Building	-0.427***	-0.226***	0.0725	0.433***	0.133*	0.110
	(0.0632)	(0.0624)	(0.0645)	(0.0672)	(0.0703)	(0.0677)
Retail, transport and warehousing	0.225***	0.328***	0.289***	0.155***	0.100**	0.143***
	(0.0461)	(0.0400)	(0.0420)	(0.0463)	(0.0450)	(0.0446)
Catering, accomm. and recreat. activity	0.146***	0.336***	0.344***	0.318***	0.343***	0.283***
	(0.0562)	(0.0491)	(0.0515)	(0.0557)	(0.0544)	(0.0539)
Professional and scientific activities	-0.109*	-0.0685	0.136***	0.256***	0.458***	0.282***
	(0.0559)	(0.0505)	(0.0529)	(0.0549)	(0.0541)	(0.0538)
Other public admin. services	-0.354	-0.479*	-0.0902	0.435*	-0.116	0.637**
	(0.254)	(0.271)	(0.267)	(0.251)	(0.279)	(0.251)
Constant	0.980***	0.0893	-0.603***	-1.036***	-0.979***	-0.943***
	(0.101)	(0.0909)	(0.0926)	(0.101)	(0.105)	(0.0984)
Obs	7,703	7,703	7,703	7,703	7,703	7,703

Notes: Multivariate Probit model (equation 3). Parameter estimates. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

TABLE 4 Internationalization of social media users

VARIABLES	EXPORT
Basic User	-0.0988***
	(0.0269)
Small	0.0162
	(0.0253)
South	0.0301
	(0.0397)
Small#South#Basic User	-0.122*
	(0.0731)
Energy	-0.475***
	(0.104)
Building	-0.478***
	(0.121)
Retail, transport and warehousing	-0.205***
	(0.0289)
Catering, accomm. and recreat. activity	0.210***
	(0.0371)
Professional and scientific activities	-0.112***
	(0.0397)
Other public admin. services	-0.267
	(0.257)
Obs	1,605

Notes: Probit model (equation 4). Average marginal effects. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

operating in *Catering, accommodation and recreational activity*sector are more likely to enter international markets via the Web than firms operating in other industries.

Our results can be summarized as follows. Small firms operating in lagging regions are able to take the opportunity of adopting SM. However, they are more likely to maintain the status of basic SM user. This is reflected in less strategic targets of SM adoption and lower probabilities of entering international markets.

5 | CONCLUSION

The ICT Revolution has profoundly changed not only our way of life but also the way of doing business. Among the new technologies, social media are particularly interesting to investigate since they can be more easily adopted by smaller firms, even those located in lagging areas. Their usage could even stimulate economic convergence, or at least mitigate divergence, between core business and lagging regions. Considering the economic potential of social media, an emerging literature has started to investigate this topic but usually by means of qualitative analyses and pilot studies, while a lack of quantitative studies and especially from a regional science perspective is observed. We aim to fill this gap in the literature providing an empirical investigation on a large sample of firms and specifically focusing on the lagging regions of Italy, namely, the southern regions.

Based on the theoretical TOE framework, the analysis first estimates a social media adoption function at firm level and compares lagging regions with the rest of Italy. Then, we estimate a similar specification but with the aim

of assessing whether firms in lagging regions are more likely to be basic or advanced users. We particularly focus on the group of small firms that should be those with higher economic returns from SM adoption, beyond being absolutely predominant in the southern regions. From these first steps of investigation, we find that small firms in lagging regions are more likely to adopt SM but at the same time they are more likely to remain at a basic level of usage. This means that they are able to take the opportunity of adopting SM, but they do not face the challenge to adopt these technologies at a professional level.

Finally, we look at potential impacts of being basic users of small size in lagging regions in terms of SM adoption targets and firms' internationalization. We find that these firms are less likely to adopt SM for strategic targets such as innovation and co-operation, while they are more likely to use them for a marketing target. The same group of firms is also less likely to enter international markets by e-commerce. In short, our findings suggest that adopting SM at a basic level by firms could be an important obstacle to economic returns of these technologies in lagging regions.

From our investigation, we can draw some interesting policy implications. Firms in lagging regions should tackle the challenge of adopting SM at a professional level and, to this end, policy-makers should more effectively encourage digital culture both in the education system and in the entrepreneurship context. This remains one of the most important challenges for lagging regions. A real technological revolution is not possible if investments in technological infrastructures are not supported by an increase in digital literacy and competencies. Our findings also show that Public Administration is one of the sectors with the lowest probability of adopting SM and this may be a sign of poor digitization in public services. This is another point that should be urgently addressed by policy-makers.

Obviously, the study is not exempt from limitations. First, Italian firms are very small-sized compared to firms in other national economies. For example, US firms may be defined as small-sized even if they have more than 50 employees. Therefore, our findings cannot be generalized to economies with a different industrial context. Second, our data do not allow the assessment of the impact of SM adoption on other measures of economic outcome, such as productivity. Third, longitudinal data are not available and this strongly limits a deeper investigation of causality directions. All these limitations may represent challenges for future research.

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APPENDIX

TABLE A1 Summary statistics

		%	
Dependent Variables	**Obs.**	**yes**	**no**
Social Media	19,248	41%	59%
Basic_User	19,248	19%	81%
Marketing	7,928	80%	20%
Customers	7,928	50%	50%
Innovation	7,928	31%	69%
Cooperation	7,928	22%	78%
Recruitment	7,928	27%	73%
Employees	7,928	24%	76%
Export	2,002	49%	51%
Independent Variables			
Mobile	19,248	75%	25%
ICT employees	19,248	31%	69%
Broadband1	18,433	6%	94%
Broadband2	18,433	48%	52%
Broadband3	18,433	26%	74%
Broadband4	18,433	11%	89%
Broadband5	18,433	9%	91%
Small	19,248	66%	34%
Training_1	19,248	13%	87%
Training_2	19,248	17%	83%
Manufacturing	19,248	24%	76%
Energy	19,248	7%	93%
Building	19,248	15%	85%
Service:			
Retail, transport and warehousing	5,391	28%	72%
Catering, accomm. and recreat. activity	2,586	13%	87%
Professional and scientific activities	2,254	12%	88%
Other public admin. services	76	1%	99%
South	19,248	18%	82%

TABLE A2 Social media adoption by geographical area

	Social Media		
	No	**Yes**	**Total**
Centre-North	9,163	6,654	15,817
	81%(58%)	84%(42%)	82%(100%)
South	2,155	1,276	3,431
	19%(63%)	16%(37%)	18%(100%)
Total	11,318	7,930	19,248
	100%(59%)	100%(41%)	100%(100%)

Note: Row percentages in parentheses.

TABLE A3 Social media adoption by firm size

	Social Media		
	No	Yes	Total
Medium & Large	3,191	3,347	6,538
	28%(49%)	42%(51%)	34%(100%)
Small	8,127	4,583	12,710
	72%(64%)	58%(36%)	66%(100%)
Total	11,318	7,930	19,248
	100%(59%)	100%(41%)	100%(100%)

Note: Row percentages in parentheses.

TABLE A4 Social media adoption by sector

	Social Media		
	No	Yes	Total
Manufacturing	2,683	1,991	4,674
	24% (57%)	25% (43%)	24% (100%)
Energy	998	378	1,376
	9% (73%)	5% (27%)	7% (100%)
Building	2,205	686	2,891
	19% (76%)	9% (24%)	15% (100%)
Retail, transport and warehousing	2,878	2,513	5,391
	25% (53%)	31% (47%%)	28% (100%)
Catering, accommod. and recreat. activity	1,384	1,202	2,586
	12% (54%)	15% (46%)	13% (100%)
Professional and scientific activities	1,122	1,132	2,254
	10% (50%)	14% (50%)	12% (100%)
Other public admin. services	48	28	76
	1% (63%)	1% (37%)	1% (100%)
Total	11,318	7,930	19,248
	100% (59%)	100% (41%)	100% (100%)

Note: Row percentages in parentheses.

TABLE A5 Social media users by geographical area

	Advanced User	Basic User	Total
Centre-North	3,770	2,884	6,654
	88%(57%)	79%(43%)	84%(100%)
South	520	756	1,276
	12%(41%)	21%(59%)	16%(100%)
Total	4,290	3,640	7,930
	100%(54%)	100%(46%)	100%(100%)

Note: Row percentages in parentheses.

TABLE A6 Social media users by firm size

	Advanced User	Basic User	Total
Medium & Large	2,366	981	6,538
	55%(71%)	27%(29%)	42%(100%)
Small	1,924	2,659	4,583
	45%(42%)	73%(58%)	58%(100%)
Total	4,290	3,640	7,930
	100%(54%)	100%(46%)	100%(100%)

Note: Row percentages in parentheses.

TABLE A7 Social media users by sector

	Advanced User	Basic User	Total
Manufacturing	1,279	712	1,991
	30% (64%)	20% (36%)	25% (100%)
Energy	199	179	378
	5% (53%)	5% (47%)	5% (100%)
Building	234	452	686
	5% (34%)	12% (66%)	8% (100%)
Retail, transport and warehousing	1,174	1,339	2,513
	27% (47%)	37% (53%)	32% (100%)
Catering, accomm. and recreat. activity	605	597	1,202
	14% (50%)	16% (50%)	15% (100%)
Professional and scientific activities	786	346	1,132
	18% (70%)	9% (30%)	14% (100%)
Other public admin. services	13	15	28
	1% (46%)	1% (54%)	1% (100%)
Total	4,290	3,640	7,930
	100% (54%)	100% (46%)	100% (100%)

Note: Row percentages in parentheses.

TABLE A8 Internationalization of SM users by Geographical Area

	Export-web		
	No	Yes	Total
Centre-North	644	738	1,382
	86%(47%)	87%(53%)	86%(100%)
South	108	115	223
	14%(48%)	13%(52%)	15%(100%)
Total	752	853	1,605
	100%(47%)	100%(53%)	100%(100%)

Note: Row percentages in parentheses.

TABLE A9 Internationalization of SM users by Firm Size

	Export-Web		
	No	Yes	Total
Medium & Large	397	448	845
	53%(47%)	52%(53%)	53%(100%)
Small	529	405	760
	47%(47%)	47%(53%)	47%(100%)
Total	752	853	1,605
	100%(47%)	100%(53%)	100%(100%)

Note: Row percentages in parentheses.

TABLE A10 Internationalization of SM users by level of adoption

	Export-Web		
	No	Yes	Total
Basic User	282	221	503
	38%(56%)	26%(44%)	31% (100%)
Advanced User	470	632	1,102
	62%(43%)	74%(57%)	69% (100%)
Total	752	853	1,605
	100%(47%)	100%(53%)	(100%)

Note: Row percentages in parentheses.