To be or not to be social? The role of online social media in bank profitability.

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ABSTRACT

Banks are increasingly using online social media to engage with their existing and potential customers; however, the use of technology may strengthen or weaken these 'virtual' relationships.
We analyse the adoption of online social media for 151 Italian banks and we test how they affect bank profitability in 2013-2016. Despite the adoption rate is lower than required by customers and banks' popularity on online social media is poor, we find that the effects of online social media are different from one to another. In particular, the presence and popularity of banks on Facebook negatively affect their profitability, while the presence on YouTube and the interaction in LinkedIn increases bank performance.

1. Introduction

Online social media have become among the Internet's most popular destinations since their early launch in the first decade of 2000. In 2017, the popular platforms Facebook and YouTube have respectively reached 2.06 billion and 1.5 billion monthly active users worldwide on their sites (Statista, 2017). These platforms provide a variety of new online information about products and services that are created, circulated and used by consumers (Blackshaw and Nazzaro, 2004). Therefore, online social media are one of the major factors for companies in influencing various aspects of customer behaviour, including information acquisition, communication and evaluation (Mangold and Faulds, 2009).

Also for banks and financial institutions the adoption of online social media may enable them to communicate with their customers in an easier way; however, the lack of human contact in these transactions may lead to a loss of trust (Proença et al., 2010). Indeed, while the ease of information propagation in online social media can be very beneficial for banks, it can also have a dramatic impact on their reputation (Kim and Ko, 2010; Bakshy et al., 2012). Furthermore, the adoption of online social media represents a cost for banks –that includes the expenses for dedicated staff, marketing research firms, public relations consultants and advertising agencies that treat the management of online social media and all costs to promote insights– and there is lack of evidence in turning such investments into financial returns (Mitic & Kapoulas, 2012). This hampers banks to obtain the financial resources needed to undertake such activities (Kapoulas and Mayer, 2004; Pry, 2010).

In light of all this, academic research is needed to survey the presence of banks in online social media and to test how these investments affect banks' economic results. To that end, we study the adoption of online social media for a sample of 151

Italian banks and we run a statistical regression model to examine the effects on their economic performances.

Our contribution is as follows: First, the study of the adoption of online social media by banks is a novel theme where the academic literature is more than scares, confined to few case studies and analyses the registered users, rather than banks. Second, we create a new hand-collected dataset, defining and measuring key metrics for the adoption of online social media that enable us to describe the presence of the banking sector in online social media. Third, we treat together topics that are usually split as they require different skills to analyse them -the adoption of online social media and the bank profitability. That empowers us to answer a new research question. Fourth, most of the literature on business adoption of Internet usage and bank profitability is already outdated as the primary focus is on e-mails; in this paper we only deal with online social media. At last but not at least, we analyse a geographical area –Italy- very interesting for competitiveness and market concentration. In any case our results can be generalized for banks located all over the world.

The remainder of the study is organized as follows. Section 2 analyses the academic literature related to this topic, focusing on positive and negative aspects of the usage of online social media for the banking industry, and state the research question. Section 3 survey the adoption of online social media for a sample of Italian banks. Section 4 describes the data-collection process and the research methods we apply. Section 5 reports the results of our analyses, and, finally, Section 6 restates the major conclusions and discusses the implications for practitioners.

2. Literature review

Online social media are popular platforms for interaction with hundreds of millions of registered users that on their user profiles can place information that they want to share with any number of peers. One peculiar characteristic of online social media is the diffusion of behaviour from one user to several others: when one user would love a product or service, he or she starts influencing his or her friends on the online social media to use it, and these friends would influence their friends and so on, thus through an electronic word-of-mouth effect a large population in the online social media would adopt this product or service (Bakshy et al., 2012)[1]. Thus, the value of one customer is worth far more than what he or she initially spends.

Recently, as online social media sites are already integrated into the consumer's everyday life with a significant percentage of people passing along information to others, many of them are becoming a huge dissemination and marketing platform for companies (Chen et al., 2009). DEI Worldwide (2008) states that companies not

[1] Manski (1995) suggests three basic categories of reasons why we might observe behavioural imitation within social networks. The first is a correlated effect, in which individuals in the same group tend to behave similarly because they face similar environments or by their characteristics they self-select into a given social network. The second category is a contextual effect, in which the propensity for a given type of behaviour varies with the background characteristics of the people in a social network. The third category is an endogenous effect.

engaging in online social media are missing opportunities to reach consumers[2].

Furthermore, online social media enable the creation of online communities of interest around specific firms or products. To gain business value, companies need to collaborate in new ways with their customers, engaging on a regular basis and co-creating contents. If these relationships are successful, customers feel like company insiders, often serving as a champion for testing company's products. Such customers are more likely to be loyal, more willing to try companies' new offerings, and become resistant to negative information about the company (Culnan et al., 2010; Kim and Ko, 2012).

For financial and banking institutions, the adoption of online social media is critical. In fact, financial and banking institutions are businesses in which the relationship with customers is essential (Proença et al., 2010). The succeed of banking crisis in Europe in the last 10 years increased the need for bank customers to perceive more credibility, stability and trustworthiness by banks, so that the importance for bank to stay close to customers has increased (Stone, 2009). Furthermore, the banking industry is becoming ever more undifferentiated (Barnes and Richard, 2014) and the survival in this new unpredictable context is no longer based on the size of the bank, but rather on its ability to innovate. In the long term, relationships can become fragile, especially when customers are faced with offers from competitors and dissatisfaction episodes which inevitably occur in customers' lives (N'Goala 2010). Thus, some banks are using online social media can permit to over-come these incidents, to engage with prospective customers and to build loyalty towards the brand (Miranda et al., 2013).

Online social media have quickly become an important channel of two-way communication between banks and customers. These platforms enable banks to both receive and give information to customers in powerful interactive dialogues and reciprocal relationship. In such a way the customer is brought closer and is more satisfy in the end (Proença et al., 2010; Özeltürkay and Mucan, 2014).

The use of online social media helps the development of innovative financial products and services simply because financial institutions are able to obtain a real-time 360 degree view of their customers' attitudes. Thus, online social media may become new forums for customers to add value to personalized and tailor-made services, empowering banks to decrease the product feedback loop and enabling customers to benefit from greater convenience and flexibility (Proença et al., 2010).

Furthermore, banks may use online social media as tools to improve brand image, to manage bank reputation, to reach new potential customers and to promote new products and services with no limits on advertising space. Additionally, banks may also obtain considerable reductions in transaction costs: customers may speed up their transactions with online started processes or they may quickly raise their issues through online social media with increased convenience and better accessibility, avoiding having to reach the physical branch to speak with the

[2] The report provides the following statistics: 70% of consumers have visited online social media sites to get information; 49% of these consumers have made a purchase decision based on the information they found through the online social media sites; 60% said they were likely to use online social media sites to pass along information to others online; and 45% of those who searched for information via online social media sites engaged in word-of-mouth.

operator (Klimis, 2010; Goi, 2014).

However, there are not only potential benefits for banks from the adoption of online social media; rather, there may be negative consequences for them. First, there is no consensus as to whether banks-customers relationships are strengthened or weakened by the use of technology (Harden, 2002). This is due to the 'virtualization' of relationship: online social media interactions involve no human communication, essential in reducing customers' perceived risks (Ford, 2001; Adelman et al, 1994; Sharma and Patterson, 1999). It can be argued that online social media interactions contain a part of human interaction and tend to be more human beings oriented as, unlike online banking with automatic response systems, customer posts are responded to by a member of customer services team. In any case, the relationship between banks and customers via online social media may be more vulnerable since the distance between banks and customers and the lack of face-to-face contact may lead to loss of trust, affecting loyalty and customer retention (Liang et al., 2008; Johns and Perrot, 2008; Proença et al., 2010). The disappearance of the time, place and social factors deprive the traditional relationship of the characteristics that define it, since in virtual relationships, the connection between the company and its customers is diluted, with exchanges mediated by computer (Harden, 2002; Egan, 2003; Gummesson, 2004). In fact, recent studies demonstrate that banks with steady presence and strong bonds with clients should avoid engaging in such novelty online relationships and should instead focus on promoting reliability in the organization and its services (N'Goala, 2010; Mitic and Kapoulas, 2012).

Indeed, while the ease of information propagation in online social media can be very beneficial, it can also have a dramatic impact on brand's reputation (Kim and Ko, 2010; Bakshy et al., 2012). Historically, companies were able to control the information available about them through strategically placed press announcements and good public relations managers. Today, banks have been increasingly relegated as mere observers, having no chance, or even no right, to alter publicly posted comments provided by their customers (Kaplan and Haenlein, 2010). In online social media, the ability to edit the content and share it across the networks is in the hands of wide audiences and this opens the possibility for fraud (Pry, 2010). This is a great concern as online social media are mostly used by one-to-many reach customers to express their dissatisfaction with the bank in a negative word-of-mouth process (N'Goala, 2010; Mitic and Kapoulas, 2012). Furthermore, in online social media, recommendations are typically from unknown individuals, so users have difficulty in determine the credibility of information (Bronner and de Hoog, 2011). Thus online social media should not be reliable for banking (Mitic and Kapoulas, 2012). However, Ernst & Young (2012) estimated that a third of customers who use online social media use it to actively comment on the service they receive from their bank.

There may arise also problems related to the use of online social media to promote banking products: online social media are mostly used for entertainment, so banks do not perceive in them the necessary seriousness to disseminate accurate information; moreover, banks should follow specific regulation on promoting new products and services, consequently their promoting activities on online social

media are limited.

In light of all this, the banking industry may be reluctant towards any online social media and its unfamiliar territory (Klimis, 2010; Miranda et al., 2013). Nowadays non-financial companies have just penetrated the online social media scene, offering direct links from their corporate websites to the most popular online social media platforms, and use these tools to promote brands and support the creation of brand communities (Kaplan and Haenlein, 2010), but banks seem to be lagging behind[3]. In this regards, Miranda et al., (2013) find that banks that joined online social media do not clearly think out what goals they are pursuing, but just follow the fashion or the lead of a competitor. In most cases, the result is considered as a failure. The majority of the largest banks in the world have a profile on online social media, but many of these are not properly managed. Instead, there needs to be a previously defined communication strategy, and the online social media presence needs to be used appropriately to achieve those strategic objectives.

Considering the potential of online social media to be a double-edged sword in building, or weakening, relationships between banks and customers, this work aims to identify the effects of online social media on bank profitability. Currently, there is no evidence of the effects on bank balance sheets from the adoption of online social media that justify these investments (Jaser, 2010; Pry, 2010; Vemuri, 2010). Hence, our research question is the followings: '*ceteris paribus*, how online social media affect bank profitability?'

3. Adoption of online social media

There are numerous types of online social media platforms with global reach capabilities that banks may join: in this study we analyse banks' adoption of two social networks (Facebook and LinkedIn), one micro-blogging service (Twitter), one video-sharing platform (YouTube) and one photo-sharing platform (Instagram). It follows a description of online social media analysed in this research.

Facebook is the most widely used social networking service in the world. This platform enables users to post their messages -text, web links and other electronic files- on their pages (called the 'wall'), that other users may comment and share. Companies may run the same social activities by opening a 'Facebook page'. LinkedIn is the largest professional online social network, where users and companies may create their page and post their messages on their wall, with a limit of 600 characters. Differently from Facebook, LinkedIn's interface caters towards the need for professional self-promotion, offering novel opportunities for deception not possible in face-to-face settings. Twitter is a blog where users post their messages (called 'tweets') within a 140-character limit and are connected with other users to receive their tweets. YouTube, the third most-trafficked website in the world, is a platform that allows users to upload videos without space limit onto customized YouTube channel, which lists videos that you or others create; unlike the other online social media in which not registered users may only see preview

[3] It has been estimated that the number of banks with presence on the most-popular platform Facebook is still very low, only about 60% of them (Miranda et al., 2013).

pages, it is not necessary to have a YouTube channel to watch the others' videos. Finally, Instagram is a relatively new form of communication where users can share their updates by taking photos and tweaking those using filters.

Common use of online social media has evolved into a well-defined jargon: '*friends*' or '*followers*' are the other users in connection with a specific user, '@' followed by a user nick name identifies that user, '#' followed by a word or unspaced phrase represents a hashtag that makes it possible for other users to easily find messages with this specific theme or content, '*like*' means that the user cares about the information encased and '*share*' or '*retweet*' are mechanism to spread information beyond the reach of the original user.

One important contribution of this paper is the novel database to describe the presence of bank in online social media. Following Miranda et al., (2013)[4] we measure the adoption rate of online social media by banks with three indexes that respectively evaluate content, popularity, and interactivity on the social media. The index 'content' is measured by evaluating the presence/absence of the institution. The index 'popularity' is used to evaluate the effectiveness of firms' use of online social media and measures the number of followers or fans of their pages. Finally, the index 'interactivity' measures the number of posting comments on the wall; it may measures the total number of wall posts made by the organization since it has joined the online social media or the number of posts in the recent period. These indexes may not be the best measure of the effectiveness of an online social media pages as they greatly depend on the firm's industry; however in this paper we study only banks, hence companies operating in the same industry.

Table 1 reports the measures of the three indexes collected from each online social media.

[4] The authors propose a new instrument called Facebook Assessment Index (FAI), which evaluate the essential information on a firm's Facebook page.

Table 1. Measures of the indexes content, popularity and interactivity for each social media analysed. Source: our elaboration.

Platform	*Index*	*Measure*	*Variable*
Facebook	*Content*	*Presence of the organization*	*FB_Cont1*
	Popularity	*Number of people like it*	*FB_Pop1*
	Interactivity	*Number of wall posts*	*FB_Inter*
LinkedIn	*Content*	*Presence of the organization*	*LI_Cont1*
	Popularity	*Number of followers*	*LI_Pop*
	Interactivity	*Number of wall posts in the recent period*	*LI_Inter*
Twitter	*Content*	*Presence of the organization*	*Tw_Cont1*
	Popularity	*Number of followers*	*Tw_Pop*
	Interactivity	*Total number of tweets*	*Tw_Inter*
YouTube	*Content*	*Presence of the organization*	*YT_Cont1*
	Popularity	*Number of subscribers*	*YT_Pop*
	Interactivity	*Total number of video posted*	*YT_Inter*
Instagram	*Content*	*Presence of the organization*	*In_Cont1*
	Popularity	*Number of followers*	*In_Pop*
	Interactivity	*Total number of pictures posted*	*In_Inter*

Our sample includes only limited-liability banks with registered office in Italy[5]: we decided to analyse only banks located in one country in order to deal with the same rate of adoption and usage of online social media by customers; the base of registered users of online social media in Italy – 31 million active online social media users corresponding to 52% of Italian population (Hootsuite and we are social, 2017) - is a sufficient critical mass of customers who demand this type of virtual interaction with banks. Additionally, the Italian territory is an interesting subject for this research considering the high level of competition among banks in the region, their unevenly sizes and organizational forms (from large international banking groups to small local banking institutions) and the presence of banking crisis that may have deterred customers' confidence on the banking system.

The adoption of online social media by Italian users is summarized in Table 2 (source: Hootsuite and we are social, 2017). As can be seen, the most used online social media are YouTube and Facebook, both used by more than a half of Italian internet users (57% and 55% respectively). The third most-used online social media is Instagram (28%), followed by Twitter (25%). Finally, LinkedIn is used by only 19% of internet users.

Table 2. Italian active users of online social media in January 2017. Source: Hootsuite and we are social, 2017.

Online social media	*Italian active users (% of Italian internet users)*
Facebook	55%
LinkedIn	19%
Twitter	25%
YouTube	57%
Instagram	28%

We collected data by hand from each website[6] and with the aid of social analyses

[5] We retrieve social data for banks in the list of banks 'Albo delle banche' by Banca d'Italia (https://infostat.bancaditalia.it).

[6] Facebook: https:\\facebook.com; LinkedIn: https:\\linkedin.com; Twitter: https:\\twitter.com;

websites[7]. The final sample includes 151 Italian banks. Descriptive statistics for the indexes content, popularity and interaction for our sample banks are reported in Table 3.

Table 3. Descriptive statistics for content, popularity and interaction of Italian banks. Source: our elaboration on data from online social media.

Variable	*Obs.*	*Mean*	*Std. dev.*	*Min*	*Max*
FB_Cont	151	0.36	0.48	0	1.00
LI_Cont	151	0.88	0.32	0	1.00
Tw_Cont	151	0.34	0.48	0	1.00
YT_Cont	151	0.34	0.47	0	1.00
Ins_Cont	151	0.13	0.35	0	1.00
FB_Pop	151	15,850.34	62,753.29	0	450,672.00
LI_Pop	151	5,839.15	18,859.50	0	153,097.00
Tw_Pop	151	1,111.05	3,654.9	0	26,200.00
YT_Pop	151	227.42	1,028.27	0	8,954.00
Ins_Pop	151	154.50	640.85	0	4.513.00
FB_Inter	151	243.46	689.57	0	4,345.00
LI_Inter	151	21.25	58.62	0	497.00
Tw_Inter	151	616.83	2,064.79	0	12,800.00
YT_Inter	151	33.55	116.83	0	890.00
Ins_Inter	151	35.23	167.75	0	1,408.00

As emerged in Table 3, only 36% of sample banks, corresponding to 54 of 151 banks, adopt Facebook. Instead, banks with a LinkedIn page are 88% of our sample (133 banks) – however, only 62% of sample banks (95) are managing their LinkedIn page while for the remaining 24% (36) there are automatic pages created by the social media[8]. It follows that the demand for banks in this online social media is greater than the presence of these banks and there is a pool of potential followers that they may exploit by joining the social network. The percentages of banks that adopt the other online social media analysed are lower: 34% of sample banks have a Twitter account, another 34% of sample banks manage a YouTube channel and only 13% of sample banks adopt Instagram. Even so, in the latter there are more than 35,000 posts with as hashtag the name of banks that did not join the platform, i.e., post talking about these organizations. Also in this case, it means that the demand for 'social' banks is higher than their offer.

For what concern the popularity, all values present great standard deviations (from more than 62,000 for Facebook to almost 650 for Instagram): this is because there is a great variability in the number of fans/followers from one bank to another for each online social media analysed, that can be 0 or 450,000. In any case, banks have on average around 15,000 users liking their Facebook page. This index has a maximum value of 450,672 (exhibited by Unicredit Italia). We should stress that this

Instagram: https:\\instagram.com; YouTube: https:\\youtube.com.

[7] Specifically: Sociograph (https://sociograph.io), a tool for understanding how many people are interacting with Facebook groups and Facebook pages; Likealyzer (https://likealyzer.com), a free tool by Meltwater for an overview of information on Facebook.

[8] A company page may exist in LinkedIn even if anybody from the organization did not create it. LinkedIn may automatically generate it when a member adds that organization as his or her work experience on his or her LinkedIn profile or when a job is posted on LinkedIn for that organization.

value is not great when compared to the number of Facebook fans of the most popular Italian page –Huawei Mobile IT- that has ten times bigger; additionally, there are no banks in the list of the 350 most popular Italian Facebook pages (source: Likeanalyser). The followers of banks on LinkedIn are about a third on Facebook's ones - exactly as Italian active users of these social networks – and in mean there are almost 5,900 followers for each bank. The maximum value is more than 153,000 followers (reached by Intesa SanPaolo). On Twitter there are only 1,111 followers for each bank by mean, despite the number of Italian active users of this online social media is greater than the one for LinkedIn, as reported above. The maximum value of Twitter's followers is 26,200 (as for Facebook, this value is exhibited by Unicredit Italia). Banks' followers on YouTube and Instagram are much less numerous: there are on average solely 227 followers for bank on the video-sharing platform and only 154 followers on the photo-sharing one. Note that YouTube and Instagram are the first and third online social media for number of active users. The maximum number of followers is 8,954 users on YouTube (reached again by Intesa Sanpaolo) and 4,531 users on Instagram (UBI).

Passing to banks' interactivity on online social media, also in this case we find a great variability expressed in terms of standard deviation. We also find four different banks that present the greater interaction with their fans/followers: it means that each bank has choose to focus to a different online social media. On average there are around 243 posts per bank on Facebook (standard deviation of 689.57); the most-interactive bank has made more than 4,300 wall posts (CheBanca!). On LinkedIn the average number of posts in recent period is 21.25 (standard deviation: 58.62). The maximum number of wall posts made in recent period is 497 (Banca Ifis). On Twitter there are 616 tweets per bank (standard deviation: 2,065). The maximum value is 12,800 (IW Bank). Finally, in YouTube and Instagram there are on average respectively 33 and 35 contents shared by each bank (standard deviations: 116 and 167). The maximum values consist in 890 videos (Banca Mediolanum) and 1,408 pictures (Banca Ifis).

Considering only banks that adopt online social media, the average values for popularity are greater than the above-mentioned values, but still not relevant compared to the number of Italian active users. Precisely, 'social' banks, on average, have around 44 thousand fans on Facebook, 9 thousand followers on LinkedIn, 3 thousand followers on Twitter, 670 subscribers of YouTube channels and 1 thousand followers on Instagram. Passing to interaction by 'social' banks, the average number of tweets per bank is almost 1.800, the number of Facebook wall posts is 680, the number of pictures posted on Instagram is almost 250, there are almost 100 videos posted on YouTube for each 'social' bank and, finally, the average number of posts on LinkedIn is around 30.

Table 4. Mean values for 'social' banks. Source: our elaboration.

Online social media	*Number of obs.*	*Pop*	*Inter*
Facebook	54	44,322.26	680.78
LinkedIn	95	9,246.24	33.77
Twitter	45	3,226.29	1.791,17
YouTube	51	673.33	99.33
Instagram	20	1,166.50	248.05

4. Model

We merge our database with the balance sheet information of banks to which the data refer. Accounting data are collected in units of Euros for the period 2013-2016 from Orbis Bureau van Dijk[9] (hereafter Orbis). The final sample includes 151 banks, with 604 observations.

Our made up dataset allowed us to run a statistical regression model to examine the relationship between the indexes content, popularity and interactivity to measure the extent of banks' adoption rate of online social media with their financial and economic performance. Through the use of the Stata 11 software package[10], we run the following generalized least squares (GLS) regression models with random-effects[11] for balanced panel data:

$$Profitability_{i,t} = \propto_0 + \propto_1 Content_i + \propto_2 Control_{i,t} + \varepsilon_{i,t} \quad \text{(Model 1)}$$
$$Profitability_{i,t} = \propto_0 + \propto_1 Popularity_i + \propto_2 Control_{i,t} + \varepsilon_{i,t} \quad \text{(Model 2)}$$
$$Profitability_{i,t} = \propto_0 + \propto_1 Interactivity_i + \propto_2 Control_{i,t} + \varepsilon_{i,t} \quad \text{(Model 3)}$$

Values are calculated for each bank *i* in period *t* with t = 2013-2016. Here $\varepsilon_{i,t}$ is a random residual. The dependent variable measures bank returns. Hoffman and Fodor (2010) suggest that returns from online social media investments should not be measured in cash units, but rather in customer behaviours tied to particular social media application. Their so-called 'social media ROI' takes into account qualitative indexes such as the likelihood of future purchase from investment in online social media. Also Gummesson (2004) define an index - called Return on relationships (ROR) - as the long-term net financial outcome caused by the establishment and maintenance of an organization's network of relationships; accounting systems do not capture the value of customer relationships although building relationships is clearly an investment, so he measure the intellectual capital as the total value of a company minus its book value or simply all resources except net financial assets. Analogously, Sterne (2010) measures the ability of online social media to boost profits by lowering costs[12]. Although there is this line of thought in the academic literature that argues that innovative ad hoc evaluating tools should be created to measure the profitability of online social media, we decided to use the same metrics adopted in the academic research to measure the impact of traditional channels. In this way we do not measures the effects of online social media on intermediate objectives such as increase in brand loyalty, but we measure the effects of online social media on bank returns, that is the final objective. Consequently, following Athanasoglou et al. (2008) and Molyneux and Thornton (1992) our

[9] Orbis Bank Focus is a new database of banks worldwide. The information is sourced by Bureau van Dijk from a combination of annual reports, information providers and regulatory sources. Orbis Bank Focus currently contains detailed information on 43,000 banks (28,000 US and 15,000 Non-US), including 6 years' history for listed banks and 4 years' for unlisted.

[10] Stata is an integrated statistical software package that provides tools for data analysis, data management, and graphics. It was created in 1985 by StataCorp.

[11] For more about random-effects models see Allison (2009).

[12] He argues '*(…)if you can show that social media is a less expensive way to measure public opinion, make friends and influence people, than you can have a larger share of budget next time around*'.

measures of bank profitability are ROA and ROE.

Our explanatory variables are the indexes designed to measure content, popularity and interactivity - as described in Section 3 – respectively for model 1, model 2 and model 3.

We retrieve from the academic literature four determinants of profitability that partially explain the dependent variable. The inclusion of these indexes in our regression model enables us to separate their effects on bank profitability, so that the effects from the adoption of online social media are isolated from the rest. These control variables measure capital, credit risk, productivity growth and size.

Table 5. Determinants of bank profitability. Source: Athanasoglou et al. (2008)

Variable	*Measure*	*Notation*	*Expected effect*
Capital	Equity/assets	EA	+
Productivity growth	Rate of change in operating revenue/employee	PR	+
Credit risk	Loan loss provisions/loans	PL	-
Size	Fixed assets in logs	S	

The descriptive statistics of accounting variables investigated are reported in Table 6 for the entire period. On average, all banks present negative values for proxy for profitability. In particular, the average value for ROA is lower than -0.01, while the average value for ROE is around -0.51. However, in the sample there are both banks with negative values and with positive values. For all two proxies of profitability the standard deviation is not very great (0.03 for ROA and 3.36 for ROE). The minimum value for ROA is -0.58 while the maximum value is 0.23. The minimum value for ROE stands out with a value of -69.04; while the maximum value is 4.63. For what concerns control variables, the index EA has an average value of 0.106, meaning that on average banks' equity capital is a tenth of their total assets. This index has a minimum value of -0.02; it follows that there are sample banks with negative values for total capital. The maximum value for EA is 0.97, meaning that there exist sample banks financed almost entirely by equity. The index PR is 0.17 by mean. This ratio goes from a –negative– minimum value of -1.00 to a maximum –positive and very great– value of 68.62. The index PL is on average lower than 0.01. It is enclosed in almost -8 and 1.44. Finally, the control variable S has a mean value of 7.08. Being a logarithmic variable, by construction it always has a positive sign, and accurately it goes from 2.14 to 10.04.

Table 6. Descriptive statistics for accounting variable for Italian banks in 2013-2016. Source: our elaboration on Orbis.

Variable	Obs.	Mean	Std. Dev.	Min	Max
Dependent variables					
ROA	541	-0.00212	0.03786	-0.58	0.23
ROE	541	-0.20562	3.36170	-69.04	4.63
Control variables					
EA	541	0.10623	0.11374	-0.02	0.97
PR	497	0.17316	3.12186	-1.00	68.62
PL	539	0.00453	0.35204	-7.99	1.44
S	534	7.08079	1.15080	2.14	10.04

5. Results

We now present estimation results for the Equation 1, 2 and 3. The null hypothesis of the model is H_0: all return coefficients equals to zero, and uppermost would state that there is no effect on bank profitability from the adoption of online social media. However, we expect to find a relationship between the adoption rate of online social media by banks and their economic returns that requires α_1 in Equation 1, 2 and 3 differ significantly from zero. In particular, if all α_1 are greater than zero, it follows that the adoption of online social media improves bank profitability as they enhance the bank-customers communication and relationship; contrariwise any α_1 lower than zero implicate that online social media represents investments that deter bank profitability. Table 7 presents these coefficients. We identify some significant influence coefficients (the analogues of α_1). Therefore the null hypothesis that all return coefficients are equal to zero is rejected.

Table 7. Random-effects GLS regression model 1, model 2 and model 3. Dependent variable: *ROA* and *ROE*. Source: our elaboration on Orbis and hand-collected data from online social media.

	1		2		3	
	ROA	ROE	ROA	ROE	ROA	ROE
Explanatory variables						
FB_cont	-0.00476 **	-1.08840 ***				
INS_cont	0.00244	0.70816				
LI_cont	0.00053	-0.31444				
TT_cont	0.00131	-0.02161				
YT_cont	0.00468 **	0.75032				
FB_pop			-6.31e-08 **	-0.000002		
INS_pop			-0.00000	0.000024		
LI_pop			0.00000	0.000002		
TT_pop			0.00000	0.000039		
YT_pop			0.000001	0.000031		
FB_inter					0.00000	-0.00020
INS_inter					0.00000	0.00010
LI_inter					0.00005 *	-0.00017
TT_inter					0.00000	0.00011
YT_inter					0.00000	0.00047
Control variables						
EA	0.02490 **	4.33853 **	0.02599 ***	4.96095 **	0.02442 **	4.96718 **
PR	0.00059 *	-0.02160	0.00060 **	-0.02089	0.00051 *	-0.02053
PL	-0.44793 ***	-6.43373 ***	-0.44842 ***	-6.27647 ***	-0.44735 ***	-6.23846 ***
S	0.00064	0.10748	0.00098	0.11849	0.00080	0.12920
Cons.	-0.00095	-0.96095	-0.00239	-1.46065	-0.00145	-1.53096
Adj. R2	0.72730	0.02460	0.72470	0.00640	0.72870	0.00690
Obs.	491	491	491	491	491	491

Note: * significant at α=10%; ** significant at α=5%; *** significant at α=1%.

The regression result for model 1 reveals that FB_cont and YT_cont significantly affect ROA and FB_cont significantly affects ROE. Variable of FB_cont negatively significantly affect proxies for profitability (ROE at α=1% and ROA at α=5%). On the other hand, YT_cont variable is positively significantly related to ROA at α=5%. This indicates that the presence of banks in Facebook negatively affects financial performance of Italian banks while their presence on YouTube has positive effects. The values of adjusted R-squared of the equation for ROA suggests that the model is reliable.

The regression result for model 2 indicates that FB_pop variable is statistically significant to ROA. FB_pop is negatively related to ROA; similar to the finding for model 1, it indicates that the popularity of banks on Facebook negatively affects their economic performance. The values of adjusted R-squared of the equation for ROA suggests that the model is reliable.

The regression result for model 3 reveals that LI_inter significantly positively affect ROA at α=10%. This indicates that the interaction of banks in LinkedIn increase financial performance of Italian banks.

6. Conclusions

In this paper we analyse the adoption of online social media on a sample of 151 Italian banks. We find that the majority of banks is adopting the professional social network LinkedIn, while the other platforms are used by less than 50% of sample banks. The rate of adoption of online social media is lower than the demand exhibited by customers, which created automatic pages and post contents about banking institutions. On the other side, the popularity of sample banks in online social media is really low compared to other sectors' pages – for example there are no banks in the list of the first 350 most liked Facebook pages. For what concerns interaction, there is a great variability between banks: on one hand there are banking institutions that do not even adopt online social media, and in the other hand there are banks that posts more than one content per day.

Our results demonstrate that the effects of online social media on bank performance is different from one to another.

Content and Popularity on Facebook both negatively affect bank profitability. This may due because Facebook is generally not perceived as a 'formal' online social media, rather it is used for fun and entertainment – while bank customers want professional and not funny relationships with their banks. Moreover, the popularity of banks on Facebook is often the results of negative behaviours and malfunctions by banks, so that users make public complaints on this social network. Following Dalsiel and Hontoir (2017), consumers reach online social media when they are stressed, frustrated and have lost their trust in their bank. Hence, online social media is viewed as a last resort when traditional channels have failed, so customers wanted to utilize the 'public' nature of online social media platforms to put pressure on banks to resolve their problem.

Banks' presence on YouTube positively affects profitability. In fact, the video sharing platform is used by banks not only for promotion but principally to increase customers' financial literacy by teaching fundamentals of finance and how to use their banking products. This aid in the usage of banking products results in an improvement of bank profitability. Nevertheless, there are no effects on bank profitability deriving from their popularity of YouTube, because users of this platform may access to the videos uploaded without having an account. Additionally, the interaction of banks with customers in YouTube has no effects on bank profitability; actually, the number of YouTube videos posted is not relevant as banks may share the same information by creating either a few long videos or many short videos.

The presence of banks in LinkedIn has no effects on profitability; this should be the results of the mixed presence of banks on LinkedIn with automatic pages and company pages. Instead, the interaction of banks in LinkedIn has positive effects on bank profitability. Contrary to Facebook, LinkedIn is a professional social network, where the customers need for privacy and reputation for professional self-promotion does not give any space for mangy complaints against organizations.

We find that none of the indexes of content, popularity and interaction of the blog service Twitter by banks affect their profitability. Also the adoption of Instagram by banks has generally no effects on profitability; this may due because only 13% of sample banks adopt this platform, hence it too soon to see some outcomes.

It follows that the value for banks comes not from the social media itself but from how a particular platform is used, by both banks and the customers, as any given platform can be used for a variety of scopes (Majchrzak and Chebakov, 2009; Culnan et al., 2010). Merely creating a presence on online social media platform does not ensure the implementation will create value, as discrepancy between what customers expected of online social media and what banks were prepared to offer may result in customer frustration.

In any case, when a bank malfunction is solved after being posted on online social media, some customers may interpret this as the bank trying to save their reputation rather than keeping their customers' interest at heart (Dalziel and Hontoir, 2017). Consequently, banks must learn how to transform customers complaints into opportunities, rather than to view them as threats (N'Goala, 2010).

On a global scale, online social media use is growing, and the challenge for banks is to effectively choose not only which applications to use, but also to identify what consumers and what elements to include in their strategy.

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