



Article

Empowering Financial Education by Banks—Social Media as a Modern Channel

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Abstract: Financial literacy is extremely important, both from the perspective of the financial well-being of individuals and the stability of the financial market and the whole economy. The more financially literate a bank's customers are, the more frequently and consciously they use financial products and services. Thus, banks are potentially significant stakeholders in the financial education process. Considering that social media have become the leading channel for communication and relationship building, especially regarding young clients, this channel should also be used by banks to increase financial literacy. The aim of this paper is to assess banks' involvement in financial education activities through social media. We assume that banks use social media as a modern and attractive channel for improving financial education among social media users. The empirical analysis was conducted using several data sources, including non-financial statements and a unique self-collected dataset that describes the specifics of the most popular social media platforms (like Facebook, Twitter, YouTube, Instagram, GoldenLine, and LinkedIn) in the activities of commercial and cooperative banks in Poland between 2010 and 2019. Descriptive statistical methods and cluster analysis were used. The results show that educational activities provided by banks in Poland differ for each social media channel. Additionally, although financial education topics have become more popular among content published by banks, there is a huge disproportion between cooperative and commercial banks. Generally, banks that are more active on social media (mostly commercial banks) also pay more attention to the financial education context.

Keywords: financial literacy; social media; banking sector



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1. Introduction

Financial literacy is extremely important both from the perspective of the financial well-being of individuals and the stability of the functioning of the financial market and the whole economy. The benefits of financial literacy have been empirically demonstrated for a variety of financial decisions and behaviors (Lusardi and Mitchell 2007a). The value of personal financial literacy has perhaps never been greater than today in the era of the global integration of financial markets and banks, and the move towards increasing sophistication, complexity, and inter-connectedness. Broader participation in financial markets, innovation in the financial sector, and changes in the funding of retirement spending have led to ever-greater personal responsibility for financial decisions (Boisclair et al. 2017). According to Al-Tamimi and Bin Kalli (2009), financial literacy is imperative for many groups (i.e., financial institutions, public and private organizations, and entrepreneurs) for better investment decisions. According to recent studies (OECD 2016; Klapper et al. 2015), there is evidence that many, if not most, consumers lack financial literacy. These results are similar to those of Christelis et al. (2010), who found that most respondents in Europe score low on financial literacy scales. Lusardi and Mitchell (2014) showed that financial literacy contributes to more informed financial decision-making, so investment in financial knowledge appears to be a specific form of human capital. The identified low level of

financial literacy indicates the need for action by governments and institutions, as well as non-governmental organizations, including banks. It is worth underscoring that banks are in a unique position because they earn profits from higher levels of financial literacy, which results in greater use of financial products. [Trunk et al. \(2017\)](#) examined the strategies and best practices in the field of education in the EU, and their research confirmed the important role of banking institutions as educators of banking services users.

There is a range of instruments used to improve financial literacy, and although there are problems in assessing the effects of financial literacy, only a well-designed financial literacy instrument that adequately captures personal finance knowledge and application can provide insight into how well financial education improves the human capital needed to behave appropriately to enhance financial well-being ([Fornero and Monticone 2011](#); [Van Rooij et al. 2012](#)).

According to [Shih et al. \(2010\)](#), the ability to create knowledge is highly important in the banking industry, and banks should concentrate on knowledge creation mechanisms to improve their knowledge creation ability. They state that knowledge creation in banks means the exchange and sharing of information, which is the main goal of using social media and Web 3.0 and Web 4.0 technologies. The effectiveness of actions and instruments for raising financial literacy is influenced by their attractiveness and interactivity ([OECD 2016](#)). Therefore, taking into account the growing popularity of social media among society, this article investigates their usefulness in financial education.

Social media are highly interactive, built with particular functionalities to create and exchange user-generated content ([Constantinides and Fountain 2008](#)). Nowadays, there are many different social media platforms, which vary considerably in their purposes. They offer services such as blogs, microblogs, media (audio, photo, video, text) sharing, collaborative projects, virtual worlds, and social networking, thus promoting the creation and support of social interaction, collaboration, and the exchange of information between users ([Kaplan and Haenlein 2010](#)). Therefore, social media data are the largest, richest, and most dynamic evidence base of human behavior, bringing new opportunities to understand individuals, groups, and society. In April 2019, social media user numbers registered solid growth (6.1%), increasing to almost 3.5 billion compared to April 2018 ([We Are Social 2019](#)). From the perspective of modern companies, the rapid diffusion of social media applications creates possibilities to reach, interact with, and customize communications with customers.

Our investigation has two goals. On the one hand, we analyze the popularity of social media in spreading financial literacy. On the other, we investigate the differences in scope and scale of using social media to empower financial literacy among two types of banks: commercial and cooperative. We choose bank activity on social media because these institutions offer financial products and services to people with different levels of financial literacy, and according to the literature, people with higher financial knowledge are more included in the financial market and benefit from it more consciously. Moreover, the Polish banking system is one of the least concentrated systems among European Union (EU) countries, with the Herfindahl–Hirschman index for assets equaling 0.0688 in 2019, characterized by a large number of cooperative banks with small market share.

To achieve our research goals, we combined a unique, self-collected, and dynamic dataset of banking activities on social media with banks' financial and non-financial statements, sociological surveys, and official demographic and economic statistics. To ascertain the determinants of social media adoption for financial literacy reasons, we used descriptive statistics and cluster analysis.

As expected, descriptive statistics reveal an increase in banks' social media activities. They also stressed the clear disparities between commercial and cooperative banks, which are determined by the bigger banks' size of operations, and in the case of commercial banks, their clients' financial and technical sophistication, and the inclusion of financial education in their corporate social responsibility (CSR) policies. It was confirmed by cluster analysis results.

The contribution of social media both in a marketing context and to manage customers' relationships is widely recognized in the literature ([Mangold and Faulds 2009](#); [Kaplan and Haenlein 2010](#); [Bolton 2011](#); [Tsimonis and Dimitriadis 2014](#); [Laroche et al. 2013](#); [Lipsman et al. 2012](#)). However, there is still a research gap concerning the educational aspects of social media adoption, especially in the context of financial literacy context. In this paper, we fill this gap by: (1) Extending the rare studies on social media application by the banking sector; (2) assessing the meaning of different types of social media disclosures from commercial banks and cooperative banks—in general, and regarding the financial education content, as well as their levels of popularity among social media users. The study also has managerial implications, showing social media as a modern and attractive communication channel that is becoming more popular in widespread financial education among users.

The article begins with a review of the existing literature on financial education as an important issue from an individual and global perspective. The next section presents the statistics of banks' activities on social media obtained from a self-collected dataset describing the specifics of banks' social media activities (Facebook, YouTube, Twitter, Instagram, GoldenLine, LinkedIn) in Poland between 2010 and 2019, including the educational context.

2. Literature Review

2.1. Financial Education—Its Role and Importance from An Individual and Global Perspective

The terms financial literacy, financial knowledge, and financial education are often used interchangeably in the literature and in popular media. In many research areas, different researchers and organizations have defined financial education, financial literacy, financial capability, and financial decisions in many different ways.

Financial education has been defined by the Organization for Economic Co-operation and Development (OECD) as “the process by which financial consumers/investors improve their understanding of financial products, concepts and risks and, through information, instruction and/or objective advice, develop the skills and confidence to become more aware of financial risks and opportunities, to make informed choices, to know where to go for help, and to take other effective actions to improve their financial well-being” (OECD 2005, p. 26). [Lusardi and Mitchell \(2007a\)](#) use the OECD definition as the basis for their review of financial literacy. According to [Huston \(2010, p. 308\)](#), financial education is an input intended to increase a person's human capital, specifically financial knowledge and/or its application (i.e., financial literacy).

As noted by the President's Advisory Council on Financial Literacy ([President's Advisory Council on Financial Literacy PACFL](#)), financial education is a process through which financial knowledge and skills are gained, rather than knowledge and skills themselves. Hence, financial education should be considered a concept that promotes financial literacy. The seminal definition of financial literacy was “the ability to make informed judgments and to take effective decisions regarding the use and management of money” ([Noctor et al. 1992](#)). Later research has adopted this definition and extended it to incorporate a more detailed description of the components underlying the concepts of what it means to be financially literate. For example, [Lusardi and Mitchell \(2014\)](#) define financial literacy as the ability to process economic information and make informed decisions about financial planning, wealth accumulation, debt, and pensions.

Although the effects of financial education are not simple to measure because of the range of objectives, audiences, activities, and timing ([Hathaway and Khatiwada 2008](#); [Rieger 2020](#); [Dong and Millimet 2020](#)), reviews of the existing literature suggest that financial education generates mostly promising results ([Braunstein and Welch 2002](#); [Fox et al. 2005](#); [Hathaway and Khatiwada 2008](#); [Lyons et al. 2006](#); [Schuchardt et al. 2009](#)). The benefits of financial literacy have been empirically demonstrated for a variety of financial decisions and behaviors. Improved financial literacy has been shown to have a positive effect on retirement planning ([Ameriks et al. 2003](#); [Lusardi and Mitchell 2007b](#); [Van Rooij et al. 2012](#); [Clark et al. 2012](#)), and it is positively related to greater participation in financial

markets (Christiansen et al. 2008; Van Rooij et al. 2011) and having more diverse portfolios (Guiso and Jappelli 2008; Abreu and Mendes 2010).

Regarding borrowing decisions, financially literate people have greater use of formal sources of borrowing and have lower-cost debt. They are also more likely to be aware of their optimal debt level (Lusardi and Tufano 2015; Stango and Zinman 2009) and use less high-cost consumer credit. Some papers show limited or negative results for financial education provided in high school (Bernheim et al. 2001). Based on these studies, it can be concluded that channels of financial education other than school are necessary.

Finally, financial literacy is an important component of financial capability, which is a relatively new concept that emerged in the last decade. The term “financial capability” was used to describe people’s financial knowledge, and their confidence and motivation to manage personal finances (Atkinson and Messy (2012). Kempson et al. (2005) identified three areas of financial capability that influence behavior: (a) knowledge and understanding, (b) skills, and (c) confidence and attitudes. Financial capability requires financial literacy, but it also requires access to appropriate financial products.

In light of the above, it should be noted that this article adopts financial literacy as the most appropriate concept for these issues. According to the literature, financial literacy is crucial both from the perspective of personal finance as well as the stability of the whole financial system.

The increasing availability of internationally comparable evidence on financial knowledge allows policymakers and researchers to have a broader picture of the status of financial knowledge in the region. Analyzing data from European countries, the Standard and Poor’s Ratings Services Global Financial Literacy Survey found that only 33% of adults worldwide are financially literate. Country-level financial literacy ranges from 71% to 13%; in Poland, it was 42% (Klapper et al. 2015). What this means is that slightly more than half of the population lack a basic understanding of financial concepts, leaving them challenged when it comes to making informed financial choices around saving, investing, borrowing, and credit. Moreover, the data show that financial literacy is higher among the wealthy, the well-educated, and those who use financial services; the young are a vulnerable group and an important target for financial education programs.

Other research confirmed that levels of financial literacy in emerging markets are lower than in industrialized countries (De Mel et al. 2011; Cole et al. 2011), especially in rural areas and among households living outside of major cities (Schuetz and Venkatesh 2020; Bouasria et al. 2020). These statistics clearly show that the level of financial literacy needs to be improved.

2.2. Social Media in the Banking Sector

The Polish financial system is dominated by the banking system. Data from the National Bank of Poland show that bank assets accounted for approximately 71% of all financial institution assets in recent years (NBP 2020). The banking system comprised commercial banks, cooperative banks, and credit institution branches, with commercial banks playing a leading role. At the end of 2019, the share of cooperative banks in total banking assets was only 7.5%. The Polish banking system is one of the least concentrated systems among European Union (EU) countries, with the Herfindahl–Hirschman index for assets equaling 0.0688 in 2019, and the five largest banks sharing below 50% of the assets (ECB 2020). It is relatively small among EU member states—in 2019, the ratio of banking system assets to GDP reached 88.3% compared to 254% of EU GDP (NBP 2020).

The Polish banking sector is very modern, amongst the most modern in the domestic economy. Banks play a very active role in the distribution of public support to enterprises and individuals thanks to their modern infrastructure. Polish online and mobile banking systems are among the fastest-growing areas in the European banking sector. At the end of 2019, 37.4 million clients had access to online banking services. The number of active users of mobile banking applications increased last year by over 15.2% and amounted to 12 million (EBF 2020).

However, it is necessary to point out how commercial and cooperative banks function, which is reflected in different power being a consequence of the scale of operation and the financial and material resources they hold. The basic differentiating factor is the local character of the cooperative banks, which are usually limited geographically to one voivodeship. As a result, cooperative banks have a much smaller number of clients than commercial banks, and they manage the relationship with them by direct contact at a bank branch (Filip et al. 2017). Compared to commercial banks, cooperative banks have a very limited budget for image campaigns and limited resources of the employees responsible for the banks' social media activity. Often, the customers of cooperative banks come from small villages and towns, where the Internet is not as popular as in big cities, where commercial banks operate. Social media adoption is a natural consequence of Internet banking adoption. Jackowicz et al. (2020) examined the determinants and consequences of cooperative banks' social media adoption. They suggest that social media can be used to develop a business model, but cooperative banks should not mechanically follow patterns established by large commercial banks that use social media.

Many scholars have pointed out the opportunities provided by social media for companies, such as improved customer-company relationships and engagement (Mangold and Faulds 2009; Kaplan and Haenlein 2010; Bolton 2011; Tsimonis and Dimitriadis 2014; Laroche et al. 2013; Lipsman et al. 2012; Durkin et al. 2015). Additionally, it can serve as an effective marketing tool in business (Cawsey and Rowley 2016), spread brand awareness or promote particular products (Lipsman et al. 2012; Guesalaga 2016), improve customer loyalty (Laroche et al. 2013; Larsson and Viitaoja 2017), engage customers at brand value creation (Merz et al. 2018) and influence purchase intentions (Adjei et al. 2010; Bonsón and Flores 2011). Moreover, there has been an unprecedented increase in social media use inside businesses. As such, some research has concentrated on media metrics and social media analytics related to marketing strategy, policy, and research (Li et al. 2021). Bonsón and Flores (2011) investigated social media as a corporate reporting arena and concluded there is a clear lack of strategy regarding the effective management of corporate dialogue among financial institutions. Szopiński (2016) reported that, in Poland, the use of Internet banking services is influenced by the use of the Internet (in general), other banking products, and trust in banks. This is crucial, considering the popularity of social media. The number of social media users increased globally from 0.97 billion to 4.14 billion people between 2010 to 2020. Filip et al. (2017) studied the impact of the Internet and social media presence on the market power of small, local banks in Poland and observed that small banks generally embraced new distribution and communication channels considerably later than the large commercial banks. Hypothesis H1 expresses this expectation:

H1. *The scale of banks' adoption of social media is increasing but differs between commercial and cooperative banks.*

Among different social media platforms, the most popular are Facebook, with 2.7 billion users, and YouTube, with 2 billion users (We Are Social 2020). There were 19 million social media users in Poland in January 2020, 92% of whom spend time on YouTube, 89% on Facebook, and 35% on Twitter. Other platforms included Instagram, LinkedIn, and its Polish counterpart—GoldenLine.

Several publications investigate separate social media channels and their functionality (Papacharissi 2009; Kietzmann et al. 2011). Twitter has been recognized as a major component of electronic word of mouth (e-WOM) used by customers to spread positive or negative statements about the usage or characteristics of particular goods or services (Jansen et al. 2009; Trusov et al. 2009; Öztamur and Karakadılar 2014). Facebook, as the most popular social media platform, is very often seen as being effective at creating links and long-term relationships with users, as a marketing channel, and to promote events (Lee et al. 2012; Hansson et al. 2013). LinkedIn, as a professional platform to contact managers and employees (Quinton and Wilson 2016), and video sharing services like YouTube, which can influence consumer perceptions of brands (Lee and Watkins 2016),

are gaining popularity. Meanwhile, [Ozdora-Aksaka and Atakan-Duman \(2015\)](#) examined social media accounts (Facebook and Twitter) of the eight largest banks in Turkey to understand their identity construction processes and how much they benefit from CSR activities in this process. The result was that banks in Turkey tend to emphasize the softer, especially socially responsible, side of their organizational identities online.

More recent publications on social media highlight the role of social media in knowledge management in non-financial organizations. They focus mainly on modernizing the process of exchanging and circulating information within an organization ([Ellison et al. 2015](#)), improving the process of sharing knowledge within the organization, and creating opportunities to benefit from expert knowledge ([Leonardi and Vaast 2017](#); [Majchrzak et al. 2013](#)) and sharing information ([Mladenović and Krajina 2020](#)). Banks, as financial experts, would fit in well with the last research stream. The increase in social media users indicated above, as well as the identified variation in the popularity of social media channels and their functionality, led us to formulate hypothesis H2:

H2. *The scale of banks' adoption of social media for financial education purposes is increasing but differs between particular social media platforms.*

All companies, including those from the banking sector, are facing increasing pressure to both maintain profitability and behave in socially responsible ways ([Kumar and Bird 2020](#)). Customers are one of the most important stakeholders for companies, and they represent a central feature of every CSR report as they are vital for a corporation's long-term survival ([Clarkson 1995](#)).

The existing literature on CSR has often stressed that it can allow a company to strengthen relationships with consumers ([Sen et al. 2006](#)). A company that engages in socially responsible behavior will gain word of mouth and improve its brand image, build reputational advantage, and generate brand loyalty, commitment, and identity attractiveness, among others ([Drumwright 1994](#); [Fombrun 2005](#); [Marin and Ruiz 2007](#)). Thus, it leads to more purchases from consumers. Financial education seems to be one of the priorities in building a trusting relationship with customers and meeting society's expectation of a socially responsible company.

Given the growing importance of social responsibility in the banking industry, it remains imperative for banks to understand how to effectively communicate social responsibility activities. The study focuses on knowledge sharing, especially financial education, as a component of CSR. The outcomes of the current research have critically demonstrated that social media can be used as a proactive CSR communication channel ([Sen et al. 2006](#); [Kusá and Urmínová 2020](#)) and a marketing channel in banks.

The banking sector has undergone significant transformations in the last few years, and it has become one of the main proactive investors in CSR activities. Although cooperative banks perceive CSR as an inherent part of their idiosyncratic identity ([Aramburu and Pescador 2019](#)), only commercial banks use a wider range of communication channels (non-financial statements and social media among them) to inform current and future clients about their CSR initiatives, including financial education. Hypothesis H3 reflects this prediction:

H3. *Commercial banks use social media for financial education more often than cooperative banks.*

3. Data and Methods

Statistical analysis was done based on a unique, self-collected dataset on the Facebook, Twitter, YouTube, Instagram, Linked In, and GoldenLine activities of cooperative and commercial banks in Poland between 2010 and 2019. The data gathering process started in 2010 (its methodology was prepared by one of the authors, Iwa Kuchciak, who also performed the complex process of self-collection). Twice a year (in January and July) all posts published by banks in the preceding half-year were analyzed and assigned to thematic categories. The periodical investigation of social media activity allowed us to collect unique data that are no longer available (e.g., some Facebook, Twitter, YouTube,

Instagram, LinkedIn, and GoldenLine profiles have been already removed, or historical data are hidden). Initially, all of these channels were included in the analysis, but taking into consideration the structure of particular social media platforms used by banks, as well as the specifics of each bank, in the further analysis, we focused only on three of them—Facebook, Twitter, and YouTube. Additionally, non-financial bank statements were used as a supplementary source.

In this paper two groups of bank were analysed – commercial and cooperative ones. In the analysis of commercial banks, to maintain greater comparability of the analyses, we will limit ourselves to a core group of 36 banks (the omitted banks had a negligible market share; they were mainly car banks, where the producer of a particular brand ran its own social media channel).

As the survey covered the whole population of banks in Poland, the statistical analysis was limited to descriptive statistics and cluster analysis, which was used in the multidimensional analysis of the banks' educational activities. The main goal of cluster analysis is to group a set of objects so that the units of one group are as similar as possible to each other due to the distinguished set of variables. At the same time, they should be as different as possible from the objects that are in the other clusters (Gatnar and Walesiak 2004, p. 310–17).

In this paper, the total number of activities on a given social media platform (the number of posts, tweets, or videos) in a particular year during the period 2010–2019 were used as diagnostic variables. These variables were analyzed in the standard way to prove that the variables meet the criteria of universality, variability, degree of correlation, and importance (Roszko-Wójtowicz 2014). Next, the variables were standardized to make them comparable. To extract the homogeneous groups of banks, the hierarchical (agglomeration) cluster analysis of Ward's method was used. This method makes it possible to estimate the distance between the clusters based on the analysis of variance. Thus, it enables clustering objects so that the strength of relationships within the clusters is maximized, while the strength of relationships between objects from different clusters is minimized. The square of the Euclidean distance was used to measure the distance. The results of the classification are shown in the dendrogram. The selection of the number of clusters was made using the Wishart criteria (Wishart 2006). Finally, the comparison between clusters using descriptive statistics was made, which allows for a substantive interpretation of the banks' grouping.

4. Results

4.1. Banks' Social Media Activity—Quantitative Approach

When analyzing banks' social media activity, six platforms were considered—Facebook, Twitter, YouTube, GoldenLine, LinkedIn, and Instagram. Activity was measured in broad terms, i.e., to be considered active on social media, the bank must have had at least one activity on at least one of the six media platforms (e.g., published a post, tweet, or video) in a given year. Between 2010 and 2019, the banking sector in Poland (Figure 1—the blue line) clearly increased its activity on social media. In 2010, nearly 5% of banks (27 out of approximately 600) were active, while at the end of 2019, it was more than 1/3 (211, i.e., 36%). A linear trend in this activity was observed (with $R^2 = 0.992$). The average annual increase in banks' engagement in social media was 3.3 pp:

$$\hat{y}_t = 0.0332 t + 0.011 \quad (1)$$

Thus, the number of banks active on social media increased by, on average, 3.3 pp per year, which means, on average, 19.7 per year.

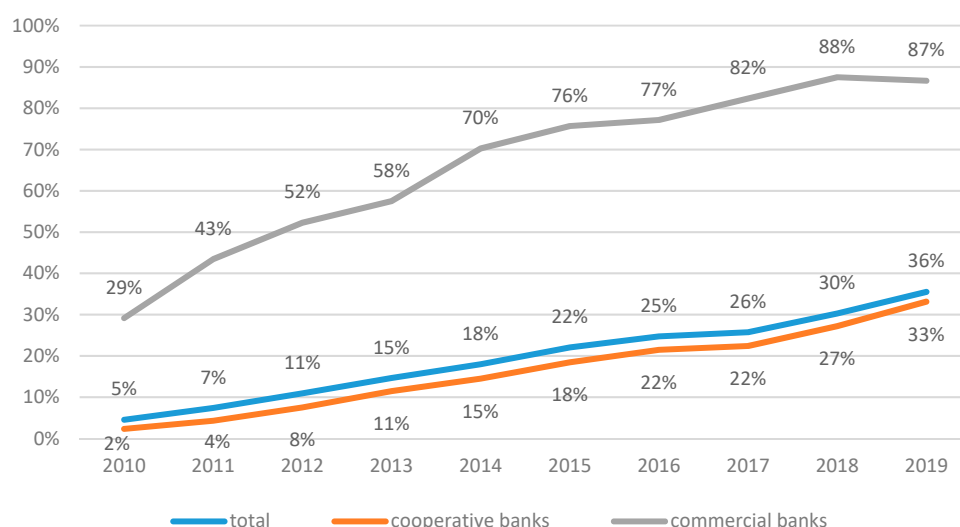


Figure 1. Share of banks active on social media between 2010–2019—total and by sector (in %). (Source: Own data).

Commercial banks always have been significantly more active on social media than cooperative banks. As far back as 2010, almost one in three commercial banks was active on at least one of the channels, and this number has been steadily increasing. This tendency can be described by a quadratic trend ($R^2 = 0.991$):

$$\hat{y}_t = -0.0063 t^2 + 0.132 t + 0.177 \quad (2)$$

Commercial banks were the subject of mergers and acquisitions in the research period (i.e., based on a core group of 33–36 banks), and we can conclude that, between 2014 and 2016, their activity on social media was stable, at the level of 70–80% (Figure 2), while in recent years, it reached approximately 90% ($R^2 = 0.965$):

$$\hat{y}_t = 0.1822 \ln(t) + 0.455 \quad (3)$$

By contrast, cooperative banks were much slower to become active on social media. Of the nearly 560 cooperative banks in 2010, only 13 (2.3%) had at least one such activity. This number has grown year on year (by nearly 19 on average; the share of such banks also grew by 3.3. pp on average ($R^2 = 0.988$)):

$$\hat{y}_t = 0.0331x - 0.019 \quad (4)$$

with a slight slowdown in the growth rate in 2017, reaching a share of 33.2% in 2019. Thus, the empirical findings in Figure 1 partially support H1.

The banks focus their activities mainly on three social media platforms (around 90% of the whole activity): Facebook, YouTube, and Twitter. According to the statistics quoted above, these platforms are also the most popular among users; hence, our in-depth analysis of activities will cover these channels. Analyzing data for the entire banking sector, we clearly observe growing activity on Facebook (in 2019, it was used by about one-third of banks in Poland). Interest was weak in YouTube (6.6–8.1% in recent years) and marginal in Twitter (2.2–5% banks). Twitter is much less popular than Facebook and YouTube, which applies to both cooperative and commercial banks. In the years 2010–2012, cooperative banks did not use Twitter at all, and since then, the percentage has still not exceeded 0.5%.

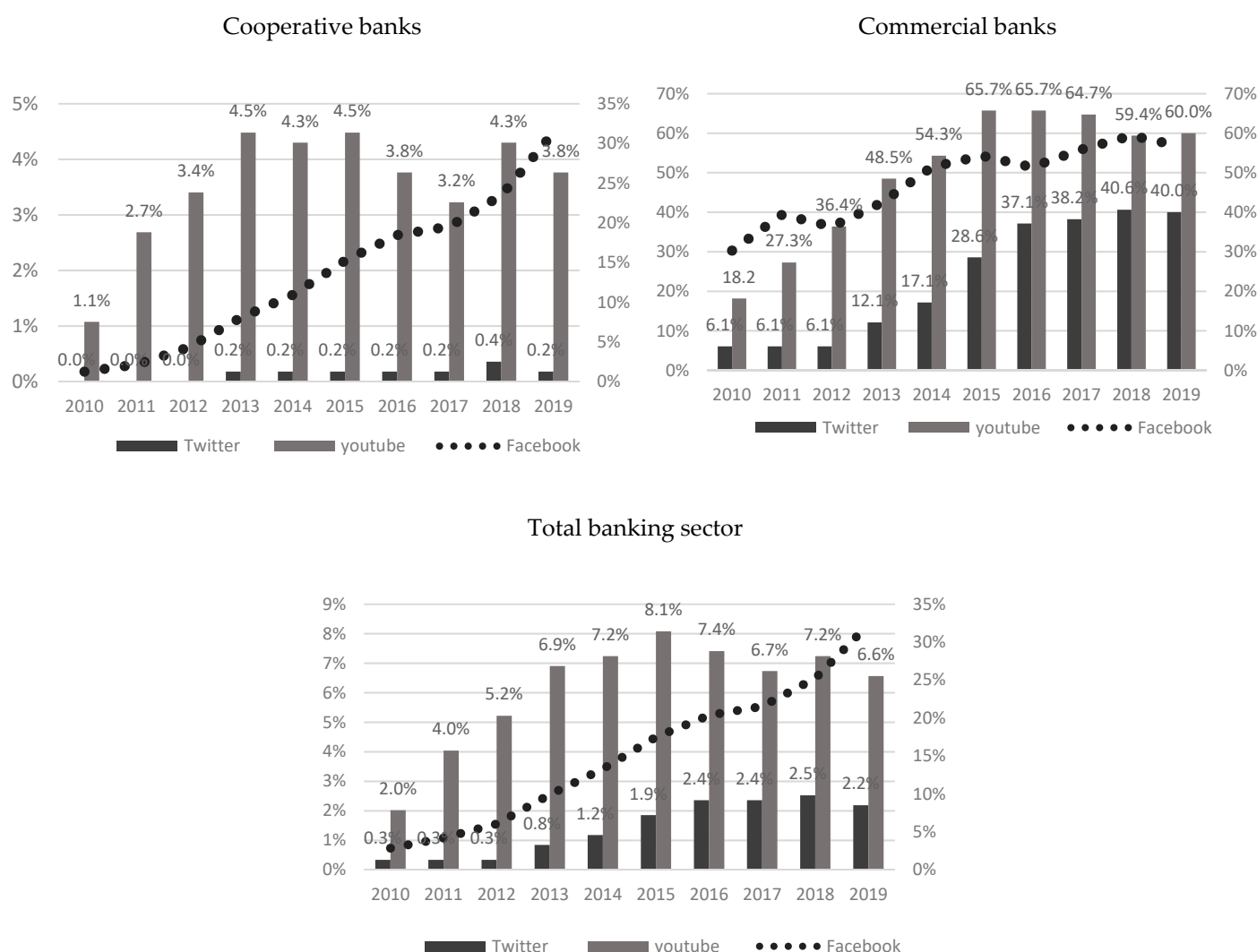


Figure 2. Share of banks active on Facebook (right axis), YouTube, and Twitter (left axis) in 2010–2019—total and by sector (Source: Own data).

In the case of commercial banks, interest in Twitter was also initially low, with only two banks tweeting anything between 2010 and 2012, although 13–15 banks have been using it since 2016. Due to the number of cooperative banks, their low interest in Twitter results in low ratios (of the order of a max 2.5%) for Poland's entire banking sector (Figure 2). On the other hand, their interest in Facebook has already increased, from approximately 1% (7 banks) in 2010 to 31.4% (175 banks) in 2019. An upward trend has been observed throughout the period, and it has even increased in the last two years. The share of cooperative banks that are active on Facebook is still almost half that of commercial banks (56.7% in 2019), although there is a clear direction of change in the approach to this platform. We stress this, especially because this is the only platform for which the interest of cooperative banks is clearly growing. While commercial banks are increasingly willing to use YouTube (in 2019, it was used by 60%, and as far back as 2013, it was already 50%), cooperative banks' use of the platform was and remains marginal (a maximum rate of 4.3% of cooperative banks using YouTube was achieved 2018). Thus, the results concerning banks' social media activities between 2010–2019 support hypothesis H1.

The average number of Facebook posts (for all banks, including those that were not active in a given year on the platform, using cut-off average) ranged from approximately 0 in 2010–2011 to approximately 17 in 2019. In turn, the average number of tweets or videos added to YouTube is close to 0. This is a result of the very low average for cooperative

banks, while the number of Facebook posts was, on average, 15 per year. In the case of commercial banks, these averages were much higher; the average number of Facebook posts fluctuated from 15 in 2010 to 100 in 2014–2017, while the average number of tweets was close to 0 in 2012, reaching a peak of 122 in 2017. Although many commercial banks publish videos on YouTube, the number is still small, although it has been increasing steadily (a maximum of 25 in 2019).

Analyzing banks that are active on a given social media platform (omitting “zeroes”—Table 1), there are clear differences between cooperative and commercial banks.

Table 1. The average number of posts and video on Facebook, Twitter, and YouTube between 2010 and 2019 by sector.

Specification			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
FB	N-C	Mean	9.57	19.50	31.71	44.56	48.82	64.71	74.68	39.02	56.32	69.81
		Median	6.00	7.00	14.50	27.00	28.00	39.00	59.00	28.00	35.00	61.00
	C	Mean	91.70	118.23	201.33	235.21	235.00	191.74	224.39	214.74	174.63	189.47
		Median	68.00	103.00	213.50	195.00	186.50	193.00	219.00	217.00	176.00	173.00
TW	C	Mean	99.00	52.50	55.50	125.00	186.33	287.30	337.77	439.23	386.92	323.50
		Median	99.00	52.50	55.50	61.50	119.50	200.50	241.00	313.00	362.00	216.50
YT	N-C	Mean	1.50	1.93	1.53	1.80	1.63	2.28	2.57	2.33	2.46	3.90
		Median	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.50	2.00
	C	Mean	11.50	17.89	19.58	36.06	21.42	24.00	33.83	39.73	56.32	67.94
		Median	6.00	7.00	12.00	17.00	12.00	14.00	15.00	16.50	25.00	49.50

Note: FB—Facebook, TW -Twitter, YT—YouTube.

On average, the number of posts on Facebook is currently almost three times higher in commercial banks; however, the biggest difference is in the number of tweets—in cooperative banks, they are practically not used, while in commercial banks, the average is about 200 across almost the entire period. What is more, their number was greater than for Facebook and even more so than for YouTube. Narrowing the analysis to banks that are active on YouTube, the number of videos uploaded is still low. Among cooperative banks, Facebook was the most important social media platform not only in terms of popularity but also in terms of intensity of use; the importance of other social media platforms remains marginal. Therefore, we find evidence supporting H1 and partially H2.

4.2. Financial Education Provided by Banks on Social Media

Just as social media adoption among banks started to grow, so did the educational context on social media. The number of banks that publish educational posts on Facebook increased from 12 in 2010 to 176 in 2019, so their share increased almost 15 times, to approximately 30% of all banks (Table 2). Among the commercial banks, the share ranged from about 1/4 in 2010 to 1/2 in 2014–2019. Regardless of the sector, if banks already have a presence on Facebook, most of them also publish educational posts there. There is an average of 24 posts per year, although half of the banks published less than 17 posts per year (the most active bank published 171 posts in 2019). This variation is significant (standard deviation exceeds 100%), with certain banks publishing much more than the others (a high right skewness). Similar conclusions apply to commercial and cooperative banks (although among commercial banks, there are no outliers, and for cooperative banks, the averages are lower (Błąd! Nie można odnaleźć źródła odwołania.)).

Table 2. Descriptive statistics on the number of educational posts published by banks on Facebook between 2010–2019—total and by sector.

Specification		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total											
Banks publishing educational posts	n	12	15	24	51	69	89	110	113	134	176
	% (total = 100)	2.0	2.5	4.0	8.6	11.6	15.0	18.5	19.1	22.6	29.8
	% (active on FB = 100)	70.6	60.0	66.7	86.4	87.3	85.6	90.9	88.3	89.3	91.7
Maximum number of posts		85	53	100	169	158	118	131	114	211	171
Mean		15.92	13.33	22.42	19.08	17.72	18.72	22.13	15.79	22.12	24.14
Median		3.00	6.00	12.00	8.00	11.00	11.00	13.00	8.00	13.50	17.00
Standard deviation		27.38	17.41	27.42	32.18	24.79	22.27	26.38	20.39	27.86	24.99
Skewness		2.00	1.74	1.67	3.76	3.76	2.21	1.90	2.37	3.11	2.16
Cooperative banks											
Banks publishing educational posts	n	4	5	13	37	51	72	93	94	117	159
	% (total = 100)	0.7	0.9	2.3	6.6	9.1	12.9	16.7	16.9	21.0	28.7
	% (active on FB = 100)	57.1	41.7	54.2	82.2	83.6	84.7	90.3	86.2	89.3	90.9
Maximum number of posts		3	6	15	31	38	118	91	69	211	171
Mean		1.50	2.80	5.85	8.84	10.45	13.90	17.25	10.37	20.32	21.87
Median		1.00	2.00	5.00	4.00	7.00	7.00	10.00	7.00	12.00	14.00
Standard deviation		1.00	1.92	4.78	8.62	9.32	17.99	20.32	11.60	27.51	23.12
Skewness		2.00	1.52	0.77	1.17	1.29	3.39	2.01	2.51	3.62	2.44
Commercial banks											
Banks publishing educational posts	n	8	10	11	14	18	17	17	19	17	17
	% (total = 100)	22.9	28.6	30.6	38.9	50.0	48.6	47.2	52.8	47.2	47.2
	% (active on FB = 100)	80.0	76.9	91.7	100.0	100.0	89.5	94.4	100.0	89.5	100.0
Maximum number of posts		85	53	100	169	158	97	131	114	88	119
Mean		23.13	18.60	42.00	46.14	38.33	39.12	48.82	42.58	34.47	45.35
Median		5.50	9.50	32.00	30.00	27.00	33.00	40.00	38.00	34.00	39.00
Standard deviation		31.62	19.43	30.38	51.87	39.92	27.33	38.34	31.31	27.92	31.91
Skewness		1.42	1.19	0.76	1.93	2.09	0.70	0.73	0.58	0.60	1.05

Note: The statistics were determined for banks posting on Facebook in a given year (excluding 0).

Educational activity on Twitter is negligible. Educational tweets were published by banks two times between 2010 and 2012, rising to 15 times in 2018 (Table 3), almost exclusively by commercial banks (only a few cooperative banks have become active on Twitter since 2014). In total, no more than 2.5% of banks were involved in financial education. If they were active on Twitter, they were also active in the field of financial education. The diversity was very strong: The maximum number of educational tweets published by a bank reached 526 in 2018 (i.e., Bank Pocztowy SA, a commercial bank, which was heavily involved in educating seniors).

YouTube is also less popular than Facebook—of the nearly 600 banks, only between four and 27 banks uploaded videos to YouTube. The year 2019 was a breakthrough for cooperative banks. Educational videos were uploaded by 2/3 of the banks active on YouTube (compared to 1/3–1/2 in previous years). Almost all commercial banks were active on YouTube. The number of uploaded videos is lower among cooperative banks (Table 4), with strong differentiation and right-hand bias for both sectors.

Table 3. Descriptive statistics on the number of educational posts published by banks on Twitter between 2010 and 2019.

Specification		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Banks publishing educational posts	n	2	2	2	4	7	11	14	14	15	13
	% (total = 100)	0.3	0.3	0.3	0.7	1.2	1.9	2.4	2.4	2.5	2.2
	% (active on TW = 100)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Maximum number of posts		27	17	11	99	162	194	350	499	526	428
Mean		22.5	13.0	9.0	35.3	45.0	54.5	72.9	113.7	83.7	91.9
Median		22.5	13.0	9.0	19.5	31.0	39.0	48.5	75.5	59.0	45.0
Standard deviation		6.36	5.66	2.83	43.30	54.21	51.33	87.12	129.46	127.73	113.83
Skewness		x	x	x	1.78	2.15	2.30	2.90	2.37	3.34	2.52

Note: The statistics were determined for banks posting on Twitter in a given year (excluding 0); x—not applicable.

Table 4. Descriptive statistics on the number of educational videos published by banks on YouTube between 2010 and 2019—total and by sector.

Specification		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Total											
Banks uploading educational videos	n	4	9	9	18	17	23	23	19	22	27
	% (total = 100)	0.7	1.5	1.5	3.0	2.9	3.9	3.9	3.2	3.7	4.5
	% (active on YT = 100)	33.3	37.5	29.0	43.9	39.5	47.9	52.3	47.5	51.2	69.2
Maximum number of videos		22	28	14	71	57	46	82	79	80	223
Mean		7.75	6.89	5.33	12.00	10.29	7.22	9.17	13.05	17.45	23.96
Median		4.00	1.00	4.00	7.00	4.00	2.00	3.00	4.00	6.50	4.00
Standard deviation		9.64	11.42	4.50	16.94	16.86	10.73	17.14	20.42	24.57	44.71
Skewness		1.83	1.62	0.82	2.86	2.42	2.61	3.82	2.36	1.81	3.68
Cooperative banks											
Banks uploading educational videos	n	1	3	1	5	3	7	6	4	5	10
	% (total = 100)	0.2	0.5	0.2	0.9	0.5	1.3	1.1	0.7	0.9	1.8
	% (active on YT = 100)	16.7	20.0	5.3	20.0	12.5	28.0	28.6	22.2	20.8	47.6
Maximum number of posts		3	1	1	4	1	4	4	2	8	26
Mean		3.00	1.00	1.00	2.20	1.00	1.57	1.50	1.50	3.20	3.80
Median		3.00	1.00	1.00	1.00	1.00	1.00	1.00	1.50	2.00	1.00
Standard deviation		x	0.00	x	1.64	0.00	1.13	1.22	0.58	2.95	7.81
Skewness		x	x	x	0.61	x	2.16	2.45	0.00	1.43	3.14
Commercial banks											
Banks uploading educational videos	n	3	6	8	13	14	16	17	15	17	17
	% (total = 100)	9.1	18.2	24.2	39.4	40.0	45.7	48.6	44.1	53.1	56.7
	% (active on YT = 100)	50.0	66.7	66.7	81.3	73.7	69.6	73.9	68.2	89.5	94.4
Maximum number of posts		22	28	14	71	57	46	82	79	80	223
Mean		9.33	9.83	5.88	15.77	12.29	9.69	11.88	16.13	21.65	35.82
Median		5.00	1.50	5.50	12.00	5.00	5.00	5.00	5.00	9.00	21.00
Standard deviation		11.15	13.32	4.49	18.71	18.04	12.12	19.33	22.08	26.60	53.01
Skewness		1.48	0.97	0.67	2.50	2.15	2.13	3.34	2.04	1.45	3.04

Note: The statistics were determined for banks posting on YouTube in a given year (excluding 0); x—not applicable.

The results concerning the financial education provided by banks on social media confirm hypothesis H2 and partially H3. Further analysis was carried out on banks' educational activities, taking into account the type of post or video on a financial education issue. Within the framework of financial education, we distinguished three main categories: information, direct involvement in financial education, and interesting news from the banking area (Table 5).

Table 5. Number of financial education publications on Facebook, Twitter, and YouTube by category.

Year	Banks—Total				Cooperative Banks				Commercial Banks			
	Financial Education-Total	INF	INV	IBA	Financial Education-Total	INF	INV	IBA	Financial Education-Total	INF	INV	IBA
Facebook												
2010	191	130	38	23	6	6	0	0	185	124	38	23
2011	210	127	33	50	14	9	2	3	196	118	31	47
2012	538	257	64	217	76	40	7	29	462	217	57	188
2013	973	467	98	408	327	150	55	122	646	317	43	286
2014	1223	582	150	491	533	230	92	211	690	352	58	280
2015	1755	893	211	651	1001	508	110	383	754	385	101	268
2016	2434	1234	381	819	1604	810	248	546	830	424	133	273
2017	1784	896	322	566	975	487	206	282	809	409	116	284
2018	3056	1999	256	801	2470	1716	104	650	586	283	152	151
2019	4273	2717	317	1239	3502	2331	142	1029	771	386	175	210
Twitter												
2010	45	37	0	8	0	0	0	0	45	37	0	8
2011	26	19	2	5	0	0	0	0	26	19	2	5
2012	18	15	0	3	0	0	0	0	18	15	0	3
2013	141	68	29	44	0	0	0	0	141	68	29	44
2014	315	106	28	181	1	0	1	0	314	106	27	181
2015	600	321	114	165	6	0	4	2	594	321	110	163
2016	1021	508	139	374	15	7	6	2	1006	501	133	372
2017	1592	681	285	626	8	2	3	3	1584	679	282	623
2018	1256	452	170	634	11	3	0	8	1245	449	170	626
2019	1195	453	233	509	6	1	3	2	1189	452	230	507
YouTube												
2010	31	12	12	7	3	0	3	0	28	12	9	7
2011	62	39	10	13	3	2	1	0	59	37	9	13
2012	48	34	4	10	1	0	1	0	47	34	3	10
2013	216	157	44	15	11	8	3	0	205	149	41	15
2014	175	113	55	7	3	1	2	0	172	112	53	7
2015	166	83	63	20	11	10	0	1	155	73	63	19
2016	211	108	72	31	9	6	3	0	202	102	69	31
2017	248	106	112	30	6	3	3	0	242	103	109	30
2018	384	188	149	47	16	10	3	3	368	178	146	44
2019	647	208	252	187	38	9	25	4	609	199	227	183

Note: INF—information about how to use financial products (education aspects, not promotion), INV—direct involvement in educational activity (e.g., information about conducting lessons, training courses), IBA—interesting news from the area of banking.

Twitter is used as a channel to provide short and more synthetic information about the use of products and to communicate interesting news from the banking area. Banks' participation in an educational activity on this social media channel systematically increased. YouTube was used primarily for instructional videos showing the proper way to use a financial product and to publicize educational campaigns conducted by the bank.

4.3. Financial Education of Commercial Banks on Social Media—Cluster Analysis Results

The cluster analysis was narrowed down to commercial banks because they are much more active on social media, and they are also more active in financial education. Cooperative banks serve customers mainly through branches, lagging significantly behind commercial banks in Internet and mobile banking implementation (Filip et al. 2017), as well as social media adoption (Jackowicz et al. 2020). The diagnostic variables are the total number of activities in a given year on social media (the number of posts, tweets, or videos). The grouping shows the similarity of commercial banks in terms of their educational activity on social media between 2010 and 2019 (Figure 3).

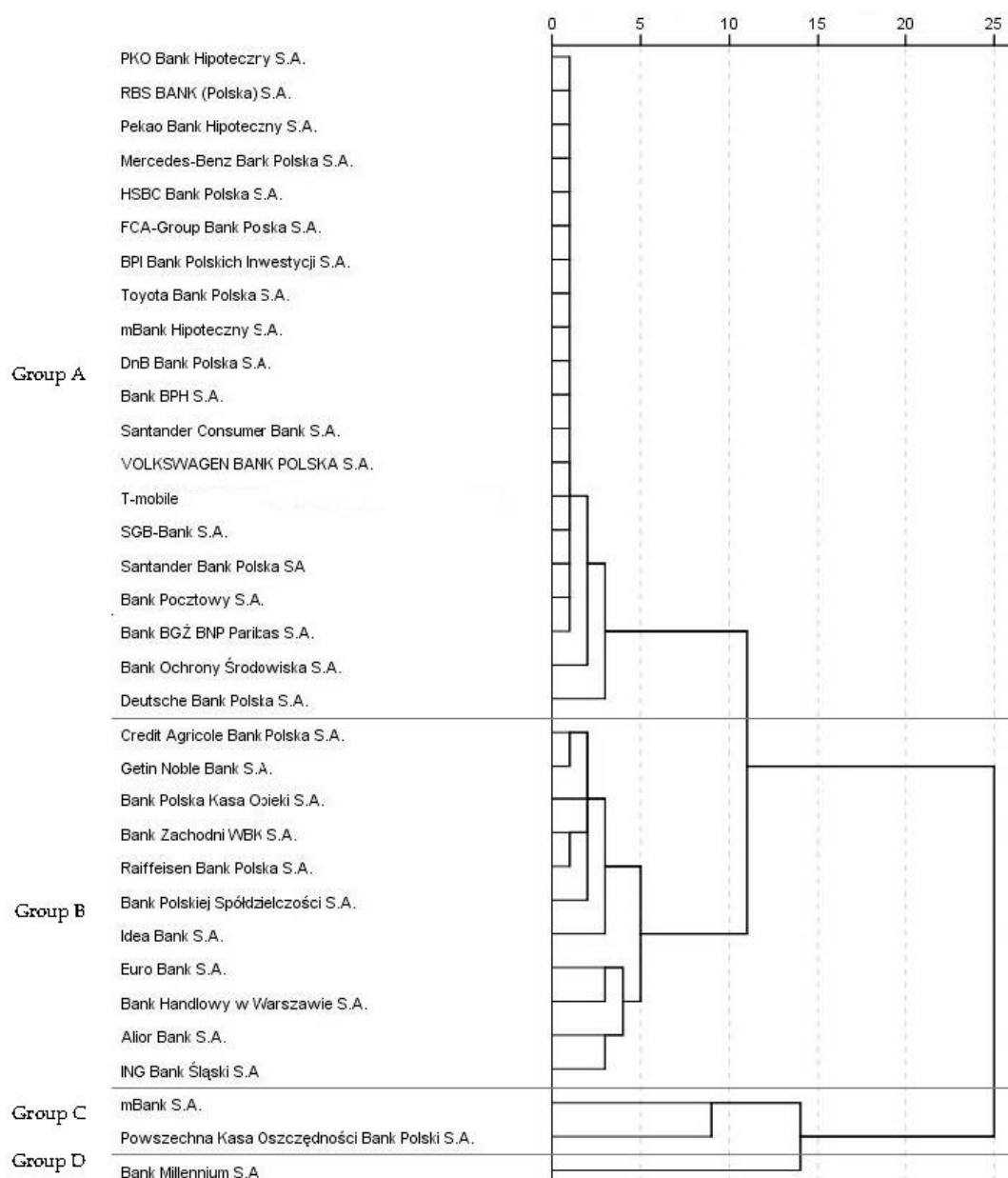


Figure 3. Clusters of commercial banks by financial education activity on social media between 2010 and 2019 (Source: Own study).

Cluster analysis revealed support for H3. Going further into the context of the conditions of banks' involvement in social media and taking into account the importance of social media as a channel of financial education, we analyzed the CSR priorities among commercial banks.

PKO BP SA and mBank SA form a separate cluster (group C) with the strongest commitment to financial education on social media. Throughout the whole period, both banks provided financial education on Facebook, and since 2013, they have also become active on Twitter (publishing about 100 tweets a year in the last three years). mBank SA is also active on YouTube, uploading about 100 videos in 2019, while PKO BP SA uploaded 223 videos. These findings are confirmed by the specifics of both banks. PKO BP SA is the largest bank in Poland, with assets exceeding 333 billion PLN at the end of the first quarter of 2020 (PRNews 2020). The bank has carried out a digital transformation and built its

business model on the latest technologies to create a bank of the future while also building its value (Jagiello and Kubisiak 2020).

Regarding information published in non-financial statements, awareness of financial education activities is very important in the context of CSR. Social media, as a communication channel, can raise the level of financial awareness. PKO BP SA has been repeatedly awarded for its CSR and social engagement communication and for individual initiatives, including those of an educational nature. It is the bank most strongly involved in the financial education program for primary schools, School Saving Bank (SSB); currently, 1/3 of primary schools in Poland participate in the SSB PKO BP SA program. The second bank, mBank SA, is a typical electronic bank aimed at young people, mostly students. Mitic and Kapoulas (2012) considered social media to be an interesting and promising addition to the marketing strategies for the retail segment, especially since it has “young” customers. Similar results about the determinants of social media adoption among the banking sector were proposed by Pathirana and Khin (2016) during an investigation of the banking sector in Sri Lanka. They demonstrated that the age of customers plays a mediating role in social media adoption. These findings are confirmed by mBank data because it has the most likes on Facebook among all banks, and demographic data confirm that young people spend the longest time on social media; therefore, this channel seems appropriate to reach this audience with financial education. mBank SA is heavily involved not only in financial education but in mathematics education, as well. It is the founder of more than 200 projects each year and the publisher of books for mathematics learning.

Taking into consideration the intensity and versatility of social media use for financial education purposes, the leaders are banks from group B (11 banks). The most numerous group (group A, $n = 20$) comprises banks whose educational activity on social media is small. For them, the average number of tweets on Twitter and videos on YouTube is negligible. In 2018–2019, the number was close to 10, while in previous years, it did not exceed 4, or even 1. There is a similar situation with Facebook, where the average is below 10. There is one more outstanding bank—Bank Millennium SA (group D). This bank is completely inactive on Facebook in terms of financial education, but since 2015, it has stood out regarding the promotion of financial education on Twitter (in the last three years, it has published an average of 500 tweets per year), while its use of YouTube is moderate.

5. Discussion

In the banking sector, social media has become an increasingly important channel of communication with clients. Our research confirmed that banks’ social media engagement increased between 2010–2019 by the increase in the number of social media users, but the intensity of activity on social media is much higher in commercial banks than in cooperative banks over the whole period. Cooperative banking in Poland has undergone many social and economic transformations. The changes in the image and quality of cooperative banking, as well as the financial crisis, have directed attention to sustainable balance sheet banking based on stable relationships with customers. In this context, the relational banking model has become particularly important (Marcinkowska 2013, pp. 10–2).

Cooperative banks’ strategies are aimed at solving local socio-economic challenges and promoting and financing initiatives that are conducive to sustainable local development (Giagnocavo et al. 2012), including those aimed at respecting natural resources and meeting stakeholders’ needs (Carrasco 2007). Considering that an important element of their functioning is fulfilling their local social mission, cooperative banks continue to build relationships based on direct contact (Ruostesaari and Troberg 2016), supporting themselves only through modern communication channels such as social media.

Our results support previous findings that insufficient resources and limited operational size constitute important barriers to implementing information technologies or social media (for example, see Courchane et al. 2002; Hernández-Murillo et al. 2010). The findings are also consistent with Filip et al. (2017) and Jackowicz et al. (2020), who recognized that the decision to adopt social media is positively related to bank size and market power. As

a consequence, cooperative banks seem to be discovering social media as an alternative channel of communication with customers, and if they decide to use it, Facebook is their first choice.

Although commercial banks are more active on social media than cooperative banks because of a different attitude to building relationships with customers, the size of their activities, and their financial and human resources, it is necessary to stress that during the last few decades, the Polish banking market has changed remarkably and the competition among banks increased significantly. Klimontowicz (2019) considered the role of banks' innovativeness in building efficiency and stressed that innovativeness factors should be taken into account when building competitive advantage and sustainable market performance.

Differences in social media adoption by commercial and cooperative banks also result in different levels of engagement in a financial literacy activity. According to the analyzed CSR reports, commercial banks are generally involved in more educational projects, which is a response of the Polish banking sector to the need to improve the financial education of Polish society than cooperative banks. Only a few cooperative banks visibly display their commitment to financial education in social media.

Over the last few years, the financial market has become increasingly sophisticated, and households assume more of the responsibility and risk for financial decisions. They need to improve their financial education, not only to ensure their financial well-being but also to ensure the smooth functioning of the financial market and whole economy. Generally, there is the idea of the need to improve financial knowledge among society that is widely supported by many authors (Ameriks et al. 2003; Lusardi and Mitchell 2007b; Clark et al. 2012; Christiansen et al. 2008; Guiso and Jappelli 2008; Abreu and Mendes 2010; Lusardi and Tufano 2015). Some research underscores that the need for financial education is strongest for low and middle-income environments, like small communities, where cooperative banks play the dominant role (Lusardi and Mitchell 2014; Van Rooij et al. 2012).

At the same time, the World Bank (2014) recently conducted a broad set of evaluations and studies concerning the effectiveness of financial education. While some of those studies found evidence that financial education is effective, others reported mixed or no evidence. Similar results were reported by Bernheim et al. (2001); Erner et al. (2016); and Belás et al. (2016), who analyzed the effectiveness of financial knowledge gained during school education, or Hathaway and Khatiwada (2008), who investigated special financial education programs. All of the results stressed weak performances on standard financial literacy and suggested that it is necessary to actively seek and implement new approaches, forms, and methods in the educational process. According to the OECD (2016), the effectiveness of actions and instruments for raising financial literacy is influenced by their attractiveness and interactivity. Commercial banks seem to be more aware of the possibilities offered by social media in this field. They use social media channels (especially the most popular ones like Facebook and YouTube) to share financial knowledge among social media users to improve their understanding of financial products. Through this information, they can develop the skills and confidence to become more aware of financial risks and opportunities to make better informed financial choices.

Over the last decade, social media has changed how we communicate and collaborate. Through its focus on building relationships and fostering interaction, social media can serve as a channel to help users overcome their reluctance to use financial services and/or products by increasing their financial knowledge. Social media has rapidly become a crucial communication tool for information generation, dissemination, and consumption, particularly during the COVID-19 lockdown (Wong et al. 2020; Tsao et al. 2021). Within our study, we investigated the financial education content of posts published by Polish commercial and cooperative banks on social media channels (Facebook, Twitter, YouTube, Instagram, GoldenLine, and LinkedIn) between 2010 and 2019, and positively verified our hypotheses regarding social media activity.

6. Conclusions

To the best of our knowledge, this is the first attempt to empirically examine banks' social media adoption for financial education purposes. Our estimation results show that the most popular social media platforms are Facebook, YouTube, and Twitter, with Facebook being the most popular (which corresponds to H1, i.e., popularity differs by type of channel). This finding is confirmed in the literature, as studies of corporate communication via social media stressed that companies mostly choose Facebook as a strategic social media channel (e.g., [Bortree and Seltzer 2009](#); [Saxton and Waters 2014](#)), with a slight increase in Twitter ([Tao and Wilson 2015](#)). [Ozdora-Aksaka and Atakan-Duman \(2015\)](#) point out that Turkish banks construct their identity on social media accounts (Facebook and Twitter) by emphasizing their softer side (especially social responsibility), which is similar to cooperative banks in Poland ([Kozłowski and Kuchciak 2019](#)).

This study focused on financial education activities because their benefits can be empirically demonstrated for a variety of financial decisions and behaviors. Among commercial banks, financial education is conducted with great intensity on Facebook. The number of videos published on YouTube is comparable to the number of posts on Facebook, while Twitter is less popular. We determined three types of financial education content, which led us to the conclusion that the financial education provided by banks is slightly different on each social media channel. Facebook is mostly used to disseminate information about how to use financial products; Twitter is used in a similar way and as a channel to communicate interesting news from the banking area; videos uploaded to YouTube show the proper way to use financial products and to report on educational campaigns conducted by the bank.

The cluster analysis results demonstrated huge differentiation, even between commercial banks. The greatest financial education activity on social media was recognized in the largest bank in Poland in terms of asset value and banks aimed at the young generation (strongly involved in social media communication). [Courchane et al. \(2002\)](#) and [Hernández-Murillo et al. \(2010\)](#) confirmed the influence of bank size on internet activity. In 2016, Szopiński reported that the adoption of online banking services in Poland was influenced by the use of the Internet, while [Durkin et al. \(2015\)](#) underlined the relevance of customer age as a determinant of the appropriacy of using Facebook to achieve a bank's goals.

Finally, although cooperative banks are less active on social media in the area of education (confirming H2), considering their total number, the role of the banking sector in financial education cannot be overlooked. Polish cooperative banks focus their education activities on one social media channel—Facebook. As they have lower market power than cooperative banks, they choose the most popular social media platform, one that is used even by less technologically literate clients.

Looking at the banks as companies that operate for profit, the research did not show the impact of social media activity on bank performance. Such analysis has been conducted by other researchers but concerning Internet adoption ([Hernando and Nieto 2007](#); [De Young et al. 2007](#); [Yang et al. 2018](#); [Islam et al. 2019](#)). The results were mostly inconclusive, as bank performance is affected by a very broad spectrum of factors, and emphasizing only one of them seemed too selective.

Another limitation in assessing the potential of social media for financial literacy purposes is showing the activities only from the banks' perspective, without indicating the reaction it evokes in the audience. We expect to conduct further research to compare educational activities carried out by banks on social media with the reaction of users measured by the number of comments and shares. This line of research should complement the assessment of the potential of social media as a modern and attractive channel of financial education.

This study is based on the Polish experience, but our findings can have a broader appeal because banks play an important role in every economy. The limited number of banks that apply an active social media policy poses a challenge from a statistical point of

view, but from a managerial perspective, this investigation suggests that social media are becoming an increasingly popular way to increase financial education.

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References

- Abreu, Margarida, and Victor Mendes. 2010. Financial Literacy and Portfolio Diversification. *Quantitative Finance* 10: 515–28. [\[CrossRef\]](#)
- Adjei, Mavis T., Stephanie Noble, and Charles Noble. 2010. The influence of C2C communications in online brand communities on customer purchase behavior. *Journal of the Academy of Marketing Science* 38: 634–53. [\[CrossRef\]](#)
- Al-Tamimi, Hussein A. Hassan, and Anood Bin Kalli. 2009. Financial literacy and investment decisions of UAE investors. *The Journal of Risk Finance* 10: 500–16. [\[CrossRef\]](#)
- Ameriks, John, Andrew Caplin, and John Leahy. 2003. Wealth Accumulation and the Propensity to Plan. *Quarterly Journal of Economics* 118: 1007–47. [\[CrossRef\]](#)
- Aramburu, Izaskun Agirre, and Irune Gómez Pescador. 2019. The effects of Corporate Social Responsibility on Loyalty Performance: The mediating effect of Reputation in Cooperative Banks versus Commercial Banks in the Basque Country. *Journal of Business Ethics* 154: 701–19. [\[CrossRef\]](#)
- Atkinson, Adele, and Flore-Anne Messy. 2012. *Measuring Financial Literacy: Results of the OECD/International Network on Financial Education (INFE) Pilot Study*. OECD Working Papers on Finance, Insurance and Private Pensions, No. 15. Paris: OECD Publishing. [\[CrossRef\]](#)
- Belás, Jaroslav, Anh Nguyen, Luboš Smrčka, Jozef Kolembus, and Eva Cipovová. 2016. Financial Literacy of Secondary School Students. Case Study from the Czech Republic and Slovakia. *Economics and Sociology* 9: 191–206. [\[CrossRef\]](#)
- Bernheim, Douglas B., Daniel M. Garrett, and Dean M. Maki. 2001. Education and saving: The long-term effects of high school financial curriculum mandates. *Journal of Public Economics* 80: 435–65. [\[CrossRef\]](#)
- Boisclair, David, Annamaria Lusardi, and Pierre-Carl Michaud. 2017. Financial literacy and retirement planning in Canada. *Journal of Pension Economics and Finance* 16: 277–96. [\[CrossRef\]](#)
- Bolton, Ruth N. 2011. Customer engagement: Opportunities and challenges for organizations. *Journal of Service Research* 14: 272–74. [\[CrossRef\]](#)
- Bonsón, Enrique, and Francisco Flores. 2011. Social media and corporate dialogue: The response of global financial institutions. *Online Information Review* 35: 34–49. [\[CrossRef\]](#)
- Bortree, Denise Sevvick, and Trent Seltzer. 2009. Dialogic strategies and outcomes: An analysis of environmental advocacy groups' Facebook profiles. *Public Relations Review* 35: 317–19. [\[CrossRef\]](#)
- Bouasria, Mohamedou, Ashta Arvind, and Zaka Ratsimalahelo. 2020. Bottlenecks to Financial Development, Financial Inclusion, and Microfinance: A Case Study of Mauritania. *Journal of Risk and Financial Management* 13: 239. [\[CrossRef\]](#)
- Braunstein, Sandra F., and Carolyn Welch. 2002. Financial literacy: An overview of practice, research, and policy. *Federal Reserve Bulletin* 88: 445–57. [\[CrossRef\]](#)
- Carrasco, Inmaculada. 2007. Corporate Social Responsibility, Values, and Cooperation. *International Advances in Economic Research* 13: 454–60. [\[CrossRef\]](#)
- Cawsey, Timothy, and Jennifer Rowley. 2016. Social media brand building strategies in B2B companies. *Marketing Intelligence and Planning* 34: 754–76. [\[CrossRef\]](#)
- Christelis, Dimitris, Tullio Jappelli, and Mario Padula. 2010. Cognitive Abilities and Portfolio Choice. *European Economic Review* 54: 18–39. [\[CrossRef\]](#)
- Christiansen, Charlotte, Juanna Schröter Joensen, and Jesper Rangvid. 2008. Are Economists More Likely to Hold Stocks. *Review of Finance* 12: 465–96. [\[CrossRef\]](#)
- Clark, Robert, Melinda Morrill, and Steven Allen. 2012. The Role of Financial Literacy in Determining Retirement Plans. *Economic Inquiry* 50: 851–66. [\[CrossRef\]](#)
- Clarkson, Max E. 1995. A stakeholder framework for analyzing and evaluating corporate social performance. *Academy of Management Review* 20: 92–117. [\[CrossRef\]](#)
- Cole, Shawn, Thomas Sampson, and Bilal Zia. 2011. Prices or Knowledge? What Drives Demand for Financial Services in Emerging Markets? *Journal of Finance* 66: 1933–67. [\[CrossRef\]](#)

- Constantinides, Efthymios, and Stefan J. Fountain. 2008. Web 2.0: Conceptual Foundations and Marketing Issues. *Journal of Direct Data and Digital Marketing Practice* 9: 231–44. [CrossRef]
- Courchane, Marsha, David Nickerson, and Richard Sullivan. 2002. Investment in internet banking as a real option: Theory and tests. *Journal of Multinational Financial Management* 12: 347–63. [CrossRef]
- De Mel, Suresh, David McKenzie, and Christopher Woodruff. 2011. Getting Credit to High Return Microentrepreneurs: The Result of an Information Intervention. *World Bank Economic Review* 25: 456–86. [CrossRef]
- De Young, Robert, William W. Lang, and Daniel L. Nolle. 2007. How the Internet affects output and performance at community banks. *Journal of Banking and Finance* 31: 1033–60. Available online: <https://ssrn.com/abstract=1988510> (accessed on 12 March 2021). [CrossRef]
- Dong, Hao, and Daniel L. Millimet. 2020. Propensity Score Weighting with Mismeasured Covariates: An Application to Two Financial Literacy Interventions. *Journal of Risk and Financial Management* 13: 290. [CrossRef]
- Drumwright, Minette E. 1994. Socially Responsible Organizational Buying: Environmental Concern as a Noneconomic Buying Criterion. *Journal of Marketing* 58: 1–19. [CrossRef]
- Durkin, Mark, Gwyneth Mulholland, and Aodhen McCartan. 2015. A socio-technical perspective on social media adoption: A case from retail banking. *International Journal of Bank Marketing* 33: 944–62. [CrossRef]
- EBF. 2020. Poland's Banking Sector: Facts and Figures. Available online: <https://www.ebf.eu/poland/> (accessed on 11 December 2020).
- ECB. 2020. Statistical Data Warehouse. Available online: <https://sdw.ecb.europa.eu/servlet/desis?node=1000002869> (accessed on 12 December 2020).
- Ellison, Nicole B., Jennifer L. Gibbs, and Matthew S. Weber. 2015. The use of enterprise social network sites for knowledge sharing in distributed organizations: The role of organizational affordances. *American Behavioral Scientist* 59: 103–23. [CrossRef]
- Erner, Carsten, Michael Goedde-Menke, and Michael Oberste. 2016. Financial literacy of high school students: Evidence from Germany. *The Journal of Economic Education* 47: 95–105. [CrossRef]
- Filip, Dariusz, Krzysztof Jackowicz, and Łukasz Kozłowski. 2017. Influence of internet and social media presence on small, localbank's market power. *Baltic Journal of Economics* 17: 190–214. [CrossRef]
- Fombrun, Charles J. 2005. A world of reputation research, analysis and thinking—building corporate reputation through CSR initiatives: Evolving standards. *Corporate Reputation Review* 8: 7–12. [CrossRef]
- Fornero, Elsa, and Chiara Monticone. 2011. Financial Literacy and Pension Plan Participation in Italy. *Journal of Pension Economics and Finance* 10: 547–64. [CrossRef]
- Fox, Jonathan, Suzanne Bartholomae, and Jinkook Lee. 2005. Building the case for financial education. *Journal of Consumer Affairs* 39: 195–214. [CrossRef]
- Gatnar, Eugeniusz, and Marek Walesiak. 2004. *Metody Statystycznej Analizy Wielowymiarowej w Badaniach Marketingowych*. Wrocław: Wydawnictwo Akademii Ekonomicznej.
- Giagnocavo, Cynthia, Silvia Gerez, and Jacopo Sforzi. 2012. Cooperative Bank Strategies for Social-Economic Problem Solving: Supporting Social Enterprise and Local Development. *Annals of Public and Cooperative Economics* 83: 281–315. [CrossRef]
- Guesalaga, Rodrigo. 2016. The use of social media in sales: Individual and organizational antecedents, and the role of customer engagement in social media. *Industrial Marketing Management* 54: 71–79. [CrossRef]
- Guiso, Luigi, and Tullio Jappelli. 2008. Financial Literacy and Portfolio Choice, EUI Working Papers, ECO2008/31. Available online: https://cadmus.eui.eu/bitstream/handle/1814/9811/ECO_2008_31.pdf?sequence=1 (accessed on 21 November 2020).
- Hansson, Linnea, Anton Wrangmo, and Klaus Solberg Søilen. 2013. Optimal ways for companies to use Facebook as a marketing channel. *Journal of Information, Communication and Ethics in Society* 11: 112–26. [CrossRef]
- Hathaway, Ian, and Sameer Khatiwada. 2008. Do Financial Education Programs Work? Federal Reserve Bank of Cleveland Working Paper No. 08-03. Available online: <http://www.clevelandfed.org/research/workpaper/2008/wp0803.pdf> (accessed on 10 November 2020).
- Hernández-Murillo, Ruben, Gerard Llobet, and Roberto Fuentes. 2010. Strategic online banking adoption. *Journal of Banking and Finance* 34: 1650–63. [CrossRef]
- Hernando, Ignacio, and Maria J. Nieto. 2007. Is the Internet delivery channel changing banks' performance? The case of Spanish banks. *Journal of Banking and Finance* 31: 1083–99. [CrossRef]
- Huston, Sandra J. 2010. Measuring Financial Literacy. *The Journal of Consumer Affairs* 44: 296–316. [CrossRef]
- Islam, Sharul, Mohammad Rokibul Kabir, Rabiul Hossain Dovash, Safa E. Nafee, and Sovan Saha. 2019. Impact of Online Banking Adoption on Bank's Profitability: Evidence from Bangladesh. *European Journal of Business and Management Research* 4. [CrossRef]
- Jackowicz, Krzysztof, Łukasz Kozłowski, Iwa Kuchciak, and Monika Marcinkowska. 2020. Local banks in social media: Determinants and consequences. *Economic Research-Ekonomska Istraživanja* 33: 3356–84. [CrossRef]
- Jagiello, Zbigniew, and P. Paweł Kubisiak. 2020. *Od Skarbanki do Chmury, Czyli Historia Transformacji PKO Banku Polskiego*. Warszawa: ICAN Management Review.
- Jansen, Bernard J., Mimi Zhang, Kate Sobel, and Abdur Chowdury. 2009. Twitter power: Tweets as electronic word of mouth. *Journal of American Society and Information Science and Technology* 60: 2169–88. [CrossRef]
- Kaplan, Andreas M., and Michael Haenlein. 2010. Users of the world unite! The challenges and opportunities of social media. *Business Horizons* 53: 59–68. [CrossRef]

- Kempson, Elaine, Sharon Collard, and Nick Moore. 2005. Measuring Financial Capability: An Exploratory Study for the Financial Services Authority. *Consumer Research* 37. Available online: <http://www.bristol.ac.uk/media-library/sites/geography/migrated/documents/pfrc0510.pdf> (accessed on 10 December 2020).
- Kietzmann, Jan H., Kristopher Hermkens, Ian P. McCarthy, and Bruno S. Silvestre. 2011. Social Media? Get Serious! Understanding the Functional Building Blocks of Social Media. *Business Horizons* 54: 241–51. [CrossRef]
- Klapper, Leora, Annamaria Lusardi, and Peter Van Oudheusden. 2015. Financial Literacy around the World: Insights from the Standard and Poor's Ratings Services Global Financial Literacy Survey. Available online: https://responsiblefinanceforum.org/wp-content/uploads/2015/12/2015-Finlit_paper_17_F3_SINGLES.pdf (accessed on 26 December 2020).
- Klimontowicz, Monika. 2019. The role of banks' innovativeness in building sustainable market efficiency: The case of Poland. *Entrepreneurship and Sustainability* 7: 525–39. [CrossRef]
- Kozłowski, Łukasz, and Iwa Kuchciak. 2019. Popularity in social media and company growth: Evidence for local banks. *Contemporary Issues in Business, Management and Economics Engineering* 2019. [CrossRef]
- Kumar, Vijay, and Ron Bird. 2020. Do Profitable Banks Make a Positive Contribution to the Economy? *Journal of Risk Financial Management* 13: 159. [CrossRef]
- Kusá, Alena, and Marianna Urmínová. 2020. Communication as a Part of Identity of Sustainable Subjects in Fashion. *Journal of Risk Financial Management* 13: 305. [CrossRef]
- Laroche, Michael, Mohammad Reza Habibi, and Marie-Odile Richard. 2013. To be or not to be in social media: How brand loyalty is affected by social media? *International Journal of Information Management* 33: 76–82. [CrossRef]
- Larsson, Anthony, and Yamit Viitaoja. 2017. Building customer loyalty in digital banking: A study of bank staff's perspectives on the challenges of digital CRM and loyalty. *International Journal of Bank Marketing* 35: 858–77. [CrossRef]
- Lee, Jung Eun, and Brandi Watkins. 2016. YouTube vloggers' influence on consumer luxury brand perceptions and intentions. *Journal of Business Research* 69: 5753–60. [CrossRef]
- Lee, Woojin, Lina Xiong, and Clark Hu. 2012. The effect of Facebook users' arousal and valence on intention to go to the festival: Applying an extension of the technology acceptance model. *International Journal of Hospitality Management* 31: 819–27. [CrossRef]
- Leonardi, Paul M., and Emmanuelle Vaast. 2017. Social Media and Their Affordances for Organizing: A Review and Agenda for Research. *Academy of Management Annals* 11: 150–88. [CrossRef]
- Li, Fanfang, Jorma Larimo, and Leonidas C. Leonidou. 2021. Social media marketing strategy: Definition, conceptualization, taxonomy, validation, and future agenda. *Journal of the Academy of Marketing Science* 49: 51–70. [CrossRef]
- Lipsman, Andrew, Graham Mudd, Mike Rich, and Sean Bruich. 2012. The power of 'like': How brands reach (and influence) fans through social-media marketing. *Journal of Advertising Research* 52: 40–52. [CrossRef]
- Lusardi, Annamaria, and Olivia S. Mitchell. 2007a. Baby boomer retirement security: The roles of planning, financial literacy, and housing wealth. *Journal of Monetary Economics* 54: 205–24. [CrossRef]
- Lusardi, Annamaria, and Olivia S. Mitchell. 2007b. Financial literacy and retirement preparedness: Evidence and implications for financial education. *Business Economics* 42: 35–44. [CrossRef]
- Lusardi, Annamaria, and Olivia S. Mitchell. 2014. The economic importance of financial literacy: Theory and evidence. *Journal of Economic Literature* 52: 5–44. [CrossRef]
- Lusardi, Annamaria, and Peter Tufano. 2015. Debt literacy, financial experiences, and overindebtedness. *Journal of Pension Economics and Finance* 14: 332–68. [CrossRef]
- Lyons, Angela, Yunhee Cheng, and Erik M. Scherpf. 2006. Translating Financial Education into Behavior Change for Low-Income Populations. *Financial Counseling and Planning* 17: 27–45. Available online: <https://ssrn.com/abstract=2232122> (accessed on 12 March 2021).
- Majchrzak, Ann, Samer Faraj, Gerald C. Kane, and Bijan Azad. 2013. The Contradictory Influence of Social Media Affordances on Online Communal Knowledge Sharing. *Journal of Computer-Mediated Communication* 19: 38–55. [CrossRef]
- Mangold, Glynn W., and David J. Faulds. 2009. Social media: The new hybrid element of the promotion mix. *Business Horizons* 52: 357–65. [CrossRef]
- Marcinkowska, Monika. 2013. *Kapitał Relacyjny Banku, tom i., Kształtowanie Relacji Banku z Otoczeniem*. Łódź: Wydawnictwo Uniwersytetu Łódzkiego.
- Marin, Longinos, and Salvador Ruiz. 2007. "I Need You Too!" Corporate Identity Attractiveness for Consumers and The Role of Social Responsibility. *Journal of Business Ethics* 71: 245–60. [CrossRef]
- Merz, Michael A., Lia Zarantonello, and Silvia Grappi. 2018. How valuable are your customers in the brand value co-creation process? The development of a Customer Co-Creation Value (CCCV) scale. *Journal of Business Research* 82: 79–89. [CrossRef]
- Mitic, Miljana, and Alexandros Kapoulas. 2012. Understanding the role of social media in bank marketing. *Marketing Intelligence and Planning* 30: 668–86. [CrossRef]
- Mladenović, Dušan, and Anida Krajina. 2020. Knowledge sharing on social media: State of the art in 2018. *Journal of Business Economics and Management* 21: 44–63. [CrossRef]
- NBP. 2020. Financial Stability Report COVID-19 Pandemic Impact Assessment. Available online: <https://www.nbp.pl/en/systemfinansowy/fsr202012.pdf> (accessed on 10 December 2020).

- Noctor, Michael, Sheila Stoney, and Robert Stradling. 1992. *Financial Literacy: A Discussion of Concepts and Competences of Financial Literacy and Opportunities for Its Introduction into Young People's Learning*. Report Prepared for the National Westminster Bank. London: National Foundation for Education Research.
- OECD. 2005. *Improving Financial Literacy: Analysis of Issues and Policies*. Paris: OECD, Available online: <https://www.oecd.org/daf/fin/financial-education/National-Strategies-Financial-Education-Policy-Handbook.pdf> (accessed on 11 November 2020).
- OECD. 2016. *Financial Education in Europe: Trends and Recent Developments*. Paris: OECD Publishing, Available online: <https://www.oecd.org/education/financial-education-in-europe-9789264254855-en.htm/> (accessed on 15 November 2020). [CrossRef]
- Ozdora-Aksaka, Emel, and Sirin Atakan-Duman. 2015. The online presence of Turkish banks: Communicating the softer side of corporate identity. *Public Relations Review* 41: 119–28. [CrossRef]
- Öztamur, Dilhan, and İbrahim Sarper Karakadılar. 2014. Exploring the Role of Social Media for SMEs: As a New Marketing Strategy Tool for the Firm Performance Perspective. *Procedia—Social and Behavioral Sciences* 150: 511–20. [CrossRef]
- President's Advisory Council on Financial Literacy (PACFL). 2008. 2008 Annual Report to the President. Available online: <http://www.treas.gov/offices/domestic-finance/financial-institution/fineducation/council/index.shtml> (accessed on 15 November 2020).
- Papacharissi, Zizi. 2009. The virtual geographies of social networks: A comparative analysis of Facebook, LinkedIn and a small world. *New Media and Society* 11: 199–220. [CrossRef]
- Pathirana, Parakum, and Aye Khin. 2016. Adoption of social media for the banking sector in Si Lanka. In *Technology and Intimacy: Choice or Coercion*. HCC 2016. IFIP International Conference on Human Choice and Computers. Edited by D. Kreps, G. Fletcher and M. Griffiths. Cham: Springer, vol. 474, pp. 166–177. [CrossRef]
- PRNews. 2020. Raport PRNews.pl: Aktywa banków—I kw. Available online: <https://prnews.pl/raport-prnews-pl-aktywa-bankow-i-kw-2020-r-451498> (accessed on 20 December 2020).
- Quinton, Sarah, and Damien Wilson. 2016. Tensions and ties in social media networks: Towards a model of understanding business relationship development and business performance enhancement through the use of LinkedIn. *Industrial Marketing Management* 54: 15–54. [CrossRef]
- Rieger, Marc O. 2020. How to Measure Financial Literacy? *Journal of Risk and Financial Management* 13: 324. [CrossRef]
- Roszkó-Wójtowicz, Elżbieta. 2014. Ocena potencjału państw Unii Europejskiej do generowania innowacji z zastosowaniem analizy skupień. *Quantitative Methods in Economics* 15: 121–36.
- Ruostesaari, Marja-Lena, and Eliisa Troberg. 2016. Differences in social responsibility toward youth—A case study based comparison of cooperatives and corporations. *Journal of Co-Operative Organization and Management* 4: 42–51. [CrossRef]
- Saxton, Gregory D., and Richard D. Waters. 2014. What do Stakeholders Like on Facebook? *Examining Public Reactions to Nonprofit Organizations' Informational, Promotional, and Community-Building Messages* *Journal of Public Relations Research* 26: 280–99. [CrossRef]
- Schuchardt, Jane, Sherman D. Hanna, Tahira K. Hira, Angela C. Lyons, Lance Palmer, and Jing Jian Xiao. 2009. Financial Literacy and Education Research Priorities. *Journal of Financial Counseling and Planning* 20: 84–95.
- Schuetz, Sebastian, and Viswanath Venkatesh. 2020. Blockchain, adoption, and financial inclusion in India: Research opportunities. *International Journal of Information Management* 52: 101936. [CrossRef]
- Sen, Sankar, C. B. Bhattacharya, and Daniel Korschun. 2006. The role of corporate social responsibility in strengthening multiple stakeholder relationships: A field experiment. *Journal of Academy of Marketing Science* 34: 158–66. [CrossRef]
- Shih, Kuang-Hsun, Chia-Jung Chang, and Binshan Lin. 2010. Assessing knowledge creation and intellectual capital in banking industry. *Journal of Intellectual Capital* 11: 74–89. [CrossRef]
- Stango, Victor, and Jonathan Zinman. 2009. Exponential Growth Bias and Household Finance. *The Journal of Finance* 64: 2807–49. [CrossRef]
- Szopiński, Tomasz Stanisław. 2016. Factors affecting the adoption of online banking in Poland. *Journal of Business Research* 69: 4763–68. [CrossRef]
- Tao, Weiting, and Christopher Wilson. 2015. Fortune 1000 communication strategies on Facebook and Twitter. *Journal of Communication Management* 19: 208–23. [CrossRef]
- Trunk, Aleš, Kočar Sergeja, and Nada Trunk Širca. 2017. Education and training for financial literacy: The role of banks—Case study Slovenia. *International Journal of Innovation and Learning* 22: 385–406. [CrossRef]
- Trusov, Michael, Randolph E. Bucklin, and Koen Pauwels. 2009. Effects of word-of-mouth versus traditional marketing, findings from an internet social networking site. *Journal of Marketing* 73: 90–102. [CrossRef]
- Tsao, Shu-Feng, Helen Chen, Therese Tisseverasinghe, Yang Yang, Lianghua Li, and Zahid A. Butt. 2021. What social media told about us in the time of COVID-19: A scoping review. *Lancet Digit Health*. [CrossRef]
- Tsimonis, Georgios, and Sergios Dimitriadis. 2014. Brand strategies in social media. *Marketing Intelligence and Planning* 32: 328–44. [CrossRef]
- Van Rooij, Maarten, Annamaria Lusardi, and Rob Alessie. 2011. Financial Literacy and Stock Market Participation. *Journal of Financial Economics* 101: 449–72. [CrossRef]
- Van Rooij, Maarten, Annamaria Lusardi, and Rob Alessie. 2012. Financial Literacy, Retirement Planning, and Households Wealth. *Economic Journal* 122: 449–78. [CrossRef]
- We Are Social. 2019. The State of Digital in April 2019: All the Numbers you Need to Know. Available online: <https://wearesocial.com/blog/2019/04/the-state-of-digital-in-april-2019-all-the-numbers-you-need-to-know> (accessed on 16 December 2020).

- We Are Social. 2020. Digital 2020. October Statshot Report. Available online: <https://wearesocial.com/blog/2020/10/social-media-users-pass-the-4-billion-mark-as-global-adoption-soars> (accessed on 15 December 2020).
- Wishart, David. 2006. *Clustan Graphics Primer: A Guide to Cluster Analysis*, 4th ed. Edinburgh: Clustan.
- Wong, Adrian, Serene Ho, Olusegun Olusanya, Marta Velia Antonini, and David Lyness. 2020. The use of social media and online communications in times of pandemic COVID-19. *Journal of the Intensive Care Society*, 1–6. [CrossRef]
- World Bank. 2014. Financial Education Programs and Strategies. Approaches and Available Resources. Available online: <http://documents1.worldbank.org/curated/en/901211472719528753/pdf/108104-BRI-FinancialEducationProgramsandStrategies-PUBLIC.pdf> (accessed on 15 February 2021).
- Yang, Shaohua, Zeyun Li, Yaxin Ma, and Xingxing Chen. 2018. Does Electronic Banking Really Improve Bank Performance? Evidence in China. *International Journal of Economics and Finance* 10: 82–94. [CrossRef]