The interplay between digital social capital and family-owned SME performance: a study of social media business networks

Tiwasing, P., Kim, Y. R. & Sawang, S.

Original citation & hyperlink:
Tiwasing, P, Kim, YR & Sawang, S 2023, 'The interplay between digital social capital and family-owned SME performance: a study of social media business networks', Journal of Family Business Management, vol. 13, no. 4, pp. 1026-1048. https://doi.org/10.1108/jfbm-07-2022-0103

DOI 10.1108/jfbm-07-2022-0103
ISSN 2043-6238

Publisher: Emerald

The interplay between digital social capital and family-owned SME performance: A study of social media business networks

Pattanapong Tiwasing[a], Yoo Ri Kim[b] and Sukanlaya Sawang[c]

[a]Rural Policy Centre, Scotland's Rural College (SRUC), Edinburgh, EH9 3JG, and Centre for Business in Society (CBiS), Coventry University, Coventry, CV1 5DL.
ORCiD: https://orcid.org/0000-0001-9604-1656

[b]School of Hospitality and Tourism Management, University of Surrey, Guildford, Surrey GU2 7XH. ORCiD: https://orcid.org/0000-0002-1451-3355

[c]Centre for Business in Society (CBiS), Coventry University, CV1 5DL, and QUT Business School, Queensland University of Technology, Brisbane, Australia.
ORCiD: https://orcid.org/0000-0001-7977-7194

Abstract

Purpose: This paper aims to examine the relationship between being members of social media business networks and SME performance by comparing business performance between family-owned SMEs that are members and non-members of social media business networks.

Design/methodology/approach: The analysis empirically draws on cross-sectional data of 9,292 English and Welsh family-owned SMEs from the UK's Government Small Business Survey 2015. Propensity Score Matching (PSM) is applied to control for selection bias and differences in firm characteristics before comparing business performance, measured in terms of annual turnover, sales-growth intention, and innovation between family-owned SMEs that are members and non-members of social media business networks.

Findings: The findings show that family-owned SMEs that are members of social media business networks are more likely to have higher prior turnover and to grow their sales than non-members. Also, they are more likely to report being innovative in products and processes than non-members. The empirical results acknowledge the importance of online business networks and digital social capital on enhanced family-owned business performance.

Originality/Value: This paper is the first to explore the comparative analysis of business performance between family-owned SMEs that are members and non-members of social media business networks. This paper is important for the development of family business research by providing a comprehensive evidence-based analysis regarding the importance of online business networks to improve family-owned business performance, given the significant contribution of digital business activities to the UK economy.

Keywords: Family-owned SMEs, Social media business networks, Business performance, Treatment effect analysis

1 Introduction

The ‘social media business networks’ are the internet-based social media sites that businesses use to network, build connections, improve communication, share information and enhance digital marketing for better business performance (Ainin *et al*., 2015; Tiwasing and Sawang, 2022; Tiwasing, 2021). In particular, these online social media business networks are mainly free and can offer an easily accessible route for businesses to exchange essential information and knowledge within the networks (Ahmad *et al*., 2019; Tiwasing, 2021). In the context of family-owned small and medium-sized enterprises (SME), social media platforms and their networking activities provide an opportunity for family-owned SMEs to have a level playing field with the competition, expand their sales and product/service exposure and adopt more digitisation approaches (Koh, 2018; Shekhar *et al*., 2021). Using the social media business networks may require the advantage of digital technology and users’ digital knowledge (Ramdani *et al*., 2013). However, evidence of the digitisation of family-owned SMEs is scarce. Despite the positive impact of social media networks and their networks on business performance highlighted by many recent studies (Chang *et al*., 2017; Quinton and Wilson, 2016; Maioli *et al*., 2020; Tiwasing *et al*., 2020; Tiwasing, 2021), to date, there is no empirical evidence on the impact of participation in social media business networks on the improvement of the performance of family-owned SMEs.

Family-owned SMEs are a critical sector in many countries around the world, including the UK (Reuschke and Mason, 2022; Deb *et al*., 2022). Reuschke and Mason (2022) also suggest that they would contribute more to the national economy if they adopt digital technology into their businesses in the digital era. In particular, BIS (2015) reports that approximately 60% of the UK SMEs have their own social media profiles, of which around 61% are family-owned businesses. However, they often experienced digital disruption (Basly and Hammouda, 2020; Reuschke and Mason, 2022) and lack robust digital strategies

(PricewaterhouseCoopers (PwC), 2017). Also, family-owned businesses are predominantly located in rural areas (Masion *et al*., 2011), where they are often found to be disadvantaged in digital connectivity and infrastructure (Townsand *et al*., 2016; Tiwasing, 2021). With a lack of digital skills and strategies and inferior connectivity, they may find it difficult to utilise social media networks and participate in online networking activities for business development (Tiwasing, 2021). Therefore, it is important to explore the influence of social media business networks on business performance within the family-owned business context. To do this, this study aims to answer the question on "to what extent does membership of social media business networks enhance family-owned businesses performance?"

To answer this question, we focus on social media networks such as LinkedIn, Facebook, and Twitter since these platforms have been widely used by people and businesses for communication, interaction, and collaboration in the digital era (Ainin *et al*., 2015; Quinton and Wilson, 2016; Tiwasing, 2021). There is a lack of understanding about the benefits of social media networks and, particularly, the networking activities of family businesses. Thus, this study attempts to provide a new evidence-based analysis of the impact of participating in social media business networks on family-owned business performance by comparing the performance between family-owned SMEs that are members and non-members of social media business networks. To do this, this study uses a large cross-sectional dataset of 9,292 family-owned SMEs from the Longitudinal Small Business Survey (LSBS) for 2015 commissioned by the UK Department for Business, Energy and Industrial Strategy (BEIS). Controlling for bias selection on being members and non-members of social media business networks and for heterogeneity in business characteristics, propensity score matching (PSM) is applied to compare the differences in business performance between family-owned SMEs that are members and non-members of social media business networks. The key results reveal the significance of online business networks on business performance measured in terms of

turnover, sale growth, and (product and process) innovation. This empirical evidence should be beneficial to policymakers, business support providers and academic researchers to help unlock digital potential for business performance and improve online business support environments amongst family-owned businesses.

This paper is structured as follows: Section 2 discusses the theoretical framework, relevant literature and hypothesis development. Section 3 and 4 detail the secondary data used and the methodology, respectively. Empirical results are then discussed in Section 5. Section 6 concludes with policy recommendations, and the limitation and future research directions are presented in Section 7.

2 Theoretical Framework, Literature Review and Hypothesis Development

2.1 Theoretical Framework

Grounded on the industrial marketing and purchasing (IMP) approach, Naudé *et al*. (2014) highlight the role of networks and networking that firms can use to create social capital, which is defined as "*features of social organisation, such as trust, norms, and networks, that can improve the efficiency of society by facilitating coordinated actions*" (Putnam, 1993, p. 167). Social capital is a social arrangement that generates social relationships to foster cooperation amongst people/companies and their networks (White, 2002; Alkhatib and Valeri, 2022; Fu *et al*., 2019). Also, it is significantly associated with the creation of social networks that provide individuals and population groups with positive economic and social benefits (Putnam, 2000; Naudé *et al*., 2014).

To build social networks, particularly via offline networking activities, there are two forms of social capital which are (1) 'bonding social capital' and (2) 'bridging social capital' (Putnam, 2000). Firstly, the term 'bonding' is largely associated with the connections between people and businesses who have close relationships such as friends, family members, and close

acquaintances (Williams, 2019). These relationships are termed as ‘strong ties’, which are the building blocks for relationships with broader social networks (Granovetter, 1973; Fu *et al*., 2019). In particular, Herrero (2018) points out that businesses that are owned and/or managed by family members have a unique type of bonding social capital, which is stemmed from relationships between members within family businesses, so called ‘family social capital’. Sorenson and Bierman (2009) also mention that family social capital is different from social capital created by non-family businesses since family businesses rarely hire human resources and obtain other types of capital elsewhere. Thus, this specific type of social capital mainly exists within family relationships (Sorenson and Milbrandt, 2022). For instance, when negative feelings and conflict occur between members of family businesses, family relationships can easily help generate liability, trust and cooperation among family members in the way of working together and supporting each other (Sorenson and Bierman, 2009). Consequently, such relationships can attract family human and other capital (e.g., external finance, collaboration) to the business (Herrero, 2018; Sorenson and Milbrandt, 2022).

Secondly, the term ‘bridging’ refers to the ability to generate social networks with the connections between heterogeneous groups of people with different backgrounds (Naudé *et al*., 2014; Fu *et al*., 2019). Granovetter (1973) introduces these relationships as ‘weak ties’, which mainly refers to the connections with formal institutes such as universities, research centres, and government organisations (Tiwasing, 2021). The weak-tie connections often lead to the creation of new information and knowledge that help enhance economic value and performance for businesses within the networks (Fu *et al*., 2019; Naudé *et al*., 2014), including family-owned businesses. For example, Uhlaner *et al*. (2015) reveal that bridging social capital is often seen as a channel for family-owned businesses to build their business networks with external businesses and organisations. This type of social capital can also help family businesses to build trust and connections with non-family businesses and increase their reputation with their

external collaborations (Salvato and Melin, 2008), resulting in family appropriability such as access to external resources, business opportunity exchange, and knowledge transfer (ibid).

Following these concepts of social capital, Bourdieu (2001) now expands the 'filed theory framework' to consider the importance of new forms of media (i.e., Television) and the creation of social capital. Likewise, Julien (2015) applies the concept of the digital realm of the 'Internet meme' to introduce 'digital social capital', which comes from both 'bridging' and 'bonding' social capital via digital means. Thus, following the two forms of (offline) social capital, businesses, including family firms can generate social networks and relationships through online networking platforms (Arcese *et al.*, 2020; Tiwasing, 2021).

In the digital world, social networks are synonymously often mentioned as social media networks in the popular press (Naudé *et al*., 2014) since social networks have now incorporated the use of online social networking sites or platforms (Quinton and Wilson, 2016; Williams, 2019). Social media networks, such as LinkedIn, Facebook, and Twitter, provide businesses with a ready tool to support the activities of social networks for sharing information and knowledge and building business relationships and collaborations (Williams, 2019). Additionally, the use of social media networks can extend business reach since users can connect with people through many-to-many, one-to-one and one-to-many connections (Tiwasing. 2021). Therefore, social media networks can offer effective online platforms for businesses to create the specified strategic networks (Chang *et al*., 2017). The interaction between businesses within social media networks can then contribute to a fluid membership constituency with members having the same interests, and subsequently, the emergence of online business networks (Quinton and Wilson, 2016) called 'social media business networks'.

Social media business networks can be used as an accessible tool to better resource accessibility for effective business solutions and business capability improvement (Chang *et al*., 2017). Following the resource-based view (RBV) perspective, the resources are defined as

"*bundles of tangible and intangible assets, including a firm's management skills, its organisational processes and routines, and the information and knowledge it controls that can be used by firms to help choose and implement strategies*" (Barney *et al*., 2011, p. 1,300). Thus, participating in social media business networks can provide its members with an opportunity to access both tangible and intangible resources (Tiwasing, 2021). Interestingly, Quinton and Wilson (2016, p. 21) highlight that "*membership of and participation in a business social media network provides a trusted environment with a potentially global reach through which nearly immediate contacts can be formed as a base for future business collaboration*". This suggests that such professional groups (e.g., LinkedIn) can perform as a trusted filter to quickly assess the credentials and extent of a potential contact expediting the relationship initiation (Chang *et al*., 2017). Thus, online business networks can help reduce the amount of time it takes to generate trustworthiness and optimise the access and use of resources compared to offline business networks (Tiwasing, 2021). Subsequently, the benefits of social media business networks can enhance members' performance and generate innovative outcomes by sharing their business interests, goals and knowledge, identifying business solutions, and creating co-working space for collaborative problem solving (Quinton and Wilson, 2016; Chang *et al*., 2017; Tiwasing, 2021).

To explore a family business phenomenon from theories outside the family business realm can be beneficial (Neubaum and Micelotta, 2021). Therefore, based on the theoretical perspectives of social capital and RBV, social media business networks can demonstrate the benefits to family-owned SMEs as effective networking means for building social capital, generating social relationships and improving business support environments. More significantly, these online business networks require much less time than conventional business networks to generate a trusted environment within their networks, leading to business engagement and collaborative problem solving. Consequently, participating in social media

business networks could potentially help family-owned SMEs to build family social capital and improve their performance. In particular, empirical studies on online (social media) business networks are scarce, and such research in family-owned businesses is even more lacking. Family-owned SMEs have distinct characteristics (Camilleri and Valeri, 2021) that can facilitate and/or inhibit technological adoption and business performance (Spriggs *et al*., 2013). Thus, much research is needed to provide evidence-based analysis on the benefits of online business networks to help improve business performance and the limitations on accessing online support and resources among family-owned SMEs.

2.2 Literature Review and Hypothesis Development

The concept of social capital can be used to explain how family firms are able to thrive. Social connectivity plays an essential role in business success, as it facilitates team learning and innovation processes which lead families towards new opportunities for growth (Tajpour *et al*., 2021). The integration of social network services into business owners' day-to-day life is becoming more and more common. These platforms provide not only a way for these people to share information, but also access to developing stronger connections with others (Ainin *et al*., 2105). In modern-day businesses, social media networks have been linked to the development of rapid social capital and relationships that can lead to fast-paced transactional exchanges (Mumi *et al*., 2019), sharing and reciprocity of content in business-to-business or business-to-consumer environments (Swani *et al*., 2014), and value creation from co-creation of ideas and collaborative problem solving (Quinton and Wilson, 2016; Valeri and Baggio, 2021). Thus, network research currently draws attention to the different ways network flexibility and variability (both digital and non-digital origins) contribute to and shape business practices including family businesses (Seaman *et al*., 2014).

Social media business networks can lead to a new way of business practices and support businesses to connect with various partners such as customers, suppliers and trade associations, expanding their access to critical resources and support to improve their performance (Quinton and Wilson, 2016). They are considered a powerful tool to interact with others on a large scale, from one-to-many to many-to-many modes (Tiwasing, 2021). In particular, such networks (e.g. LinkedIn) can provide a cost-effective way of organisational learning and innovation for SMEs through interaction and sharing of knowledge and information within the online business networks (Jones *et al.*, 2015; Shekhar *et al.*, 2021). This can significantly help businesses, including family-owned SMEs to make a positive difference in their business performance for actual and perceived performance (Reuschke and Mason, 2022; Baggio and Valeri, 2020).

However, family-owned businesses are often found to have a common characteristic called an 'ability-willingness paradox' (Zapata-Cantu *et al*., 2022). This is because family businesses are more eager to innovate than non-family companies, but at the same time, they have been shown to have less ability for innovation and a lower proclivity for high-risk activities, which probably makes them rely on other aspects like motivation or inspiration from outside forces in order to make significant changes within their business culture (Ano and Bent, 2021; Zapata-Cantu *et al*., 2022). Veider and Matzler (2016) also support that if family businesses can solve this paradox and unlock innovative potential, this can lead to organisational ambidexterity, which refers to a company's capacity to be efficient in managing current business and also be adaptive to changes in the future demand through both exploration and exploitation of new technologies, which can potentially make a significant improvement for family business performance. Thus, this paradox may explain why family businesses do not always make use of digital tools for growth despite having to access them through different platforms like social media networks and similar (Ano and Bent, 2021).

Since the theoretical framework has highlighted the benefits of social media business networks for family social capital, business engagement and collaborative problem solving and the past studies have also emphasised the positive link between the membership of social media-based business networks and firm performances among non-family SMEs (Ainin *et al*., 2015; Quinton and Wilson, 2016; Maioli *et al*., 2020; Tiwasing et al., 2020; Tiwasing, 2021), we would, therefore, like to know whether family-owned SMEs that participates in online business networks can enhance business performance the same way as non-family businesses do or not. We set our first hypothesis to explore the impact of social media business networks on business performance for family-owned SMEs, focusing on actual performance measured in terms of annual turnover as:

H1: Family-owned SMEs that are members of social media business networks are more likely to have higher annual turnover than non-members.

As well as focusing on actual business performance, we also look at the perceived performance, which is the sales-growth expectation (Tiwasing and Swang, 2022), since social media networks have increasingly become part of sales strategies for modern-day businesses (Tiwasing, 2021). Thus, following the RBV theory, participating in social media business networks can help enhance perceived (intangible) business performance (e.g., sales-growth intention) for SMEs (Quinton and Wilson, 2016; Tiwasing, 2021) and family-owned businesses (Reuschke and Mason, 2022). In addition, Parveen *et al*. (2015) report that social media usage has a positive impact on organisational performances in terms of sales revenue generation, increased competitive advantage, improved brand visibility, enhanced information accessibility, and improved customer relations and services. Nonetheless, the use of social media networks may lead to some disadvantages such as increasing customer power and negative word-of-mouth or so-called online firestorms (Pfeffer *et al*., 2014). In particular,

family firms are often experienced with the ability-willingness dilemma, leading to a fear of adopting new technologies, including social media networks for online sales activities, which can affect sales performance (de Groote *et al*., 2021). Also, Ahmad *et al*. (2019) discover that social media adoption has no effect on SMEs' performance including sales due to unplanned strategies of social media adoption. Therefore, to examine the relationship of social media networks and their business networks on family-owned SME performance, particularly sales-growth intention, our second hypothesis is set as:

H2: Family-owned SMEs that are members of social media business networks are more likely to have higher levels of sales-growth intention than non-members.

In recent years, the use of social media has provided powerful channels for online collaboration and networks with customers, suppliers and partners (Chang *et al*., 2017; Tiwasing, 2021), increasing the innovative capability of family-owned SMEs and their ability to find new ideas and processes as well as to develop new products and services (Obermayer *et al*., 2021). However, organisational learning and innovation are again different for family-owned and non-family-owned SMEs. For example, Brinkerink (2018) argue that family influence can augment the absorptive capacity performance of R&D for exploitative innovation while impeding for exploratory innovation. The factors of product and process innovation for family-owned SMEs also vary and have different implications for performance. Nevertheless, recent studies recognise the benefits of using social media platforms for innovation activities for home-based SMEs (Scuotto *et al*., 2017; Reuschke and Mason, 2022). In particular, social media and e-commerce can bring the creation of new digital products, so-called 'e-goods' (Reuschke and Mason, 2022), which can be considered as a new form of product innovation. Zapata-Cantu *et al*., (2022) also assert that social media and other digital platforms can offer new practices to family businesses to develop novel business models and innovation

capabilities. Similarly. Cepeda-Carrion *et al*. (2022) show that social media has a significant and positive contribution to open innovation processes. Following empirical literature, family-owned SMEs that participate in social media platforms and their networks could be more innovative than those who do not participate. Therefore, the next hypothesis is proposed as:

H3: Family-owned SMEs that are members of social media business networks are more likely to be innovative in products and processes than non-members.

To sum up, Table I summarises the key findings of above literature related to the benefits of social media and its business networks on business performance. Overall, given the significant contribution of online business networks to business growth and economy development in the digital era, there is a need to explore the link between social media business networks and family-owned SMEs' performance, since most of the recent literature focuses on non-family businesses.

Table I about here

3. Secondary Data and Descriptive Statistics

This paper employs 13,906 family-owned SMEs from England and Wales from the Longitudinal Small Business Survey (LSBS) for 2015. Although this survey has been conducted in subsequent years, we only use the LSBS 2015, which is the first wave, since the information on social media business networks was only collected in this year and only for England and Wales. In this paper, we follow the definition of family-owned SME from Kiwia *et al*. (2020, p. 215) as "*a business whose ownership as well as control is within the founder's*

family members, the family members are directly involved in business' daily activities and the business will be transferred to subsequent generations". Approximately 66.8% (9,292) of English and Welsh SMEs are family-owned businesses which are controlled by the same family for at least one generation. They were asked whether they are part of social media business networks (e.g., LinkedIn). Around 46% of family-owned SMEs are members of social media business networks.

Table II reports differences in business performance between the member and non-member groups and the descriptive statistics of the key variables. For example, 27.0% of family-owned SMEs that are members of social media business networks are located in rural areas compared with 33.8% of non-members. Approximately 45% of family-owned SMEs with membership operate their businesses in the business service sector compared with 19.7% of those without non-membership. Family-owned SMEs that are members of social media business networks are more likely to register higher levels of prior annual turnover and report greater levels of sales growth than those that are non-members. However, to produce a robust analysis for the comparison of business performance between the member and non-member groups, controlling for heterogeneity in firms' characteristics and profiles should also be taken into consideration at the same time.

Table II about here

3.1 Dependent Variables

In the LSBS 2015, family-owned SMEs reported their annual turnover in the past 12 months. Therefore, annual turnover used in this analysis is prior turnover. For sales growth, family-owned SMEs were also asked whether or not they aim to grow their sales in the next three years, which is a sales-growth expectation. We are also interested in exploring the differences

in product and process innovation amongst family-owned SMEs that are members and non-members of online business networks since recent studies recognise the benefits of using social media platforms for innovation activities for home-based SMEs (Reuschke and Mason, 2022). Family-owned SMEs were asked whether they have introduced any new or significantly improved processes and goods/services in the last three years, which are a binary variable.

3.2 Independent and Control Variable

Social media business network is used as an independent variable in this analysis, which is a binary variable. We use this variable as the independent variable to evaluate the impact of online business networks on business performance, especially in the context of comparative analysis between family-owned SMEs that are members and non-members of social media business networks.

For the control variables, the technology readiness and adoption of online business networks can vary significantly due to the ownership, management, behaviour, size and sector of family-owned SMEs (Kraus *et al*., 2019; Tiwasing *et al.*, 2020). Therefore, we consider three main types of control variables which are business characteristics, business capabilities and digital-related activities (Table II). For *business characteristics*, the analysis controlled for business sectors and regions to account for differences in performance between social media business network members and non-members (Phillipson *et al*., 2019; (Maioli *et al*., 2020; Tiwasing and Sawang, 2022). We also include business size (Spriggs *et al*., 2013), business types (sole trader or team, Tiwasing and Sawang, 2021), business age (Kraus *et al*., 2019) and women-led businesses (Maioli *et al*., 2020), since these variables are found to be significantly associated with digitisation and business development.

For *business capabilities*, information on SME family-owned SMEs that seek external information/advice to improve their businesses and seek external finance are included. These

variables are significantly associated with the decisions to join the business networks and can contribute to business performance and growth (Maioli *et al*., 2020; Tiwasing *et al*., 2020). Finally, the analysis focuses on *key digital-related activities* using the website ownership, use of the third party's websites and e-commerce adoption among family-owned SMEs. These variables can be related to online retail activities, which can influence business performance improvements (Tiwasing, 2021).

4. Propensity Score Matching (PSM)

In this analysis, we address our research question by comparing business performance between family-owned SMEs that are members and non-members of social media business networks. To do this, direct comparisons between the two groups (members and non-members) may result in biased estimations by uneven confounding variables between comparison groups (Rosenbaum and Rubin 1983). Also, it is difficult to directly compare the difference in family-owned SMEs' business performance between members and non-members since these two events (i.e., being members and non-members) cannot simultaneously occur within the same firm and at the same time period. Thus, family-owned SMEs have to choose between being members and non-members of social media business networks. In fact, businesses that are members of these online business networks may have different key characteristics compared to non-member businesses (Tiwasing, 2021; Tiwasing and Sawang, 2022). In this case, selection bias can arise since groups of these family-owned SMEs differ in business characteristics, which are the baseline characteristics of the two groups, when comparing their performance (Phillipson *et al*., 2019; Tiwasing and Sawang, 2022).

To address this issue and more precisely assess the social media business membership effect, Propensity Score Matching (PSM) is applied to produce the exact matched-pair comparisons. PSM is widely used to estimate causal effects in observational studies and is

effective in minimising selection bias (Rosenbaum and Rubin, 1983). Basically, this technique is used to pair the outcomes between two groups of observational studies: the treated (treatment) and untreated (control) groups. In this case, family-owned SMEs with the social media business network membership are assigned to be the treatment group (non-members are the control group). To produce the matched-pair comparison, PSM computes a propensity score by balancing a large number of observed characteristics (covariates) between the two groups and compressing them into a single score. Then, PSM compares the outcome of individual firms that have similar (matched) propensity scores between the treatment and control groups. Practically, the propensity score is estimated using a logit model, which can be written as:

$$PS(X_i) = Pr(D_i = 1|\mathbf{X_i}) = \beta_0 + \beta_1 \mathbf{X}_i \quad (1)$$

where $PS(X_i)$ is the propensity score of i^{th} firm, $Pr(D_i=1)$ is the probability of i^{th} family-owned SMEs that are members of social media business networks (treated group), i is the number of individuals; i=1,…, n; **X** is a set of explanatory variables that need to be controlled for before comparing the outcomes such as business sector, business age, business capability, and so on (see Table I).

To match the propensity scores, this study conducts matching estimators using one-to-one matching, nearest-neighbour matching and calliper matching to check for robustness since this analysis considers both continuous and dichotomous dependent variables (Caliendo and Kopeinig, 2008). This study also conducts the Standardised Differences and Variance Ratio for a balancing test to assess the matching quality and to ensure that there are no significant differences in covariate means between the treatment and control groups (Dehejia and Wahba, 2002). If the Standardised Differences are lower than 0.25, this indicates that a regression

model adjusting for covariates is not sensitive to model specification because of a lack of balance (or overlap) (Ho *et al*., 2007). Also, the Variance Ratio should be closed to 1 and is not significantly differences in covariate means between the control and treatment groups (Dehejia and Wahba, 2002) (See Appendix). After the satisfaction of balancing tests, the average treatment effect for the treated (ATET) on business performance between members and non-members is then calculated:

$$\begin{aligned} ATET &= E[Y_{1i} - Y_{0i} \mid D_i = 1] \\ &= E\{E[Y_{1i} - Y_{0i} \mid D_i = 1, Pr(\mathbf{X}_i)]\} \end{aligned} \quad (2)$$

where Y_{1i} and Y_{0i} represent business performance for i^{th} family-owned SME that is members and non-members of social media business networks, respectively. Here, business performance is measured in terms of annual turnover, sales-growth intention, process innovation and product innovation.

In this context, this paper provides a number of reasons why PSM is preferable to conventional binary regressions. Firstly, PSM is effective in diminishing selection bias (Cepeda *et al*., 2003; Tiwasing, 2021). PSM is also reported to be more robust than the logistic/probit model when comparing differences between two groups in observational studies (Rubin, 2007). Next, PSM does not rely on any specific linearity assumptions for the treatment effects, which are fundamental for the regression-based model (Wellalage and Fernandez, 2019). Moreover, before comparing the outcomes, PSM can identify differences in key characteristics between family-owned SMEs with and without network membership.

5. Results and Discussion

Table III reports the results of the logit model. Model I appears to perform reasonably well with 77% corrected classification, which is relatively high. The likelihood ratio (LR) and the Wald test are applied to evaluate the parameters of the covariates, which are highly statistically significant. Also, we further check for multicollinearity using the Pearson correlation coefficient, and this issue does not affect Model I's ability to predict the determinants since the highest correlation is 0.42, which is the correlation between AGE05 and AGE20. Moreover, we use the Durbin-Wu-Hausman (DWH) test to check for endogeneity between social media business network and business performance measures (see Table IV). The results of the DWH chi-square test show that the p-value is higher than 0.05 for four performance equations, which concludes that there is no endogeneity (Davidson and MacKinnon, 1990).

Table III about here

The findings show that family-owned SMEs located in rural areas (RURAL) are less likely to be members of social media business networks. This is because rural locations are significantly subject to poor digital infrastructure, inferior broadband connectivity, and low levels of digital literacy (Townsend *et al.,* 2016; Tiwasing, 2021). Additionally, family-owned SMEs with sole proprietorship (SOTRAD) and micro (MICRO) and small businesses (SMALL) are less likely to be members of these online business networks. These results are similar to the study of Tiwasing *et al*. (2020) where small businesses are often at a digital disadvantage compared to larger businesses when it comes to time and resources. The result also found that business age matters for social media business network membership. The results show that younger businesses (AGE0_5) are more likely to participate in social media business networks. Whilst older businesses (AGE20) are less likely to be members of these online business networks. This suggests that older managers and businesses including family-owned

businesses may find it difficult to use new communication platforms and online digital technologies in their businesses (Kraus *et al*., 2019).

The result also reveals that family-owned SMEs operating in the business service sector (BUSINESS) are more likely to be members of social media business networks. Business services often require digital technologies to be well-connected with their existing and new customers through online services, operations and communications (Reuschke and Mason, 2022; Tiwasing *et al*., 2020). Thus, being members of social media business networks and other online activities can help family-owned SMEs to build family social capital, resulting in expanding business reach and networks (Uhlaner *et al*., 2015). Additionally, regions matter for the online business network participation since the result shows that family-owned SMEs located in London and the South East (LDSE) are more likely to participate in social media business networks. On average, businesses in these regions are often reported to be well-connected to the Internet and hi-speed broadband (Maioli *et al*., 2020; Tiwasing *et al*., 2020) since they have greater digital access and superior networks than other regions (Tiwasing, 2021).

Focusing on the digital-related activity variables, the finding found that family-owned SMEs that sought external advice or information on matters affecting their businesses (SUPPORT) and those who tried to obtain external finance in the last 12 months (FINANCE) are more likely to be members of social media business networks. This suggests that participating in such online business networks can help family-owned SMEs with better access to online information and digitalised public services and funding resources (Reuschke and Mason, 2022). Likewise, family-owned SMEs that use their own website (OWNWEB) and the third party's website (OTHERWEB) and use e-commerce to promote and sell their products or services (ECOMM) are more likely to participate in social media business networks. These results suggest that participating in online business networks is significantly associated with

being familiar with digital technologies and online retail competency (Reuschke and Mason, 2022; Tiwasing, 2021).

Considering the business performance (Table IV), for Model II, the results demonstrate that family-owned SMEs that are members of social media business networks are more likely to have higher turnover than those that are non-members, supporting H1. Similarly, for Model III, family-owned SMEs with social media business network membership are more likely to aim to grow their sales than those without membership, supporting H2. Social media networks are often used in marketing and sales strategies. Therefore, networking through these online business platforms can help family-owned SMEs to enhance business performance including sales and turnover (Ainin *et al*., 2015; Quinton and Wilson, 2016; Tiwasing, 2021). Despite this paper could not measure social capital separately due to data unavailability, the significant impact of social media business networks on business performance sales can suggest the creation of social capital for member businesses via such networks (Naudé *et al*., 2014). Given the online nature of social capital networks, both strong and weak ties of business relationships were feasible, and the sharing of business interests and knowledge may have supported family-owned SMEs with their sales and performance implicitly (Williams, 2019; Tiwasing, 2021).

For Model IV and V, the results also reveal that family-owned SMEs that are members of social media business networks are more likely to be innovative in processes and products or services compared with those that are non-members, supporting H3. This suggests that social media business networks can provide a platform for family-owned SMEs to share their business interests and identify business solutions (Quinton and Wilson, 2016), which could potentially enable them to develop complementary processes and products/services within a digital ecosystem (Reuschke and Mason, 2020). The findings also highlight the cost-effective way of organisational learning and innovation for family-owned SMEs, where they are more likely to suffer from resource scarcity. Thus, following the RBV, participating in social media business

networks can provide their members with an opportunity to access both tangible and intangible resources (Tiwasing, 2021).

Table IV about here

6. Conclusion and Policy Recommendations

This study reveals the significance of online business networks on business performance measured in terms of turnover, sales-growth ambition, and innovation. The empirical analysis supports all three research hypotheses and highlights the importance for family-owned SMEs to participate in social media business networks or make use of online business networks to improve their performance and innovation. The findings reveal that there are significant differences between family-owned SMEs that are members of social media business networks and that are non-members. These differences show that firms that are part of social media business networks are located in urban regions such as London and the South East of England, where digital infrastructure and literacy is more likely to be high and strong, which implies a greater access to new resources and technology adoption that can help incumbent family-owned SMEs to thrive in sales and growth. Also, digital-related activities and business capabilities can motivate family-owned SMEs to participate in social media business networks. Additionally, larger and younger family-owned businesses and those in the service sector are more likely to be members of social media business networks. An advantage of family-owned SMEs is that the generational succession of the management can bring some positive implications for the business in terms of IT adoption (Basly and Hammouda, 2020), and thus forward-thinking next-generation business owners could be more innovative and can explore into new products and services (Koh, 2018), which these empirical findings support.

This empirical research also provides beneficial and practical implications for

policymakers, practitioners and academic researchers to help unlock digital potential for business performance and improve online business support environments amongst family-owned SMEs. The results emphasise the digital inequality between family-owned SMEs at different geographical locations which can impact on the internet connection and digital infrastructure. These lead to a barrier to adopting the social media network and engaging in online networking activities. The development of digital infrastructures and connectivity such as satellite internet, superfast broadband or 5G network should be beneficial to those family businesses in poor digital service areas such as rural and 'hard-to-reach' areas. As well as focusing on investing in advanced digital infrastructure and connectivity, IT and digital business support are needed for family-owned SMEs located in these areas and beyond London and the South East to be educated about the benefits of social media business networks and their potential to build social capital and resources via digital means at low costs to induce innovation and growth.

The results also highlight the issue of digital illiteracy and digital exclusion among older firms and managers and small-sized businesses. Therefore, a digital skills training programme should be implemented in the form of on/off the job training or even apprenticeships for older businesses (and mature labour) and micro and small businesses to help increase their ability to work with digital technologies and improve their odds of thriving in the digital world (Tiwasing, 2021). This should also apply to family-owned SMEs in the primary and secondary sectors, since those in the service sector, such as tourism and food and beverage industries, are likely to be well-connected with social media business networks through their online services and operation (e.g., e-commerce, booking system, and so on) (Arcese *et al*., 2020). Therefore, since digital business services have significantly contributed to the UK economy, particularly during the COVID-19 lockdown, family business owners not only in the service sector but also in other business sectors (e.g., agriculture and farming) should put provisions in place to pursue

digital business activities (Townsend *et al*., 2016; Tiwasing, 2021).

This study provides a theoretical contribution to family business research. We advance the understanding of social capital and RBV theory through social media business networks as business resources (both intangible and tangible resources) for family-owned SMEs to develop their business performance. Specifically, family social capital is often seen as a significant driver for family businesses to improve business performance by fostering bonding and relationships among family members via collaborative efforts and mutual support (Herrero, 2018; Sorenson and Milbrandt, 2022). Social media business networks can assist family-owned businesses in rapidly expanding family social capital through the creation of digital social capital. This can help family businesses with the online business network membership to quickly expand their business networks with non-family businesses and customers, resulting in knowledge sharing and collaborative problem solving, and subsequently improved business performance (Quinton and Wilson, 2016). Our results support that family-owned SMEs that participate in social media business networks perform better than those that do not participate in these online networks. Thus, this study stresses the importance of digital social capital to enable family-owned SMEs, like non-family businesses, to access new knowledge, resources and collaborations to improve their performance and innovation.

This study also provides novel insights into the family business literature regarding online business networks. Firstly, this study is the first to examine the impact of social media business networks on business performance for family-owned SMEs, providing significant input to debates regarding the benefits of online business networks to enhance performance for family-owned SMEs. Also, this paper introduces the matching method, PSM, for the comparative analysis between family-owned businesses that are members and non-members of social media business networks. Finally, this study uses a large and unique representative sample of the LSBS dataset to add a comprehensive evidence-based analysis to existing

literature since timely empirical studies on online business networks in the current digital business climate are needed, especially for family-owned SMEs.

7. Limitations and Future Research

This study suggests some avenues for future research. Firstly, due to the data limitation, this analysis only uses the LSBS 2015. Therefore, future research should further explore the impact of social media business networks using the updated data, especially during the COVID lockdown and in the digital era when online platforms become a significant tool for marketing strategies and business activities. Secondly, this study is only based on empirical analysis (quantitative research), future research should be beneficial by interviewing family business owners to gain a deeper understanding of their motivation and challenges in participating in online business networks to enhance business performance in the real business setting. Also, it would be interesting for future research to consider the benefits of online business networks and digital social capital on business development for family businesses in specific sectors and geographical locations that significantly rely on digital connectivity and technological devices such as tourism and hospitality, rural businesses, local handicraft businesses and so on (see Kumar *et al*., 2021; Shekhar *et al*., 2021; Tiwasing, 2021; Valeri and Baggio, 2021; Deb *et al*., 2022). Next, future research should explore the interaction between members within the social media business networks to understand how they use these online networks to improve their business performance since this information is not available in the LSBS 2015. Finally, since this analysis does not distinguish the different types of social media networks (e.g., LinkedIn, Facebook, Twitter), it would, therefore, be interesting for future research to explore the impacts of different online platforms on business performance in order to identify the effective online business networks for SME family-owned businesses.

References

Ahmad, S.Z., Abu Bakar, A.R. and Ahmad, N. (2019), "Social media adoption and its impact on firm performance: the case of the UAE", *International Journal of Entrepreneurial Behavior & Research*, Vol. 25 No. 1, pp. 84-111.

Ainin, S., Parveen, F., Moghavvemi, S., Jaafar, N.I. and Shuib, N.L.M. (2015), "Factors influencing the use of social media by SMEs and its performance outcomes", *Industrial Management & Data Systems*, Vol. 115, No. 3, pp. 570–588.

Alkhatib, A.W. and Valeri, M. (2022), "Can intellectual capital promote the competitive advantage? Service innovation and big data analytics capabilities in a moderated mediation model", *European Journal of Innovation Management*, in-press. https://doi.org/10.1108/EJIM-04-2022-0186

Ano, B. and Bent, R. (2021), "Human determinants influencing the digital transformation strategy of multigenerational family businesses: a multiple-case study of five French growth-oriented family firms", *Journal of Family Business Management*, in-press. https://doi.org/10.1108/JFBM-12-2020-0117

Arcese, G., Valeri, M., Poponi, S. and Elmo, G.C. (2021), "Innovative drivers for family business models in tourism", *Journal of Family Business Management*, Vol. 11 No. 4, pp. 402-422.

Baggio, R. and Valeri, M. (2022), "Network science and sustainable performance of family businesses in tourism", *Journal of Family Business Management*, Vol. 12, No. 2, pp. 200-213.

Barney, J.B., Ketchen, D.J. and Wright, M. (2011), "The future of resource-based theory: Revitalization or decline?", *Journal of Management*, Vol. 37, No. 5, pp. 1299– 1315.

Basly, S. and Hammouda, A. (2020), "Family Businesses and Digital Entrepreneurship Adoption: A Conceptual Model", *Journal of Entrepreneurship*, Vol. 29, No. 2, pp. 326–364.

BIS. (2015). "Digital capabilities in SMEs: Evidence review and re-survey of 2014 small business survey respondents", available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/457750/BIS-15-509-digital-capabilities-in-SMEs-evidence-review-and-re-survey-of-2014-smallbusiness-survey-respondents.pdf

Bourdieu, P. (2001), "Television", *European review*, Vol. 9, No. 3, pp. 245-256.

Brinkerink, J. (2018), "Broad search, deep search, and the absorptive capacity performance of family and nonfamily firm R&D", *Family Business Review*, Vol. 31, No. 3, pp. 295-317.

Caliendo, M. and Kopeinig, S. (2008), "Some practical guidance for the implementation of propensity score matching", *Journal of economic surveys*, Vol. 22, No. 1, pp. 31-72.

Camilleri, M.A. and Valeri, M. (2021), "Thriving family businesses in tourism and hospitality: A systematic review and a synthesis of the relevant literature", *Journal of Family Business Management*, in-press. https://doi.org/10.1108/JFBM-10-2021-0133

Cepeda, M.S., Boston, R., Farrar, J.T. and Strom, B.L. (2003), "Comparison of logistic regression versus propensity score when the number of events is low and there are multiple confounders", *American journal of epidemiology*, Vol. 158, No. 3, pp.280-287.

Chang, S. E., Liu, A. Y. and Shen, W. C. (2017), "User trust in social networking services: A comparison of Facebook and LinkedIn", *Computers in Human Behavior*, Vol. 69, pp. 207– 217.

Davidson, R. and MacKinnon, J.G. (1990), "Specification tests based on artificial regressions", *Journal of the American Statistical Association*, Vol. 85, No. 409, pp. 220-227.

Deb, S.K., Mohanty, P.P. and Valeri, M. (2022), "Promoting family business in handicrafts through local tradition and culture: an innovative approach", *Journal of Family Business Management*, in-press. https://doi.org/10.1108/JFBM-10-2021-0131

de Groote, J.K., Conrad, W. and Hack, A. (2021), "How can family businesses survive disruptive industry changes? Insights from the traditional mail order industry", *Review of Managerial Science*, Vol. 15, pp. 2239–2273.

Dehejia, R. and Wahba, S. (2002), "Propensity score matching methods for nonexperimental causal studies", *The Review of Economics and Statistics*, Vol. 84, No. 1, pp. 151-161.

Fu, J., Sawang, S. and Sun, Y. (2019), "Enterprise Social Media Adoption: Its Impact on Social Capital in Work and Job Satisfaction", *Sustainability*, Vol.11, No. 16, pp.4453. https://doi.org/10.3390/su11164453

Granovetter, M. S. (1973), "The strength of weak ties", *American Journal of Sociology*, Vol. 78, No. 6, pp. 1360– 1380.

Herrero, I. (2018), "How familial is family social capital? Analyzing bonding social capital in family and nonfamily firms", *Family Business Review*, Vol. 31, No. 4, pp.441-459.

Jones, N., Borgman, R. and Ulusoy, E. (2015), "Impact of social media on small businesses", *Journal of Small Business and Enterprise Development*, Vol. 22, No. 4, pp. 611–632.

Julien, C. (2015), "Bourdieu, social capital and online interaction", *Sociology*, Vol. 49, No. 2, pp. 356-373.

Kiwia, R.H., Bengesi, K.M.K. and Ndyetabula, D.W. (2020), "Succession planning and performance of family-owned small and medium enterprises in Arusha City – Tanzania", *Journal of Family Business Management*, Vol. 10 No. 3, pp. 213-230.

Koh, A. (2018), "The changing face of family business", *Asian Management Insights*, Vol. 5, No. 1, pp. 16-22.

Kraus, S., Gast, J., Schleich, M., Jones, P. and Ritter, M. (2019), "Content is king: How SMEs create content for social media marketing under limited resources", *Journal of Macromarketing*, Vol. 39, No. 4, pp. 415– 430.

Maioli, S., Tiwasing, P., Gorton, M., Phillipson, J. and Newbery, R. (2020), "Spatial disparities in SMEs productivity in England", ERC Research No 84, Enterprise Research Centre, available at: https://www.enterpriseresearch.ac.uk/wp-content/uploads/2020/02/ERC-ResPap84-Maioli-et-al.pdf (accessed 14 May 2020).

Mumi, A., Obal, M., and Yang, Y. (2019), "Investigating social media as a firm's signaling strategy through an IPO", *Small Business Economics*, Vol. 53, No. 3, pp. 631-645.

Naudé, P., Zaefarian, G., Tavani, Z.N., Neghabi, S. and Zaefarian, R. (2014), "The influence of network effects on SME performance", *Industrial Marketing Management*, Vol. 43, No. 4, pp. 630-641.

Neubaum, D.O. and Micelotta, E. (2021), "WANTED—Theoretical Contributions: An Editorial on the Pitfalls and Pathways in Family Business Research", *Family Business Review*, Vol. 34, No. 3, pp. 242–250. https://doi.org/10.1177/08944865211032503.

Obermayer, N., Kővári, E., Leinonen, J., Bak, G., and Valeri, M. (2021), "How social media practices shape family business performance: the wine industry case study", *European Management Journal*, Vol. 40, No. 3, pp.360-371

Parveen, F., Jaafar, N.I. and Ainin, S. (2015), "Social media usage and organizational performance: Reflections of Malaysian social media managers", *Telematics and informatics*, Vol. 32, No. 1, pp.67-78.

Pfeffer, J., Zorbach, T., and Carley, K.M. (2014), "Understanding online firestorms: Negative word-of-mouth dynamics in social media networks", *Journal of Marketing Communications*, Vol. 20, No. 1-2, pp. 117-128.

Phillipson, J., Tiwasing, P., Gorton, M., Maioli, S., Newbery, R. and Turner, R. (2019). Shining a spotlight on small rural businesses: How does their performance compare with urban?, *Journal of Rural Studies*, Vol. 68, pp. 230-239.

PricewaterhouseCoopers (PwC). (2017). A decade of digital keeping pace with transformation, 2017 Global Digital IQ Survey: 10th anniversary edition, available at: https://www.pwc.co.uk/consulting/assets/documents/global-2017-digital-iq-report.pdf (accessed 5 December 2021).

Putnam, R.D. (2000), "Bowling alone: America's declining social capital", Crothers, L. and Lockhart, C. (Eds.), *Culture and politics: A reader*, Palgrave Macmillan US, New York, pp. 223– 234.

Quinton, S. and Wilson, D. (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*, Vol. 54, pp. 15– 24.

Reuschke, D. and Mason, C. (2022), "The engagement of home-based businesses in the digital economy", *Futures*, Vol. 135, pp. 102542.

Rosenbaum, P.R. and Rubin, D.B. (1983), "The central role of the propensity score in observational studies for causal effects", *Biometrika*, Vol. 70, No. 1, pp. 41– 55.

Rubin, D.B. (2007), "The design versus the analysis of observational studies for causal effects: parallels with the design of randomized trials", *Statistics in medicine*, Vol. 26, No. 1, pp.20-36.

Salvato, C. and Melin, L. (2008), "Creating value across generations in family-controlled businesses: The role of family social capital", *Family business review*, Vol. 21. No. 3, pp.259-276.

Scuotto, V., Santoro, G., Bresciani, S. and Del Giudice, M. (2017), "Shifting intra-and inter-organizational innovation processes towards digital business: an empirical analysis of SMEs", *Creativity and Innovation Management*, Vol. 26, No. 3, pp.247-255.

Seaman, C., McQuaid, R., and Pearson, M. (2014). "Networks in family business: a multi-rational approach", *International Entrepreneurship and Management Journal*, Vol. 10, No. 3, pp.523-537.

Shekhar, S., Gupta, A. and Valeri, M. (2021), "Mapping research on family business in tourism and hospitality: a bibliometric analysis", *Journal of Family Business Management*, in press. https://doi.org/10.1108/JFBM-10-2021-0121

Skarpova, L. and Grosova, S. (2015), "The application of business network approach for small and medium enterprises (SME) with regard to their buying behavior", *Journal of Competitiveness*, Vol. 7, No. 2, pp. 62–74.

Sorenson, R.L. and Bierman, L. (2009), "Family capital, family business, and free enterprise", *Family Business Review*, Vol. 22, No. 3, pp.193-195.

Sorenson, R.L. and Milbrandt, J.M. (2022), "Family Social Capital in Family Business: A Faith-Based Values Theory". *Journal of Business Ethics*, in-press. https://doi.org/10.1007/s10551-022-05110-4

Spriggs, M., Yu, A., Deeds, D. and Sorenson, R.L. (2013), "Too many cooks in the kitchen: Innovative capacity, collaborative network orientation, and performance in small family businesses", *Family Business Review*, Vol. 26, No. 1, pp. 32-50.

Swani, K., Brown, B.P. and Milne, G.R. (2014), "Should tweets differ for B2B and B2C? An analysis of Fortune 500 companies' Twitter communications", *Industrial marketing management*, 43, No. 5, pp. 873-881.

Tajpour, M., Salamzadeh, A., Salamzadeh, Y. and Braga, V. (2021), "Investigating social capital, trust and commitment in family business: case of media firms", *Journal of Family Business Management*, in-press. https://doi.org/10.1108/JFBM-02-2021-0013

Tiwasing, P. (2021), "Social media business networks and SME performance: A rural–urban comparative analysis", *Growth & Change*, Vol. 52, No. 3, pp. 1892-1913.

Tiwasing, P. and Sawang, S. (2022), "Does membership of local Chambers of Commerce networks enhance rural SME performance? An empirical analysis", *International Journal of Entrepreneurial Behavior & Research*, Vol. 28, No. 2, pp. 368-385.

Tiwasing, P., Kim, Y.R. and Akinremi, T. (2020), "Spatial disparities in SME productivity: evidence from the service sector in England", *Regional Studies, Regional Science*, Vol. 7, No. 1, pp. 589-602.

Townsend, L., Wallace, C., Smart, A. and Norman, T. (2016), "Building virtual bridges: How rural micro-enterprises develop social capital in online and face-to-face settings", *Sociologia Ruralis*, Vol. 56, No. 1, pp. 29– 47.

Ughetto, E., Rossi, M., Audretsch, D. and Lehmann, E. E. (2020), "Female entrepreneurship in the digital era", *Small Business Economics*, Vol. 55, No. 2, pp. 305– 312.

Uhlaner, L.M., Matser, I.A., Berent-Braun, M.M. and Flören, R.H. (2015), "Linking bonding and bridging ownership social capital in private firms: Moderating effects of ownership–management overlap and family firm identity". *Family Business Review*, Vol. 28, No. 3, pp.260-277.

Valeri, M. and Baggio, R. (2021), "Increasing the efficiency of knowledge transfer in an Italian tourism system: a network approach", *Current Issues in Tourism*, Vol. 25, No. 13, pp. 2127-2142.

Valeri, M. and Baggio, R. (2021), "Italian tourism intermediaries: A social network analysis exploration", *Current Issues in Tourism*, Vol. 24, No. 9, pp.1270-1283.

Veider, V. and Matzler, K. (2016), "The ability and willingness of family-controlled firms to arrive at organizational ambidexterity", *Journal of Family Business Strategy*, Vol. 7, No. 2, pp.105-116.

Wellalage, N.H., and Fernandez, V. (2019), "Innovation and SME finance: Evidence from developing countries", *International Review of Financial Analysis*, Vol. 66, pp. 101370.

White, L. (2002), "Connection matters: Exploring the implications of social capital and social networks for social policy", *Systems Research and Behavioral Science*, Vol. 19, No. 3, pp. 255-269.

Williams, J.R. (2019), "The use of online social networking sites to nurture and cultivate bonding social capital: A systematic review of the literature from 1997 to 2018", *New Media & Society*, Vol. 21, No. 11–12, pp. 2710– 2729.

Zapata-Cantu, L., Sanguino, R., Barroso, A., and Nicola-Gavrilă, L. (2022). "Family Business Adapting a New Digital-Based Economy: Opportunities and Challenges for Future Research", *Journal of the Knowledge Economy*, in press, pp. 1-18. https://doi.org/10.1007/s13132-021-00871-1

Table I The summary of key relevant literature on the benefits of social media and its business networks as well as digital technology on business performance

Author	Area	Type of businesses	Method	Impacts of social media and its business networks on business performance
Ainin *et al*. (2015)	Malaysia	SMEs	Partial Least Squares Structural Equation Modelling (PLS-SEM)	Positive (financial and non-financial performance (e.g., cost reduction on marketing and consumer services etc.))
Jones *et al*. (2015)	USA (the western mountain region of Maine)	Small businesses	Semi-structured interviews	Positive (sales generation via creating better brand awareness and improving relationships with customers)
Parveen *et al*. (2015)	Malaysia	Non-family businesses	Semi-structured interviews	Positive (organisational performances in terms of sales revenue generation, increased competitive advantage, improved brand visibility, enhanced information accessibility, and improved customer relations and services)
Quinton and Wilson (2016)	Australia, Europe (Portugal, France, Spain), South Africa, UK, and USA	Non-family businesses (wine industry)	In-depth interviews	Positive (business performance through trust generation among network members, network creation opportunities, new business contracts and collaborative problem solving)
Scuotto *et al*. (2017)	EU	SMEs	Structural equation modelling (SEM)	Positive (process and product innovation)
Ahmad *et al*. (2019)	UAE	SMEs	PLS-SEM	No effect
Tiwasing *et al*. (2020)	England	SMEs (service sector)	Multilevel (2-level) analysis	Positive (productivity)
Tiwasing (2021)	England and Wales	Rural and urban SMEs	Inverse Probability Weighting	Positive (annual turnover and sales growth)
Cepeda-Carrion *et al*., (2022)	Spain	Family firms	PLS-SEM	Positive (open innovation processes)

Obermayer *et al*. (2022)	Hungary (Balaton region)	Family businesses (wine industry)	Semi-structured interviews	Positive (business performance via increasing brand awareness and reaching new customers)
Reuschke and Mason (2022)	Scotland	Home-based businesses	Multinomial logistic regression	Positive (sales generation)
Zapata-Cantu *et al*. (2022)	-	Family businesses	Literature review	Positive (professionalisation, business succession, and innovation processes)

3
4

Table II Definition of variables and Descriptive Statistics

Variable	Definition	family-owned SMEs		Chi-Square ($\chi 2$): Value (df)
		Non-member of SMN	Member of SMN	
Dependent				
TURN	Annual turnover	£1,469,515.86	£2,148,100.29	28.79(1)**[a]
SALE	Whether a firm aims to grow sales	55.9%	74.3%	341.79(1)**
PROC	Whether a firm has introduced any new or significantly improved processes in the last three years	18.4%	31.6%	214.83(1)**
PROD	Whether a firm has introduced any new or significantly improved goods/services in the last three years	32.9%	49.7%	269.92(1)**
Independent				
RURAL	Whether a firm is located in rural areas	33.8%	27.0%	55.64(1)**
PRIM	Whether a firm operates in broad sector including primary, production and construction	35.3%	16.7%	183.08(1)**
TRANST	Whether a firm operates in broad sector including transport, retail and food services	21.2%	13.3%	85.17(1)**
BUSINESS	Whether a firm operates in broad sector including business services	19.7%	44.5%	263.77(1)**
MICRO	Whether a firm has 1-10 employees	27.7%	25.1%	8.57(1)**
SMALL	Whether a firm has 11-49 employees	22.7%	22.8%	0.14(1)
MEDIUM	Whether a firm has 50-249 employees	11.1%	15.5%	38.94(1)**
AGE05	Age of business between 0 - 5 years	9.7%	15.9%	83.07(1)**
AGE20	Age of business 20 years and more	60.4%	49.2%	117.41(1)**
SOTRD	Whether a firm is sole proprietorship (Legal status)	27.5%	16.1%	73.98(1)**
WOMEN	Whether a firm is a women-led business	19.2%	19.6%	0.22(1)**

LDSE	Whether a firm is located in the core regions (London and South East)	25.6%	34.3%	83.67(1)**
SUPPORT	Whether a firm sought external advice or information on matter affecting its business in the last 12 months	26.3%	38.7%	167.17(1)**
FINANCE	Whether a firm tried to obtain external finance in the last 12 months	15.9%	18.5%	10.71(1)**
OWNWEB	Whether a firm has its own website	64.1%	85.5%	552.37(1)**
OTHERWEB	Whether a firm uses third party's websites	15.8%	22.5%	67.57(1)**
ECOMM	Whether a firm use e-commerce (e.g. direct order from own websites, using Amazon and eBay, etc.)	24.7%	38.5%	227.22(1)**

Notes: ** is significance difference at 5%, and df is degree of freedom

SMN is social media business networks.

[a]Welch t-test in turnover since this variable is continuous and its variances between two groups are unequal.

Table III Results of Logit Model

Variable (DV= SMN membership)	Model I
	Coefficient (SE)
Constant	-1.178*** (0.097)
RURAL	-0.179*** (0.052)
WOMEN	0.080 (0.060)
SOTRAD	-0.493*** (0.065)
MICRO	-0.311*** (0.064)
SMALL	-0.269*** (0.071)
MEDIUM	-0.035 (0.087)
AGE05	0.266*** (0.077)
AGE20	-0.259*** (0.052)
PRIM	-0.018 (0.077)
TRANST	-0.103 (0.075)
BUSINESS	1.066*** (0.074)
LDSE	0.181*** (0.051)
SUPPORT	0.382*** (0.051)
OWNWEB	0.560*** (0.083)
OTHERWEB	0.232*** (0.062)
ECOMM	0.419*** (0.049)
FINANCE	0.120** (0.063)
Number of Observations	**8,999**
Correctly classified	**76.70%**
Probability (LR-statistic)	**0.000**
Model Wald Statistic (χ^2_{17})	**1,244.22**

Notes: *, **, *** denote significance at 10%, 5% and 1%, SE is standard errors,
The correlation test is available upon request.

Table IV Results of Propensity Score Matching

Matching technique	Model II (TURN)	Model III (SALE)	Model IV (PROC)	Model V (PROD)
	ATET (SE)	**ATET (SE)**	**ATET (SE)**	**ATET (SE)**
PSM (1-to1)	303450.7** (143703.6)	0.073*** (0.013)	0.101*** (0.013)	0.072*** (0.015)
Nearest Neighbour (3)	280564.3** (143582.6)	0.084*** (0.012)	0.097*** (0.012)	0.091*** (0.014)
Caliper(0.021)[a]	310434.4** (144213.2)	0.076*** (0.012)	0.099*** (0.014)	0.087*** (0.014)
Observations				
Raw	**7,932**	**8,999**	**8,946**	**8,999**
Match	**7,612**	**8,308**	**8,258**	**8,308**
Variance ratio[b]	**No significant difference**			
Durbin-Wu-Hausman Chi-sq (1) (p-value)	**0.7941 (0.4107)**	**0.4543 (0.1972)**	**0.6211 (0.3721)**	**0.6637 (0.3814)**

Notes: *** and ** are significant at 1% and 5%, respectively.

SE is robust standard error, and ATET is average treatment effect on the treated.

[a]The width of Caliper equals to 0.2 of the standard deviation of the logit of the propensity score.

[b]The results of variance ratio are available upon request.

Appendix

Table A.1: the results of a correlation matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
SOMEDIA (1)	1.000																	
RURAL (2)	-0.077	1.000																
PRIM (3)	-0.141	0.124	1.000															
TRANST (4)	-0.096	0.025	-0.362	1.000														
BUSINESS (5)	0.268	-0.101	-0.399	-0.412	1.000													
MICRO (6)	-0.029	0.045	0.012	0.067	0.006	1.000												
SMALL (7)	-0.010	-0.015	0.008	0.109	-0.110	-0.325	1.000											
MEDIUM (8)	0.064	-0.033	-0.039	0.037	-0.063	-0.231	-0.208	1.000										
AGE05 (9)	0.095	-0.062	-0.066	0.011	0.054	0.036	-0.021	-0.085	1.000									
AGE20 (10)	-0.113	0.060	0.113	0.062	-0.111	0.006	0.050	0.130	-0.421	1.000								
SOTRD (11)	-0.136	-0.014	0.025	-0.061	-0.092	-0.117	-0.226	-0.197	-0.058	-0.082	1.000							
WOMEN (12)	0.006	-0.008	-0.121	-0.030	-0.007	0.016	0.032	-0.055	0.029	-0.064	0.106	1.000						
LDSE (13)	0.096	-0.164	-0.101	-0.064	0.154	-0.008	-0.031	0.001	0.028	-0.042	-0.053	0.018	1.000					
SUPPORT (14)	0.133	0.026	-0.017	-0.047	0.076	0.002	0.081	0.142	0.018	0.016	-0.174	-0.005	0.012	1.000				
FINANCE (15)	0.023	0.039	0.066	0.044	-0.067	-0.017	0.095	0.136	-0.012	0.038	-0.105	-0.035	-0.021	0.119	1.000			
OWNWEB (16)	0.243	-0.047	-0.123	0.019	0.063	-0.003	0.172	0.182	0.060	-0.083	-0.211	0.009	0.052	0.125	0.078	1.000		
OTHWEB (17)	0.086	-0.001	-0.077	0.081	-0.029	0.021	0.002	0.013	0.020	-0.015	0.006	-0.013	0.002	0.023	0.027	0.113	1.000	
ECOMM (18)	0.149	-0.017	-0.129	0.175	-0.058	0.012	0.042	0,066	0.045	-0.043	-0.046	0.007	0.018	0.051	0.047	0.307	0.297	1.000

Table A.2: The results of balancing test using Standardised Differences

	Standardized Differences							
	Model II (TURN)		Model III (SALE)		Model V (PROC)		Model VI (PROD)	
	Raw	Matched	Raw	Matched	Raw	Matched	Raw	Matched
RURAL	-0.15226	-0.00292	-0.15505	0.007982	-0.1535	0.064715	-0.15505	0.007982
PRIM	-0.24497	-0.03223	-0.24787	-0.02306	-0.24946	-0.04255	-0.24787	-0.02306
TRANST	-0.20745	-0.005	-0.19397	-0.00562	-0.19442	-0.00735	-0.19397	-0.00562
BUSINESS	0.243673	0.008847	0.252577	-0.00615	0.254481	0.011439	0.252577	-0.00615
MICRO	-0.0498	0.039669	-0.05844	0.010886	-0.05944	0.030298	-0.05844	0.010886
SMALL	-0.00518	-0.01179	-0.00025	-0.00449	0.003086	0	-0.00025	-0.00449
MEDIUM	0.124279	-0.03453	0.127705	-0.06292	0.126074	-0.05222	0.127705	-0.06292
AGE05	0.185949	0.04919	0.190726	0.029958	0.191484	0.074295	0.190726	0.029958
AGE20	-0.2125	-0.0518	-0.22879	-0.04095	-0.22962	-0.05307	-0.22879	-0.04095
SOTRD	-0.20312	0.050321	-0.21778	0.044958	-0.2222	0.016219	-0.22778	0.044958
WOMEN	0.038671	0.100845	0.012257	0.064393	0.012572	0.075026	0.012257	0.064393
LDSE	0.187077	0.02024	0.191878	0.010925	0.193739	0.03009	0.191878	0.010925
SUPPORT	0.254	0.022337	0.246972	0.04178	0.246424	0.043049	0.246972	0.04178
FINANCE	0.027418	0.040139	0.046181	-0.00788	0.047181	0.027593	0.046181	-0.00788
OWNWEB	0.193373	-0.04344	0.208352	-0.02979	0.207959	-0.05811	0.208352	-0.02979
OTHWEB	0.158504	0.026936	0.171763	0.027285	0.171183	0.06847	0.171763	0.027285
ECOMM	0.234895	-0.01594	0.241241	0.001451	0.232405	-0.05132	0.231241	0.001451
NO. of observations	**8,026**	**7,724**	**9,192**	**8,500**	**9,130**	**8,444**	**9,192**	**8,500**
Treated observations	**3,862**	**3,862**	**4,250**	**4,250**	**4,222**	**4,222**	**4,250**	**4,250**
Control observations	**4,164**	**3,862**	**4,942**	**4,250**	**4,908**	**4,222**	**4,942**	**4,250**

Notes: Our Standardised Differences are lower than 0.25 (or 0,30), indicating that a regression model adjusting for covariates is not sensitive to model specification because of lack of balance (or overlap) (Rubin, 2001; Ho *et al*., 2007; Harder *et al*., 2010; Linden and Samuels, 2013).

Table A.3: the results of balancing test using Variance Ratio

	Variance Ratio							
	Model II (TURN)		**Model III (SALE)**		**Model V (PROC)**		**Model VI (PROD)**	
	Raw	**Matched**	**Raw**	**Matched**	**Raw**	**Matched**	**Raw**	**Matched**
RURAL	0.8764903	0.9969398	0.8755701	1.008469	0.8769167	1.075661	0.8755701	1.008469
PRIM	0.7191273	0.9533116	0.7187078	0.9655205	0.7176163	0.938465	0.7187078	0.9655205
TRANST	0.7993935	0.9932551	0.8151594	0.9926965	0.8142394	0.9904356	0.8151594	0.9926965
BUSINESS	1.21563	1.001775	1.260342	0.9987055	1.260199	1.002566	1.260342	0.9987055
MICRO	0.9454666	1.050727	0.9392957	1.012739	0.9384499	1.036635	0.9392957	1.012739
SMALL	0.9931429	0.9845355	0.9996996	0.9941622	1.00409	1	0.9996996	0.9941622
MEDIUM	1.210041	0.9382292	1.225599	0.8919859	1.122518	0.9080276	1.125599	0.8919859
AGE05	1.122192	1.100794	1.142325	1.059028	1.24425	1.160144	1.242325	1.059028
AGE20	1.039737	1.001182	1.045111	1.000212	1.045189	1.000856	1.045111	1.000212
SOTRD	0.7766888	1.101831	0.7802827	1.089985	0.77567	1.030832	0.7802827	1.089985
WOMEN	1.064054	1.188475	1.019183	1.110922	1.019748	1.132358	1.019183	1.110922
LDSE	1.177681	1.013884	1.184855	1.007396	1.187157	1.021141	1.184855	1.007396
SUPPORT	1.200855	1.010511	1.225189	1.02163	1.224908	1.022408	1.225189	1.02163
FINANCE	1.055284	1.083039	1.099757	0.9847513	1.102106	1.057299	1.099757	0.9847513
OWNWEB	0.8463312	1.095133	0.8402448	1.063633	0.8404048	1.131834	0.8402448	1.063633
OTHWEB	1.108227	1.037359	1.11265	1.03768	1.110677	1.10173	1.21265	1.03768
ECOMM	1.166791	0.9927086	1.17572	1.000692	1.177111	0.9786582	1.17572	1.000692
Number of obs	**8,026**	**7,724**	**9,192**	**8,500**	**9,130**	**8,444**	**9,192**	**8,500**
Treated obs	**3,862**	**3,862**	**4,250**	**4,250**	**4,222**	**4,222**	**4,250**	**4,250**
Control obs	**4,164**	**3,862**	**4,942**	**4,250**	**4,908**	**4,222**	**4,942**	**4,250**

Notes: The Variance Ratio is not significantly different between the raw and matched and all values are closed to 1 (Dehejia and Wahba, 2002; Abadie and Imbens, 2011; Phillipson *et al*., 2019).