Public support and firm performance: a systematic review and research agenda

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ABSTRACT

Public support for enterprises contributes to fostering innovation and entrepreneurship. The impact evaluation is a relevant and complex topic that still receives relatively limited scholarly attention. The study consists of an integrative review of a systematic selection of 60 articles published between 1998 and 2023 on public financial and non-financial support and firm performance outcomes. The study first describes the state-of-the-art publications on public support and firm performance in terms of journal outlets, publishing year, methodologies, country of origin, sample characteristics, and unit of analysis. Through an in-depth content analysis of articles, the review proposes an integrative framework describing the relationships between public support and firm performance outcomes, also underlining interacting variables. Our critical analysis and synthesis illustrate what is confirmed in the literature and what is not. We propose an agenda for future research, contributing to the debate on enterprise policy evaluation. This review has practical implications as it contrasts public policies' impacts on different geographical contexts, providing food for thought for practitioners and policymakers.

KEYWORDS

Public support; governmental aid; entrepreneurship and SMEs supporting policy; firm performance; literature review; integrative framework

1. Introduction

Public support for enterprises encompasses a variety of programmes and policy types aimed at supporting firms in their innovation activities, strategies, and growth processes (Dimos et al. 2022; OECD (2023); Testa, Szkuta, and Cunningham 2019). According to the OECD (2023), public support to businesses encompasses a wide range of measures that governments and public entities can offer to all-sized companies, such as grants, support in equity and debt financing, tax incentives, subsidies, and many others (Dumont 2017). Enterprise public policies can be established at regional, national, or international levels to meet goals at the macro level. SME policies typically tackle small companies as job creators aiming to stimulate entrepreneurship (Dvouletý, Srhoj, and Pantea 2021) and decrease unemployment rates (Al Shukaili et al. 2022; Testa, Szkuta, and Cunningham 2019). Other policies might aim at preventing outsourcing (Lenihan 2011), fostering industrial change (Lenihan 2011) or economic development (Kersten et al. 2017), boosting national competitiveness (Dvouletý, Srhoj, and Pantea 2021), or supporting innovation (Jugend et al. 2020; Dvoulety et al. 2018).

Policy, economics, innovation, and entrepreneurship scholars have widely debated the necessity and effects of creating policies to stimulate innovation or to tackle market failures (Laplane and

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Mazzucato 2020). Drawing evidence from the American context, Mazzucato (2011, 2018) has suggested that governments should adopt an entrepreneurial approach to investing in companies to favour national champions' survival and growth and innovative companies' creation. According to this view, the State can be seen as a risk taker and co-investor in innovation, even though it is essential that public funding agencies also share the rewards of investments, not only the risks (Laplane and Mazzucato 2020). However, a considerable part of the scholarly community has stood against this theory, questioning the entrepreneurial approach of the United States and discussing the risks and dangers of developing top-down industrial and public policies to address failures and lead innovation and entrepreneurship (Coad et al. 2022; Wennberg and Sandström 2022). Besides the more comprehensive and lively debate on the reasons why public bodies should give or avoid giving support to businesses, both the scholarly and policy communities agree on the urgent need to have robust evaluations of public policies supporting entrepreneurship, SMEs and innovation to verify if the established measures are appropriate, have the expected returns, and eventually identify potential improvements (Lenihan 2011). Despite these arguments, impact evaluation has received relatively limited scholarly attention. At the same time, extant literature has focused chiefly on the impact at the level of assisted firms rather than at the societal level (Lenihan 2011). Although a growing stream of research has analysed the effects of policy measures on firm performance-related outcomes, the picture is still unclear for some reasons. First, different types of public support are made available to businesses. Second, the support is given for various purposes, an aspect that must be carefully addressed when developing the enterprise policy evaluation process. These two aspects are interrelated as the effectiveness of a policy in achieving its goals depends on its design and features, including the selection criteria, targeting, and intensity of support (Dvouletý, Srhoj, and Pantea 2021; OECD 2023). Also, heterogeneous scenarios and circumstances can influence the effectiveness of measures (Lenihan 2011). For all these reasons, scholars have underlined that policy evaluation is a complex issue that must be carefully handled.

We develop a critical review of the literature on the impact of public support on firm performance outcomes, which goes beyond the evaluation reports provided at the policy levels (e.g. Brown and Lee 2018). In the case of rapidly evolving research evidence, conducting a literature review is a method to summarize the state-of-the-art of scholarly knowledge, create the foundations to advance the knowledge in the field, identify converging areas and under-investigated themes, and facilitate theory development (Snyder 2019). For this purpose, we have systematically selected 60 articles published in 34 journals between 1998 and 2023 (both included) to develop an integrative review (Elsbach and van Knippenberg 2020; Torraco 2016). Our work complements and extends existing reviews on public support, which are focused on particular support types (e.g. Ayatse, Kwahar, and Iyortsuun 2017; Dimos et al. 2022; Dvouletý, Srhoj, and Pantea 2021; Foreman-Peck and Zhou 2022; Castellacci and Lie 2015; Testa, Szkuta, and Cunningham 2019; Kersten et al. 2017), and the ones that limit to specific contexts, such as low and middle-income countries (Abramovsky et al. 2018; Kersten et al. 2017).

Our review contributes to the literature on entrepreneurship, innovation, and policy evaluation by reviewing and assessing the public policy literature concerning firm performance outcomes. The review first describes the state-of-the-art of the studied literature in terms of the number of publications, journal outlets, geographical and industrial contexts, methodologies and units of analysis. Secondly, through an in-depth content analysis of articles, our review proposes an integrative framework describing the relationships between public support and firm performance outcomes and the interacting variables, clarifying what is confirmed and what is not in the literature. Finally, we identify gaps and inconsistencies in this field and propose an agenda for future research, thus contributing to public entrepreneurship, SME, innovation, and policy evaluation research. Our study enriches the broader public policy evaluation literature by clarifying the evidence on public support and firm performance relationship, which encompasses the more traditional evaluation practices considering the impact of public support on firm outcomes (Lenihan 2011). The discussion emphasizes opportunities and challenges emerging in this field, with substantial implications for practitioners and policymakers.

2. Methodology

This study systematically selects and critically appraises 60 articles on public support, both financial and non-financial, and firm performance published between 1998 and 2023 (both included). Although there are several review types (Paul and Rialp-Criado 2020; Snyder 2019), critical reviews, in comparison to other review types, have the aim 'to assess, critique or synthesise the literature', setting the foundations to advance future studies on the topic, highlighting not only what has been studied previously, but also what has been confirmed or not by empirical studies (Snyder 2019). For this reason, they are suitable for analysing relatively emergent topics to provide an initial synthesis or mature topics to reconceptualize (Elsbach and van Knippenberg 2020; Torraco 2016). We align with the first approach as the purpose of this integrative review is twofold: provide a bibliometric description of the literature on public support and firm performance and, through content analysis and synthesis, provide an integrative theoretical framework describing the relationships between public support and firm performance, and the interaction effects with other variables. Critical reviews must properly justify the need for the review (Elsbach and van Knippenberg 2020). To the best of our knowledge, no recent comprehensive reviews have specifically addressed public support and firm performance. This work is unique in its intent and scope, complementing and extending existing reviews that are focused on specific arguments, such as particular policy types – e.g. corporate tax incentives in low and middle-income countries (Abramovsky et al. 2018) innovation and R&D policies (e.g. Jugend et al. 2020; Dimos et al. 2022; Castellacci and Lie 2015; Testa, Szkuta, and Cunningham 2019), financing for innovation (e.g. Stefani et al. 2020), business incubation and angel financing (e.g. Ayatse, Kwahar, and Iyortsuun 2017; J. Lerner 1998), competitiveness and investment aid for SMEs (Dvouletý, Srhoj, and Pantea 2021; Kersten et al. 2017). Jugend et al. (2020) focus only on innovation policies and their implications for open innovation by investigating 121 articles quoting keywords such as 'government/public support' OR 'public intervention/action/agent' AND innovation published between 2012 and 2019. In addition, Dvouletý, Srhoj, and Pantea (2021) review 30 articles examining competitiveness/entrepreneurship and SME-promoting grants, focusing only on the context of the European Union. We expand the existing reviews by offering a perspective of the broader geographical coverage and by including non-financial public support.

2.1. Search and selection of studies

Identifying the boundary conditions is a fundamental step for integrative reviews (Elsbach and van Knippenberg 2020), which aim to provide an overview of research problems, identify theoretical arguments, and develop a future research agenda. As the lack of rigour and depth are potential flaws for this review type (Palmatier, Houston, and Hulland 2018), we develop strategies, guidelines and reporting practices to ensure the review is accurate, precise, and trustworthy (Snyder 2019). We have created a protocol to search and select the articles following the instructions of the preferred reported items for systematic reviews and meta-analysis (PRISMA) approach (Moher et al. 2015). To ensure the replicability of our selection strategy, we have included Figure 1, which documents the flow diagram for selecting the final sample of articles based on the PRISMA strategy (Moher et al. 2015).

The final selection of studies results from a methodological process combining electronic means with a manual search. At each step, co-authors discussed reaching a consensus on the chosen approach. The initial search criteria comprise articles investigating public financial support (monetary, such as subsidy) and public non-financial (non-monetary, such as counselling) support (for defining, see OECD 2023) and firm performance published in business, management, economics, and finance, without limits of scope and journal. Books, book chapters and conference proceedings were excluded. As a first step, a systematic literature search was performed in *Scopus* by using keyword searches in 'Title, abstract and keywords': 'financial support' AND 'public' AND 'firm performance' and 'financial incentive' AND 'performance' and 'governmental support' OR 'public subsidy' OR 'public incentive' AND 'firm performance' in business, management and economics and finance areas, limiting to articles

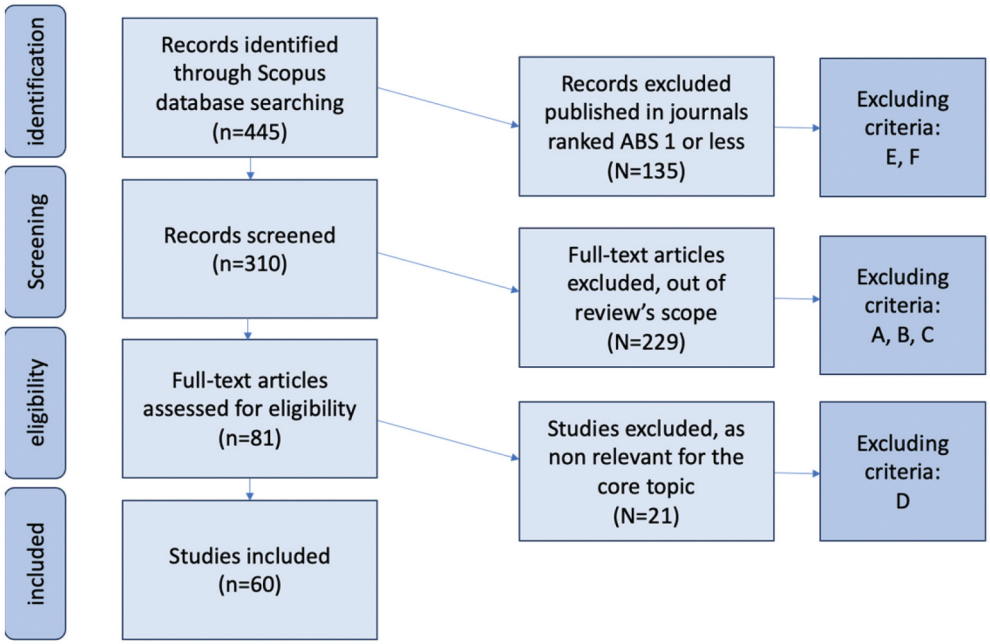

Figure 1. Flow diagram for the selection of literature reviewed based on PRISMA (Moher et al. 2015). Source: own elaboration.

and reviews published in English. We have purposefully imposed no restrictions on the initial year of analysis. Through the Scopus search, we initially obtained 445 articles. Then, we selected only the articles published in journals with a rating equal to or higher than two according to the official list of Association Business Schools (ABS) (United Kingdom 2018), excluding 135 articles. This procedure ensures the inclusion of only peer-reviewed articles (Moher et al. 2015). We followed other articles in this choice but still acknowledge the existence of other reliable rankings that could be alternatively considered, such as the Declaration on Research Assessment (https://sfdora.org/). As the third step, we went through the manual reading of articles and excluded the ones considered out of topic (229). To ensure objectivity in work inclusion, each author independently classified the articles considered out of topic in an Excel file. Then, the files were matched, and the authors discussed when there was disagreement to keep or exclude the record. Then, the other 21 articles were excluded because they were not explicitly focused on public support but rather more related to financial constraints and barriers. Table 1 describes the criteria for evaluating whether the articles were eligible for this review. Through this procedure, we identify a final dataset of 60 articles, including three reviews and 57 empirical articles, published in 34 peer-reviewed journals between 1998 and 2023.

Table 1. Inclusion/Exclusion criteria.

Inclusion criteria	Exclusion criteria
(A) Mention "public support" and/or "financial support" and/or "financial incentive" or "governmental support" or "public subsid" or "public incentive" and "firm performance" in the abstract, title or keywords.	(A) Articles discussing individual/employee incentives and performance.
(B) Be published in journals ranked ABS 2 or more (ABS, 2018)	(B) Articles discussing university-industry collaborations.
(C) Be a review or an empirical article	(C) Articles discussing non-public financial support.
(D) Be written in English	(D) Articles discussing non-related topics, e.g. on financial constraints and barriers.
	(E) Chapter contributions and articles published in journals ranked less than 2 in ABS.
	(F) Not written in English.

2.2. Procedures for Thematic Analysis and framework building

The data organization procedures comprise the creation of an Excel workbook to record and compare articles in chronological order. The three reviews have been separately analysed, confirming the lack of recent and comprehensive reviews on public support and firm performance. We have given each empirical article an identification number (1–57). Following the structure of prior review articles (Martineau and Pastoriza 2016; Romanello and Chiarvesio 2019), we have content-analysed each empirical article to collect and codify the following descriptive data, such as authors, title, year of publication, journal source, purpose, main findings, empirical method, sample features, country of origin, dependent variable(s), independent variable(s), interacting variable(s). The analysis follows two steps. Initially, we have carried out a bibliometric analysis to describe the evolution of the literature, the geographical and industry context, theoretical foundations, the research methods and sample features. As a result, we illustrate the state-of-the-art literature on public support and firm performance. After carefully reading and rereading all 57 articles, we have identified initial patterns. As Palmatier, Houston, and Hulland (2018) highlighted, comprehensive reviews face the risk of simply indexing the findings. To address this aspect, we have used critical evaluation to *make sense* of the content of the articles (Williams et al. 2021). Through content analysis and organized synthesis (Palmatier, Houston, and Hulland 2018), we have categorized dependent, independent and interacting variables analysed in each article to build an integrative framework, which is the final output of this review. Framework-based reviews have a robust structure and help summarize extant evidence (Paul and Rialp-Criado 2020). Through critical analysis and synthesis, we have critically assessed the examined paths in the literature and synthesized the main findings of the articles. Critical analysis assesses, analyses, and critiques extant literature, while creative synthesis identifies themes, relationships, and gaps (Callahan 2014; Elsbach and van Knippenberg 2020; Torraco 2016). Synthesis refers to aggregating all the studies with different perspectives to make sense of them and serve the purpose of the review (Paul and Rialp-Criado 2020). As a result, we have identified under-researched topics, confirmed and contrasting evidence, and the arguments that deserve more research attention (Elsbach and van Knippenberg 2020; Torraco 2016).

3. State-of-the-art of the literature

3.1. Publication year and outlet

Figure 2 shows the number of articles published per year, showing an increased interest from 2014, with an apical point between 2019 and 2020.

As shown in Table 2, the highest number of articles are published in *Research Policy (6), Journal of Small Business Management (5), and Technovation (4)*.

3.2. Country of origin

Regarding the geographical context, most papers consider Asian countries (22 papers) and Europe (29), as illustrated in Figure 3. Almost all the papers under scrutiny have a single-country focus. The most represented Asian countries are China (10), Korea (2) and Vietnam (2). Studies on Europe mainly relate to Italy (5), the United Kingdom (3), the Czech Republic (2), France (2), and Portugal (2). In addition, three studies consider the U.S. (3), whereas there is a recent interest in other areas of the world, such as the Middle East and Africa. According to the classification of the International Monetary Fund (2018), 36, 7% of the studies relate to emerging and developing countries: China (10), Malaysia (1), Pakistan (1), Vietnam (2), Russia (1), Turkey (2), Uruguay (1), Chile (1), South Africa (1), Uganda (1). Moreover, a few papers adopt a cross-country perspective, directly comparing two countries (e.g. China and India) or considering samples of European Countries, CEE countries or mixed countries.

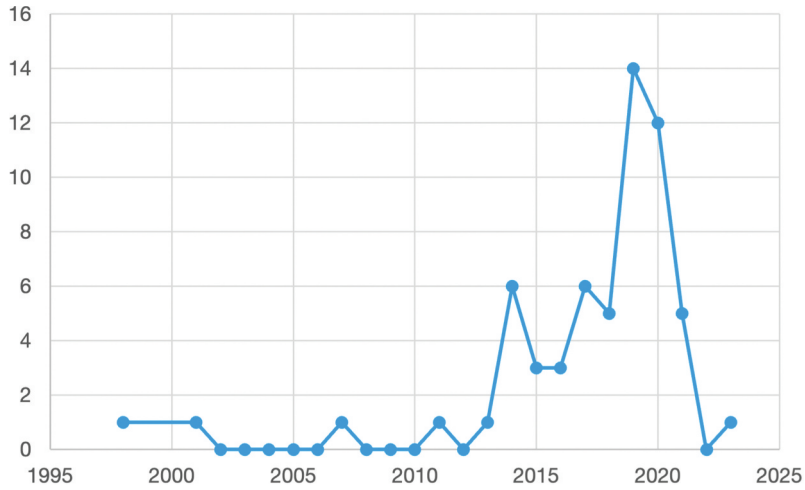

Figure 2. The number of articles per year. Source: own elaboration.

Table 2. Number of articles per year published per journal.

N.	Journal	ABS Rank	Total	Year (Number Articles)
1	Asia Pacific Business Review	2	1	2014 (1)
2	B.E. Journal of Economic Analysis and Policy	2	1	2019 (1)
3	China Economic Review	2	1	2017 (1)
4	Economic Modelling	2	1	2021 (1)
5	Economics of Innovation and New Technology	2	2	2020 (1), 2016(1)
6	Entrepreneurship and Regional Development	3	3	2018 (1), 2016 (1), 2014 (1)
7	Entrepreneurship Research Journal	2	1	2021 (1)
8	European Economic Review	3	1	2020 (1)
9	Finance Research Letters	2	1	2021(1)
10	Innovation: Management, Policy and Practice	2	1	2015 (1)
11	International Business Review	3	1	2007 (1)
12	International Journal of Entrepreneurship	2	2	2019 (2)
13	International Journal of Industrial Organization	3	1	2017 (1)
14	International Journal of Innovation and Technology Management	2	1	2015 (1)
15	International Journal of Innovation Management	2	1	2020 (1)
16	International Journal of Technology Management	2	1	2017 (1)
17	International Small Business Journal	3	1	2017 (1)
18	Journal of Banking and Finance	3	1	1998 (1)
19	Journal of Business Research	3	3	2021 (1), 2018 (1), 2016 (1)
20	Journal of Business Venturing	4	1	2001 (1)
21	Journal of Cleaner Production	2	3	2019 (3)
22	Journal of Common Market Studies	3	1	2020 (1)
23	Journal of General Management	2	1	2011 (1)
24	Journal of International Business Studies	4	1	2019 (1)
25	Journal of Small Business Management	3	5	2020 (2), 2019 (2), 2014 (1)
26	Journal of Technology Transfer	2	3	2023 (1), 2019 (1), 2017 (1)
27	Local Economy	2	1	2014 (1)
28	Managerial and Decision Economics	2	1	2020 (1)
29	Research Policy	4*	6	2020 (1), 2019 (1), 2018 (2), 2015 (1), 2014 (1)
30	Small Business Economics	3	2	2021 (1), 2019 (1)
31	Structural Change and Economic Dynamics	2	1	2019 (1)
32	Technological Forecasting and Social Change	3	4	2020 (2), 2017 (1), 2014 (1)
33	Technovation	3	4	2020 (1), 2019 (1), 2018 (1), 2013 (1)
34	World Economy	2	1	2020 (1)

Note: ABS ranking goes from 2 to 4* (best level).

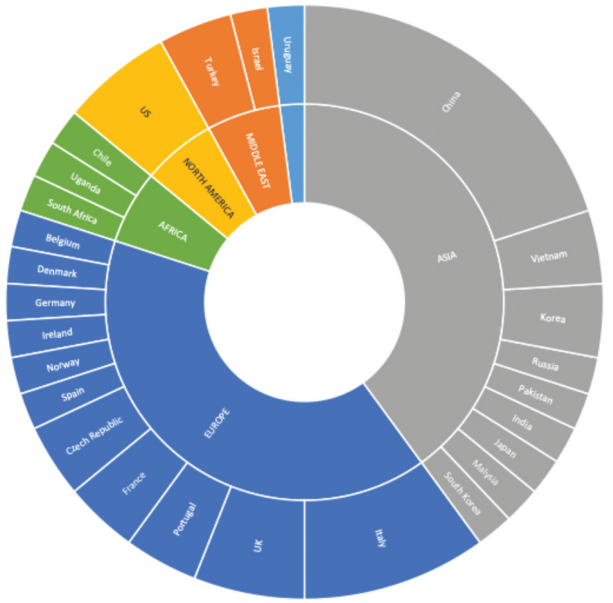

Figure 3. Geographical areas: markets and continents investigated in single-country studies. Source: own elaboration.

3.3. Theoretical foundations

From a theoretical perspective, we underline the multidisciplinary nature of this research stream. Still, we have classified studies into two main categories (see Table A1 in the appendix). The first group includes approaches associated with firms' or entrepreneurs' behaviour, resources, and growth. In the second cluster, articles utilize macroeconomic and institutional theoretical approaches, including subjective goals of policymakers (i.e. evolutionary approaches). The interplay between the individual-/firm-level and institutional approaches can be established through the entrepreneurial ecosystem framework (Stam and Van de Ven 2021), which unites the elements and institutions and links them with entrepreneurial activity, i.e. firms and entrepreneurs. In particular, systemic conditions contain the support services/intermediaries, i.e. entrepreneurship and SMEs supporting policies, that aim to foster the ecosystem's quality to boost overall aggregate value creation and serve thus as an overlapping framework for future studies, addressing specific areas of the policy interest (OECD 2023).

3.4. Methodological perspectives

Regarding methodologies, 91% use a quantitative approach based on primary and secondary data, a few exploratory studies adopt qualitative approaches, and one is a mixed method study. Companies are often selected through purposive or convenience sampling techniques and primary data are collected through interviews with CEOs, managers or members of institutional agencies. A few studies collect data from multiple sources, such as recipients and agencies offering financial support to organizations with a complementary perspective (Motoyama and Knowlton 2016) or with different methods, e.g. semi-structured interviews, focus groups and personal observations (Khan et al. 2020). Data analysis could include case studies, fuzzy-set qualitative comparative analysis (fsQCA), content analysis and a realistic evaluation approach (see Table 3).

Quantitative studies mainly analyse primary data collected online or through telephonic surveys and secondary data relying on unique longitudinal/cross-sectional datasets. Secondary data are drawn from international databases, such as the EU-EFIGE/Bruegel-Unicredit dataset of

Table 3. Qualitative and quantitative techniques in the sampled studies.

Methods	Approaches and techniques	Example
Qualitative	• Case study approach	• Radziwon, Bogers, and Bilberg (2017)
	• Content analysis	• Khan et al. (2020)
	• Realistic evaluation approach	• Irwin, Pattinson and Scott (2014)
	• Fuzzy-set qualitative comparative analysis (fsQCA)	• Rey-Martí, Ribeiro-Soriano, and Sánchez-García (2016)
Quantitative	• Chi-square analysis	• Yesilay, Ar, and Temel (2015)
	• ANOVA	• Guan and Yam (2015)
	• Factor Analysis	• Lerner and Haber (2001)
	• Propensity Score Matching	• Dvouletý, Čadil, and Mirošník (2019)
	• Regression-based models	• Minola, Vismara, and Hahn (2017)
	○ Logistic	• Guan and Pang (2017)
	○ Probit	• Mardones and Sepúlveda (2020)
	○ Tobit	• Stojčić, Srhoj, and Coad (2020)
	○ Inverse probability weighted regression (ipwra)	• Hu, Li, and Aulakh (2019)
	○ OLS	• Feng, Meng, and Huang (2021)
	○ Modified switching regression model	• Aguiar and Gagnepain (2017)
	○ Instrumental variable regression model	• Zhou et al. (2020)
	○ Hierarchical	• Santos (2019)
	○ Difference-in-difference (DiD)	• Khyareh, Khairandish, and Torabi (2019)
	○ Structural equation models (e.g. PSM-SEM; MIMIC)	
	• Non-parametric tests: Data Envelopment Analysis (DEA)	• Min, Kim, and Sawng (2020)
	• Semi-parametric econometric technique	• Fattorini, Ghodsi, and Rungi (2020)
	• Bi-level programming mode	• Chalmardi and Camacho-Vallejo (2019)
	• Spatial Durbin model	• Montmartin, Herrera, and Massard (2018)
Mixed Method	• Regression models and case study approach	• Xiao and North (2018)

companies from European countries (e.g. Okafor, Bhattacharya, and Apergis 2020), or firm-level national datasets, such as the Community Innovation Survey data (Aboal and Garda 2016). This stream of research mainly aims to explain or predict the impact of public support on firm performance outcomes. Although most studies in this group develop and test hypotheses, about 20 studies having confirmatory purposes do not explicitly state the hypotheses, the conceptual model nor anchor the analysis in a theoretical background (e.g. Fattorini, Ghodsi, and Rungi 2020; Nilsen, Raknerud, and Iancu 2020; Okafor, Bhattacharya, and Apergis 2020). Quantitative analyses are performed using different methodologies, as shown in Table 3. Many studies analyse panel data (longitudinal datasets) to assess the impact of public support over time (e.g. Doh and Kim 2014; Pergelova and Angulo-Ruiz 2014), typically through regression-based approaches. This strategy reflects a monitoring intention, as these studies solely consider the support recipients (Lenihan 2011), instead of including non-supported companies as controls (OECD 2023). In contrast, several articles adopt a counterfactual approach by comparing two (or more) samples of companies presenting different features and testing the differences through, e.g. propensity score matching (PSM) and difference-in-difference (DiD) analyses. Comparisons mainly involve firms that benefited from public support (treated) against a control group of firms that have not received any support (non-treated) (e.g. Santos 2019; Vanino, Roper, and Becker 2019), rejected applicants (Dvouletý, Srhoj, and Pantea 2021) or firms that received support from different public programmes (e.g. Bellucci, Pennacchio, and Zazzaro 2019). This perspective reflects the attempt to develop rigorous analyses of the impact of public policy in line with an evaluation approach (Storey 2017). Compared to monitoring, evaluation determines a policy's relevance, efficiency, and effectiveness against its initial objectives (Lenihan 2011; OECD 2023; Storey 2017).

3.5. Industrial context

Although most studies adopt the firm as a unit of analysis, a few exceptions choose different perspectives: three are regional studies (Min, Kim, and Sawng 2020; Montmartin, Herrera, and Massard 2018; Radziwon, Bogers, and Bilberg 2017), one study has adopted a supply chain perspective (Chalmardi and Camacho-Vallejo 2019), and a few studies have analysed country-level data (e.g. Khyareh, Khairandish, and Torabi 2019).

Most firm-level studies use cross-sectoral databases, but some studies focus on specific industries, e.g. manufacturing firms (e.g. Fattorini, Ghodsi, and Rungi 2020; Guan and Yam 2015; Vlasova 2021), cultural and creative industries (e.g. Zhou et al. 2020), agro-based companies (e.g. Nakku et al. 2020), young technology-based firms (Minola, Vismara, and Hahn 2017), firms related to New Energy Vehicles industry (Li et al. 2019). Concerning firm types, 25% of studies analyse SMEs and young ventures, including innovative start-ups (Lukeš, Longo, and Zouhar 2019) and early internationalizing firms (Catanzaro, Messeghem, and Sammut 2019). In contrast, some studies focus on specific firm types: business groups (e.g. Hu, Li, and Aulakh 2019), A-share listed firms (e.g. Chang et al. 2021; Feng, Meng, and Huang 2021), social enterprises (Cheah, Amran, and Yahya 2019; Rey-Martí, Ribeiro-Soriano, and Sánchez-García 2016), tourism ventures (Lerner and Haber 2001), collective research centres (Knockaert, Spithoven, and Clarysse 2014) and co-operative groups (Othman, Mansor, and Kari 2014).

4. Public support and firm performance measures

4.1. Public support measures

Table 4 summarizes the variety of public support measures highlighted through the analysis. Innovation policy research focuses on innovation and R&D support and programmes while clearly distinguishing subsidies, incubation and interactions with universities and R&D organizations. Most studies adopt one measure of support, but some use multiple measures (e.g. Okafor, Bhattacharya, and Apergis 2020). Besides simply referring to regional or governmental support, some scholars also examine the specific characteristics of the support received in terms of dose and duration (e.g. Bannò, Piscitello, and Amorim Varum 2014; Nilsen, Raknerud, and Iancu 2020; Vu and Tran 2021), which is crucial for capturing the aid effects over time (Dvouletý, Srhoj, and Pantea 2021). Non-financial (non-monetary, including training, advisory services provision or counselling) support has increasingly been considered relevant.

Another approach consists of contrasting policy types in a comparative way: central-government-funded projects and local-government-funded research projects (Zhou et al. 2020); public subsidies provided by local administrations, government, and European Union programmes (Greco, Grimaldi, and Cricelli 2017); different national programmes, e.g. START and ZARUKA (Dvouletý, Čadil, and Mirošník 2019), or different innovation policy types–namely, public financial support and public procurement for innovation, and the combination of the two different SME policies (Stojčić, Srhoj, and Coad 2020).

Most studies test the impact of public support on firm performance indicators (52 studies), either considering public support as an independent variable alone or, alternatively, with individual, firm, environmental, and network-level antecedents summarized in Table 5. A few papers have considered the moderating role of public support on the relationship between specific antecedents and firm performance.

4.2. Firm performance measures

Our analysis highlights seven categories of firm performance indicators. The first broad group of indicators relates to firm growth and survival measured in terms of short/medium-term growth and survival (Nakku et al. 2020), sales growth and the compound annual rate of sales growth (e.g.

Table 4. Public support variables.

Public support variables (1A)	Description and measures
Access to public credit	1a.1 Access to credit • the firm receiving some credit (e.g. Guan and Yam 2015; Khyareh, Khairandish, and Torabi 2019; Okafor, Bhattacharya, and Apergis 2020),
Financial incentives and support	1a.2 financial incentives and support • the firm obtaining public finance (e.g. Bannò, Piscitello, and Amorim Varum 2014; Moura, Madeira, and Duarte 2020; Okafor, Bhattacharya, and Apergis 2020; Radziwon, Bogers, and Bilberg 2017; Rey-Martí, Ribeiro-Soriano, and Sánchez-García 2016).
Tax incentives	1a.3 tax incentives • tax incentives (e.g. Guan and Yam 2015; Lenihan et al. 2023; Okafor, Bhattacharya, and Apergis 2020).
R&D/Innovation support	1a.4 innovation-related support and programmes. • public funding for R&D and innovation (Fattorini, Ghodsi, and Rungi 2020; Mardones and Sepúlveda 2020; Stojčić, Srhoj, and Coad 2020; Yesilay, Ar, and Temel 2015). • public R&D expenditures (Min, Kim, and Sawng 2020). • the participation in publicly funded research, innovation programmes and R&D grants (Lenihan et al. 2023; Montmartin, Herrera, and Massard 2018; Santos 2019; Vanino, Roper, and Becker 2019).
Government and innovation subsidies	1a.5 Subsidies • innovation subsidies (e.g. Greco, Grimaldi, and Cricelli 2017; Guo, Guo, and Jiang 2018; Montmartin, Herrera, and Massard 2018; Msomi, Ngibe, and Nyide 2019; Santos 2019). • subsidies for growth (Choi and Lee 2020).
Regional and governmental support	1a.6 Regional or governmental support • regional or governmental funding programmes (e.g. Aboal and Garda 2016; Aguiar and Gagnepain 2017; Irwin, Pattinson, and Scott 2014; Doh and Kim 2014; Dvouletý, Čadil, and Mirošník 2019; Fattorini, Ghodsi, and Rungi 2020; Barzi et al. 2015; Guan and Yam 2015; Khyareh, Khairandish, and Torabi 2019; Motoyama and Knowlton 2016; Nilsen, Raknerud, and Iancu 2020; Zhou et al. 2020).
Interactions with universities and R&D organizations	1a.7 Interactions with universities and R&D organizations (Vlasova 2021).
Government incubation	1a.8 Government incubation (Lukeš, Longo, and Zouhar 2019; Msomi, Ngibe, and Nyide 2019).
Policy types	1a.9 Participation in different policy programmes (Bellucci, Pennacchio, and Zazzaro 2019; Dvouletý, Čadil, and Mirošník 2019; Greco, Grimaldi, and Cricelli 2017; Stojčić, Srhoj, and Coad 2020; Zhou et al. 2020).
Export support programmes	1a.10 export-support programmes providing financial, informational, and operational support (Catanzaro, Messeghem, and Sammut 2019).
Training and non-financial support	1a.11 training and non-financial support • education, training programmes and professional support (Cheah, Amran, and Yahya 2019; Han et al. 2018; Khyareh, Khairandish, and Torabi 2019; Rey-Martí, Ribeiro-Soriano, and Sánchez-García 2016; Xiao and North 2018). • technical support and entrepreneurial support (Xiao and North 2018). • accounting practices and government monitoring activities (Nishimura and Okamuro 2018).
Other	1a.12 Other aspects

The codes included in the table (e.g. 1a.1, 1a.2) are drawn from Table A2 in the appendix.

Cowling and Siepel 2013; Choi and Lee 2020; Vanino, Roper, and Becker 2019), turnover/size (e.g. Bannò, Piscitello, and Amorim Varum 2014; Lukeš, Longo, and Zouhar 2019), firm employment growth (e.g. Čadil, Mirošník, and Rehák 2017; Vanino, Roper, and Becker 2019), employment change (e.g. Cowling and Siepel 2013) and job creation (Lukeš, Longo, and Zouhar 2019). Some studies consider multiple measures of firm growth, e.g. employment growth and compound annual sales growth rate (e.g. Choi and Lee 2020) or short-term growth and long-term survival (Nakku et al. 2020).

The second sub-category, representing a robust group of studies, considers competitiveness, productivity and efficiency measures. Measures can include productivity (e.g. Vu and Tran 2021) and total factor productivity growth (e.g. Fattorini, Ghodsi, and Rungi 2020; Khan et al. 2020; Santos 2019), personnel cost and price cost margin (e.g.J. Čadil, Mirošník, and Rehák 2017; Dvouletý, Čadil,

Table 5. Individual, firm, relational, and environmental variables.

Variable types	Description and measures
Individual variables (1B)	1b. Characteristics and background of entrepreneurs/founders Socio-demographic variables • degree of entrepreneurial experience (Rey-Martí, Ribeiro-Soriano, and Sánchez-García 2016); background, previous experience (Lerner and Haber 2001). • socio-demographic variables (Msomi, Ngibe, and Nyide 2019) Personality traits • personality traits (Lerner and Haber 2001).
Firm-level variables (1C)	1c. Characteristics, resources, and capabilities Absorptive capacity • absorptive capacity (Knockaert, Spithoven, and Clarysse 2014; Moura, Madeira, and Duarte 2020) Firm size, age and internationalization • size, age and internationalization (Aboal and Garda 2016; Li et al. 2019; Choi and Lee 2020; Minola, Vismara, and Hahn 2017; Msomi, Ngibe, and Nyide 2019) Firm R&D investment/intensity • R&D/innovation intensity (Feng, Meng, and Huang 2021; Guan and Pang 2017; Choi and Lee 2020; Minola, Vismara, and Hahn 2017; Yesilay, Ar, and Temel 2015), Entrepreneurial orientation • entrepreneurial orientation (Nakku et al. 2020) Ownership/board • ownership and board of directors compositions (Aboal and Garda 2016; Cowling and Siepel 2013; Minola, Vismara, and Hahn 2017)Other
Environmental variables (1D)	1d. Factors related to sector/industry, country and institutional aspects. Industry/sector • sector/industry (Choi and Lee 2020; Msomi, Ngibe, and Nyide 2019) Technology • technology-related aspects (Msomi, Ngibe, and Nyide 2019). Country dynamics • country dynamics (Khyareh, Khairandish, and Torabi 2019) Institutional environment • institutional aspects, e.g. local governance quality and government regulations (Demirbag, Tatoglu, and Glaister 2007; Nguyen 2019), tax burden for entrepreneurs, and access and quality of physical infrastructure (Khyareh, Khairandish, and Torabi 2019) Other financial sources. • informal finance and bank finance (Nguyen 2019).
Network variables (1E)	1e. Cooperation and network relations. • cooperation in innovation (Moura, Madeira, and Duarte 2020), business group affiliation (Barzi et al. 2015; Hu, Li, and Aulakh 2019).

The codes included in the table (e.g. 1a, 1b, 1c, 1d) are drawn from Table A2 in the appendix.

and Mirošník 2019), value-added and value-added per labour costs (e.g. Čadil, Mirošník, and Rehák 2017) and gross value added (e.g. Min, Kim, and Sawng 2020). Firm competitiveness is measured as value creation and capture (e.g. Radziwon, Bogers, and Bilberg 2017; Santos 2019) and competitive advantage (e.g. Pergelova and Angulo-Ruiz 2014).

The third sub-category considers firm profitability indicators, mainly measured in terms of return on assets (e.g. Dvouletý, Čadil, and Mirošník 2019) and EBITDA (e.g. Santos 2019).

The fourth, highly relevant category considers innovation performance in terms of innovation propensity (e.g. Aboal and Garda 2016; Guan and Pang 2017), input additionality, output additionality, and R&D collaborations and open innovation. Input additionality is mainly measured as innovation/R&D expenditure intensity or change (e.g. Bellucci, Pennacchio, and Zazzaro 2019; Crass, Rammer, and Aschhoff 2019; Feng, Meng, and Huang 2021; Lenihan et al. 2023; Mardones and Sepúlveda 2020; Montmartin, Herrera, and Massard 2018) and the hiring of new R&D employees (e.g. Bellucci, Pennacchio, and Zazzaro 2019). Output additionality is measured as product/process innovation (e.g. Moura, Madeira, and Duarte 2020), radical and incremental innovation (e.g. Zhou et al. 2020), technological innovation (e.g. Doh and Kim 2014), innovative sales/profits (e.g. Guan and Yam 2015; Mardones and Sepúlveda 2020), rate of technology transfer (e.g. Min, Kim, and Sawng 2020), number of intellectual property rights or patent

applications, also acquisition or ownership (e.g. Bellucci, Pennacchio, and Zazzaro 2019; Guan and Yam 2015; Mardones and Sepúlveda 2020; Yesilay, Ar, and Temel 2015). R&D collaborations can be measured as the propensity to collaborate with external subjects (e.g. Barzi et al. 2015; Greco, Grimaldi, and Cricelli 2017) and open innovation (e.g. Greco, Grimaldi, and Cricelli 2017). Studies also use multiple indicators, such as sales growth, knowledge acquisition, product development, patent acquisition and quality of patents (e.g. Nishimura and Okamuro 2018) or input and output additionality (e.g. Crass, Rammer, and Aschhoff 2019), respectively measured as change in the ratio of R&D expenditure over sales during the research project and sales generated by new project-related products.

The fifth category pertains to international performance measured as propensity to export (e.g. Cowling and Siepel 2013), export indicators or subsidiary performance (e.g. Demirbag, Tatoglu and Glaister 2007; Han et al. 2018; Lenihan et al. 2023). Export is measured as export intensity and the number of exported product lines (e.g. Okafor, Bhattacharya, and Apergis 2020), export value (e.g. Min, Kim, and Sawng 2020), economic international performance and number of foreign destination markets (e.g. Catanzaro, Messeghem, and Sammut 2019). One study consider the innovation performance of foreign subsidiaries with the aim of measuring positive returns for the host country (Lenihan et al. 2023).

A few studies consider sustainability-related performance in terms of social performance of social enterprises (e.g. Cheah, Amran, and Yahya 2019) and environmental performance within the supply chain (e.g. Chalmardi and Camacho-Vallejo 2019).

The residual category named 'process and entrepreneurial outcomes' includes programme funding access intended as acceptance of proposals (Irwin, Pattinson, and Scott 2014) and propensity of use and public support (Vlasova 2021), process outcomes (Motoyama and Knowlton 2016) such as the adoption of management accounting practices (Msomi, Ngibe, and Nyide 2019) and entrepreneurial outcomes such as entrepreneurial reinvestments (Nguyen 2019), level of entrepreneurial activity (Khyareh, Khairandish, and Torabi 2019), and entrepreneurial income (Lerner and Haber 2001).

5. An integrative framework

Our content analysis highlights the most researched links between public support and firm performance outcomes, along with interacting effects of specific variables mediating or moderating role in the support-performance relationship. Determinants, outcomes and interacting variables are coded with specific numbers as follows. Codes beginning with 1 refer to determinants (e.g. 1a); codes beginning with 2 refer to performance outcomes (e.g. 2a), and codes that start with 3 refer to interacting variables (e.g. 3a). Table 6 describes the research linkages analysed in sampled articles (further details are provided in Table A2 in the appendix).

The prevalence of studies mainly analyses the impact of public support on growth and survival (2a1, 2a2, 2a3, 2a4) and innovation performance (2d1, 2d2, 2d3, 2d4), covering various geographical areas, Europe, Asia and North America. However, some papers consider less investigated countries, such as Uruguay, Chile, and Turkey, for innovation performance and Uganda for growth. Firm productivity (2b1) has been investigated in the European and Asian countries and competitiveness (2b2) primarily in the US context. Articles on profitability (2c) mainly investigate Europe, North America and Asia (e.g. Vietnam, China, India). A few articles consider international performance (2e1, 2e2, 2e3) in Europe and China, whereas the two articles on sustainability performance (2f1, 2f2) focus on Asia and North America, suggesting that these are under-researched areas of inquiry.

Our analysis reveals that the impact of public support varies according to the performance indicator considered in the analysis. Building on this, we propose an integrative framework (Figure 4) underlining confirmed and unconfirmed relationships in the literature on public support and firm performance, also highlighting variables influencing main relationships.

Table 6. Density of studies per research linkage.

	Determinants				
Firm performance	Public support (1a1, 1a2, 1e3, 1e4, 1e5, 1e6, 1e7, 1e8, 1e9, 1e10, 1e11, 1e12)	Individual (1b)	Firm (1c)	Environmental (1d)	Network(1e)
Growth and survival (2a) • Firm's growth (2a.1) • Size/Turnover (2a.2) • Firm employment growth (2a.3) • Long term survival (2a.4)	Bannò, Piscitello, and Amorim Varum (2014); Čadil, Mirošník, and Rehák (2017); Cheah, Amran, and Yahya (2019); Choi and Lee (2020); Cowling and Siepel (2013); Dvouletý, Čadil, and Mirošník (2019); Khan et al. (2020); Lenihan et al. (2023); M. Lerner and Haber (2001); Lukeš, Longo, and Zouhar (2019); Motoyama and Knowlton (2016); Nilsen, Raknerud, and Iancu (2020); Nishimura and Okamuro (2018); Pergelova and Angulo-Ruiz (2014); Rey-Martí, Ribeiro-Soriano, and Sánchez-García (2016); Santos (2019); Vanino, Roper, and Becker (2019);	Cowling and Siepel (2013); Lerner and Haber (2001); Rey-Martí, Ribeiro-Soriano, and Sánchez-García (2016).	Choi and Lee (2020); Cheah, Amran, and Yahya (2019); Cowling and Siepel (2013); M. Lerner and Haber (2001); Nakku et al. (2020); Nishimura and Okamuro (2018).	Choi and Lee (2020); Lerner and Haber (2001).	Hu, Li, and Aulakh (2019).
Productivity and competitiveness (2b) • Firm productivity and efficiency (2b.1) • Firm competitiveness, value creation and capture (2b.2)	Aguiar and Gagnepain (2017); Bannò, Piscitello, and Amorim Varum (2014); Čadil, Mirošník, and Rehák (2017); Dvouletý, Čadil, and Mirošník (2019); Fattorini, Ghodsi, and Rungi (2020); Guo, Guo, and Jiang (2018); Khan et al. (2020); Min, Kim, and Sawng (2020); Nilsen, Raknerud, and Iancu (2020); Othman, Mansor, and Kari (2014); Pergelova and Angulo-Ruiz (2014); Radziwon, Bogers, and Bilberg (2017); Santos (2019); Vlasova (2021); Vu and Tran (2021).		Li et al. (2019).		
Profitability (2c) • Firm profitability (2c)	Aguiar and Gagnepain (2017); Chang et al. (2021); Dvouletý, Čadil, and Mirošník (2019); Lerner and Haber (2001); Nilsen, Raknerud, and Iancu (2020); Pergelova and Angulo-Ruiz (2014); Santos (2019).	Lerner and Haber (2001);	Lerner and Haber (2001).	Lerner and Haber (2001).	

(*Continued*)

Table 6. (Continued).

Firm performance	Determinants				
	Public support (1a1, 1a2, 1e3, 1e4, 1e5, 1e6, 1e7, 1e8, 1e9, 1e10, 1e11, 1e12)	Individual (1b)	Firm (1c)	Environmental (1d)	Network(1e)
Innovation performance (2d) • Propensity to innovate (2d.1) • Output additionalities (2d.2) • Input additionalities (2d.3) • R&D collaborations and open innovation (2d.4)	Aboal and Garda (2016); Barzi et al. (2015); Bellucci, Pennacchio, and Zazzaro (2019); Crass, Rammer, and Aschhoff (2019); Doh and Kim (2014); Greco, Grimaldi, and Cricelli (2017); Guan and Pang (2017); Guan and Yam (2015); Knockaert, Spithoven, and Clarysse (2014); Lenihan et al. (2023); Mardones and Sepúlveda (2020); Min, Kim, and Sawng (2020); Montmartin, Herrera, and Massard (2018); Moura, Madeira, and Duarte (2020); Nishimura and Okamuro (2018); Radziwon, Bogers, and Bilberg (2017); Santos (2019); Stojčić, Srhoj, and Coad (2020); Xiao and North (2018); Yesilay, Ar, and Temel (2015); Zhou et al. (2020).		Aboal and Garda (2016); Barzi et al. (2015); Feng, Meng, and Huang (2021); Guan and Pang (2017); Knockaert, Spithoven, and Clarysse (2014); Moura, Madeira, and Duarte (2020); Nishimura and Okamuro (2018); Radziwon, Bogers, and Bilberg (2017); Yesilay, Ar, and Temel (2015).	Aboal and Garda (2016).	Barzi et al. (2015); Moura, Madeira, and Duarte (2020).
International performance (2e) • Propensity to export (2e.1) • Export (2e.2) • Subsidiary performance (2e.3)	Catanzaro, Messeghem, and Sammut (2019); Cowling and Siepel (2013); Demirbag, Tatoglu, and Glaister (2007); Han et al. (2018); Lenihan et al. (2023); Min, Kim, and Sawng (2020); Okafor, Bhattacharya, and Apergis (2020)	Cowling and Siepel (2013);	Cowling and Siepel (2013); Demirbag, Tatoglu, and Glaister (2007).	Demirbag, Tatoglu, and Glaister (2007).	
Sustainability performance (2f) • Social performance (2f.1) • Environmental performance (2f.2)	Cheah, Amran, and Yahya (2019); Chalmardi and Camacho-Vallejo (2019).		Cheah, Amran, and Yahya (2019).		
Process and entrepreneurial outcomes (2g) • Programme funding access (2g.1) • Process outputs (2g.2) • Entrepreneurial outputs (2g.3)	Irwin, Pattinson, and Scott (2014);Khyareh, Khairandish, and Torabi (2019); Lerner and Haber (2001); Msomi, Ngibe, and Nyide (2019); Motoyama and Knowlton (2016);Nguyen (2019).	Lerner and Haber (2001); Msomi, Ngibe, and Nyide (2019).	Lerner and Haber (2001); Minola, Vismara, and Hahn (2017); Msomi, Ngibe, and Nyide (2019); Santos (2019); Wei et al. (2011).	Khyareh, Khairandish, and Torabi (2019); Lerner and Haber (2001); Msomi, Ngibe, and Nyide (2019); Nguyen (2019); Wei et al. (2011).	Crass, Rammer, and Aschhoff (2019).

The codes included in the table (e.g. 1a, 1b, 2a, 2b) are drawn from Table A2 in the appendix.

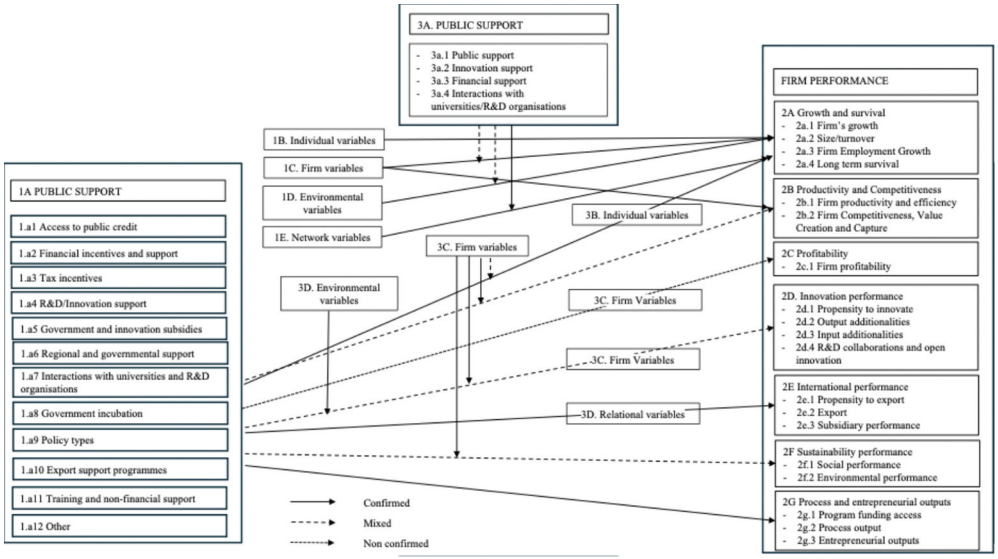

Figure 4. Integrative framework. Source: own elaboration based on authors' thematic analysis.

5.1. The impact of public support on growth and survival

The positive impact of public support on growth and survival is generally confirmed, except for a few studies (e.g. Cheah, Amran, and Yahya 2019; choi and Lee 2020; Vu and Tran 2021). Impacts on sales and employment are positive notwithstanding the considered support type and measure, such as government financing, subsidies, and training (e.g. Khan et al. 2020), guarantees and equity (Pergelova and Angulo-Ruiz 2014) or direct subsidies (Čadil, Mirošník, and Rehák 2017). Loan guarantee schemes support sales growth and job creation by enhancing access to new finance (Cowling and Siepel 2013), such as government funding programmes for R&D and growth (Vanino, Roper, and Becker 2019). However, selecting recipients of government venture capital based on a specified number of easily applicable criteria is essential (Minola, Vismara, and Hahn 2017). In the European context, various types of R&D policy instruments (grants and tax credits) drive technological progress (Vu and Tran 2021) and R&D activities of subsidiaries but also lead to improvements in turnover, exports and value-added in the host country (Lenihan et al. 2023). Investigating the effects on multiple levels moves the focus from the firm performance to the effects in the host country. However, some studies found no significant effects (Dvouletý, Čadil, and Mirošník 2019) or negative impacts, especially considering mere public subsidies that seem to play a perverse stimulus for firms to remain small and keep receiving those subsidies in Korea (Choi and Lee 2020).

Individual and firm-level characteristics can influence the relationship. Manufacturing, smaller and pre-awarded firms, which belong to an R&D-intensive region, obtain additionalities (Vanino, Roper, and Becker 2019). Responsiveness of growth and performance to R&D engagement emerges as statistically significant for R&D starters only (Nilsen, Raknerud, and Iancu 2020), where the indirect effect generates more additionality than the direct one. In contrast, incubators are reported to have a negative impact only on sales revenues in the short term, which, though, turn positive in the long run for innovative start-ups (Lukeš, Longo, and Zouhar 2019). However, there is no effect on job creation. In the case of tourism ventures, an attractive environment contributes to higher revenues, even though ventures receiving advisory support from the governmental tourism incubator perform worse than ventures financially supported by external sources (Lerner and Haber 2001). Features such as personality characteristics and entrepreneurial family background are crucial for leading advisory services from government incubators to enhance revenue creation (Lerner and Haber 2001). Government financial

support for internationalization programmes boosts domestic turnover and productivity growth, with additionalities for smaller and younger firms and those with accumulated international experience (Bannò, Piscitello, and Amorim Varum 2014). In social enterprises, financial support helps create jobs or improve organizational performance. However, the effect is respectively reinforced in the case of founders with training and professional experience (Rey-Martí, Ribeiro-Soriano, and Sánchez-García 2016) or business planning (Cheah, Amran, and Yahya 2019), while socioeconomic context has no effect.

5.2. Public support impacts productivity, competitiveness and profitability

Results on productivity are mixed. When considering productivity and efficiency, the type of support matters. Studies find a positive productivity impact of R&D programmes in China, with more additionality for decentralized governance (e.g. Guo, Guo, and Jiang 2018) and government financing, subsidies, and training in Pakistan (Khan et al. 2020). Combined governmental intervention, which encourages collaboration in R&D activities and grants subsidies to firms engaging in joint research projects (e.g. the Information Society Programme), enhances firm productivity (Aguiar and Gagnepain 2017) but has a limited effect on profit margin. Still, R&D grants and tax credits positively impact the value-added of foreign subsidiaries (Lenihan et al. 2023). Programmes supporting direct investments in R&D are associated with firm productivity increases in a region, whereas general programmes to support businesses are not (Fattorini, Ghodsi, and Rungi 2020). When developing regional funds (e.g. the European Regional Development Fund), heterogeneities in firm characteristics and regional absorptive capacities matter, with less efficient firms being more responsive to research, technology, and development spending (Fattorini, Ghodsi, and Rungi 2020). Other studies find no strong evidence of impacts on productivity (e.g. Dvouletý, Čadil, and Mirošník 2019; Nilsen, Raknerud, and Iancu 2020; Vu and Tran 2021) or negative effects (e.g. Othman, Mansor, and Kari 2014). Despite stimulating technological progress, government financial support detrimentally impacts technical efficiency (Vu and Tran 2021). Despite boosting fixed asset investment and technological progress, public innovation subsidies make subsidized firms less performing than non-subsidized ones and generally fail to increase productivity and value creation (Santos 2019). Subsidized companies are less effective in achieving the planned goals regarding labour productivity and value creation (Santos 2019). Concerning export and support programmes, Othman, Mansor, and Kari (2014) find that only 19.6% of cooperatives are efficient, with the biggest being the most successful.

Some studies questioned whether the performance is sustainable in the long run when the policy impacts on specific efficiency indicators (e.g. personnel expenditures) are not accompanied by an appropriate increase in competitiveness and value-added (e.g. Čadil, Mirošník, and Rehák 2017). Mixed results on impacts depend not only on the programme type but also on productivity measures. Hence, adopting a total factor productivity measure may hinder the real impacts of public support on different productivity dimensions. Moreover, firm size and age negatively influence the relationship between public support and turnover and productivity (Bannò, Piscitello, and Amorim Varum 2014), even though other studies suggest that public support has an indirect effect by moderating the size-growth relationship (Li et al. 2019).

Except for Hu, Li, and Aulakh (2019), profitability outcomes are never investigated alone but primarily with growth and productivity indicators. Evidence shows that policy never impacts profitability, regardless of geographic context (Europe, the US or Asia) or public support type (financial support or subsidies for growth or R&D). Hence, growth or productivity improvements due to public support do not entail profitability improvements (e.g. Nilsen, Raknerud, and Iancu 2020; Santos 2019).

5.3. The impact of public support on innovation performance

Policy impacts change according to the measure of innovation performance adopted in the study. Evidence mainly shows positive impacts on output additionality and collaborations, whereas results

are less clear on the propensity to innovate and input additionality. Only two studies find that public financial support and patent protection (Aboal and Garda 2016) and direct/indirect government subsidies (Guan and Pang 2017) positively affect the propensity to innovate, even though the latter is influenced by industry characteristics (Guan and Pang 2017).

Public funding and tax credits for R&D positively and significantly impact input additionality measured as innovation expenditure intensity of funded companies (Mardones and Sepúlveda 2020) and foreign subsidiaries (Lenihan et al. 2023). Considering a spatial approach, crowding-in-effects change according to the type of policy, with national subsidies being more effective than local tax credits and European subsidies (Montmartin, Herrera, and Massard 2018). From a regional perspective, combining public investments with network building is a relevant aspect for South Korean companies, also when considering R&D collaborations (Doh and Kim 2014; Min, Kim, and Sawng 2020). Commercialization efficiency is higher in regions with large innovation networks, while technology development efficiency is higher in regions where R&D activities are more public-focused (Min, Kim, and Sawng 2020). In addition, governmental technological development assistance positively impacts patent acquisition and new design registrations of local SMEs (Doh and Kim 2014).

As far as the financial support for R&D and innovation activities is concerned, R&D grants, and tax credits alone or in combination with other instruments, e.g. government monitoring (Nishimura and Okamuro 2018), technical services (Xiao and North 2018) and technological infrastructure (Yesilay, Ar, and Temel 2015) positively impact output additionality (e.g. Greco, Grimaldi, and Cricelli 2017; Guan and Pang 2017; Lenihan et al. 2023; Mardones and Sepúlveda 2020; Moura, Madeira, and Duarte 2020; Radziwon, Bogers, and Bilberg 2017; Stojčić, Srhoj, and Coad 2020). Companies achieve higher additionality in sales from new products when benefiting from both financial support and innovation-oriented procurement (Stojčić, Srhoj, and Coad 2020). Positive impacts on product and process innovation are a joint effect of cooperation, absorptive capacity, and financial support (Moura, Madeira, and Duarte 2020). In the Chinese context, studies find negative or non-linear financial support impacts on output additionality (Bellucci, Pennacchio, and Zazzaro 2019; Guan and Yam 2015; Zhou et al. 2020). However, the level of governmental involvement and the type of innovation matter (Zhou et al. 2020). Central-government-funded projects show an inverted U-shaped effect on firms' radical and incremental innovations. In contrast, local-government-funded research projects show an inverted U-shaped effect on incremental innovations of firms but no significant effects on radical innovation. Knowledge stock moderates this relationship (Zhou et al. 2020).

Differences in the additionality of public subsidies on input and output measures depend on the target of public policies; investments in individual research projects are more successful in output additionality in comparison with non-subsidized firms in Italy (Bellucci, Pennacchio, and Zazzaro 2019) than collaborative projects among SMEs and universities. In contrast, a few studies show non-significant effects on input or output additionality (Crass, Rammer, and Aschhoff 2019; Vlasova 2021). Concerning the 'Innovative SME' scheme, there is no evidence of an effect of geographical clustering on the programme's effectiveness in terms of input or output additionality (Crass, Rammer, and Aschhoff 2019) even though being part of a knowledge-based cluster significantly increases their chance of receiving public financial support. High levels of firm absorptive capacity also stimulate a more intense use of technology intermediaries, thus generating higher levels of cognitive capacity additionality from R&D (Knockaert, Spithoven, and Clarysse 2014).

Public support and subsidies at the European, national and local levels positively impact R&D collaborations (e.g. Doh and Kim 2014; Barzi et al. 2015; Greco, Grimaldi, and Cricelli 2017; Moura, Madeira, and Duarte 2020; Nishimura and Okamuro 2018), also among beneficiaries (Greco, Grimaldi, and Cricelli 2017). Moreover, aligning common goals and financial support with the value-capture process inside regional innovation ecosystems is essential, as it involves inter-firm negotiations to manage knowledge flows (Radziwon, Bogers, and Bilberg 2017). In the European context, local and national subsidies are associated with open innovation efficiency, but European subsidies are not statistically significant (Greco, Grimaldi, and Cricelli 2017).

5.4. The impact of public support on international and sustainability performance

Public support positively impacts export indicators, such as the number of markets and export intensity (Cowling and Siepel 2013; Lenihan et al. 2023; Okafor, Bhattacharya, and Apergis 2020), even though the international relational capital mediates the relationships between informational, operational, and financial support provided by export-support programmes and export performance at the network level (Catanzaro, Messeghem, and Sammut 2019). In contrast, evidence on subsidiary performance is blurred: positive in some cases (Han et al. 2018; Lenihan et al. 2023) and non-significant in others (Catanzaro, Messeghem, and Sammut 2019; Demirbag, Tatoglu, and Glaister 2007), also influenced by interstate relationships (Han et al. 2018).

From a supply chain network perspective, a properly sustainability-designed governmental financial support programme decreases the environmental impact within the supply chain (Chalmardi and Camacho-Vallejo 2019).

5.5. The impact of public support on process and entrepreneurial outputs

Interactions with Universities, R&D organizations, and support organizations, as well as knowledge of available funding, increase the likelihood of accessing programme funding (Irwin, Pattinson, and Scott 2014; Motoyama and Knowlton 2016; Vlasova 2021). Regarding process outcomes, public support favours the adoption of management accounting practices (Msomi, Ngibe, and Nyide 2019). Concerning entrepreneurial outcomes, local governments and external financing favour entrepreneurial reinvestments (Nguyen 2019), while government support and supportive policies stimulate entrepreneurial activity (Khyareh, Khairandish, and Torabi 2019).

5.6. Third variables

Individual-level variables, such as entrepreneurial behaviour and international relational capital, mediate the relationship between financial and informational support and export and growth performance (Catanzaro, Messeghem, and Sammut 2019; Khyareh, Khairandish, and Torabi 2019).

Firm variables, such as business planning, international experience and knowledge stock (number of patents), moderate the relationship between support and social performance, productivity and innovation performance, respectively (e.g. Bannò, Piscitello, and Amorim Varum 2014; Cheah, Amran, and Yahya 2019; Knockaert, Spithoven, and Clarysse 2014; Nishimura and Okamuro 2018; Zhou et al. 2020). Government guarantee and equity commitment foster competitive advantage but only indirectly impact performance (Pergelova and Angulo-Ruiz 2014). At the firm level, competitive advantage in innovation, licencing marketing and human capital positively moderate the relationship with profitability even though the direct effect is not significant (Pergelova and Angulo-Ruiz 2014). The impact of improvement in local government quality on entrepreneurial reinvestments is stronger when firms are privately or state-owned, while results are mixed when the owners are foreign (Nguyen 2019). The relationship between support and productivity is stronger for smaller and younger firms (Bannò, Piscitello, and Amorim Varum 2014), even though the influence of age changes when considering incubation and revenues (Lukeš, Longo, and Zouhar 2019). Although firm size negatively moderates the relationship between incentives and turnover and productivity (Bannò, Piscitello, and Amorim Varum 2014), other studies have found that government policies, regulations and financial subsidies positively moderate the relationship between firm size and productivity (Li et al. 2019) but have a negative moderating effect on growth, suggesting that some subsidized companies want to remain small (Choi and Lee 2020). The role of firm size in having direct and indirect effects on public support and performance requires further investigation. Considering the indirect effects of policy, financial and non-financial support positively moderates the relationship between entrepreneurial orientation and long-term growth or survival (Nakku et al. 2020).

Considering the environmental dimension, industrial features (monopolies and capital-intensive industries) and inter-state relationships between home-host countries positively moderate the primary relationship with innovation performance of companies and overseas subsidiaries respectively(Guan and Pang 2017; Han et al. 2018). Industry characteristics influence the impact of indirect subsidies, with firms in capital-intensive industries and monopoly industries being more likely to innovate (Guan and Pang 2017). The effect of home-country government support is increased through close political relations and diminished when economic relations between China and the host country are strong (Han et al. 2018).In addition, the impact of business group affiliation on the performance of firms is stronger in a state-led system of state capitalism (e.g. China) than in a co-governed system (e.g. India) (Hu, Li, and Aulakh 2019). Moreover, the probability of receiving public support is positively associated with political ties, and the relation is stronger when the opportunity exploration capability is higher (Wei et al. 2011). Collaborations with universities have also been found to be a determinant of receiving public support, which, in turn, increases competitiveness (Vlasova 2021).

6. Discussion and future research agenda

Our integrative framework underlines confirmed and unconfirmed relationships between public support measures and performance indicators of firms, as well as the interacting variables (Figure 4). The positive relationships between public support and growth, survival, and international performance are mainly supported. Mixed results are reported when considering productivity, efficiency indicators, innovation and sustainability performance. By contrast, relationships with profitability are never supported. Hence, our analysis shows that public policy does not necessarily positively impact performance, confirming that policy effects are influenced by the features of companies, policy tools and contexts (Dvouletý, Blažková, and Potluka 2021; Lenihan 2011). For this reason, comparisons between subsidized and non-subsidized companies still represent a fruitful way to investigate this topic. At the same time, further research is needed to clarify the conditions under which policy instruments are less or more effective (Lenihan 2011), considering that evidence has already shown the influence of individual, firm-specific, relational and environmental variables on this relationship. At the same time, extant literature has shown that public support moderates the relationship between firm-specific variables and growth, opening future avenues of inquiry on the indirect effects of public support on other performance indicators.

Our analysis allows us to identify a future research agenda. First, we acknowledge the importance of developing impact evaluation studies that assess the policy capability to reach pre-established goals (Huergo and Moreno 2017; Lenihan 2011; OECD 2023), also through qualitative and mixed-methods approaches (e.g. Motoyama and Knowlton 2016).

Second, a rising research branch engages with impact evaluation outside the traditional domain of performance indicators, investigating how government subsidies and incubation favour the adoption of management accounting and disclosure practices (e.g. Msomi, Ngibe, and Nyide 2019), but might also consider other procedural aspects inside the organization.

Third, research must further investigate the impact of assessment and monitoring systems on firm outcomes, as each type of monitoring system – such as decentralized or more central – can have a different effect on firm performance (Guo, Guo, and Jiang 2018). This might be relevant to verifying the programme's effectiveness and returning helpful information to policymakers who decide whether and to which programme allocates resources (Storey 2017).

Fourth, the review highlights a strong influence of the context, including the country and regional variables that represent the quality of the entrepreneurship ecosystem (Stam 2015). In this respect, an increase in spatial and regional studies could provide a novel and enriching approach to the topic as public policies promoting entrepreneurship belong to the systemic conditions of the entrepreneurial ecosystem (Stam and Van de Ven 2021), and regional evaluation studies can improve the programmes and tailor them to the needs of the particular regions. Geographical clustering can impact programme access and moderate the relationship between participation and programme

effectiveness (Crass, Rammer, and Aschhoff 2019). There is room for further exploration. Moreover, some world areas (such as Asia) are overrepresented, whereas American and African countries are less investigated. Although this might depend on the selection process, considering that Europe is so diversified in culture, population and firm features, more studies would be needed on countries that are missing in this review, (e.g. Finland, Sweden).

Fifth, innovation policy stream, networks and collaborations with external and technical partners emerge as relevant factors for success. We suggest exploring network financing and public-private financing for innovation that are still underexplored topics. In this respect, future research could investigate the returns of national and regional policies supporting the adoption of Industry 4.0 and digital technologies on firm competitiveness and sustainability orientation within the context of the Deal progress.

Sixth, evidence supports the idea that firms receiving public support (or mixed public-private) are better placed to attract other market funding. In Europe, national and European-level programmes are increasingly based on a co-investment rationale involving public bodies and private investors (e.g. business angels and venture capital) or company-owned resources. Such developments call for research investigating the multiplying effects of public-private co-investments (amounts committed, type of partners involved), additionalities generated by the supported firms (Čadil 2019) and the overall impact on the firm's performance and access to finance. Such research would also complement the literature on spillover effects regarding possible crowding-in or crowding-out effects of public support on R&D investments (e.g. Montmartin, Herrera, and Massard 2018).

Seventh, we call for studies investigating the impact of a governmental financial support strategy on decreasing environmental impact within the supply chain, following Chalmardi and Camacho-Vallejo (2019). Considering the increasing interest in digitalization and sustainability of global value and supply chains (e.g. OECD 2020), we call for studies adopting this perspective and showing the extent to which specific public support (maybe a national one) might positively impact sustainability indicators within the whole chain across countries. Also, we recall the urgency of investigating the sustainability and environmental impacts of public financing in the context of environmental or sustainability programmes to provide arguments in favour or contra the scepticism and reluctance of companies towards the idea that environmental care cannot be merged with profits.

Eighth, given the limited attention to export-support policies and international performance, research on this might be particularly valuable in Europe, where, despite open cross-border trade, non-exporting establishments still account for about 50% of the total (European Company Survey 2019, Eurofound Agency, Louxembourg, 2019).

In addition, our review shows the importance of training and non-financial support, suggesting the importance of monitoring non-financial policies among traditional programmes for SMEs and established companies. In our view, impact evaluations should consider the various types and aspects of support offered by programmes, including non-financial aid and training, in relation to different performance outcomes, not just human-capital or entrepreneurial intentions (Hogendoorn et al. 2019). Policymakers would undoubtedly be interested in knowing whether combining direct financial assistance with expert advisory services, or counselling brings higher competitiveness gains and whether these gains are cost-efficient (Autio and Rannikko 2016; Flanagan, Uyarra, and Laranja 2011). To determine the desirable level of public financial and non-financial assistance, randomized control trials (RCTs), i.e. experiments, might be helpful despite the political/public barriers to implementation (OECD 2023).

Last, we raise the attention to considering the age and growth stage of business when evaluating the effectiveness of policy support, as companies might have different goals and needs of support accordingly during their lifecycles.

6.1. Contributions and limitations

Our literature review contributes to entrepreneurship and innovation literature by critically appraising the state of knowledge of the literature on public support and firm performance, underlining the

most investigated research linkages on the one hand and gaps and inconsistencies on the other hand. In addition, it contributes to the open debate on public entrepreneurship and SME policy evaluation, which is considering more innovative and holistic approaches to evaluating the appropriateness and effectiveness of policies (Lenihan 2011). Our review is aligned with scholars' underlining the importance of considering the policy types, features and objectives, the firm type, and the context of the application (from industry to institutional context) (Dvouletý, Blažková, and Potluka 2021; Huergo and Moreno 2017; Lenihan 2011; OECD 2023), as our article shows that results change considerably when all these parameters change. This is especially important because it integrates entrepreneurship and SMEs supporting policies with the entrepreneurial ecosystem concept (as a part of systemic conditions), describing an entrepreneur's wider institutional and economic surroundings (Stam 2015) and, thus, connecting it with the general entrepreneurship literature. Moreover, this study provides a critical review of a specific sub-field that investigates the relationship between public support and various types of performance outcomes; thus, future research might consider the necessity to explore the literature on procedural aspects of policymaking, including the public sector economics and political science studies, adding to our review even a broader multidisciplinary perspective and complex picture. In our analysis, we have seen that the literature is evolving towards more complex monitoring and evaluation approaches that give more consideration to the goals, the policy features, and the contextual characteristics when evaluating the proper targeting of the aid, its suitability and subsequent success of public intervention, i.e. being cost-efficient and meeting the stated objectives and milestones. However, we present that there are still many studies and programmes that are not based on the proper theoretical background and those that lack an appropriate theory of change explaining the possible mechanism of the changes in the desired outcomes upon receiving public support; this remains a challenge to be addressed more systematically in future studies (OECD 2023).

We acknowledge that our study has limitations, as our selection may not be free of omissions. We excluded articles treating university-industry collaborations, as reviews on this topic were recently published (e.g. Mascarenhas, Ferreira, and Marques 2018), and about financial constraints, a closely related topic that might be the focus of future reviews. Another limitation stems from excluding articles published in journals ranked one or un-ranked in the ABS list, guaranteeing that every article included is peer-reviewed. We included only English-written studies; we thus acknowledge that there might be relevant and valuable findings published in other languages but not included in this review. Although we adopted strict and rigorous selection procedures based on the PRISMA methodology (Moher et al. 2015) to increase the replicability of this study (Snyder 2019), we acknowledge that our keyword selection might be a source of omissions. Future studies might consider less specific keywords, such as 'enterprise policy impact' or 'enterprise policy evaluation', to reconnect with the broader enterprise/entrepreneurship and SME policy evaluation research stream. To better interpret our results, we underline that we have adopted a more traditional focus to analyse the effectiveness of public policies for firms rather than a more holistic perspective, which looks at more comprehensive societal benefits and emphasizes the medium-to-long-term effects (Lenihan 2011). Building on our contribution, we believe that future studies might encompass the holistic perspective and revise the literature by focusing on the alignment between the original goals of the supporting policy and the evaluation process of policies.

Our review proposes some insights for policymakers and researchers. Our results show that public support is not necessarily positive for firm performance and that the effectiveness of policies depends on the firm size, programme characteristics, and application context. Based on our results, policy features should be carefully designed to meet the desired outcome at the firm level.

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