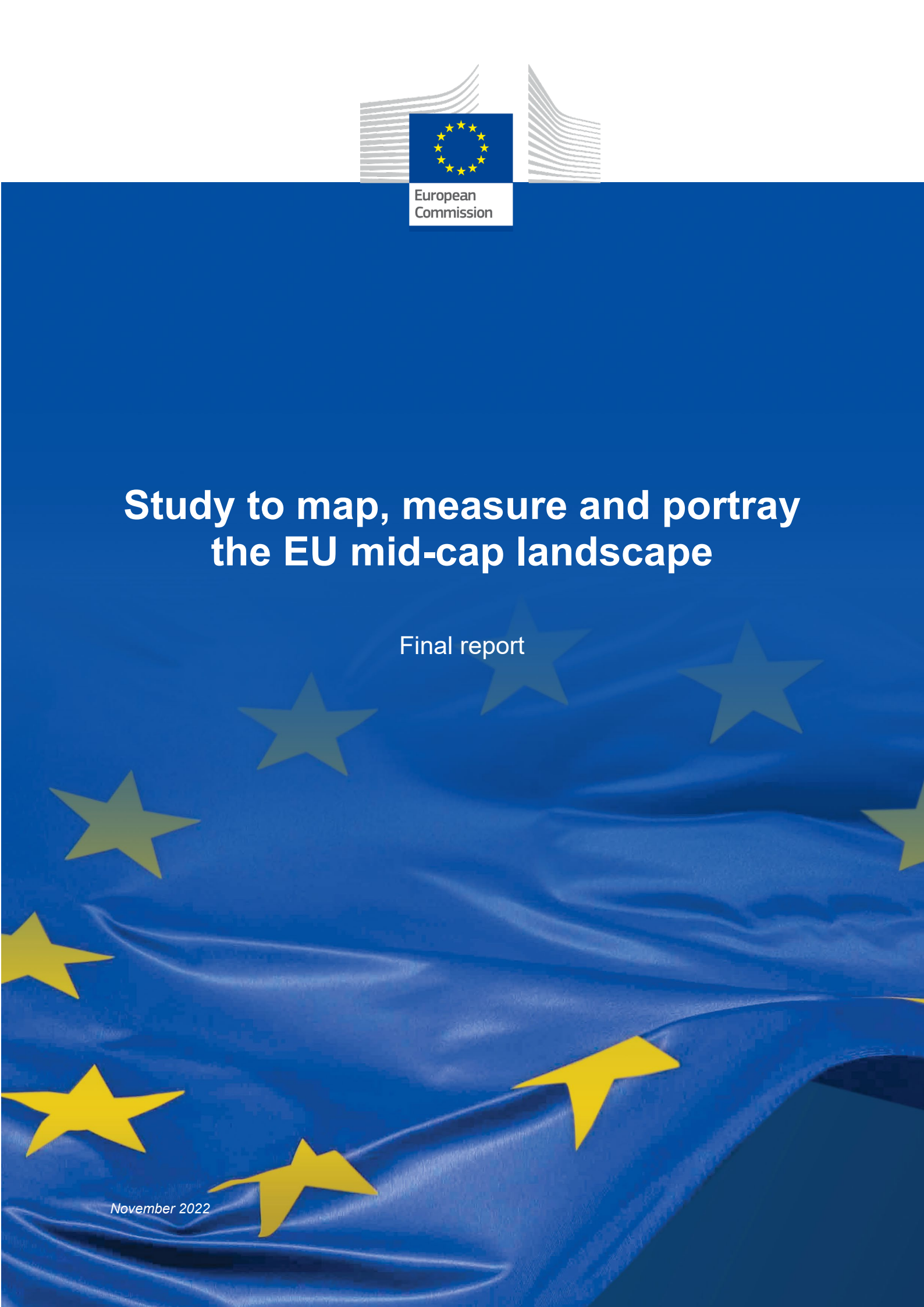
European Commission

Study to map, measure and portray the EU mid-cap landscape

Final report



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EXECUTIVE SUMMARY

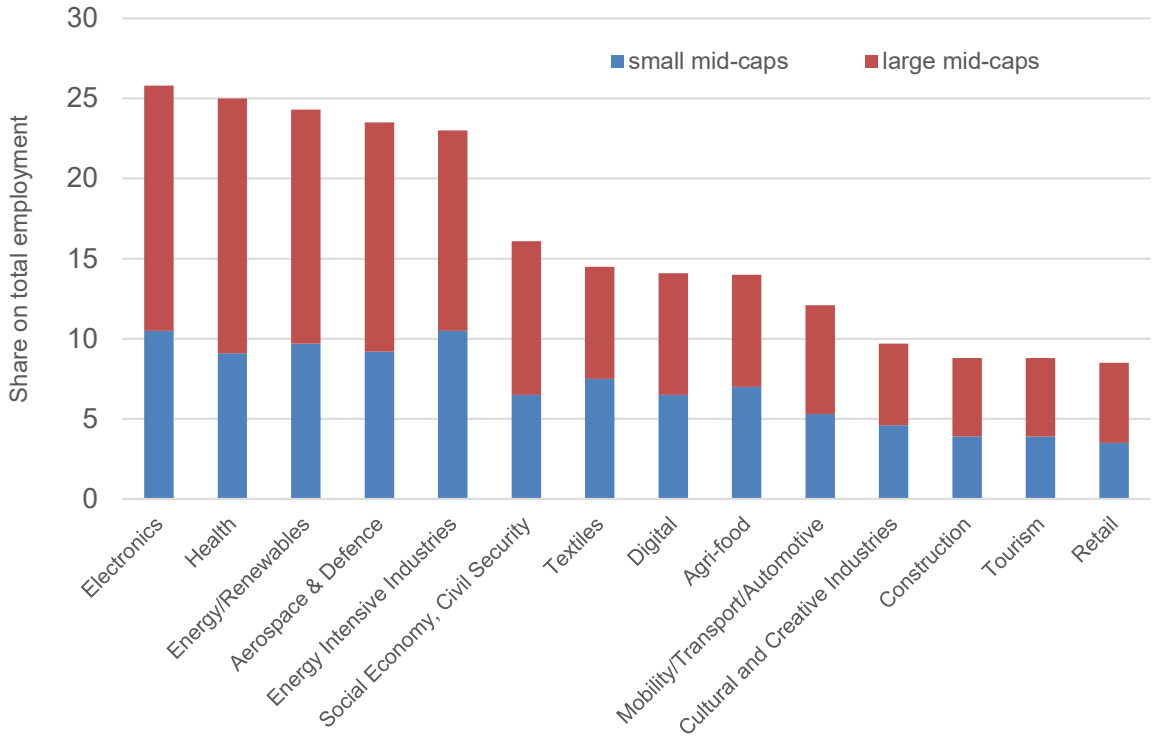
Middle-sized enterprises (or mid-caps) lie between small and medium-sized enterprises (SMEs) and large corporations. We consider mid-caps as those enterprises with 250 or more, but less than 1,500 employees.

Mid-caps are an essential part of the European economy. We estimate that small mid-caps (250-499 employees) and large mid-caps (500-1,499 employees) together account for more than 13% of overall employment in the European business sector, compared to a share of 38% for micro firms, around 35% for SMEs (excluding micro firms), and 14% for large companies with 1,500 or more employees.

The share of mid-cap firms is particularly high in industrial ecosystems that are key to the competitiveness of the European Union: Electronics, Aerospace & Defence, Energy, Energy-intensive Industries and Health (see Figure below).

There are also differences between countries in terms of the share of mid-cap firms. Mid-caps employ around 20% of all employees in the business sector of the Nordic countries, in Luxembourg, Germany and Austria, while their share in employment is 10% or less in Spain, Portugal, France, Poland, Greece, or Cyprus.

Share of mid-caps on total business sector employment in different industrial ecosystems, 2019



Source: ORBIS Europe database, own calculations based on the Ecosystems definition by the European Commission (2021)

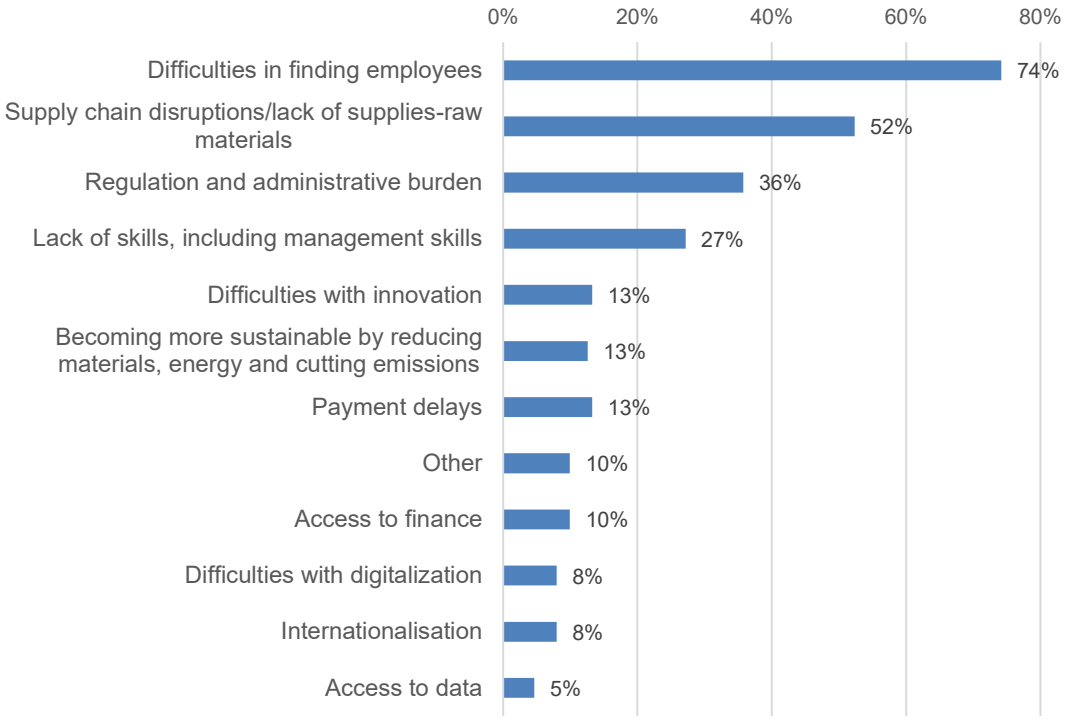
Around one quarter of all mid-cap firms are owned by foreign (non-national, including Member States) firms, so foreign ownership is more frequent among mid-caps than among SMEs (15%). Around half of all foreign-owned mid-cap firms are affiliated to a parent company that resides outside the EU. The share of foreign-owned mid-caps is highest in small countries. Family ownership is also frequently found among mid-cap firms.

Most mid-caps are established firms which have already survived the 'up or out'-stage of early firm evolution. They grow faster than the average enterprise in most EU member states. Two thirds of all small mid-caps in 2019 were already mid-cap companies three years earlier, and this share is even larger for large mid-caps. Around 20% of all small and 14% of all large mid-caps in 2019 were SMEs three years earlier, so scaling-up is frequent among mid-cap firms. The Single Market is their home market, but most of them are also active on markets outside the EU.

Innovation and digitalization are important for the growth and the competitiveness of mid-cap firms. Their innovation performance is above that of SMEs and slightly below that of large companies. Mid-caps also employ digital technologies to a higher degree than SMEs. Innovation and new technologies can help mid-caps to apply their capabilities in profitable market niches where they can flourish as world market leaders ('Hidden Champions').

The growth of mid-cap firms, however, may also be hampered by different factors (see figure below): the top three challenges identified by this study are difficulties in finding employees, supply chain disruptions, and regulation and administrative burden. These three most important challenges are the same for small and large mid-caps. In contrast, the most pressing problems for SMEs identified by a previous Eurobarometer study are regulatory obstacles and administrative burden, payment delays, access to finance, and a lack of skills.

Main challenges for mid-caps in the European Union



Source: Own elaboration based on 151 interviews.

Difficulties in finding employees are felt strongest when firms try to recruit staff with technical skills, in particular information technology skills, less for administrative and sales staff. Mid-caps also face losses of skilled personnel to competitors, in particular larger companies. Looking at the two sub-groups, the lack of skilled employees appears to be a major obstacle to growth for 66% of small mid-caps and 74% of large mid-caps. The lack of skilled personnel is also a serious obstacle for digitalization.

Supply chain disruptions are reported by half of the firms, mainly by manufacturing mid-caps. 79% of all mid-caps in manufacturing face this obstacle – more manufacturers suffer from supply chain disruptions than from difficulties in finding employees. Outside manufacturing, the share of mid-caps facing this challenge is 33%. Russia's invasion of Ukraine is a source of heightened difficulties and challenges because rising prices for energy and other production inputs put companies, including mid-cap firms, under pressure. Mid-caps, unlike large firms, may not be able to pass through price increases to their customers.

The third major challenge reported by mid-cap firms is *regulation and administrative burden* (36% of all respondents). Large mid-caps (39%) report this obstacle more often than small mid-caps (31%). Differences in legislation across countries are felt as the most pressing regulatory burden by mid-caps, followed by the requirements from environmental regulation, and trade/customs-related requirements and accounting standards. Thus, regulation seems to hamper international expansion in particular.

Additional challenges reported by mid-caps in the interviews are difficulties with innovation, the challenge of becoming more sustainable, or access to finance. Panel discussions with mid-cap firms reveal that their size often does not allow them to hire specialists in certain areas such as innovation funding, sustainability, or digitalization. Finally, family-owned mid-cap firms indicate challenges related to succession.

These challenges are relevant for firms of all sizes, not just mid-caps. Moreover, an elaborated set of measures are in place at member states and at EU level to tackle them. Thus, new instruments to support mid-cap firms are not an immediate concern; rather, policy should monitor and evaluate how existing initiatives benefit mid-cap firms and adapt these initiatives if necessary. If policy wants to consider targeted financial support for mid-cap firms, these measures should focus on scaling-up and growing mid-caps. Another field where targeted intervention may be feasible is size-dependent regulation. Finally, a wider application of the existing mid-cap definition in business statistics and policy evaluations could enhance our understanding of the role of mid-caps in the economy which is a pre-condition for possible policy interventions in the future.

ABSTRACTS IN ENGLISH, FRENCH, AND GERMAN

English abstract

Middle-sized enterprises (or mid-caps) are those enterprises with at least 250, but less than 1,500 employees. We estimate that they account for more than 13% of overall employment in the European business sector, and around 20% of all employees in the Nordic countries, Luxembourg, Germany, and Austria, while their share on employment is 10% or less in Spain, Portugal, France, Poland, or Greece. Their share is particularly high in industrial ecosystems that are key to the European Union's competitiveness: Electronics, Aerospace & Defence, Energy, Energy-intensive Industries and Health.

Mid-caps most often are not start-ups, but established firms which have already survived the 'up or out'-phase of early firm evolution. They grow faster than the average enterprise in most EU member states. Their innovation performance is above that of SMEs and slightly below that of large companies. Most of them are also active on markets outside the EU. Family ownership is frequently found among mid-cap firms, but a considerable number of them are also subsidiaries of foreign[1]-owned multinational companies.

The growth of mid-cap firms may be hampered by different factors: most pressing are difficulties in finding employees, supply chain disruptions, regulation and administrative burden, or obstacles in the innovation process. Another challenge is succession in family-owned mid-caps. In addition, rising energy prices and other production inputs emerged as a major challenge for mid-caps in recent months.

French abstract

Les entreprises de taille intermédiaire (ou mid-caps) sont celles qui emploient au moins 250 personnes, mais moins de 1 500. Nous estimons mid-caps représentent plus de 13% de l'emploi total du secteur privé en Europe et environ 20% de l'emploi total dans les pays nordiques, au Luxembourg, en Allemagne et en Autriche, alors qu'elles représentent 10% ou moins de l'emploi en Espagne, au Portugal, en France, en Pologne ou en Grèce. Leur part est particulièrement élevée dans des secteurs essentiels à la compétitivité de l'Union européenne : l'électronique, l'aérospatiale, la production d'énergie, les industries à forte consommation d'énergie et la santé.

Dans la plupart des cas, les mid-caps ne sont plus des start-ups, mais des entreprises établies qui ont déjà surmonté les premières phases de leur développement. Elles se développent plus rapidement que l'entreprise moyenne dans la plupart des États membres de l'UE. Leurs performances en matière d'innovation sont supérieures à celles des PME et légèrement inférieures à celles des grandes entreprises. La majorité d'entre elles est également active en dehors de l'UE. Les moyennes capitalisations sont souvent détenues par des familles; mais un grand nombre d'entre elles sont des filiales de grandes entreprises étrangères[2].

La croissance des mid-caps peut être freinée par différents facteurs, dont les plus importants sont les difficultés à trouver des employés qualifiés, les ruptures de la chaîne d'approvisionnement, une réglementation excessive, la bureaucratie ou des difficultés dans les processus d'innovation. Un autre challenge pour les moyennes capitalisations familiales résulte de la gestion de la succession. En outre, la hausse des prix de l'énergie et d'autres intrants de production est devenue un défi majeur pour les moyennes capitalisations au cours des derniers mois.

1 Non-national, also including Member States.

2 Non-national, Pays-Membres inclus.

German abstract

Mittelgroße Unternehmen (oder Mid-caps) sind Unternehmen mit mindestens 250, aber weniger als 1.500 Beschäftigten. Wir schätzen, dass mehr als 13% der Gesamtbeschäftigung im europäischen Unternehmenssektor und etwa 20% aller Beschäftigten in den nordischen Ländern, Luxemburg, Deutschland und Österreich auf sie entfallen, während ihr Anteil an der Beschäftigung in Spanien, Portugal, Frankreich, Polen oder Griechenland 10% oder weniger beträgt. Besonders hoch ist ihr Anteil in Bereichen, die für die Wettbewerbsfähigkeit der Europäischen Union von zentraler Bedeutung sind: Elektronik, Luft- und Raumfahrt, Energieerzeugung, energieintensive Industrien und Gesundheit.

Mid-caps sind in den meisten Fällen keine Start-ups mehr, sondern etablierte Unternehmen, die bereits die frühen Phasen der Unternehmensentwicklung überstanden haben. Sie wachsen in den meisten EU-Mitgliedstaaten schneller als der Durchschnitt der Unternehmen. Ihre Innovationsleistung liegt über der von KMUs aber leicht unter der von Großunternehmen. Die Mehrheit von ihnen ist auch auf Märkten außerhalb der EU tätig. Mid-caps befinden sich häufig in Familienbesitz, eine beträchtliche Anzahl von ihnen sind aber auch Tochtergesellschaften multinationaler[3] Unternehmen.

Das Wachstum von Mid-caps kann durch verschiedene Faktoren gebremst werden: zu den Wichtigsten gehören Schwierigkeiten bei der Suche nach qualifizierten Beschäftigten, Unterbrechungen der Lieferketten, überschießende Regulierung und Verwaltung oder Schwierigkeiten im Innovationsprozess. Eine weitere Herausforderung für Mid-caps in Familienbesitz ist die Regelung der Nachfolge. Darüber hinaus haben sich die steigenden Preise für Energie und andere Produktionsinputs in den letzten Monaten zu einer großen Herausforderung für Mid-caps entwickelt.

3 Nicht-national, EU Mitgliedstaaten einbegriffen.

1 INTRODUCTION

This report investigates the relevance of middle-sized enterprises (or mid-caps) in the European Union. Mid-caps are those enterprises with at least 250, but less than 1,500 employees. Alternative definitions with a higher threshold of 3,000 or 5,000 employees also exist. Thus, mid-caps are larger than small and medium-sized enterprises (SMEs), but still smaller than large multinational corporations.

One starting point for the interest in mid-cap companies were evaluations of the SME definition (Sylvest et al. 2018, European Commission 2021e) which raised the attention for companies that have 'outgrown' the thresholds of this definition. These studies suggest that there is an important part of the enterprise population which are not SMEs but are not large enterprises either. Another, more general background for the study is the ongoing research on scaling-up of SMEs, and the relationship between firm size, firm age, innovation, and firm growth in general (Cohen 2010, Coad, Holm et al. 2018, OECD 2021f).

The study has several goals. A first goal is to collect and compare definitions of mid-cap firms. Second, we measure the economic relevance of mid-caps for employment, value added, innovation, etc. Another aim is to investigate the challenges mid-cap firms are facing. Finally, the study provides insights to understand better whether policy could potentially support mid-caps to cope with these challenges.

The report is structured as follows: after a brief sketch of the research design and the methodology in Chapter 2, Chapter 3 provides an overview of mid-cap definitions. In Chapter 4, we provide a statistical overview of mid-cap enterprises in the European Union based on data from the ORBIS Europe database and Eurostat. Chapter 5 follows with an analysis of the challenges mid-caps face, based on 151 interviews with managers from mid-cap enterprises. Chapter 5, together with Chapter 4, are the core of the study. The report closes with a review of support measures for mid-caps in the main trade partners of the EU and conclusions for policy in Chapters 6 and 7.

2 RESEARCH DESIGN AND METHODOLOGY

The study follows a range of approaches to shed light on the economic relevance of mid-cap firms.

Frist, we scan the existing literature, in particular documents from governmental sources, the OECD, the IMF, and the World Bank, or from research institutes that define and discuss enterprises of different sizes. Moreover, we use different databases for policy measures such as Global Trade Alerts, the EU anti-subsidy rules database by the EU, the WTO database on formal disputes concerning subsidies, and the OECD tracker of policy responses to COVID-19. This literature also provides first inputs to identify the challenges mid-caps are facing.

Second, the study provides an empirical analysis of mid-cap firms in the EU based on the ORBIS Europe database, a large-scale data set provided by Bureau van Dijk. The ORBIS Europe database includes financial and balance sheet information for companies and covers the whole enterprise population in Europe. Other data sets that are used in the empirical analysis are Eurostat's Structural Business Statistics (SBS), Eurostat's Community Innovation Survey (CIS), and data from the European Manufacturing Survey (EMS). The methodological approach of the empirical analysis is to characterize and compare mid-cap firms across countries and industrial eco-systems with descriptive statistics.

Third, we collect quantitative and qualitative data with 151 semi-structured interviews. The interviews targeted managers of mid-caps across EU27 countries. The interview partners are drawn from a representative sample of 10,108 mid-cap firms based on the ORBIS Europe data set. We distinguish between small mid-caps (250-499 employees) and large mid-caps (500-1,499 employees). Questions in the interviews cover ownership, access to finance, employment and skills, foreign direct investment (FDI), R&D and innovation activities, digitalisation, regulatory burdens, and sustainability. Descriptive statistics based on the data collected with the interviews provide a detailed picture of the challenges that mid-cap firms face. In addition, we verify and further discuss the results from the interviews in three panel discussions with representatives of mid-cap firms, industrial associations, and from academia.

3 DEFINITIONS OF MID-CAPS

A first aim of this project is to review definitions of mid-caps with the goal of suggesting an appropriate definition for the later stages of the study. An appropriate definition would refer to differences between mid-caps and larger or smaller firms[4] based on differences in certain economic indicators. The focus will thus be on definitions that use the number of employees, turnover, or balance sheet volumes, and less on definitions based on stock market capitalisation. Only a small minority of European mid-caps are listed on the stock market, so market capitalisation is available only for a few companies. The Commission is currently working on an initiative[5] to simplify listing requirements in order to make public capital markets more attractive for EU companies and facilitate access to capital. It will help EU companies, especially smaller ones for whom the process is currently cumbersome, raise funds on capital markets and reap the benefits of going public, such as exposure to a wider investor base, higher growth, and job creation.

To identify mid-cap definitions in EU legislation, in documents by international organisations, or in national regulations, we performed searches with Google and Google Scholar using keywords such as 'mid-cap', 'middle-sized enterprise', 'medium enterprise', 'medium firm', 'Mittelstand', 'Mittlere Unternehmen", and variations of these keywords.

Definitions in the EU

The SME definition is central to many EU enterprise policies. Its relevance emerges from the idea that policy should help small and medium-sized firms to overcome disadvantages that arise from market and systemic failures due to their size. A recent evaluation (European Commission 2021e) found that the SME definition remains relevant and fit for its purpose. The SME definition does not foresee mid-caps as a separate group of firms. Rather, it distinguishes between medium-sized firms (between 50 and 250 employees, up to 50 million EUR turnover or up to 43 million EUR balance sheet) and large firms (more than 250 employees or passing both financial thresholds).

This definition, however, is seen as arbitrary in some cases as it could lead to a different treatment of otherwise similar firms. For example, fast-growing, innovative firms that seek external funding for scaling-up are often, but not necessarily SMEs (Daunfeldt et al., 2016). There are also certain mid-caps which face this challenge. Thus, various funding schemes for risk finance and scaling-up approved by the European Commission cover also firms other than SMEs, such as small and/or innovative mid-cap enterprises, to address their funding gap. This was possible because the EC communication on Guidelines on State aid to promote risk finance investments (European Commission 2014, European Commission 2021c) allow support under certain conditions to these types of companies. The Risk Finance Guidelines define mid-caps as all those enterprises that are not an SME and whose number of employees does not exceed 1,500 (European Commission 2021c, p. 13). Within that category, the Guidelines further mention small mid-caps and innovative mid-caps. Small mid-caps have less than 500 employees and an annual turnover of less than 100 million EUR or a balance sheet of less than 86 million EUR. An innovative mid-cap may be defined on the basis of different criteria; for example, a mid-cap that spends at least 10% of its total operating cost on research and development in at least one of the three years that precede the first investment under the risk finance measure is considered innovative. Thus, under the Guidelines, risk finance aid can be given to start-ups, SMEs, small mid-caps, and innovative mid-caps, but not to innovative mid-caps with 500 or more employees (which could though receive State aid under a different legal basis).

Another example is InnovFin, a joint initiative launched by the European Investment Fund (EIF) as part of the European Investment Bank (EIB) Group and the European Commission. InnovFin provided loans, guarantees and equity funding under Horizon 2020 (H2020). It distinguishes between small mid-caps up to 499 employees, and large mid-caps with 500 up to 2,999 employees. A turnover or balance sheet criterion have not been applied. Another example of measures within H2020 which

4 Firm, enterprise, and company are used as synonyms throughout the study

5 https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/13238-Listing-Act-making-public-capital-markets-more-attractive-for-EU-companies-and-facilitating-access-to-capital-for-SMEs_en

also support small mid-caps in addition to SMEs, is the European Innovation Council (EIC) accelerator.

Outside H2020, mid-caps were eligible for funding from the European Fund for Strategic Investments (EFSI), a European instrument to improve access to financing of enterprises, with a particular focus on SMEs and small mid-cap companies, but also open to large mid-caps up to 2,999 employees. Horizon Europe and InvestEU replaced Horizon 2020 and EFSI in 2020 with new instruments. InvestEU provides investments and risk funding in four policy areas or "windows". One of these is open only for SMEs and small mid-caps, while the other windows support all other types of firms. The definition of small mid-caps remains unchanged from EFSI regulation (European Union 2021b).

The same is true for the European Defence Fund (EDF), an EU initiative to foster this industry and promote defence-related R&D. The EDF, among other goals, encourages the participation of SMEs and mid-caps in the defence sector. The guidelines on state aid to promote risk finance investments (European Union 2021c) are referring to middle capitalisation companies or mid-caps, as enterprises that employ a maximum of 3,000 persons. The same thresholds can also be found in Digital Europe, a programme that will support digitalization across enterprises in the EU. Horizon Europe is open for enterprises of all sizes. Mid-caps enjoy a special treatment in the EIC accelerator which supports scaling-up of radical innovations through funding and investments and is part of Horizon Europe.

References to mid-cap firms also appear in various recovery packages of national governments to fight the economic consequences of COVID-19. For example, on 14 April 2020, the European Commission announced that it has decided to approve, under the state aid rules, an Italian guarantee scheme to support self-employed workers, small and medium-sized enterprises (SMEs) and mid-caps affected by the outbreak of COVID-19.[6] This scheme is open to self-employed workers and companies with up to 499 employees. Covid-19 also triggered a lot of additional funding activities by the EIB which also target mid-cap firms. The underlying definitions, however, are the same as those used in other EIB activities so we have not included it as new mid-cap definitions in the list above.

Various definitions of mid-caps can also be found at the **national level**. The French statistical agency INSEE (2020) defines an "Entreprise de taille Intermédiaire" or ETI to be a company with between 250 and 5,000 employees, and a turnover which does not exceed 1.5 billion EUR or a balance sheet total which does not exceed two billion EUR. This puts the ETI definition clearly above mid-cap definitions found in the context of European funding schemes. A company with fewer than 250 employees, but a turnover bigger than 50 million EUR and a balance sheet exceeding 43 million EUR is also no longer considered an SME according to the EU SME definition.

Germany also has a strong tradition of considering mid-caps or "mittelständische Unternehmen" as a distinct group of firms that merits attention on its own. The German "Mittelstand", however, is less defined by the number of employees, but by shared values such as independence from other companies, independent long-term decision-making and the unity of ownership and management (Welter et al., 2015). Mittelstand, according to Welter et al. (2015), is not just an economic, but also an emotional category that distinguishes itself from other types of firms by long-term thinking and commitment, owner-managers instead of employed managers, and often family ownership. Thus, enterprises of very different sizes can be Mittelstand, and they are often family-owned firms; subsidiaries of multinational firms regardless of their size, however, cannot be Mittelstand.

The IfM Bonn (2020) defines Mittelstand as those firms where up to two natural persons or their family members hold (directly or indirectly) at least 50% of the shares of the company, and where these natural persons belong to the management. However, they also admit that this includes the vast majority of all firms up to 500 employees. Röhl (2018) considers large mid-caps as Mittelstand firms with more than 250, but less than 3,000 employees. Another important definition of the Mittelstand is that of the German bank KfW which is influential because of its use for research based on the KfW Mittelstandspanel (KfW, 2021). KfW defines Mittelstand as all enterprises with up to a turnover of 500 million EUR. Thus, this definition includes SMEs as well as small and large mid-caps. There are also some national definitions of SMEs in Europe that deviate from the EU definition in terms of turnover or sub-categories of SMEs, but not in the employee threshold of 250 persons. The issue of increasing this threshold to 500 employees has, however, been raised in Germany (Röhl,

6 https://ec.europa.eu/commission/presscorner/detail/en/ip_20_656

2018). The differences between various national SME definitions are discussed in detail in the evaluation of the SME definition (European Commission, 2021b) and the supporting background study (Sylvest et al., 2018).

Table 3.1: Mid-cap definitions

Name	Source	Lower bounds (employment)	Upper bounds (employment)	Turnover (EUR)	OR Balance sheet (EUR)
SME definition	EU	-	249	<50 million EUR	<43 million EUR
Mid-caps	Risk finance State Aid (Risk Finance Guidelines)	500	1,499	-	-
Small mid-caps	State Aid (GBER, Risk Finance Guidelines)	250	499	<100 million EUR	<86 million EUR
Innovative mid-caps	State Aid (Risk Finance Guidelines)	500	1,499	See * in the notes	
Large mid-caps	InnovFin, EFSI	500	2,999	-	-
Entreprise de taille intermédiaire	INSEE, FR	250	4,999	<=1.5 billion EUR	<= 2 billion EUR
Mittlere Unternehmen	IfM, DE	50	499	<50 million EUR	
Großer Mittelstand	Röhl 2018	250	2,999		
Mittelstand	KfW			< 500 million EUR	
Hidden Champions	Simon 2012		9,999	< 5 billion EUR	
Mid-sized business	BIS, UK			> 25 million £ and < 500 million £	
Middle market	US Chamber of Commerce			> 10 million USD and < 1 billion USD	
Little Giants	Chinese Ministry of Commerce				

Source: own research

Notes: The INSEE definition requires that the actual value of turnover or balance sheet exceeds only one of the two thresholds. IfM: employment and turnover criteria must be met

* at least 10% of its total operating cost on research and development in at least one of the three years; has recently been awarded a Seal of Excellence quality label by the European Innovation Council in accordance with the Horizon 2020 work programme 2018-2020 (43) or with Article 2(23) and Article 15(2) of Regulation (EU) 2021/695; or has recently received an investment from the European Innovation Council Fund, such as an investment in the context of the Accelerator Programme as referred to in Article 48 of Regulation (EU) 2021/695; and either has participated to any CASSINI (44) action (CASSINI Business Accelerator or Matchmaking), or has received investment from CASSINI Seed and Growth Funding Facility, or has been awarded a CASSINI Prize, meeting the evaluation thresholds set therein, or has been supported by space- related projects funded by Horizon Europe which has resulted in the creation of a start-up; see (European Commission 2021c, p. 13).

A variation of the Mittelstand concept are 'Hidden Champions'. These are mid-caps from manufacturing industries which are among the top 3 in their respective market segment on the global market (Simon, 2012). Market segment is defined as a narrow niche in a larger market. In many cases these firms are hardly known to the public due to their high degree of specialization. There were around 1,800 Hidden Champions in Germany in 2016, which should be around half of the total world-wide population. 73% of these firms are SMEs according to the EU definition, while another 12% are small mid-caps with up to 500 employees (Rammer and Spielkamp, 2019).

Definitions outside the EU

The Mittelstand and "Hidden Champions" concepts have also inspired the Chinese Ministry of Commerce when developing China's "specialized and sophisticated enterprises" (专精特新) also known as "Little Giants" (Brown, 2022). We present this concept and its connection to enterprise policies in more detail in Chapter 6. Little Giants are recruited among Chinese SMEs and should work on technologies listed in the 'Industrial Four Bases Development Catalogue' and the 'Made in China 2025 Strategy', and become market leaders in their niches, just like Germany's "Hidden Champions". The goal is to develop 10,000 Little Giants until 2025, the Ministry will support this goal with 10 billion Yuan (1.43 billion EUR).

While there is no definition of mid-caps, the thresholds for SMEs are much higher in China compared to the EU and vary by sector. A considerable number of SMEs would thus already fit under the definition of mid-caps as used in this study. In manufacturing, all firms with less than 1,000 employees or an operating revenue of less than 400 million Yuan qualify as an SME. Software and information technology firms are SMEs if they have fewer than 300 employees or less than 100 million Yuan operating revenues (Chinese Ministry of Industry 2011).

In the United Kingdom, the Department for Business, Innovation & Skills (BIS, 2012) has been looking at 'Mid-sized Businesses' based on turnover. It defines these mid-sized businesses as firms with a turnover of 25 million to 500 million £ per year. 25 million £ being the upper bound of the UK SME turnover definition, whilst 500 million £ lies somewhere in the range of the large mid-cap definition brought forward by various EU initiatives or Röhl (2018). However, a more recent post of the UK government (2021b) suggests that mid-sized businesses are defined as those that have a turnover of more than 10 million £ and/or more than 20 employees. This would put mid-sized firms in the range of SMEs.

In the United States, there is no legal mid-caps definition according to information provided by the U.S. Small Business Administration (SBA). However, the SBA uses higher thresholds than the EU in a sophisticated system of small business size standards to identify SMEs eligible for funding. These standards define industry-specific thresholds based on the number of employees or turnover. In manufacturing, the SBA applies six size standards which are the upper bounds of small businesses (U.S. Small Business Administration, 2019a, p. 27): 250, 500, 750, 1,000, 1,250, and 1,500 employees. Some of these thresholds go well into mid-cap territory with thresholds of 1,500 employees, and there are very few industries -mostly in utilities- where thresholds of 250 employees are applicable (U.S. Small Business Administration, 2019b). This means that several small businesses in the US would actually be considered as a mid-cap in Europe. The rationale for this large variety of thresholds are differences in the structure and organisation of industries. A bakery of 250 employees may be a large firm in this sector, while a steel mill with the same number of employees will only be regarded as small. The SBA examines industry structure by four factors – average firm size, degree of competition within an industry, start-up costs and entry barriers, and distribution of firms by size. These factors go into the calculation of each industry-specific size standard (U.S. Small Business Administration, 2019a).

There is no definition of mid-caps in Japan, but as in the other examples above, their thresholds for SMEs are higher and sector-specific: any manufacturing, construction, or transportation firm whose regular workforce does not exceed 300 persons, or whose capital does not exceed 300 million Yen is considered as an SME (Small and Medium Size Enterprise Agency, 2019). In wholesale trade and services, the threshold is only 100 persons, in retail trade even 50 persons. This means that mid-caps in manufacturing, construction and transport are partly covered by the SME definition in Japan, but not in service industries. Moreover, there exists a category of firms called 'chûken kigyô' which seem similar to German Mittelstand companies (Storz, 2008), characterized by independence from large conglomerates and possibly traded in the mid-caps segment of the Tokyo Stock Exchange.

More evidence on national SME definitions is provided by the World Bank which has put together a comprehensive database including 240 positions (SME Finance Forum, 2019). The data shows that SME thresholds vary from a low of 19 employees to a high of 499 employees. The World Bank itself relies on these national definitions and does not have an SME or mid-cap definition of its own (World Bank, 2019). However, it uses the term mid-caps in some of its press releases, referring to companies that employ between 250 to 3,000 people (World Bank, 2021).

Finally, there are several definitions of mid-cap firms based on their stock market capitalization. These definitions are proposed by industrial associations or banks to monitor business conditions of mid-caps and have an informal character. However, as there seem to be less than 5,000 European companies listed at EU stock markets, this mid-cap definition would only encompass a tiny fraction of all mid-cap companies. An example is the Italian Bank Mediobanca which refers to mid-caps as listed companies similar to Mittelstand firms. However, Mediobanca's coverage includes no more than 70 companies (Mediobanca 2020).

In the US the National Center for the Middle Market affiliated to Ohio State University defines middle market companies as those with annual revenues between 10 million USD and 1 billion USD (National Center for the Middle Market, 2021). The US Chamber of Commerce regularly publishes a Middle Market Business Index[7]. This index also considers companies with annual revenues between 10 million USD and 1 billion USD, split into small mid-caps (10 - 50 million USD) and large mid-caps (50 million USD - 1 billion USD). A similar example would be Japan's 'chûken kigyô' or the French ETI, both mentioned above. Based on these thresholds, it seems that the 'Middle Market' covers an area considerably larger than the mid-cap definitions used in the EU and encompasses a lot of the SME territory. According to the National Center for the Middle Market (2021), it includes 200k businesses and a third of private sector GDP and employment in the US.

To sum up, definitions of mid-cap firms at EU level as a separate group within the business sector are often related to risk financing and the ability of mid-cap firms to raise the necessary investments. Another definition refers to companies with a smaller stock market capitalization than the largest companies; however, only very few of the existing mid-caps in Europe are listed at a stock market. The most common size brackets for mid-cap definitions are 250-500 for small mid-caps and 500-1,499 for large mid-caps. There are some national definitions which deviate from these thresholds. Countries outside the EU often include mid-caps under the higher thresholds for their SME definition.

7 Various issues can be found here: (https://www.uschamber.com/economy/middle-market-business-index)

4 MID-CAPS IN THE EUROPEAN UNION – EMPIRICAL EVIDENCE

This chapter puts forward and assesses three definitions of mid-caps which are then used for mapping mid-caps in the EU. Further, the chapter discusses in more depth their performance by EU member state and industrial ecosystem.

The chapter is organised as follows: Section 4.1 provides empirical evidence based on firm-level data across the EU member states and, on that basis, assesses three definitions of mid-caps. Using the selected definitions of mid-caps, Section 4.2 provides an analysis of mid-caps' performance indicators; Sections 4.3 and 4.4 continue the analysis by EU member state and by industrial ecosystem. Section 4.5 analyses foreign ownership in the mid-caps segment, while Section 4.6 looks at the growth performance of mid-caps. Section 4.7 looks at mid-caps in EU enlargement countries. Finally, Sections 4.8 and 4.9 focus on innovation and digitalization in mid-cap firms.

4.1 An empirical assessment of mid-caps definitions

Finding a suitable definition of mid-caps is challenging. In this section, we assess empirically different definitions of mid-caps, and examine how the mapping of mid-caps would differ by each definition. To this purpose, we examine the impact of each definition on the overall distribution of mid-caps across all EU27 member states.

Most mid-caps definitions are based on turnover or the number of employees. This makes sense because such information is available for the vast majority of companies. However, using both turnover and the number of employees could cause difficulty in identifying mid-caps that can generate a large turnover with a small staff, so employment and turnover are not proportional. Frequent examples can be found in finance, wholesale, or retail trade. This brings a lot of heterogeneity to mid-caps definitions. Thus, it seems desirable and feasible to concentrate on measures based on the number of employees, the most widely used data in mid-caps definitions. Some of the mid-cap definitions used in relevant studies have been discussed in Chapter 3.

We consider three working definitions of mid-caps based on the number of employees, and compare them to two national definitions, *Entreprise de taille intermédiaire* used in France, and *Mittlere Unternehmen* from Germany:

(1) Small mid-caps: firms with 250-499 employees;
(2) Large mid-caps: firms with 500-1,499 employees;
(3) Very large mid-caps: firms with 1,500-2,999 employees;
(4) Entreprise de taille intermédiaire: firms with 250-4,999 employees;
(5) Mittlere Unternehmen: firms with 50-499 employees.

To compare the above-mentioned definitions, we consider how the following economic performance indicators of mid-caps would change when using each definition, and we also compare them with those of micro firms, SMEs, and very large firms with over 3,000 employees:

(1) share of number of firms of a firm size group in the total number of all firms;
(2) share of employment of a firm size group in the total employment of all firms;
(3) share of turnover of a firm size group in the total turnover of all firms.

Eurostat's Structural Business Statistics (SBS) data set does not provide statistical information for mid-caps in the European Union. Mid-caps are part of the group of large firms, which includes all firms with 250 and more employees. Thus, it is not possible to distinguish mid-caps from larger firms in the Eurostat data. As an alternative, our analysis uses the ORBIS Europe database, which is a comprehensive firm-level database provided by Bureau van Dijk. It includes financial and balance sheet information that covers the whole enterprise population in Europe. However, the quality of the ORBIS Europe data is uneven across countries and has some limitations. The filing requirements differ across countries; therefore, the data extracted from the ORBIS Europe database are often not representative for all EU member states. To put together a representative micro-data set for the EU member states, we follow the guidelines for data extraction and data cleaning provided by Kalemli-Ozcan et al. (2019).

The main criterion for the preparation of the firm-level data from the ORBIS Europe data base to be used in the empirical analysis is that firms are still active in June 2022, when the data was retrieved from the ORBIS Europe online platform, and that firms report unconsolidated financial statements or limited financial statements. Details on the data preparation are discussed in Appendix A.

To validate the constructed data set extracted from ORBIS Europe, we aggregate the micro data by country and compare summary statistics of various indicators by firm size distribution to the aggregated official statistics from the Eurostat's Structural Business Statistics (SBS) data set. Overall, the ORBIS Europe data has a good quality in terms of covering large firms including mid-caps, although the quality is less satisfactory for SMEs and for micro firms. In terms of the number of companies, our results suggest that in general the ORBIS Europe data set has a limited coverage of micro firms compared to the SBS data, while the ORBIS Europe and the SBS have similar coverages of SMEs and large firms. Comparing the number of firms in the ORBIS Europe and SBS databases, the corresponding average ratios across all countries are 0.32 for micro firms, 0.69 for SMEs and 0.74 for large firms. A similar pattern is observed when comparing the number of employees and turnover by firm size group in the two databases. However, despite a good coverage, our results are weighted estimations which may deviate from the results published by Eurostat or national statistical agencies. More details are provided in Appendix A.

Because of the variation in coverage, the sampling probability of a company in the ORBIS Europe database differs by country and by firm size group. To ensure a better representativeness of the ORBIS Europe database relative to the full population of enterprises reported in the SBS database, the statistics presented in this chapter are weighted. The weights are calculated as the ratio of the total number of firms in each size group (micro firms 0-9 employees, SMEs 10-249 employees, and large firms 250+ employees) in a country in the SBS database to that in the ORBIS Europe database over the common sectors of these two datasets. To apply the weights to all firms extracted from the ORBIS Europe data, some assumptions are made. One assumption is that the sampling probability of a firm in the ORBIS Europe database in all sectors is the same in the same size group and the same country. A further assumption is that the sampling probability in the ORBIS Europe database is identical for firms with more than 250 employees across all sectors in a country, as it is not possible to further separate firms with 250+ employees in the SBS database to construct more detailed weights. The list of the constructed weights is shown in Table A7 in Appendix A.

Figures 4.1 and 4.2 below summarize the results of the assessment of mid-caps definitions. The figures show how the definition of mid-caps influences the overall picture of the cohort of such companies across all EU member states. In general, large firms including mid-caps account for a tiny proportion of the total number of enterprises, while they contribute a large share of employment and turnover to the economy.

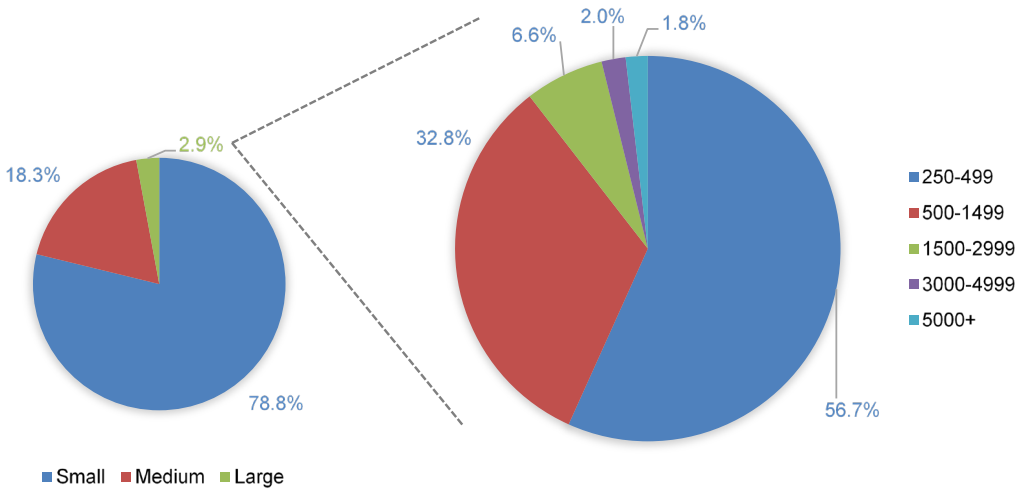
Most companies are micro firms (with less than 10 employees), namely 93.3% of all firms on the basis of the available data for 2019. Of all firms, 6.5% are SMEs (excluding micro firms) and 0.2% are large firms including mid-caps. As shown in the left panel of Figure 4.1, of all SMEs (excluding micro firms) and large firms, 78.8% are small firms with 10-49 employees, and 18.3% of them are medium-sized firms. Large firms only account for 2.9%. If we focus on the group of large firms, small mid-caps (250-499) account for 56.7% of all large firms, large mid-caps (500-1,499) account for 32.8%, and very large mid-caps (1,500-2,999) make another 6.6%. The remaining 2.0% and 1.8% are very large firms with 3,000-4,999 employees and with more than 5,000 employees, respectively.

The data suggest that the mid-caps category accounts for 0.11% of all firms (equivalent to having 11 firms per 10k firms) if only small mid-caps are selected, whereas it accounts for 0.17% (equivalent to 17.4 firms per 10k firms) if both small mid-caps and large mid-caps (250-1,499) are considered. It will take around 0.19% (or 18.7 firms per 10k firms) if all small, large and very large mid-caps (250-2,999) are counted. Therefore, using both small and large mid-caps would bring considerably more firms into the mid-caps category than using only the small mid-caps group, while using all small, large and very large mid-caps (250-2,999) would only expand the category to some limited extent.

We estimate that, in absolute terms, there are around 31,000 small mid-caps firms and another 18,000 large mid-caps in the European Union. Germany accounts for around 14,000 small and large mid-cap firms, France for around 5,000, followed by Italy and Spain with around 4,000 mid-cap firms each. Mid-cap firms can be found in all EU member states; Malta, for example, hosts 70 small mid-caps according to information provided by its National Statistics Office. In addition, there are around 3,600 very large mid-cap firms in the EU with between 1,500 and 2,999 employees.

If we compare our mid-caps definitions to the ones covering the *Entreprise de taille intermédiaire* and *Mittlere Unternehmen*, mid-caps using the French definition would account for 0.19% of all firms (19.1 firms per 10k firms), while using the German definition mid-caps would account for 1.33% of all firms (132.9 firms per 10k firms).

Figure 4.1. Share of firms by firm size group



Source: Own calculations based on the ORBIS Europe database.

In terms of the number of employees reported in 2019, micro firms represent 38.2% of the total employment of all firms, and SMEs account for another 34.4% (small firms 16.1% and medium sized firms 18.3%)[8]. Small mid-caps (250-499) contribute 5.7% of employment, large mid-caps (500-1,499) contribute 7.6%, while very large mid-caps make another 3.9%. Firms with 3,000-4,999 employees, and firms with more than 5,000 employees provide the rest 2.2% and 7.9% of employment, respectively. These numbers are shown in the left panel of Figure 4.2.

As a result, the share of employment provided by mid-caps varies considerably by mid-caps definition. Taking the data for 2019 as an example, mid-caps account for 5.7% of employment when only small mid-caps are considered, while mid-caps with 250-1,499 employees (small and large mid-caps) represent 13.3% of all employment. Mid-caps with 250-2,999 employees (small, large, and very large mid-caps) provide 17.2% of the employment in all firms.

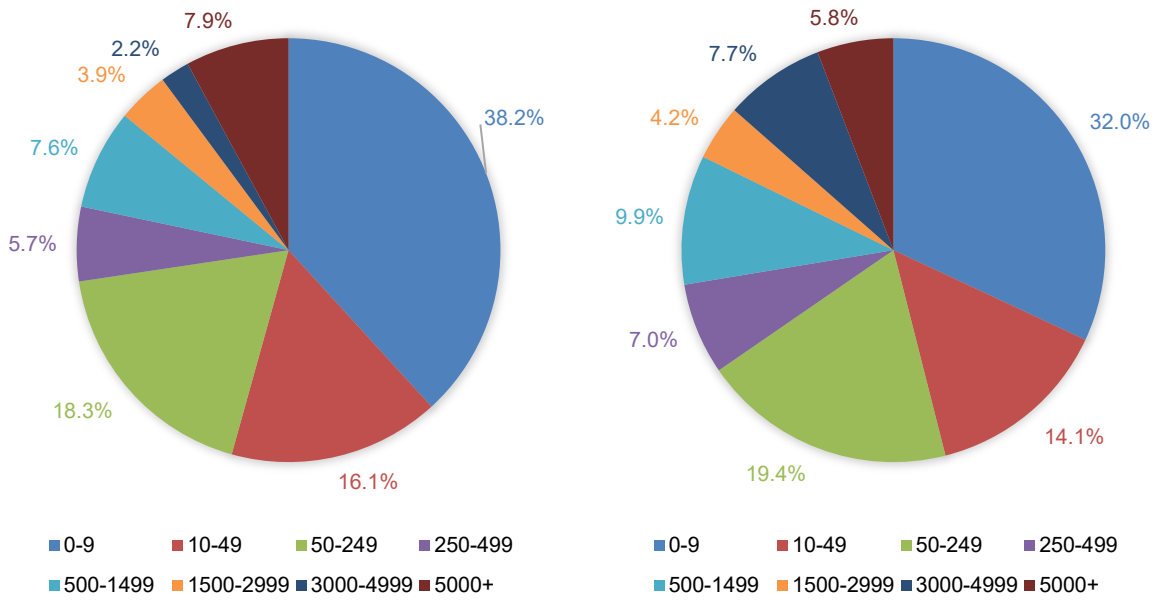
Comparing the employment shares of mid-caps using the *Entreprise de taille intermédiaire* definition (250-4,999) and the *Mittlere Unternehmen* definition (50-499), respectively, mid-caps with 250-4,999 employees account for 19.5% of total employment, and mid-caps with 50-499 employees contribute 24.0%, respectively.

The turnover share shows a similar pattern to the employment share by firm size groups. As shown in the right panel of Figure 4.2, in 2019, 32.2% of the total turnover generated by all firms in the EU member states is accounted for by micro firms, 33.4% is contributed by SMEs (14.1% from small firms, and 19.3% from medium-sized firms). In the large firms' group, small mid-caps account for

8 The combined employment figure of micro firms and SMEs in the ORBIS Europe database is 72.6%, while this is 65% in the Eurostat SBS database. The discrepancy may reflect different survey methods and different firm coverage across countries.

7.0% of total turnover, large mid-caps account for 9.7%, and very large mid-caps contribute 4.2%. The remaining 13.5% of turnover is generated by firms with 3,000 and more employees, of which, 7.7% is from firms with 3,000-4,999 employees. Therefore, mid-caps consisting only of small mid-caps contributed 7.0% of total turnover in 2019, whereas 16.7% of total turnover would be accounted by mid-caps if both small and large mid-caps are selected. However, only another 4.4% of total turnover would be added to the mid-cap group if the definition also includes very large mid-caps. Considering the French and German definitions, mid-caps with 250-4,999 employees generate 28.8% of turnover, and mid-caps with 50-499 employees generate 26.3%. Although the figures are close, the composition of firms may be very different.

Figure 4.2. Share of employment (left) and share of turnover (right) by firm size group



Source: Own calculations based on the ORBIS Europe database.

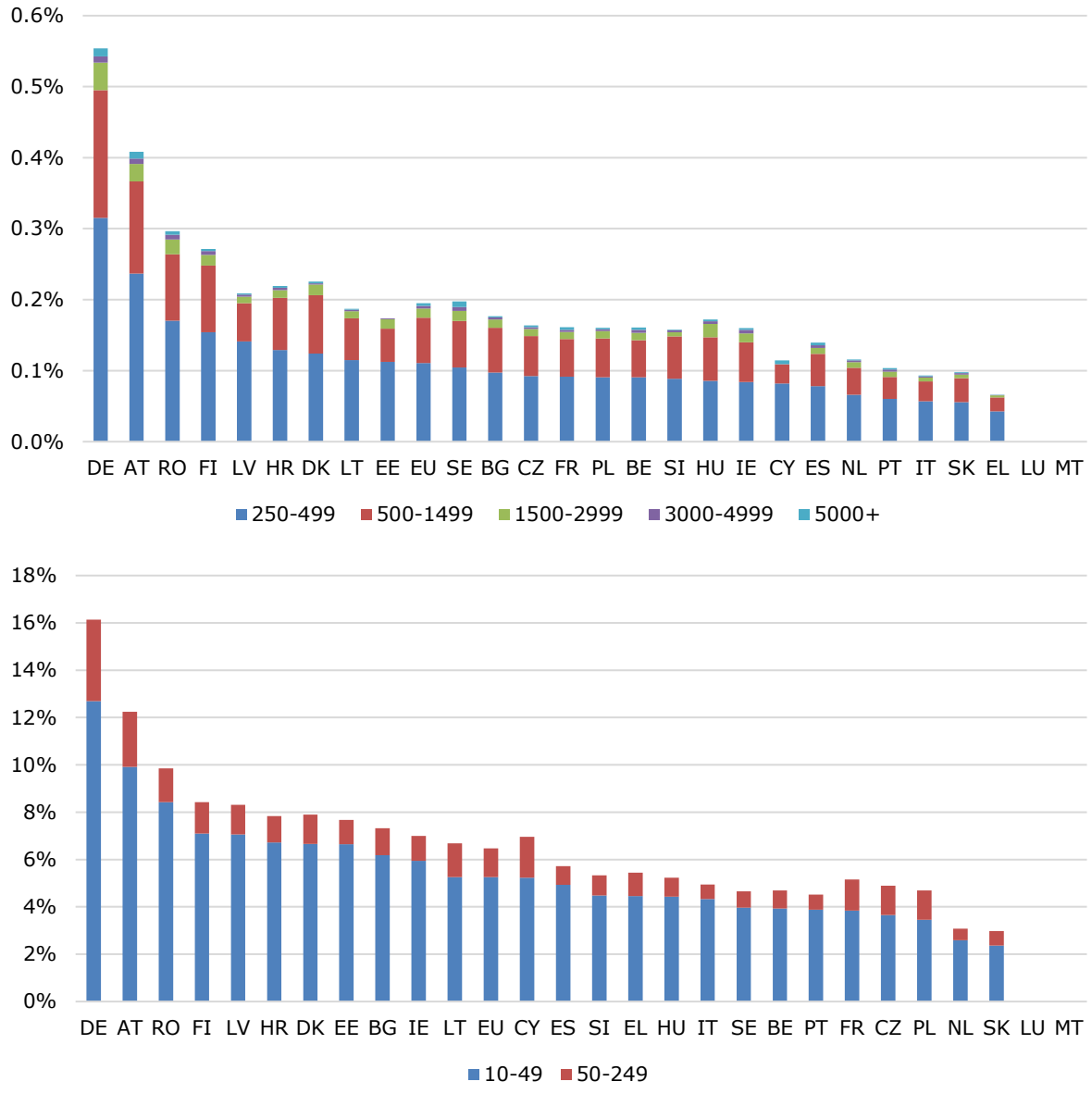
Different mid-caps definitions have also a considerable influence on the distribution of mid-caps across EU member states. Figures 4.4 to 4.6 summarise the statistics of mid-caps by EU member state using various definitions. These figures allow us to assess the impact of mid-caps definitions on the mapping of mid-caps. Descriptive statistics of SMEs (excluding micros) and very large firms are also reported so that they could be compared to those of mid-caps. The corresponding statistics are shown in Tables A9 to A11 in Appendix A.

The pattern of mid-caps by country is complex. In general, the data suggest that selecting both small and large mid-caps (firms with 250-1,499 employees) would bring in a significant higher number of firms to the mid-cap group compared to using solely small mid-caps (250-499 employees). However, including all small, large, and very large mid-caps (250-2,999 employees) would have only a limited additional benefit, as it would only append a tiny fraction of firms to the mid-caps group.

Take Germany as an example. Small mid-caps represent 0.32% of all firms (equivalent to 31.5 firms per 10k firms). Small and large mid-caps represent 0.50% (or 49.5 firms per 10k firms). However, the count of mid-caps in the broadest sense including all small, large, and very large mid-caps is 0.53% (or 53.4 firms per 10k firms), which adds only little to the number of mid-caps in the previous two definitions. This pattern repeats for other EU member states as well. Detailed information on how the number of firms increases with a broader definition of mid-caps is provided in the top panel of Figure 4.3. As a comparison, the bottom panel of the same figure plots the share of SMEs (excluding micros) by EU member state, which is much higher than that of large firms.

If we still take Germany as an example and consider the two definitions used for *Entreprise de taille intermédiaire* (250-4,999) and the *Mittlere Unternehmen* (50-499), the former definition will include 54.3 firms per 10k firms in Germany (0.54% of all firms), while the latter definition will include 376.1 firms per 10k firms (3.76% of all firms). Again, the German definition would bring in a significant number of firms into the mid-cap category.

Figure 4.3. Share of mid-caps and SMEs by EU member state and by mid-caps definition



Source: Own elaboration based on the ORBIS Europe database.

Notes: All firms with non-missing employment information in 2019 in ORBIS Europe database are included in the analysis. Luxembourg and Malta are excluded due to limited observations. Ranked by the share of small mid-caps (firms with 250-499 employees). SMEs exclude micro firms.

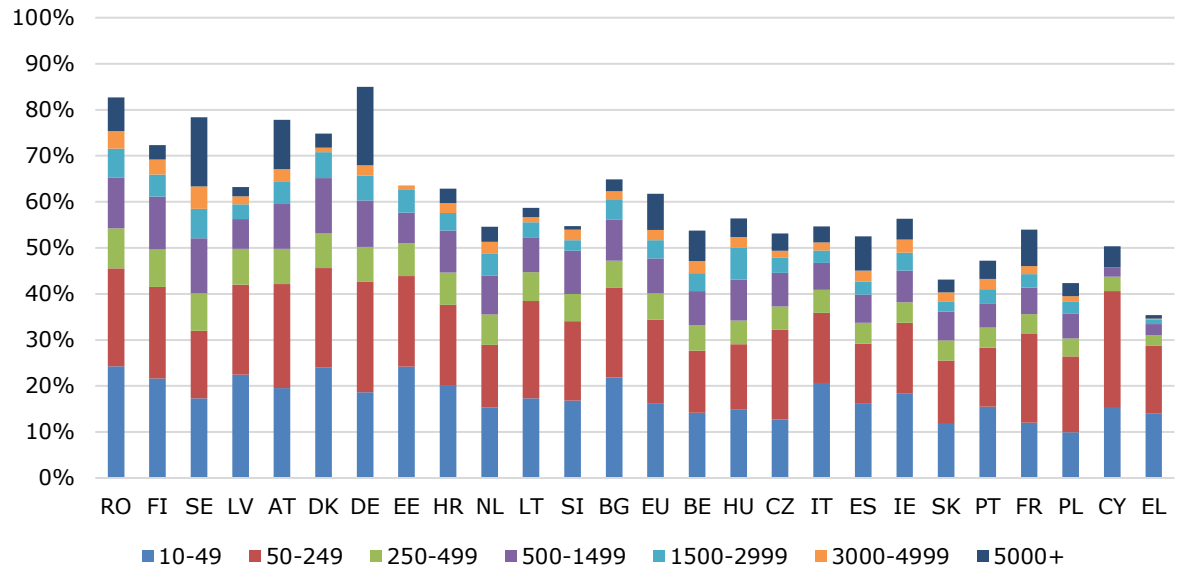
Another important pattern is that Germany and Austria tend to have a higher share of mid-caps than other countries as shown in Figure 4.3, followed by Romania and Finland. In contrast, Greece, Slovakia, Italy, and Poland have a very low share of mid-caps in comparison to other countries. This pattern holds regardless of the selected mid-caps definition.

Furthermore, small mid-caps, large mid-caps and very large mid-caps all show a certain high level of importance in terms of their contribution to the employment and turnover shares, although their importance varies by country. Figure 4.4 provides a comparison across EU member states. The share

of small mid-caps in total employment is highest in Romania, Finland, Sweden, and Latvia followed by Austria and Germany, the countries with the largest shares of mid-caps in the total number of firms. Generally, small mid-caps and large mid-caps tend to contribute more to employment and turnover than very large mid-caps. Therefore, it might be reasonable to use small mid-caps and large mid-caps as being more relevant in defining mid-caps in Europe.

For example, as shown in Figure 4.4, small mid-caps contribute more than 8% of total employment in Romania, Finland, and Sweden in 2019, while they contribute less than 4% in Poland, Cyprus, and Greece. Large mid-caps contribute more than 11% of total employment in Sweden, Denmark, Finland, and Romania, however, they contribute around or less than 5% in Portugal (5.4%), Greece (2.5%) and Cyprus (2.0%). Similarly, the importance of very large mid-caps in terms of the employment share also varies by country. They contribute over 6% of employment in Hungary, Romania, and Sweden, whereas they only contribute less than 3% in France, Spain, Italy, Poland, Slovenia, Slovakia, and Greece. No firms in this size category were reported in the ORBIS Europe database for Cyprus. Luxembourg and Malta are excluded from the analysis due to limited numbers of observations.

Figure 4.4. Share of total employees by EU member state and by mid-cap definition



Source: Own elaboration based on the ORBIS Europe database.

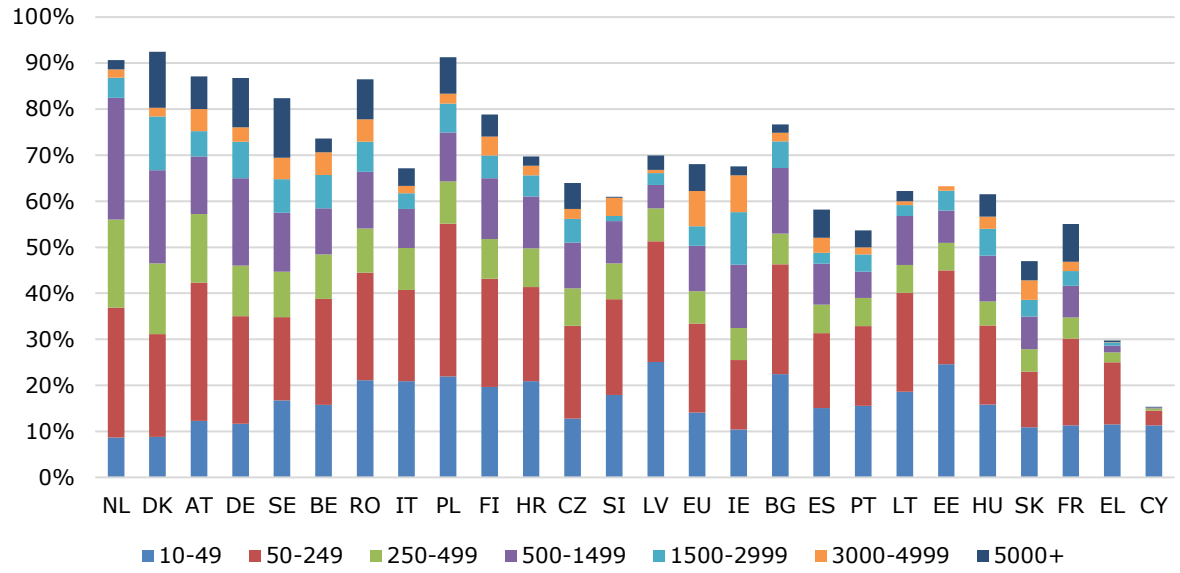
Notes: All firms with non-missing employment information in 2019 in ORBIS Europe database are included in the analysis. Luxembourg and Malta are excluded due to limited numbers of observations. Ranked by the share of total employment of small mid-caps (firms with 250-499 employees). Micro firms provide the remaining share of employment.

If we take the *Entreprise de taille intermédiaire* definition, the top countries in mid-caps' employment share are Sweden (31.3%), Romania (29.8%), Finland (27.7%) and Denmark (26.1%), followed by Germany and Austria (25.2% and 25.0%, respectively). Using this definition, mid-caps account for less than 10% of the employment share in Greece and Cyprus. If we take the definition of mid-caps used by *Mittlere Unternehmen*, the top-ranking countries are Germany (31.6%), Austria (30.3%), Romania (30.0%) and Denmark (23.1%).

If turnover is taken as the measure of mid-caps' economic importance, small mid-caps generate around or more than 15% of total turnover in 2019 in the Netherlands (19.2%), Denmark (19.0%), and Austria (14.9%). However, they provide less than 5% of the total turnover in Slovakia, France, Greece, and Cyprus. Large mid-caps generate more than 15% of turnover in the Netherlands (26.4%), Denmark (20.2%) and Germany (19.0%), while they generate less than 5% of the total turnover in Greece, and Cyprus. Additionally, very large mid-caps contribute over 10% of the turnover in Ireland (11.4%) and Denmark (11.7%), whereas they create less than 3% of the total turnover in Latvia, Spain, Lithuania, Slovenia, Greece, and Cyprus. These statistics are shown in Figure 4.5. Again, Luxembourg and Malta are excluded from the analysis due to limited numbers of observations.

Considering the *Entreprise de taille intermédiaire* definition, the top countries in mid-caps' turnover share are the Netherlands (51.8%), Denmark (49.2%), Germany (41.0%) and Ireland (40.1%). While mid-caps using this definition in Greece and Cyprus only account for less than 10% of the turnover share. If we take the *Mittlere Unternehmen* definition of mid-caps, the top-ranking countries are the Netherlands (47.4%), Austria (44.9%), Poland (42.3%) and Denmark (37.7%). Mid-caps in Cyprus make less than 5% of turnover share under this definition.

Figure 4.5. Share of total turnover by EU member state and by mid-cap definition



Source: Own elaboration based on the ORBIS Europe database.

Note: All firms with non-missing employment and turnover information in 2019 in ORBIS Europe database are included in the analysis. Luxembourg and Malta are excluded due to limited observations. Ranked by the share of turnover of small mid-caps (firms with 250-499 employees). Micro firms provide the remaining share of turnover.

4.2 Key features of mid-caps

Having examined the impact of mid-caps definitions on the share of mid-caps, in this section, we provide detailed analysis of mid-caps' performance indicators in the EU. The analysis is based on the ORBIS Europe database in 2019. This year is chosen because we believe it is more appropriate to use pre-pandemic data to represent the general structure of EU mid-caps. Another reason is that the last available year in the SBS database is 2019 which is used to construct the weights to ensure data representativeness.

The performance indicators of mid-caps selected for analysis in this section are total assets intensity (total assets per employee), labour productivity (turnover per employee), assets-turnover ratio (turnover over total assets), efficiency ratio (cash flow over total assets) and profit margin (net income over turnover). The total assets to employment ratio is an indicator that measures the intensity of total assets of a company. The other four performance indicators measure the competitiveness of companies, which is crucially important for the economic growth of EU member states. Labour productivity measures how much output could be produced per one unit of labour input, which is a key determinant of living standards in the long run. The assets-turnover ratio measures a company's efficiency in using its assets to generate revenue. The efficiency ratio measures a firm's ability to use its assets to generate cash flow. Finally, the profit margin measures a firm's ability to generate profits.

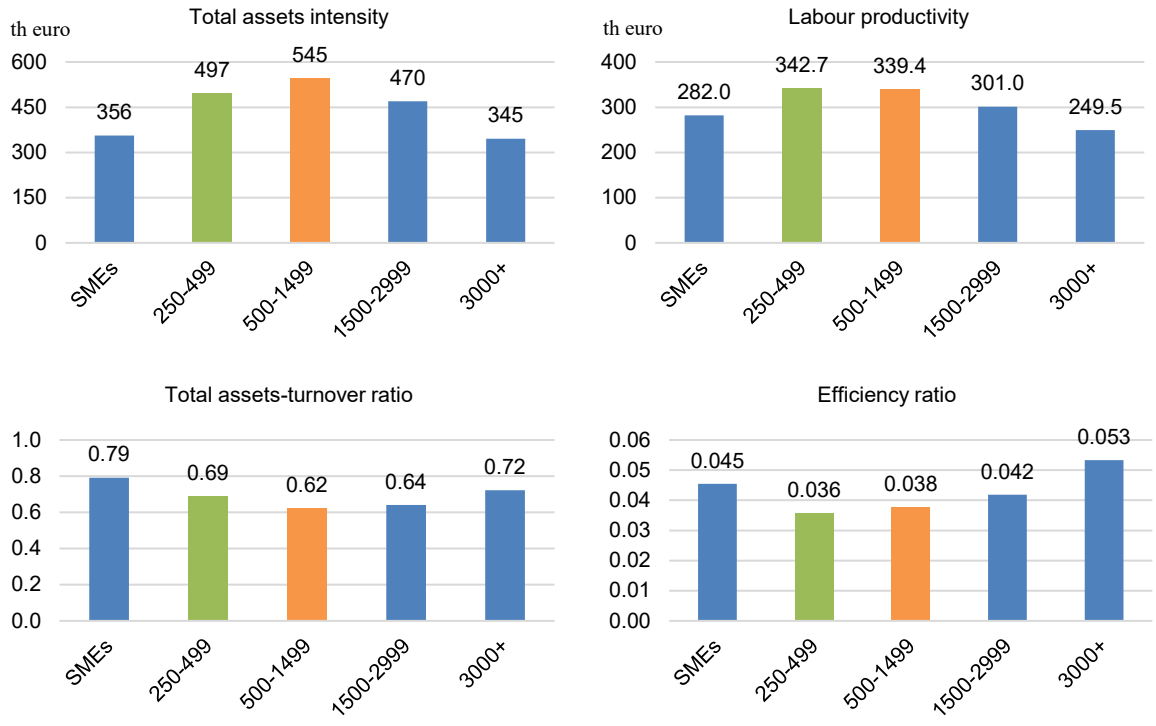
We compare these indicators among mid-caps groups where we focus on the three working definitions of mid-caps: small mid-caps (firms with 250-499 employees), large mid-caps (firms with 500-1,499 employees) and very large mid-caps (firms with 1,500-2,999 employees). We also compare these indicators between mid-caps, SMEs (excluding micro firms), and firms with more than 3,000 employees. Figure 4.6 summarises the key features of mid-caps. Additional figures on mid-caps' key features are provided in Appendix A.

In terms of the performance indicators, the data suggests some interesting patterns. As shown in Figure 4.6, mid-caps are more intensive in total assets than SMEs (excluding micros) or firms with 3,000+ employees. Their labour productivities are higher compared to that of smaller or larger firms, perhaps due to their higher capital intensity. However, their assets-turnover ratio and efficiency ratio are the lowest among all firm size groups, suggesting that they are less efficient in using assets to generate turnover and cash flow compared to smaller or larger firms. No clear pattern is found in terms of companies' profit margins.

Comparing the performance indicators between firm size groups in detail, on average, large mid-caps have the highest total assets intensity, 545k EUR per employee in 2019. Small and very large mid-caps follow with 497k and 470k EUR total assets per employee, respectively. Interestingly, perhaps due to a large number of employees, firms with 3,000+ employees have the lowest total assets to employee ratio (345k EUR), slightly lower than that of SMEs (excluding micros), which is 356k EUR.

In terms of labour productivity, small mid-caps are the most productive (342.7k EUR per employee in 2019), and large mid-caps have the second highest labour productivity (339.4k EUR). Labour productivity of very large mid-caps, SMEs (excluding micros) and firms with 3,000+ employees are lower, 301.0k, 282.0k and 249.5k, respectively. The labour productivity pattern matches the total assets intensity pattern, as in general, firms that are more intensive in capital tend to have a higher labour productivity.

Figure 4.6. Average performance indicators by size group



Source: Own calculations based on the ORBIS Europe database.

Notes: The 2019 average USD to EUR exchange rate 0.8931 is used. Luxembourg and Malta are excluded due to limited observations. The ORBIS Europe database tend to report slightly higher labour productivity than that in the SBS for SMEs and large firms, perhaps due to sampling bias. SMEs exclude micro firms.

On the other hand, small and large mid-caps tend to be less efficient in using their assets to generate turnover and cash flow, compared to SMEs (excluding micros) and firms with 3,000+ employees, as shown in the lower panels of Figure 4.6. For example, the assets-turnover ratio (turnover over total assets) of large mid-caps in 2019 is 0.62, which is the lowest among all firm size groups. Very large mid-caps have the second to the lowest ratio (0.64), followed by small mid-caps (0.69). SMEs (excluding micros) and firms with 3,000+ employees have higher ratios than mid-caps, 0.79 and 0.72, respectively. A similar pattern appears if we examine firms' efficiency ratios. Small mid-caps

are the least efficient group to use assets to generate cash flow among all firms. They only generate 36 EUR of cash flow out of 1,000 EUR of total assets. Large mid-caps generate 38 EUR using the same amount of total assets, whereas very large mid-caps make 42 EUR. SMEs (excluding micros) and firms with 3,000+ employees are more efficient. The SMEs (excluding micros) make 45 EUR from 1,000 EUR of total assets, and the firms with 3,000+ employees make 53 EUR.

In terms of profit margins, there is no clear pattern. Small mid-caps tend to have the lowest margin, 3.5% in 2019. It means that of each 100 EUR of turnover a company makes, its net income is only 3.5 EUR. The profit margin of very large mid-caps is just marginally higher, 3.8%. Large mid-caps, SMEs (excluding micros) and firms with 3,000+ employees have similar profit margins, around 4.2%. Numbers are shown in Figure A1 in Appendix A.

Based on the above discussed performance indicators, mid-caps including small and large mid-caps share some common features in general, which are different from very large mid-caps, SMEs (excluding micros), and firms with 3,000+ employees. However, such distinctions vary across countries and across industrial ecosystems. In the next parts of this section, we undertake a more detailed analysis on mid-caps' performance indicators by EU27 member states and by industrial ecosystem.

4.3 Mapping of mid-caps across EU member states

In this sub-section, we conduct an in-depth analysis of mid-caps' performance indicators by EU member state. We start our analysis by looking at the foreign ownership structure of firms by country, and we then present a snapshot of mid-caps' performances in 2019. Figures 4.7 – 4.11 summarize the findings, and the detailed statistics are shown in Tables A12 – A17 in Appendix A.

As discussed in the previous sections, small mid-caps (firms with 250-499 employees) and large mid-caps (firms with 500-1,499 employees) share some similarities and might be more appropriate to define mid-caps in the EU. Therefore, in this section, our discussion focuses on the cohort of mid-caps identified using these two definitions. However, it should be noted that very large mid-caps (firms with 1,500-2,999 employees) might also be useful to define mid-caps in some countries to produce an inclusive map of mid-caps. Tables reported in Appendix provide a comparison between small mid-caps, large mid-caps, very large mid-caps, SMEs (excluding micros), and firms with 3,000+ employees.

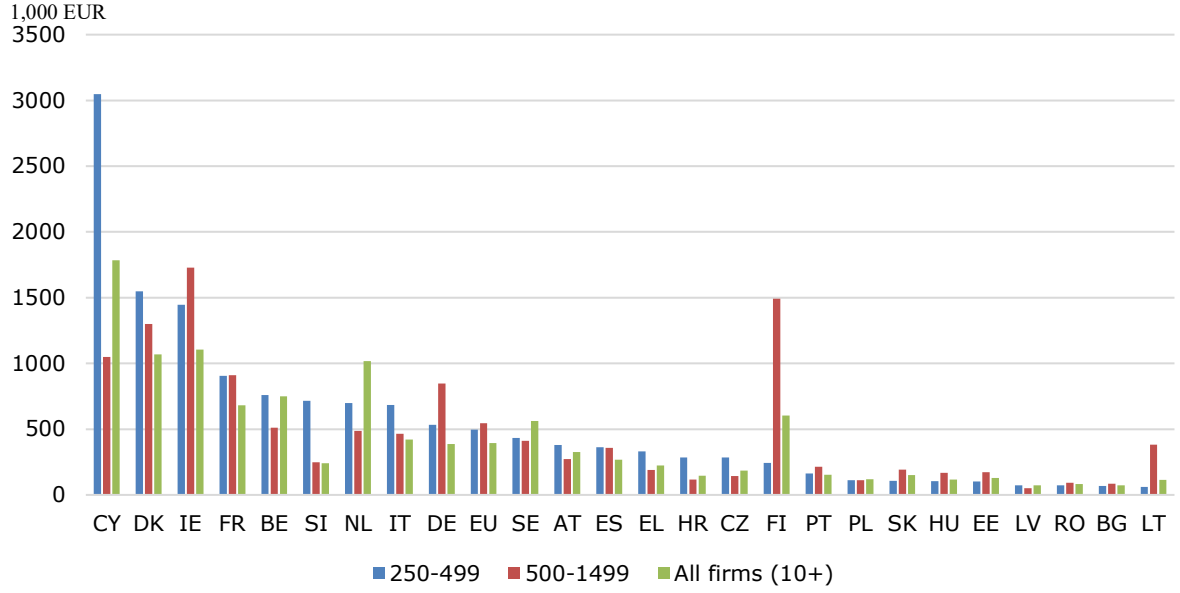
The indicators included in the analysis are foreign ownership, total assets intensity (total assets per employee), labour productivity (turnover per employee), total assets-turnover ratio (turnover over total assets), efficiency ratio (cash flow over total assets) and profit margin (net income over turnover). The indicators are summarized by EU member state. All statistics are weighted as in previous sections.

We analyse next mid-caps' performance indicators by EU member state. Looking at total asset intensity (total assets per employee), the data uncover big variations of firms' total assets intensity across EU member states, as shown in Figure 4.7. The total assets per employee averaged over all SMEs and large firms (excluding micro firms) in some countries is much higher than that in other countries. For instance, the total assets intensity in Cyprus is around 2,000k EUR on average, while it is 1,236k EUR in Ireland, 1,197k EUR in Denmark, and 1,139k EUR in the Netherlands. The high total assets intensity in these countries reflects their high intensity in foreign direct investment (FDI) which is likely to be capital-intensive (see for example Davies et al. 2021). However, total assets intensity is lower than 100k in Bulgaria, Latvia, and Romania.

Comparing mid-caps to the average level in a country, the figure suggests that mid-caps (small and large) tend to have a higher total assets intensity than the average level of all firms (SMEs and large firms, excluding micro firms) in most EU member states. Only in the Netherlands and in Sweden mid-caps have a lower total assets intensity than the average of all firms with 10+ employees. Furthermore, small mid-caps in many countries have significantly a higher total assets intensity than large mid-caps, e.g., small mid-caps in Cyprus, Denmark, Belgium, Slovenia, the Netherlands, and Italy. However, in some other countries, large mid-caps tend to be significantly more intensive in total assets for example in Finland, Germany, Ireland, and Lithuania.

The next performance indicator of interest is labour productivity (measured by turnover per employee, see Figure 4.8). Again, the data show a high variation of labour productivities of firms across EU member states. SMEs and large firms (excluding micros) on average have very high labour productivities in the Netherlands (833k EUR per employee in 2019), Ireland (597k EUR), Denmark (550k EUR), and Belgium (501k EUR). However, firms tend to have lower labour productivity on average in Latvia, Romania, Lithuania, and Bulgaria, which are close to or lower than 100k EUR per employee in 2019. Figure 4.8 summarises the findings. One factor that may explain the high labour productivity in the Netherlands, Ireland, and Denmark is that firms in these countries tend to be more intensive in total assets as is shown in Figure 4.7.

Figure 4.7. Total asset intensity of mid-caps by EU member states



Source: Own calculations based on the ORBIS Europe database.

Note: Ranked by the total asset intensity of small mid-caps (firms with 250-499 employees). All firms (10+) category includes all firms with more than 10 employees (SMEs and large firms, excluding micros). Luxembourg and Malta are excluded due to limited observations.

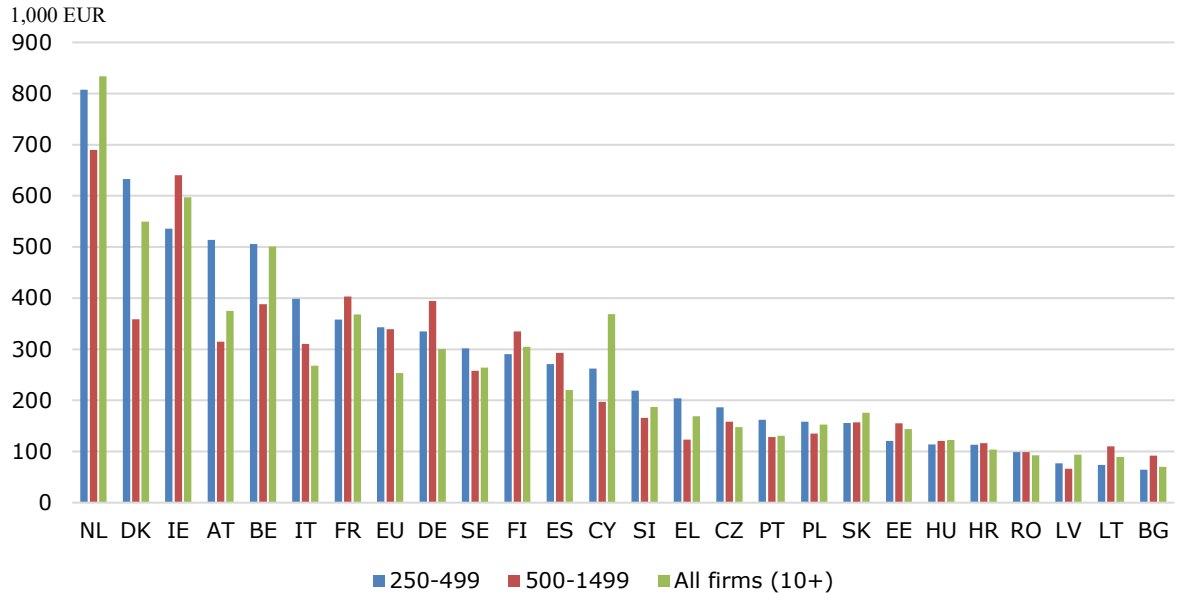
Interestingly, if we compare the labour productivity of mid-caps to the average level of all firms (SMEs and large firms, excluding micros) in a country, the difference is not so pronounced. In most countries, the labour productivity of small mid-caps and large mid-caps tends to be slightly lower but close to the average level. The gap between the productivity of small mid-caps and the average level is bigger in the Netherlands and Ireland, whereas the gap between the larger mid-caps and the average level is big in the Netherlands, Denmark, Austria, and Belgium. In contrast, small mid-caps' labour productivity is higher than the average in some other countries, e.g., Austria and Italy, and the large mid-caps tend to have higher labour productivity than the average in Germany, Spain, and Bulgaria. The high labour productivity of SMEs in Cyprus reflects their high intensity in total assets, driven most likely by a high FDI intensity.

Figure 4.9 presents the assets-turnover ratio. In most countries, the ratio in the case of large mid-caps is lower than the average level of firms with more than 10 employees, suggesting that they are less efficient in using assets to generate turnover. This pattern is consistent with the findings in the previous sub-section, where the statistics are averaged across all EU member states. However, large mid-caps in the Netherlands, Bulgaria, the Czech Republic, Latvia, and Croatia have higher assets-turnover ratios than the average level.

Combining Figures 4.9-4.11, it is not surprising to find that the high assets-turnover ratio of large mid-caps in the Netherlands is due to their high labour productivity, whereas the relatively high assets-turnover ratio of large mid-caps in Bulgaria, the Czech Republic, Latvia, and Croatia is most likely because of their very low total assets intensities. In contrast, small mid-caps tend to be more efficient than the average level in some countries, such as Finland, Lithuania, Slovakia, and the Netherlands, while they are less efficient than the average in some other countries (e.g., Germany, Denmark, and France). The mixed pattern of mid-caps' assets-turnover ratio suggests the need to

assess mid-caps' performance by EU member state due to mid-caps specific features in different countries.

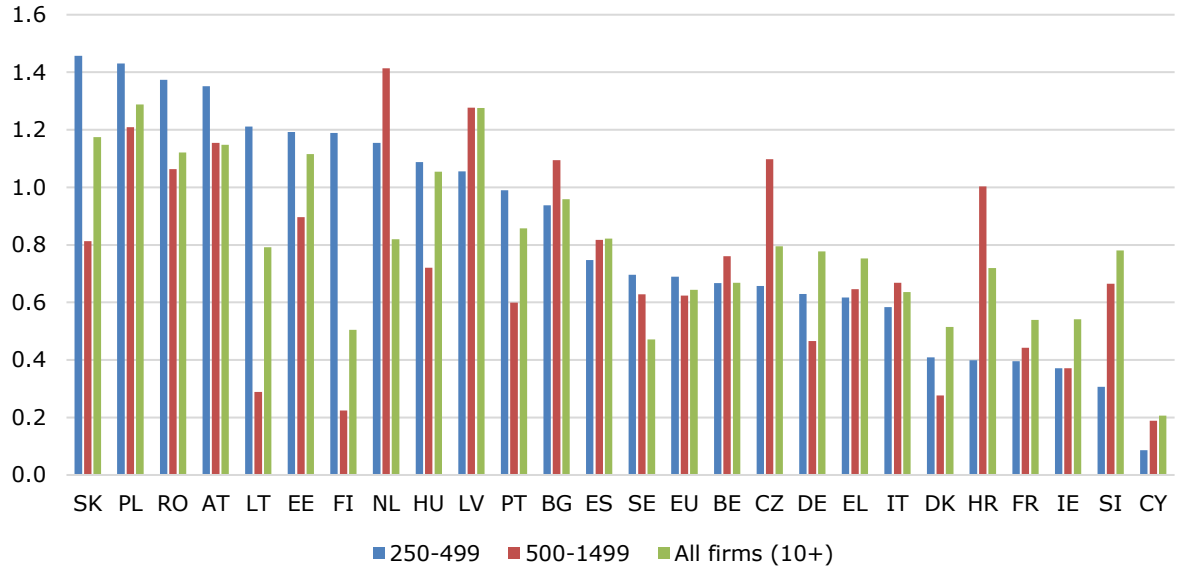
Figure 4.8. Labour productivity of mid-caps by EU member states



Source: Own calculations based on the ORBIS Europe database.

Note: Ranked by the asset intensity of small mid-caps (firms with 250-499 employees). All firms (10+) category includes all firms with more than 10 employees (SMEs and large firms, excluding micros). Luxembourg and Malta are excluded due to limited observations.

Figure 4.9. Assets-turnover ratio of mid-caps by EU member state



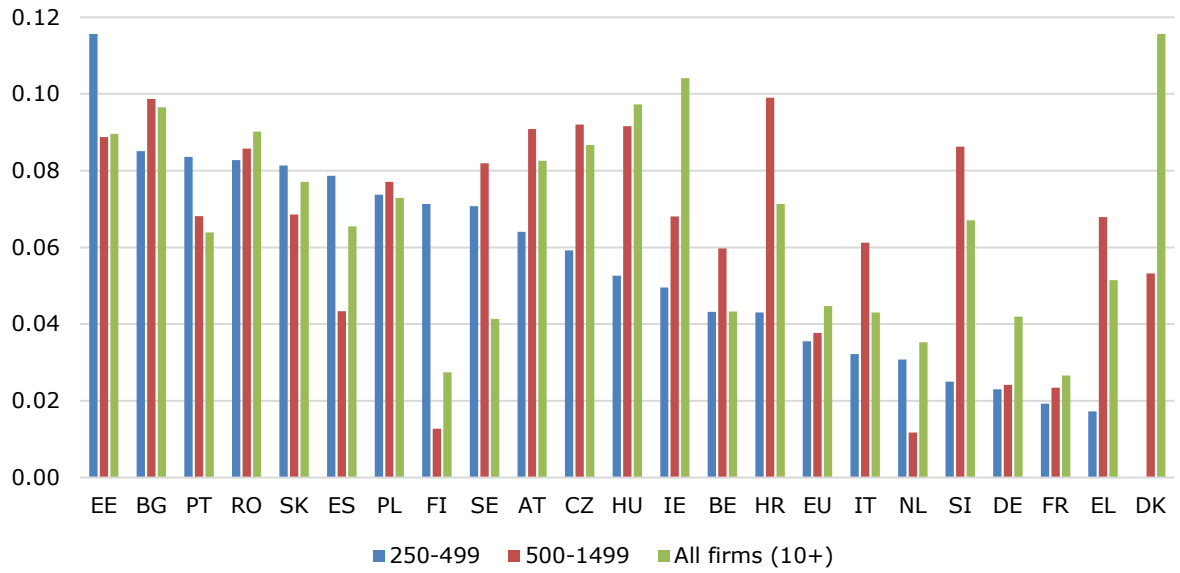
Source: Own calculations based on the ORBIS Europe database.

Note: Ranked by the asset turnover of small mid-caps (firms with 250-499 employees). All firms (10+) category includes all firms with more than 10 employees (SMEs and large firms, excluding micros). Luxembourg and Malta are excluded due to limited observations.

Looking at the efficiency ratio of mid-caps in Figure 4.10, there are also large variations across countries and between firm size groups. Therefore, it is not easy to find a common pattern across all countries. Generally, small mid-caps tend to be less efficient in using assets to generate cash flow than the average level of SMEs and large firms (excluding micros). Large mid-caps tend to be more efficient than the average level in some countries, such as Croatia, Slovenia, Italy, and Greece.

However, the reasons of their high efficiency ratios are different. For example, in Croatia, the high efficiency ratio is driven by large mid-caps in the Cultural and Creative Industries ecosystem.[9] While in Slovenia, it is mainly driven by large mid-caps in the Agri-food ecosystem. On the other hand, large mid-caps are less efficient than the average in many other countries, e.g., Ireland, Denmark, and Germany. Also, large mid-caps tend to be more efficient than small mid-caps in many countries. The two obvious exceptions are large mid-caps in Finland and the Netherlands, where large mid-caps are the least efficient.

Figure 4.10. Efficiency ratio of mid-caps by EU member states



Source: Own calculations based on the ORBIS Europe database.

Note: Ranked by the efficiency ratio of small mid-caps (firms with 250-499 employees). All firms (10+) category includes all firms with more than 10 employees (SMEs and large firms, excluding micros). Luxembourg and Malta are excluded due to limited observations. No data on the cash flow of small mid-caps in Denmark.

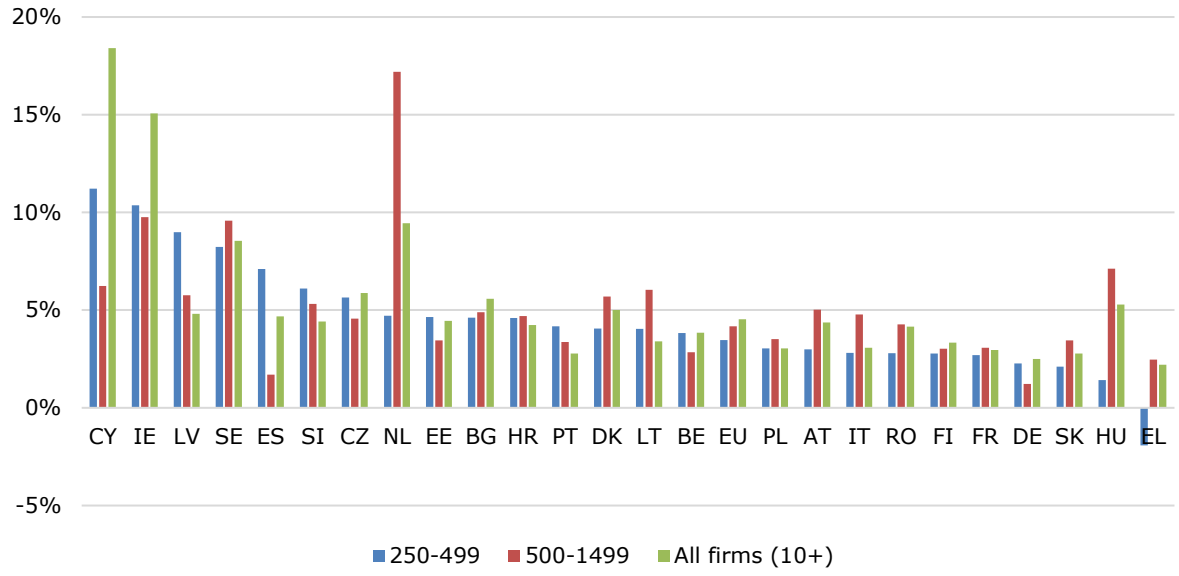
Mid-caps' profitability is another important economic performance variable (Figure 4.11). Profit margin is computed as a firm's net income over its turnover in 2019. Overall, firms with 10 and more employees on average have high profit margins in Cyprus (18%) and Ireland (15%), followed by firms in the Netherlands (9%) and Sweden (9%).

The very high profit margins in Cyprus and Ireland could be linked to the low corporate tax rates in these two countries which make them attractive to FDI (for a review of international evidence on the impact of corporate taxation on attractiveness to FDI, see for example Davies et al. 2021).

In terms of small mid-caps, their profit margins are higher in Cyprus, Ireland, Latvia, Sweden, and Estonia, while profit margins are lower in France, Germany, Slovakia, Hungary, and Greece. Large mid-caps in the Netherlands tend to have a very high profit margin (17%), followed by mid-caps in Ireland and Sweden, with profit margins around 10%. The high profit margin of large mid-caps in the Netherlands is driven by large mid-caps in the Agri-food ecosystem (21% profit margin) and the Health ecosystem (49% profit margin). Comparing small mid-caps and large mid-caps, and mid-caps and the average level of all SMEs and large firms (excluding micros), the pattern is mixed, as shown in Figure 4.11. In general, small mid-caps, large mid-caps and other firms in the same country tend to have similar profit margins with few exceptions.

[9] See next section for the definition of ecosystems used in this study.

Figure 4.11. Profit margin of mid-caps by EU member states



Source: Own calculations based on the ORBIS Europe database.

Note: Ranked by the profit margin of small mid-caps (firms with 250-499 employees). All firms (10+) category includes all firms with more than 10 employees (SMEs and large firms, excluding micros). Luxembourg and Malta are excluded due to limited observations.

In summary, perhaps the most striking result from these comparisons is the wide range of values for all performance indicators of mid-caps across EU member states. One possible reason could be related to firms' ownership structure. A large body of international evidence has established that foreign-owned firms are more productive than domestic firms, as foreign direct investment is associated with new technologies and managerial know-how (see for example reviews of this international evidence by Bloom et al. 2012 and Schiffbauer et al. 2017).

4.4 Mapping of mid-caps by industrial ecosystem

The considerable variation in performance of mid-caps in the same country, as seen in the previous sub-section, points to the importance of mid-caps' sectoral affiliation for economic performance. To complete the picture, we turn now to analysing the features of mid-caps in 2019 by industrial ecosystems.

The ecosystems approach aims to integrate activities that are often considered ancillary to the core industry sector, such as the supply of raw materials, research and innovation, the provision of business services, or the access to distribution networks. Thus, industrial ecosystems highlight the interconnected character of diverse economic actors – horizontally and vertically. The concept was introduced by the European Commission in the March 2020 Industrial Strategy, and the 14 industrial ecosystems were defined in the May 2020 Commission Staff Working Document "Identifying Europe's recovery needs". The Annual Single Market Report 2021 (European Commission 2021a) provided first analysis of the challenges faced by industrial ecosystems. The ORBIS data includes all relevant NACE 2-digit sectors for the construction of the industrial ecosystems proposed by the European Commission except one (Accommodation and food service activities) as there is no observation in this sector in the ORBIS data.

Fourteen ecosystems are identified and used in this study based on their economic and technological relevance:

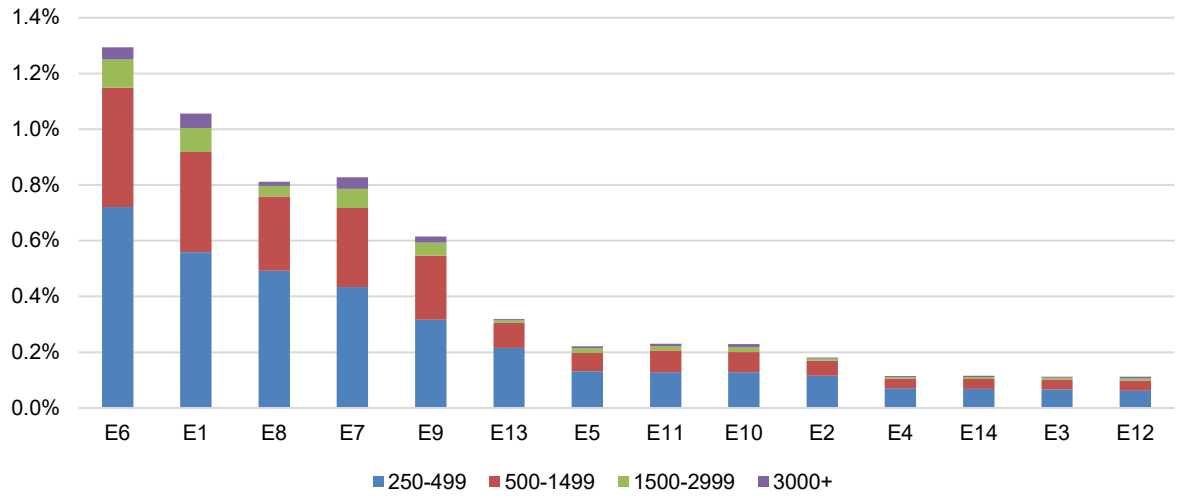
E01: Aerospace & Defence	E08: Energy-Intensive Industries
E02: Agri-food	E09: Health
E03: Construction	E10: Mobility - Transport - Automotive
E04: Cultural and Creative Industries	E11: Proximity, Social Economy and Civil Security
E05: Digital	E12: Retail
E06: Electronics	E13: Textile
E07: Energy - Renewables	E14: Tourism

The concordance between the defined industrial ecosystems and the NACE Rev.2 sectors is given in Table A6 in Appendix A. The share assigned to each NACE Rev.2 sector is also reported in the table, representing a sector's contribution to the corresponding industrial ecosystem. In order to provide a higher comparability between the two studies, in this study such shares are identical to those used in the aforementioned EC Annual Single Market Report. All statistics are weighted in the same way as in the previous sections.

We start our analysis by examining the share of mid-caps in each industrial ecosystem in 2019. As before, we look at the share of mid-caps in the number of enterprise entities, mid-caps' employment share in the total employment of an ecosystem, and finally, mid-caps' turnover share in the total turnover generated by an ecosystem. Figures 4.12 and 4.13 summarise the findings; detailed statistics are listed in Tables A18 – A20 in Appendix A.

In general, mid-caps employ a considerable share of the workforce across all ecosystems. In terms of the share of mid-caps, Figure 4.13 show that in the ecosystems Electronics (E06), Aerospace & Defence (E01), Energy Intensive Industries (E08), Energy-Renewables (E07), and Health (E09) small mid-caps tend to have a higher share than in other ecosystems. These ecosystems also tend to have larger mid-caps than other ecosystems.

Figure 4.12. Share of mid-caps in the total number of firms by industrial ecosystem



Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: All firms with non-missing employment information in 2019 in ORBIS Europe database are included in the analysis. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy, and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14). Ranked by the share of small mid-caps.

For example, Electronics has a share of 0.72% small mid-caps and 0.43% large mid-caps, respectively, the highest figures across all ecosystems. In comparison, Retail (E12) has only a share of 0.06% small and 0.04% large mid-caps (6 and 4 firms per 10k firms). Furthermore, Electronics (E06), Aerospace & Defence (E01), and Energy-Renewables (E07) also have higher shares of very

large mid-caps and firms with 3,000+ employees. In terms of employment and turnover shares, all mid-caps, either small, large, or very large, show a certain high level of importance in several ecosystems. Figure 4.13 provides the shares of firms in different size classes on overall employment and turnover. The difference to 100% employment is delivered by micro firms. As shown in Figure 4.13, small mid-caps tend to account for higher employment shares in Electronics (E06), Energy Intensive Industries (E08), Energy - Renewables (E07), Aerospace & Defence (E01), and Health (E09), and they also tend to generate a higher turnover share in Energy - Renewables (E07), Energy Intensive Industries (E08), Electronics (E06), Digital (E05) and Health (E09). This pattern generally also holds if we look at large mid-caps instead of small mid-caps.

Figure 4.13. Share of total employees and share of total turnover in mid-caps by ecosystem

Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

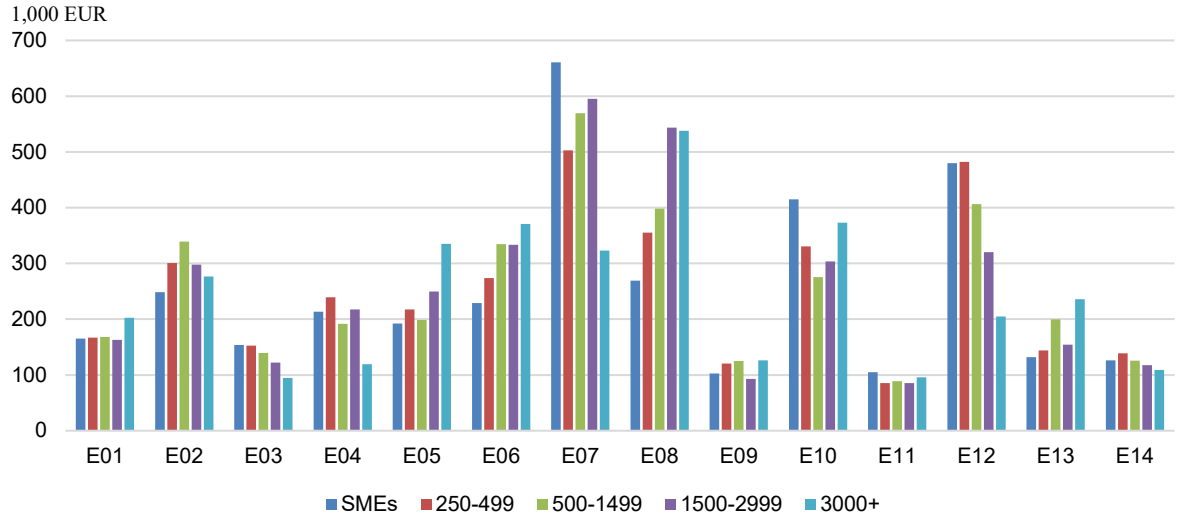
Notes: All firms with non-missing employment information in 2019 in ORBIS data are included in the analysis. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy, and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14). SMEs exclude micro firms. Micro firms provide the remaining share of employment and turnover of each ecosystem.

Taking the above statistics together, EU mid-caps form a highly important group in the ecosystems Electronics (E06), Energy-Intensive Industries (E08), Energy-Renewables (E07), Health (E09), Aerospace & Defence (E01) and Digital (E05) in terms of their shares in the number of enterprises, employment, and turnover.

We further analyse performance indicators for mid-caps by industrial ecosystems. For consistency, we also examine the following performance indicators by ecosystem: assets intensity (total assets per employee), labour productivity (turnover per employee), assets turnover ratio (turnover over total assets), efficiency ratio (cash flow over total asset) and profit margin (net income over turnover). Statistics are also weighted as in previous sections. Figures 4.14 – 4.18 plot these performance indicators by firm size group and by ecosystems. The main findings are summarised below.

We start with labour productivity. The variation of labour productivity is much more significant across ecosystems than within ecosystems across firm size groups. The Energy-Renewables ecosystem (E07), and Energy Intensive Industries (E08) have the highest labour productivity, followed by firms in the Mobility-Transport-Automotive (E10) and Retail (E12). SMEs (excluding micros) in the Energy-Renewables ecosystem have very high labour productivity (661k EUR per employee in 2019). Small mid-caps (503k euro), large mid-caps (569k euro) also have high labour productivity, higher than that of firms with 3,000+ employees (323k EUR) but lower than the labour productivity of very large mid-caps (595k euro). In some ecosystems, labour productivity is increasing in firms' size, e.g., E5 Digital, E6 Electronics, E8 Energy Intensive Industries and E13 Textile. While in some other ecosystems labour productivity is decreasing in firms' size (E3 Construction, E4 Cultural and Creative Industries, E12 Retail and E14 Tourism), which means that SMEs in these ecosystems have higher labour productivity than large firms.

Figure 4.14. Labour productivity of mid-caps by ecosystem



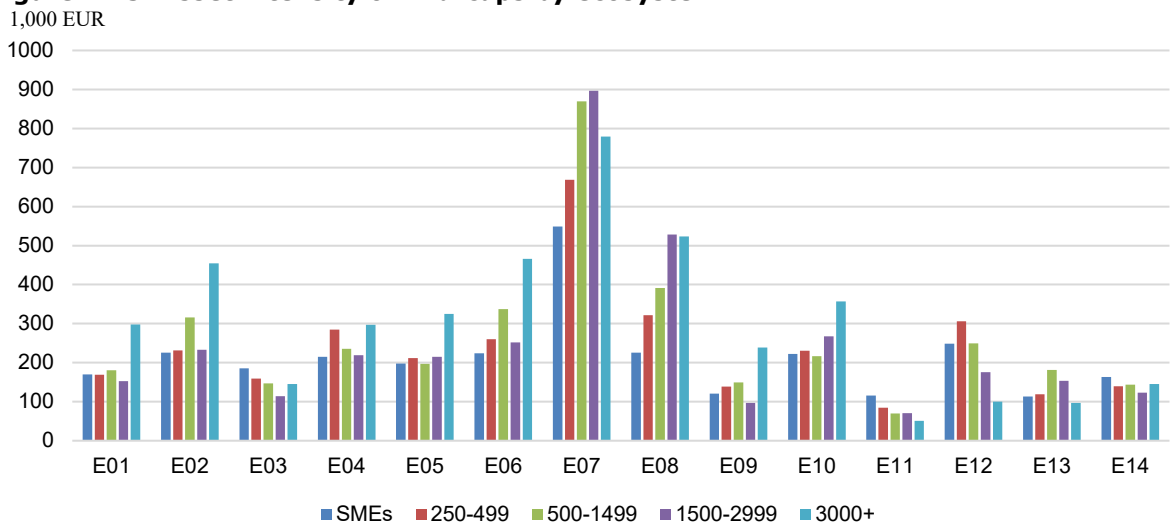
Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: All firms with non-missing employment information in 2019 in ORBIS data are included in the analysis. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy, and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14).

In terms of asset intensity, it is not surprising that the ecosystem E07 Energy-Renewables is the one most intensive in assets. This is consistent with previous findings that labour productivity is also the highest in this ecosystem, as often, a firm's labour productivity would be high if it is asset intensive. It is also interesting that firms with 3,000+ employees are the most asset intensive group in many ecosystems, such as E01, E02, E04, E05, E06, E09 and E10. Large mid-caps also tend to be very asset-intensive compared to firms in other size groups. Very large mid-caps, however, tend to be less asset intensive than large mid-caps in many ecosystems, except E07 Energy-Renewables and E08 Energy Intensive Industries.

In the previous sub-sections, we found that mid-caps tend to be less efficient in using assets to generate turnover and cash-flow. We found that the pattern of efficiency ratio still broadly holds in most ecosystems (Figure 4.16). For example, SMEs (excluding micros) and firms with 3,000+ employees tend to have higher efficiency ratios than mid-caps (small, large, and very large ones) in the Energy-Renewables ecosystem. Also, in the Aerospace & Defence (E01) and Electronics (E06) ecosystems, SMEs (excluding micros) are most efficient compared to large firms. However, some exceptions could also be found, for example in Tourism (E14), where large mid-caps are the most efficient to generate cash flow, followed by very large mid-caps and small mid-caps.

Figure 4.15. Asset intensity of mid-caps by ecosystem

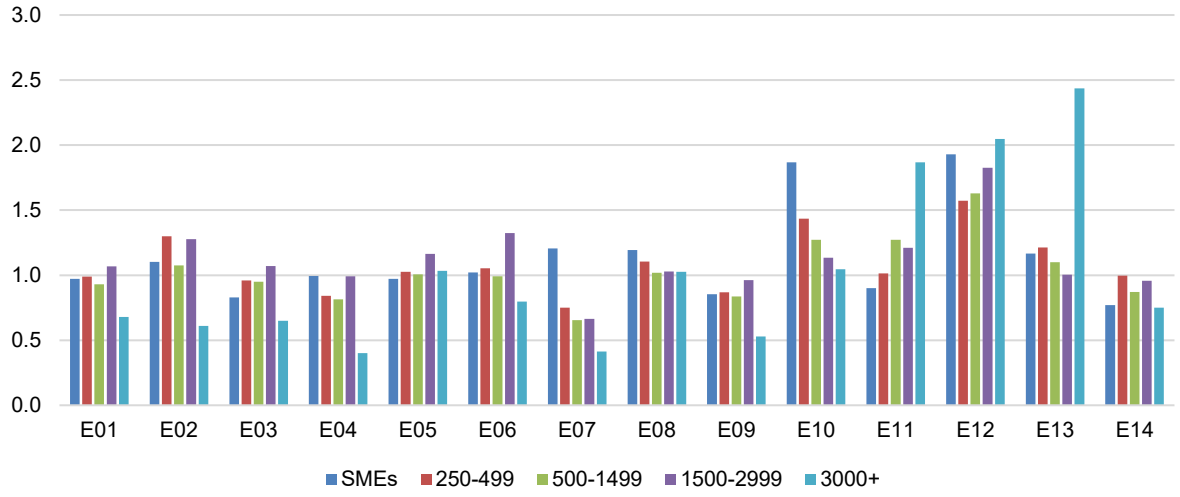


Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: All firms with non-missing employment information in 2019 in ORBIS data are included in the analysis. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy, and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14).

The pattern of assets turnover is more complex. Assets turnover ratios are similar for SMEs (excluding micros), small mid-caps, large and very large mid-caps in many ecosystems, such as E01, E05, E08, E09 and E14. SMEs (excluding micros) and mid-caps in these ecosystems are more efficient in using assets to generate turnover than firms with 3,000+ employees. Specifically, the SMEs (excluding micros) in E10 Mobility-Transport-Automotive have the highest assets turnover ratio among all firms, 1.9 EUR of turnover per 1 EUR of total assets.

Figure 4.16. Asset turnover of mid-caps by ecosystem

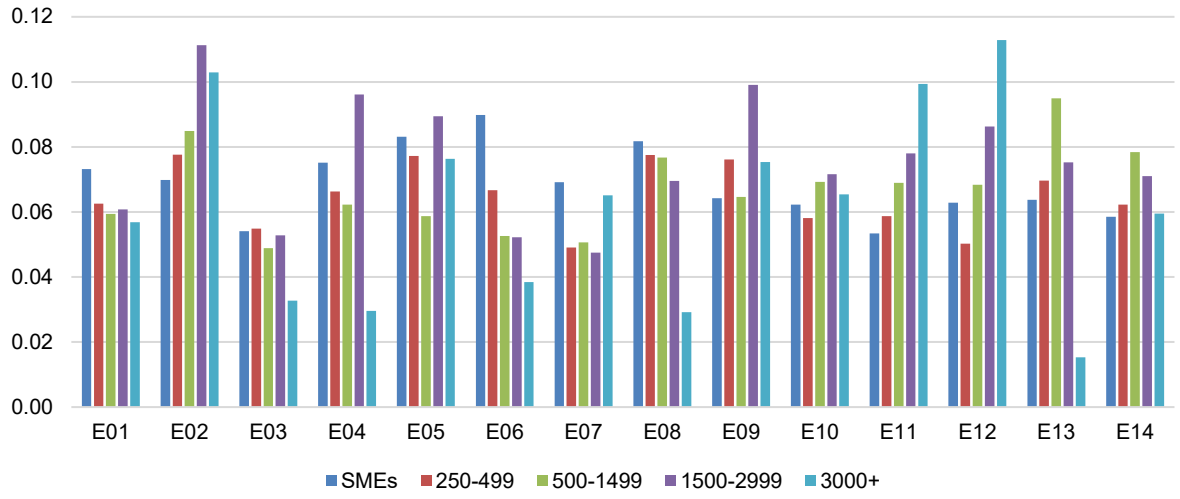


Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: All firms with non-missing employment information in 2019 in ORBIS data are included in the analysis. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy, and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14).

On the other side, firms with 3,000+ employees in E11 Proximity, Social Economy and Civil Security, and E13 Textile are very efficient in generating turnover, while SMEs (excluding micros) and other large firms in these two ecosystems are much less efficient. All firms in E12 Retail are quite efficient compared to firms in other ecosystems.

Figure 4.17. Efficiency ratio of mid-caps by ecosystem



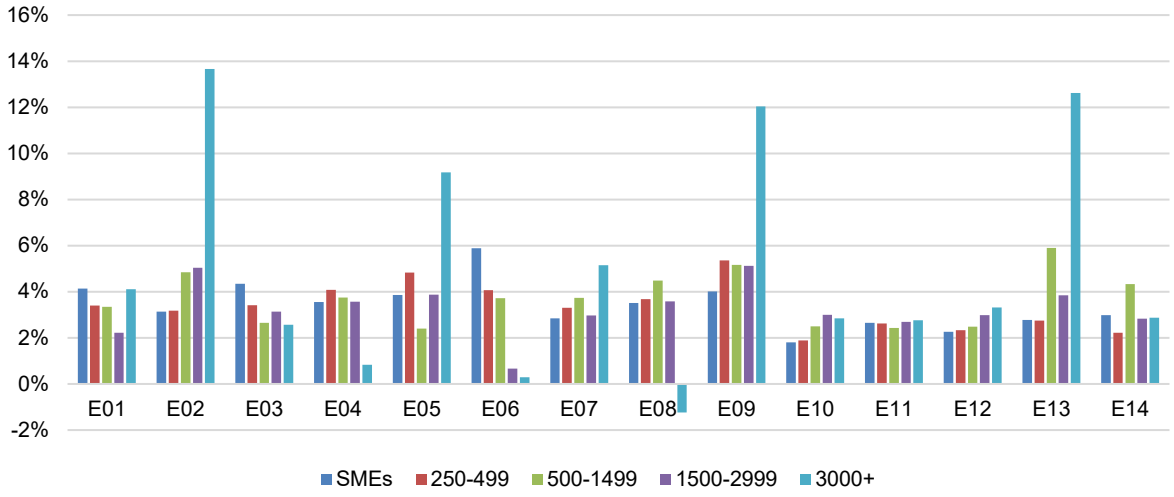
Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: All firms with non-missing employment information in 2019 in ORBIS data are included in the analysis. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy, and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14). One firm in E3 with 3,000+ employment is excluded for a better presentation. It has efficiency ratio close to 50%, which brings the average efficiency ratio of this category to become 34%.

Profit margin (Figure 4.18) is another important performance indicator, and we close this sub-section with it. As shown in Figure 4.18, the pattern is very informative. The most eye-catching columns are profit margins of firms with 3,000+ employees in E02 Agri-food, E05 Digital, E09 Health and E13 Textile, which are close to or above 12%. The profit margins of other firms and in other ecosystems are just around 5%. However, firms with 3,000+ employees in E04 Cultural and Creative Industries and E06 Electronics have very low profit margins (close to 1%), and their margin is even negative

1% in E08 Energy Intensive Industries. In terms of small and large mid-caps, their profit margins are around 4% and are close to SMEs (excluding micros) and very large mid-caps in most ecosystems. Small, large, and very large mid-caps in E09 Health and large mid-caps in E13 Textile tend to have slightly higher profit margins (6%). SMEs (excluding micros) in E06 Electronics also tend to have a slightly higher margin. This pattern suggests that these firms in some ecosystems are very profitable, comparing to the market average.

Figure 4.18. Profit margin of mid-caps by ecosystem



Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: All firms with non-missing employment information in 2019 in ORBIS data are included in the analysis. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy, and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14).

4.5 Foreign ownership in mid-cap firms

Next, we examine foreign ownership by firm size group across EU27 member states. We separate foreign ownership by the location of the ultimate owners (parent companies that hold at least 50.1% share of a company): ultimate owners in an EU27 member state other than the home country (intra-EU), and ultimate owners in non-EU27 member states (extra-EU). The data suggests that foreign ownership tends to increase with firm size. A significantly lower proportion of SMEs (excluding micro firms) is owned by foreign companies compared to large firms. As shown in Figure 4.19, 15.7% of SMEs are foreign owned, of which 5.3% by parent companies in other EU27 member states and 10.4% by parent companies in countries outside EU27.

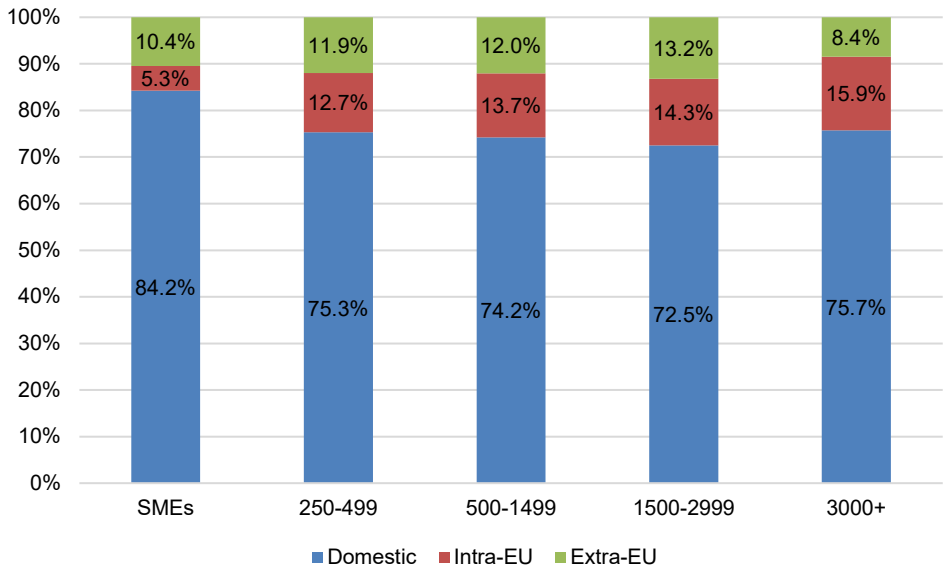
Small, large, and very large mid-caps tend to have a slightly higher share of extra-EU foreign ownership than firms with 3,000+ employees, whereas firms with 3,000+ employees have a higher share of foreign ultimate owners in other EU member states. Thus, the data clearly indicate the foreign ownership is important in the mid-caps segment, and more important than in the SMEs segment and among the largest firms. Moreover, being a domestically owned mid-cap does not indicate that the company is independent, maybe family-owned; domestically owned firms can also be owned by another company. The data provide no further information on the ownership status of these firms. There are ongoing activities at Eurostat to collect this ownership information in a statistical database[10].

Figure 4.20 below compares the importance of foreign ownership in small mid-caps, large mid-caps, and all firms with 10 or more employees (SMEs and large firms, excluding micros) for each EU member state. The figure suggests that companies in some countries are more likely to be foreign-owned on average than companies in other countries. There is also a significant variation of intra-EU and extra-EU foreign ownership across countries and firm size groups. For example, according to the

10 https://ec.europa.eu/eurostat/web/statistical-business-registers/eurogroups-register

analysed data, 70% of companies in Estonia are owned by foreign companies (12% by parent companies in other EU member states, and 58% by parent companies outside the EU). 60% of firms in Luxembourg (25% intra-EU, 35% extra-EU), 59% of firms in Portugal (6% intra-EU and 53% extra-EU), and 60% of companies in Ireland are foreign-owned (4% intra-EU and 56% extra-EU). In contrast, less than 10% of SMEs and large companies in Germany, Italy, the Netherlands, Belgium, and Austria are foreign-owned, where around half of them are owned by parent firms in other EU27 countries, and the remaining half are owned by parent firms located outside the EU.

Figure 4.19. Domestic and foreign ownership by size group



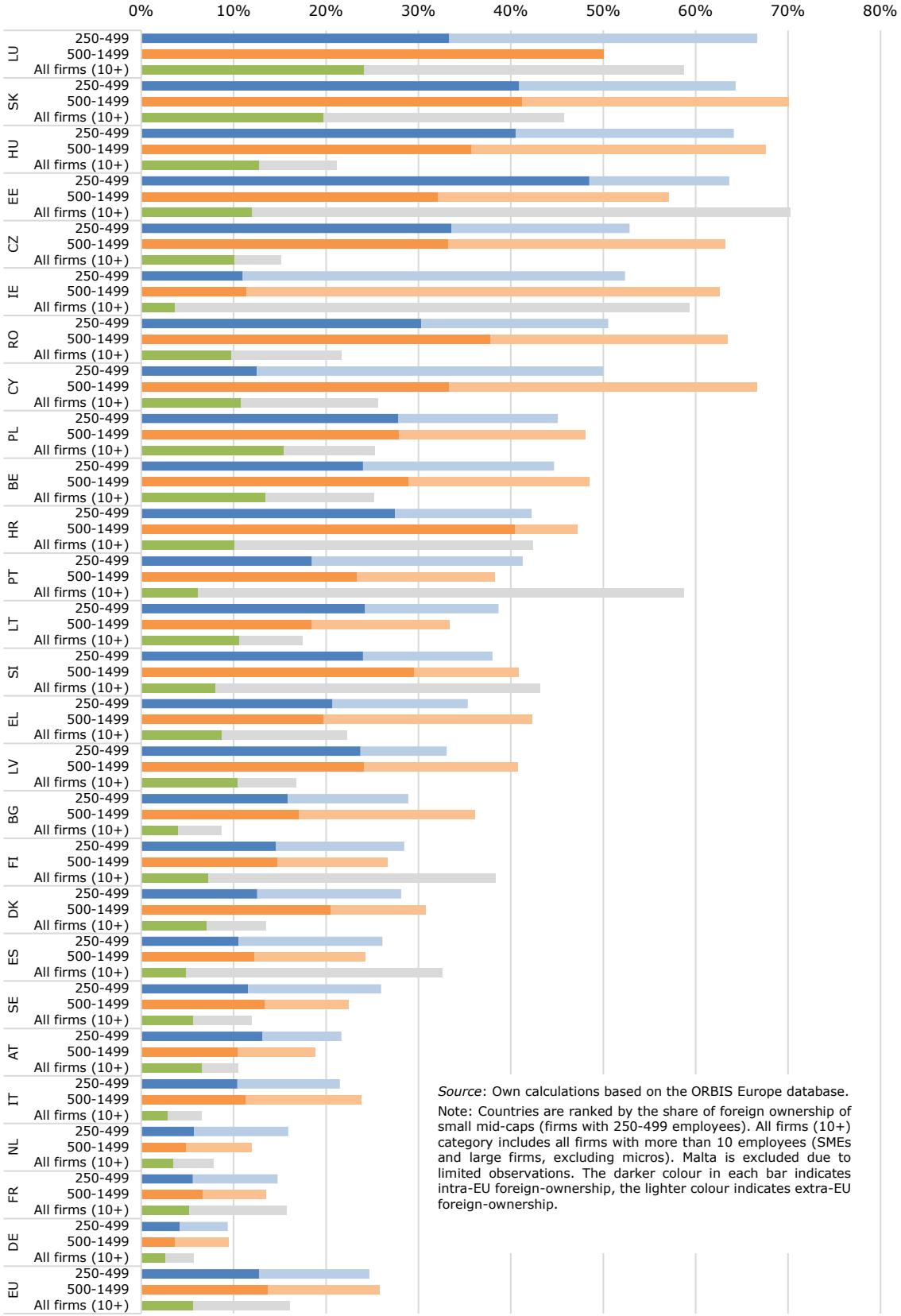
Source: Own calculations based on the ORBIS Europe database.

In addition, in some EU member states a higher share of mid-caps tend to be foreign-owned than the average of all SMEs and large firms (excluding micros). For instance, 65% of small mid-caps (41% intra-EU, 24% extra-EU) and 68% of large mid-caps (36% intra-EU, 32% extra-EU) are foreign-owned in Hungary, while on average only 21% of all SMEs and large companies are owned by foreign companies (13% intra-EU, 8% extra-EU). Similar patterns are also observed in many other countries, e.g., Romania, Belgium, Bulgaria, and the Czech Republic. On the other hand, in some countries, the share of foreign-owned firms in the mid-caps category is lower than the average share among all firms. For example, this pattern is found in Estonia, Portugal, Finland, and Spain.

Having looked at the share of mid-caps, we examine next foreign ownership by industrial ecosystem. Looking at the share of foreign-owned mid-caps in Figure 4.21, again, there is a considerable variation across ecosystems and between firms with different sizes within the same ecosystem. As before, foreign ownership is partitioned by intra-EU (rest of EU) and extra-EU, depending on the location of the ultimate owner. Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy-Intensive Industries (E08), Mobility-Transport-Automotive (E10) and Textile (E13) tend to have a higher share of foreign-owned companies compared to other ecosystems. Health (E09) has the lowest share of foreign ownership, less than 10% for all firm size groups. Overall, small mid-caps and large mid-caps have a higher share of foreign-owned companies than SMEs (excluding micros), and firms with 3,000+ employees. Very large mid-caps tend to have the highest share of foreign ownership among all firm size groups. Specifically, the share of foreign-owned very large mid-caps in Textile (E13) is 56%.

If we look at the proportion of intra-EU and extra-EU foreign ownership, firms in Cultural and Creative Industries (E4), Digital (E5) and Electronics (E6) tend to have higher shares of extra-EU than intra-EU foreign ownership. On the other hand, firms in Energy-Renewables (E07), Energy- Intensive Industries (E08), and Mobility-Transport-Automotive (E10) are more likely to be owned by parent companies located in another EU27 country than in a country outside the EU.

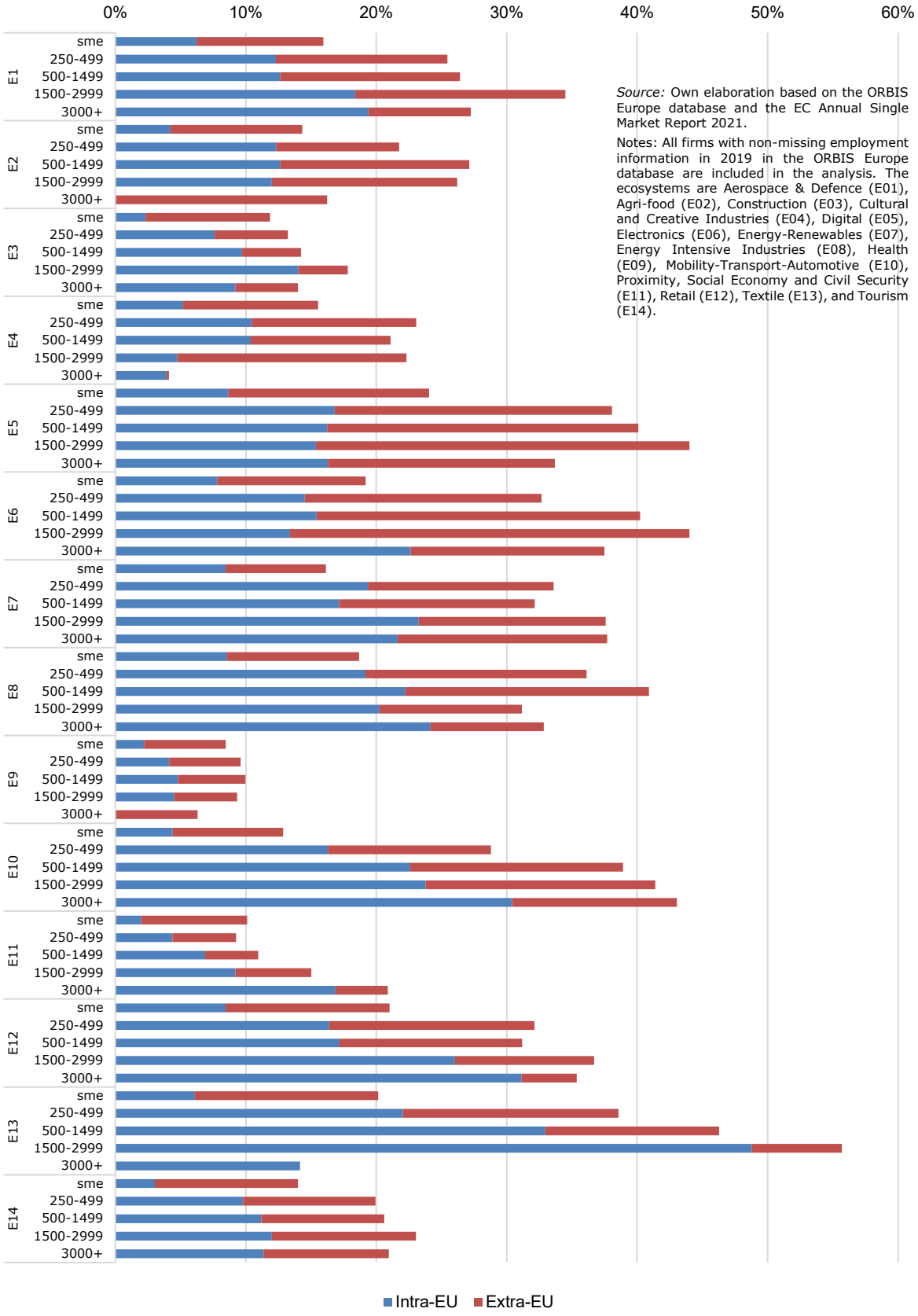
Figure 4.20. Foreign ownership (intra-EU and extra-EU) of mid-caps by EU member states



Source: Own calculations based on the ORBIS Europe database.

Note: Countries are ranked by the share of foreign ownership of small mid-caps (firms with 250-499 employees). All firms (10+) category includes all firms with more than 10 employees (SMEs and large firms, excluding micros). Malta is excluded due to limited observations. The darker colour in each bar indicates intra-EU foreign-ownership, the lighter colour indicates extra-EU foreign-ownership.

Figure 4.21. Foreign ownership of mid-caps by industrial ecosystem



Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: All firms with non-missing employment information in 2019 in the ORBIS Europe database are included in the analysis. The ecosystems are Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14).

4.6 Growth patterns of mid-caps

Static indicators are very useful to describe the EU mid-caps' economic performance in recent years. In addition, dynamic indicators help to understand how mid-caps will evolve over time and provide insights on mid-caps' possible development in the near future. In this sub-section, we track the growth of mid-caps and analyse the evolution of their employment and turnover over time. To track the growth of each firm, we add a few more steps to the extraction procedure of the data from the ORBIS Europe database. These additional steps significantly improve the quality of the data and enable us to include more firms in the analysis. Details of the additional steps are described in Appendix A. We discuss mid-caps' growth by EU member state and by ecosystem.

The first question we ask is how a mid-cap grows over time. Looking at mid-caps in 2019, how many of them were already mid-caps three or five years ago? How many of them scaled-up from SMEs or even micro firms during the past three or five years? How many of them shrank from larger firms?

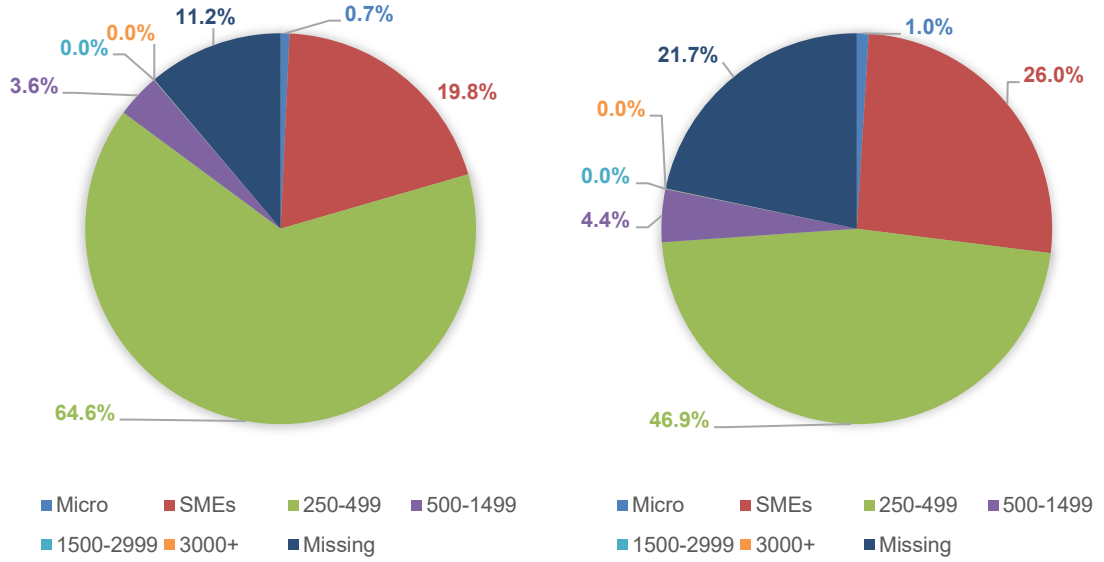
To answer these questions, we first select small and large mid-caps (firms with 250-499 and with 500-1,499 employees, respectively) in 2019, defining them as the cohort of mid-caps of interest (the extraction procedure is identical to that used in the previous analyses). We then examine in which firm size group these mid-caps were found three or five years ago. We also track their employment and turnover figures for five years backwards and compute the growth rates of the number of their employees and turnover.

Figure 4.22 and Figure 4.23 present the status of mid-caps three years ago in the left panel and four years ago in the right panel. Figure 4.22 focuses on small mid-caps, while Figure 4.23 shows the historical status of large mid-caps. All results are weighted using weights as described in the previous sections.

The left panel of Figure 4.22 suggests that over two thirds (64.6%) of all small mid-caps in 2019 were already small mid-caps three years ago. 19.8% of these mid-caps scaled-up from SMEs, and 3.6% of them shrank from firms with 500+ employees. Interestingly, 0.7% of the small mid-caps were just micro firms with 10 or less employees three years ago, thus revealing an impressive growth performance. If we look at the right panel, 46.9% of small mid-caps were already small mid-caps five years ago, 26% of mid-caps scaled up from SMEs and 4.4% of them shrank from large mid-caps. 1% of mid-caps scaled up from micro firms during the past five years. All two figures indicate that it is virtually impossible to fall back from a very large mid-cap or large firm into the small mid-cap category. Thus, structural change seems to go only in one direction. If large firms fail, market exit is more likely than shrinking.

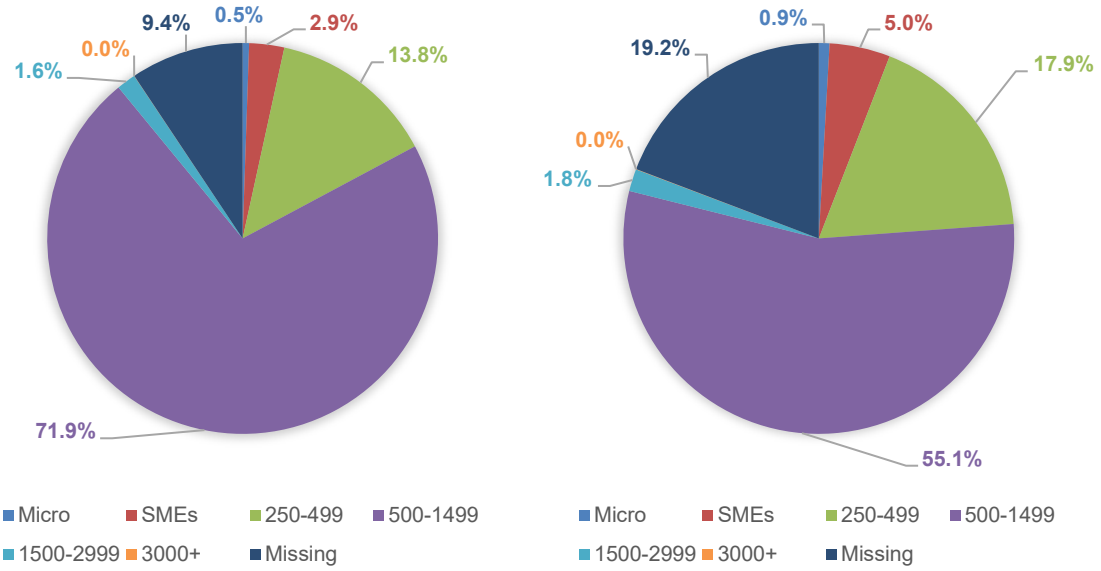
If we consider large mid-caps (500-1,499 employees), the cohort of mid-caps group appears more stable over time. Figure 4.23 shows in the left panel that 71.9% of large mid-caps were already large mid-caps three years ago, 13.8% of them scaled up from small mid-caps, 2.9% scaled up from SMEs, and 0.5% of them scaled up from micro firms over the past three years. Around 1.6% of them shrank from very large mid-caps (firms with 1,500+ employees). The right panel of the same figure suggests that 55.1% of large mid-caps were already in the same size group five years ago, 17.9% of them scaled up from small mid-caps, 5% from SMEs and 0.9% scaled up from micro firms. There is also 1.8% of large mid-caps that shrank from very large mid-caps (1,500 to 3,000 employees) over the past 5 years.

Figure 4.22. Status of mid-caps three years ago (left) and five years ago (right) (Small mid-caps: 250-500 employees in 2019)



Source: Own elaboration based on the ORBIS Europe database.

Figure 4.23. Status of mid-caps three years ago (left) and five years ago (right) (Large mid-caps: 500-1,500 employees in 2019)



Source: Own elaboration based on the ORBIS Europe database.

In summary, the above figures indicate that mid-caps are a relatively stable group of firms, as many of them are staying in this category for a relatively long time. A certain proportion of mid-caps are firms that scaled-up from SMEs over the previous 3 or 5 years, while only a tiny fraction of them shrank from larger firms during the analysed period. Thus, moving from being a large firm to being mid-cap is not very likely. Scaling up from being a micro-firm to mid-cap is also not very likely. Next, we further examine these fast-growing firms – firms that scaled-up from micro firms to mid-caps during the past 3 or 5 years.

Fast-growing firms

As shown in Figures 4.22 and 4.23, there are some firms that scaled up fast from micro firms to become mid-caps in the past 3 or 5 years. We provide some additional information on these firms below.

We identified 483 firms in the data that have grown very fast from micro-firms to either small mid-caps or large mid-caps within the past 5 years. The data shows that 30% of these firms are in Poland, 14% are in Italy, 9% of them are in Romania, and 8% are in Spain. Around 6% of these fast-growing firms are in Germany and 5% in France. Looking at the ecosystems they are in, 18% are in E11 Proximity, Social Economy and Civil Security, followed by 14% in E4 Cultural and Creative Industries. There are also around 10% of them in E1 Aerospace & Defence, E3 Construction and E14 Tourism each.

Looking at the data, the number of employees of these fast-growing firms jumped from a single digit to over 250 in just one year in many cases, which might be the result of mergers and acquisitions (M&As). To verify this, we search the identifier of the fast-growing firms in the Zephyr data base on M&As: we found 17% of them (or 83 firms) were involved in M&A cases as either an acquiror, a target or a vendor.

Mid-caps' growth rates

Mid-caps' employment and turnover growth rates provide useful information. We summarize our findings in the following tables and figures. We first present the overall pattern of all mid-caps across all EU member states. We then disaggregate our analysis by EU member state and then by ecosystem. In each set of analysis, the top and the bottom 2.5% of the data are winsorized to eliminate outliers.

Since there is a high skewness in the distribution of growth rates, we report median values instead of the means. In general, the growth rates of large mid-caps are slightly lower than those of small mid-caps. The median annual employment growth rate of mid-caps in EU27 member states over the past 5 years is 3% for small mid-caps and 2.7% for large mid-caps. This finding suggests that half of the small (or large) mid-caps have employment growth faster than 3% (or 2.7%) and half of them have rates lower than this number.

Next, we examine mid-caps' growth rates by country. We focus on the figures of small mid-caps, as those of large mid-caps are similar. The first column in Table 4.1 lists the median employment growth rates of small mid-caps' in EU member states. The second column in Table 4.1 shows the median of small mid-caps' turnover growth rates. To compare our figures to the general growth rates of all firms and to micro firms, SMEs, and all large firms, we also present the average annual employment growth rate of firms by size group in the last four columns in the same table. As it is not feasible to compute the growth rate of SMEs and micro firms in ORBIS Europe database, we use the average annual employment growth rate between 2015-2019 reported by the Eurostat SBS data. However, the turnover growth is not available in SBS, therefore, the comparison of turnover growth between mid-caps and all firms could not be included in this report.

The employment growth rates vary a lot by EU member state, as seen in the first column in Table 4.1. Generally, employment growth rates are lower in the Central European member states than in the southern parts and eastern parts of the EU. Ireland is an exception. Focusing on small mid-caps, mid-caps in Ireland have the highest employment growth, 6.1% annually, followed by mid-caps in Spain (5.6%) and Portugal (5.3%).

Comparing these figures to the general growth rate of all firms, the data suggests that mid-cap grow faster than the average for the total firm population in most EU member states. Moreover, both small and large mid-caps grow relatively faster than micro firms in most countries between 2015 and 2019, and they also growth faster than SMEs in some countries in this period. However, the comparison shall be read with caution as figures in the first two columns in Table 4.1 are the *medium* growth rates of small mid-caps, and the next two columns in Table 4.1 are the *medium* growth rates of large mid-caps, while the last four columns in Table 4.1 are the *mean* growth rate of all firms. Although the mean values would be close to medium values when there are many observations, discrepancies may appear. Additionally, the data coverage of the ORBIS Europe and the SBS databases is not

identical, which may introduce some incomparability of the figures. Nevertheless, Table 4.1 presents the general idea that mid-caps tend to grow faster than the general average across all firms.

Table 4.1. Growth performance of mid-caps by EU member state

	Small mid-caps		Large mid-caps		Overall	Micros	SMEs	Large
	Employment	Turnover	Employment	Turnover	Employment			
	(median)	(median)	(median)	(median)	(mean)			
EU27	3	5.2	2.7	5	2.4	0.3	2.4	5.3
Austria	2.3	3.9	1.8	3.7	1.9	0.3	-2.9	15.9
Belgium	2	3.5	2.1	3.7	1.6	0.5	-0.9	4.7
Bulgaria	2.7	7.2	1.6	6.3	1.3	1.3	1.2	1.8
Cyprus	.	8.5	.	3.5	6.5	5.5	5.3	10.6
Czech Republic	1.6	8.8	0	8.6	1.5	0.7	1.2	2.5
Germany	2.9	4.2	2.8	4.3	2.6	1.1	1.4	5.4
Denmark	2.6	3.3	2.2	3.4	1.8	1.2	2.7	2.3
Estonia	2.7	6.8	3	5.3	1.6	2.4	2.4	0.7
Spain	5.6	6.8	6	6.9	4.1	1.3	5.1	7.4
Finland	2	4	2.6	5.3	1.3	-1.3	1.7	1.7
France	1.7	3.8	1.7	3.4	0.6	-5.0	-0.7	8.7
Greece	4.2	6.4	4.4	5.7	3.8	1.1	12.3	3.0
Croatia	1.8	5.2	2.6	5.5	2.2	4.0	3.5	3.1
Hungary	2.5	6	2.1	6.1	3.5	3.4	2.5	4.8
Ireland	6.1	7.6	6.2	7.6	5.7	2.7	5.9	10.2
Italy	3.7	5.2	3.3	4.8	1.5	-0.4	1.8	3.3
Lithuania	2.4	7.9	2.6	8.7	2.3	3.4	0.4	4.3
Luxembourg	2.7	3.8	1.5	4	3.5	1.9	2.6	5.4
Latvia	2.3	7.7	4.5	9.1	0.6	-0.1	0.6	2.4
Malta	.	.	.	.	6.3	5.6	6.8	7.4
Netherlands	3	4.8	4.8	4.5	2.8	1.9	2.2	3.9
Poland	2.4	7.9	2.3	7.9	3.6	2.3	9.2	5.0
Portugal	5.3	6.8	4.3	5.7	4.2	3.0	4.3	.
Romania	4.4	8.6	4.1	7.7	1.3	2.0	0.7	1.9
Sweden	2.9	2.9	2.4	1.8	2.4	-2.7	-0.5	11.6
Slovenia	3.4	6	1.9	3.7	3.1	2.2	4.1	3.7
Slovakia	1.7	5.3	1.5	4.4	2.7	3.8	1.2	2.0

Source: Own elaboration based on the ORBIS Europe database and the Eurostat SBS database.

Notes: Employment and turnover growth rates of mid-caps are the median annual growth rates in a country between 2015-2019, computed from firm level data in the ORBIS Europe database. To eliminate outliers, the top and bottom 2.5% of the data in each country are winsorized. Employment growth rates of all firms are the mean values between 2015-2019 reported in the SBS database.

In terms of annual turnover growth, turnover growth rates of small mid-caps are higher in Eastern European member states than in the Central European member states (see Table 4.1). But small mid-caps in Ireland, Spain, and Portugal, also have relatively high turnover growth. Small mid-caps in Czech Republic (8.8%) have the highest growth rates followed by small mid-caps in Romania (8.6%) and Cyprus (8.5%). Mid-caps in Sweden (2.9%) and Denmark (3.3%) have the lowest turnover growths in the past 5 years. This finding is not so surprising as mid-caps in Scandinavian countries are already quite advanced in terms of production.

Looking at large mid-caps, figures in Table 4.1 show that large mid-caps in Ireland and Spain have the highest annual growth rate of employment during the past 5 years, 6.2% and 6.0% respectively, while the employment growth rates for large mid-caps in Slovakia, Luxembourg, and Bulgaria are low (around 1.5%). Looking at annual growth rates of turnover, large mid-caps in Latvia (9.1%) and Lithuania 8.7%) have the highest growth rates, while the growth rates are lower for large mid-caps in Sweden (4.8%), Denmark (3.4%), and France (6.4%).

The results of a similar analysis on the growth rates of mid-caps by ecosystem are reported in Table 4.2. The left panel of the table reports the statistics of small mid-caps, and the right panel of the table reports statistics of large mid-caps. Similar to the findings in our analysis at country level, mid-caps' annual growth rates are quite heterogeneous across ecosystems. Traditional industries such as Energy Intensive Industries (E08), Energy-Renewables (E07), and Textile (E13) tend to have lower growth. On contrary, growth rates of mid-caps in new and high-tech industries would be higher. Data suggests that mid-caps (either small mid-caps or large mid-caps) in the E05 Digital ecosystem have both the highest growth of employment and turnover.

In terms of annual employment growth, small mid-caps in the ecosystem E5 Digital (5.14%) have the highest rates. However, mid-caps in the E08 Energy Intensive Industries (1.43%) and E07 Energy-Renewables (1.67%) have low employment growth rates. On the other side, small mid-caps in the ecosystem E05 Digital have the highest annual turnover growth, 7.83% per year, followed by mid-caps in the E03 Construction. Small mid-caps in the ecosystems E08 Energy Intensive Industries (3.31%), E13 Textile (3.33%), and E07 Energy-Renewables (1.67%) have low turnover growth rates.

Looking at large mid-caps, they have the highest employment growth rate in the E05 Digital ecosystem (5.76%), while those in the E13 Textile ecosystem grow slowest (0.10%). Further, large mid-caps in the E05 Digital (8.47%) ecosystem have the highest turnover annual growth rates, greater that 8%. While mid-caps in the E07 Energy-Renewables and E13 Textile ecosystems have the lowest turnover growth rate, less than 3%.

Table 4.2. Growth performance of mid-caps by industrial ecosystem

	Small mid-caps			Large mid-caps	
Ecosystem	Employment	Turnover		Employment	Turnover
E01	3.12	5.98		2.87	5.37
E02	2.36	4.10		1.57	3.55
E03	4.11	6.80		3.85	6.23
E04	4.10	5.99		4.60	5.83
E05	5.14	7.83		5.76	8.47
E06	2.71	5.04		2.17	4.40
E07	1.67	3.73		1.34	2.96
E08	1.43	3.31		1.27	3.21
E09	2.71	5.22		2.15	5.30
E10	3.24	5.58		2.91	5.23
E11	3.80	5.60		4.29	5.67
E12	3.17	4.50		3.64	4.48
E13	1.21	3.33		0.10	2.42
E14	3.91	5.76		3.89	5.83

Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: To eliminate outliers, the top and bottom 2.5% of the data in each ecosystem is winsorized. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy, and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14).

4.7 Mid-caps in the EU enlargement countries

In this section, we provide some information of mid-caps in the EU enlargement countries. The countries included in the analysis are Albania, Bosnia and Herzegovina, Kosovo, Montenegro, North Macedonia, Serbia, and Turkey. However, the coverage of the ORBIS Europe database appears to be poor in a number of EU enlargement countries. For example, in 2019, only around 660 firms in total are recorded in Albania in the ORBIS Europe database, 17 in Kosovo, and 46 in Turkey. Therefore, we exclude these countries from further analysis.

To validate the quality of the data, we also compare the ORBIS Europe data to the Eurostat SBS data. The SBS data contains information for three countries: Bosnia and Herzegovina, North Macedonia, and Serbia. Comparing the number of firms reported in both datasets, we find that the quality of the ORBIS Europe data for these countries is fairly good. Furthermore, as before, we construct weights based on the number of companies by firm size category reported in both data. Since SBS data does not contain information on Montenegro, we assume its weights to be 1. The following statistics are weighted to ensure representativeness.

Statistics of mid-caps in the EU enlargement countries are reported in Tables 4.3 – 4.6. Table 4.3 shows the share of firms by size group by country. Table 4.4 shows the employment share and turnover share of firms by size group and by country. Table 4.5 lists firms' average labour productivity (1,000 of EUR per employee in 2019) by firms' size and country. Finally, Table 4.6 summarizes the share of foreign-owned firms in these countries. As before, foreign-owned firms are separated by whether they are owned by EU or non-EU firms (intra-EU and extra-EU). In the last row of each table, the average values of the corresponding statistics in EU27 member states are also listed for comparison.

Looking at the share of firms in EU enlargement countries in Table 4.3, the composition of firms is similar to the EU27 average level. Serbia is an exception, as it tends to have a slightly higher share of small mid-caps, large mid-caps, and very large mid-caps. If we look at the proportion of firms with 3,000+ employees, the proportion of these firms in Serbia is much higher than the EU27 average. However, in fact, only 24 firms with 3,000+ employees are reported in ORBIS Europe (5 are state-owned), which is not so large. Therefore, this pattern is mainly driven by a lower share of micro firms in the country, probably because of an under-reporting of micro firms.

In terms of the employment share and turnover share by firm size group (Table 4.4), the shares in EU enlargement countries are similar to the EU27 average, although SMEs and mid-caps in these countries tend to account for slightly higher shares. In contrast, micro firms tend to have slightly lower shares than the EU27 average level. Especially in Serbia, the employment share and turnover share of micro firms are only 13.1% and 11.2%, whereas the EU27 average is 38.2% and 32.0%, respectively. Additionally, firms with 3,000+ employees tend to account for lower employment and turnover shares in these countries than the EU27 average, except those in Serbia.

A notable difference in performance indicators of companies in the EU enlargement countries than the EU27 average is labour productivity. Companies in the enlargement countries tend to have lower labour productivity than the EU27 average. For example, the average labour productivity of small mid-caps in these countries are between 60,000-90,000 EUR per employee in 2019 while the EU27 average is 342,700 EUR per employee. The difference persists in the other size groups as well. Labour productivity of companies in all size groups in the EU enlargement countries is around one fifth to one third of the EU27 average level. Furthermore, mid-caps in these countries seem to have lower labour productivity than SMEs and firms with 3,000+ employees. Table 4.5 presents the numbers.

Finally, as shown in Table 4.6, companies in all size groups in the EU enlargement countries exhibit larger shares of foreign ownership than the EU27 average. For example, the share of foreign-owned small and large mid-caps in these countries is close to 40%, while the EU27 average is around 25%. More than half of these foreign-owned firms are owned by EU27 firms, comparing to non-EU27 firms. In the EU27, the share of intra-EU ownership is 12.7% of all firms, while the share of firms owned by companies outside the EU is 11.9%. Some exceptions are micro firms and SMEs in North Macedonia, and micro firms in Serbia.

Additionally, in Serbia, 10% of small mid-caps, 8% of large mid-caps, 10% of very large mid-caps, and 21% of all firms with 3,000+ employees are state-owned, according to the ORBIS Europe data. However, the data does not record any state ownership in Bosnia and Herzegovina, North Macedonia, or Montenegro. Furthermore, due to the large number of SMEs and micro firms, it is not feasible to compute the proportion of state ownership from the ORBIS Europe data.

Table 4.3. Share of companies by firm size and by country

	Micro	SMEs	250-499	500-1,499	1,500-2,999	3,000+
	(per 100 firms)		(per 10k firms)			
Bosnia and Herzegovina	92.0	7.6	23.8	12.0	2.6	0.9
North Macedonia	90.5	9.3	15.1	8.8	1.4	0.5
Montenegro	89.8	9.9	14.3	12.3	1.3	0.6
Serbia	88.1	11.2	36.2	22.6	6.0	2.9*
EU27	93.3	6.5	11.1	6.4	1.3	0.8

Source: Own elaboration based on the ORBIS Europe database. *Only 24 giant firms are listed in the ORBIS Europe database in Serbia. This high figure is driven by the low share of micro firms in the country, probably because of an underreporting of micro firms.

Table 4.4. Employment and turnover share of mid-caps by firm size by country

Employment share	Micro	SMEs	250-499	500-1,499	1,500-2,999	3,000+
Bosnia and Herzegovina	35.1%	33.3%	9.9%	11.4%	6.6%	3.8%
North Macedonia	32.5%	41.3%	7.6%	10.8%	3.8%	4.2%
Montenegro	25.6%	46.7%	7.0%	14.1%	3.8%	2.9%
Serbia	13.1%	32.1%	11.1%	16.1%	11.2%	16.4%
EU27	38.2%	34.4%	5.7%	7.6%	3.9%	10.1%
Turnover share	Micro	SMEs	250-499	500-1,499	1,500-2,999	3,000+
Bosnia and Herzegovina	35.9%	35.2%	10.6%	10.3%	4.6%	3.5%
North Macedonia	24.6%	43.6%	8.3%	19.6%	1.7%	2.3%
Montenegro	20.4%	55.3%	7.7%	8.3%	4.6%	3.7%
Serbia	11.2%	36.0%	13.2%	17.4%	9.0%	13.4%
EU27	32.0%	33.4%	7.0%	9.9%	4.2%	13.5%

Source: Own elaboration based on the ORBIS Europe database.

Table 4.5. Labour productivity (1,000 euro) by firm size by country

GEO	Micro	SMEs	250-499	500-1,499	1,500-2,999	3,000+
Bosnia and Herzegovina	69.1	71.4	72.5	60.6	47.0	62.7
North Macedonia	41.8	58.4	60.3	100.1	25.4	30.6
Montenegro	60.7	90.2	83.8	44.7	93.2	98.3
Serbia	64.7	85.2	90.1	82.0	61.4	61.9
EU27	285.2	282.0	342.7	339.4	301.0	249.5

Source: Own elaboration based on the ORBIS Europe database.

Table 4.6. Foreign ownership of mid-caps by firm size by country

Country	Location	Micro	SMEs	250-499	500-1,499	1,500-2,999	3,000+
Bosnia and Herzegovina	Intra-EU	6.4%	10.8%	21.2%	25.9%	40.0%	0.0%
	Extra-EU	36.5%	22.1%	15.9%	17.2%	0.0%	20.0%
North Macedonia	Intra-EU	0.7%	4.0%	14.0%	25.0%	0.0%	50.0%
	Extra-EU	0.9%	4.0%	12.0%	17.5%	80.0%	0.0%
Montenegro	Intra-EU	4.2%	9.3%	26.7%	28.6%	.	.
	Extra-EU	11.3%	12.3%	20.0%	7.1%	.	.
Serbia	Intra-EU	2.8%	8.2%	29.1%	36.1%	27.7%	33.3%
	Extra-EU	2.7%	4.0%	9.6%	10.1%	19.1%	29.2%
EU27	Intra-EU	2.2%	5.3%	12.7%	13.7%	14.3%	15.9%
	Extra-EU	16.8%	10.4%	11.9%	12.0%	13.2%	8.4%

Source: Own elaboration based on the ORBIS Europe database.

4.8 Innovation in mid-cap firms

Innovation – the introduction of new products and processes to the market – is generally regarded as one of the main drivers for economic growth. As one of many examples, the Industrial Strategy for Europe presented by the European Commission in 2020 points out the pivotal role of innovation for growth, but also for mastering the twin ecological and digital transitions, and for securing Europe's sovereignty. Moreover, innovation plays a key role in increasing the resilience of firms and industrial ecosystems.

Understanding how mid-caps perform in innovation and what may hamper their innovative activities is therefore essential to understand the future prospects of this type of firms. A look in the literature shows that discussions on the relationship between innovation and firm size focussed on small and large firms while mid-caps as a group of companies between these small and large firms found only very little recognition. Joseph A. Schumpeter (1911) on the one hand, stressed the role of the single entrepreneur in economic development and its importance in creating and accomplishing innovation. On the other hand, he recognized in his later work (Schumpeter 1942), the importance of large, multidivisional firms for the "routinized" creation of technical novelties, and their financial power for large-scale investments. This has led to the hypothesis that two distinct patterns of how innovative activity is organized exist - `Schumpeter Mark I' and `Schumpeter Mark II' - associated with specific industries and size classes.

There are several arguments why large firms are disproportionately more innovative (Cohen 2010): they may find it easier to secure finance for risky innovation projects; there may be economies of scale in innovation, such as benefits from a higher degree of specialization in R&D and innovation departments; the returns from innovation are higher when the firm has a larger volume of sales over which to spread the fixed costs that come with it; moreover, large, diversified firms may find it easier to spread the risk associated to innovation over a larger turnover. There are, however, also counterarguments that may point to the benefits of being small for innovation: small firms may benefit from the involvement of a founder or manager who drives innovation, or from a higher flexibility to react to market opportunities, while large firms may suffer inefficiencies through slow decision-making and complicated internal processes which takes considerable time of the firm's scientists and engineers; moreover, we may only observe highly innovative small firms in economic statistics because non-innovative small firms go bankrupt quite fast, while non-innovative large firms can still sustain on their past success.

We test the hypothesis that innovation increases with firm size with data from the Community Innovation Survey (CIS), a large-scale survey of innovation activities of firms in the European Union, Iceland, and Norway. The CIS rests on a European-wide harmonized questionnaire and collects data on firms' innovation expenditures, innovation output and other business-related information like employment and sales. It applies the definitions and methodology of the Oslo Manual on innovation surveys (OECD 2018) and is conducted biannually by the national statistical offices or legalized national institutions of the European Union's member states. The core target population of the CIS

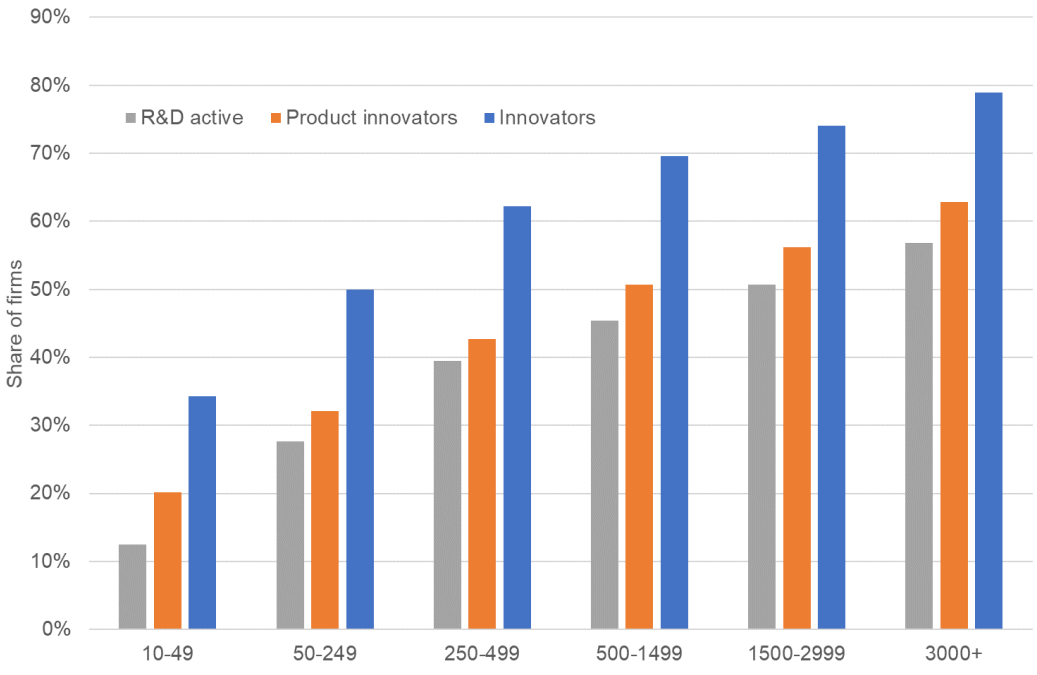
2018 includes all firms in the relevant NACE classes with 10 or more employees. So, the data does not include micro enterprises.

Data at firm level is provided as microdata by Eurostat's Safe Center in Luxembourg. We use data from the CIS 2018, which includes around 150k observations for the years 2016-2018. The dataset includes observations from 19 countries (BE, BG, CZ, DE, EE, EL, ES, FI, FR, HR, HU, IT, LT, LU, LV, PT, RO, SE, SK) and is weighted to adjust to the different country and sector size.

We first look at various forms of innovative activities. The CIS distinguishes between new or improved products and services, new or improved processes including production, logistics, organization, communication, and marketing. Moreover, the questionnaire distinguishes between products new to the market or products just new to the firm. The first indicator used is *all innovators*, which measures the share of firms with at least one of the innovations listed above. *Product innovators* include only firms with a new product or service, while *market novelties* indicates that this product or service is also new to the market.

The data presented in the figure below indicate that innovativeness increases mostly with firm size which is not surprising given the advantages of large firms discussed above. Mid-caps generally have higher shares than SMEs in all three categories, but lag behind large firms. However, the gap narrows down when we only look at the largest mid-caps. The share of innovative firms among mid-caps is 62% (small mid-caps) and 70% (large mid-caps). This is very much in line with the results from interviews presented in Chapter 5 which reveal that the share of firms which innovate continuously is 63% among the respondents. In contrast, the share of R&D active firms in the interview sample is considerably larger than in the CIS data. There is also a clear hierarchy between different size classes when it comes to R&D. The share of R&D active firms, just like the share of innovators, increases steadily with firm size, and is highest among large firms.

Figure 4.24: Innovative activities by size classes, 2018



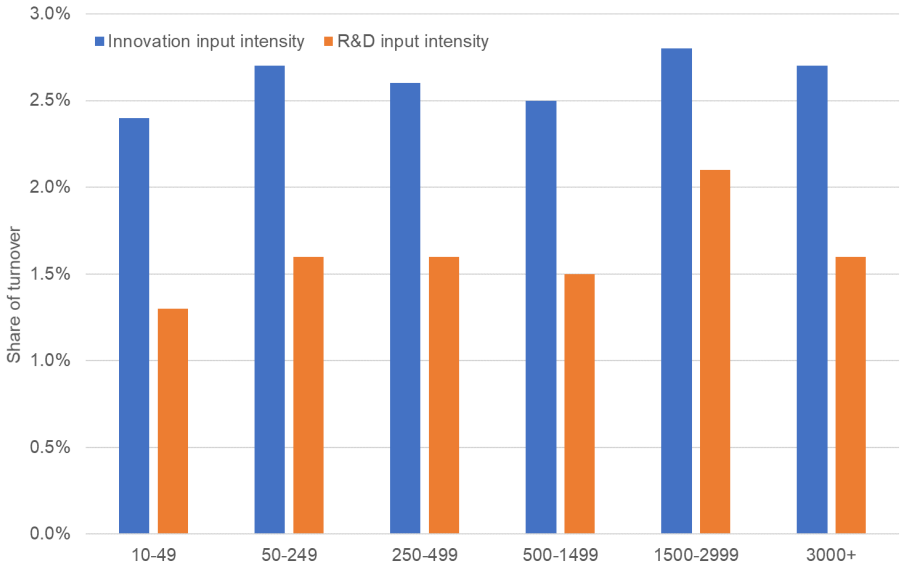
Source: Own elaboration based on Community Innovation Survey, 2018

Another way to measure differences in innovation is to look at innovation expenditures, meaning the resources firms spend on innovative activities. This includes expenditures for R&D performed in-house or contracted out, expenditures for own personnel working on innovation, expenditures for services, materials, supplies purchased from others for innovation, or expenditures for capital goods for innovation, including machinery, equipment, software, IPRs, buildings etc.

Figure 4.25 below provides two indicators, innovation input intensity (the share of innovative expenditures in turnover), and R&D input intensity (the share of R&D expenditures in turnover). The results are less conclusive that for the share of innovative firms in each size class: innovation input intensity is roughly the same (around 2.5%) for all size classes, so there is only little variation in the amount firms spend on innovation as a share of turnover.

Variation in R&D expenditure intensity is also quite low. We see a maximum value for very large mid-caps (1,500-3,000 employees). Readers should note that all firms with no innovation activities have been set to zero innovation expenditures to correct for the fact that SMEs innovate less frequently than mid-caps and larger firms, but then have quite high expenditure intensities. The results would look differently if non-innovating firms would have been excluded.

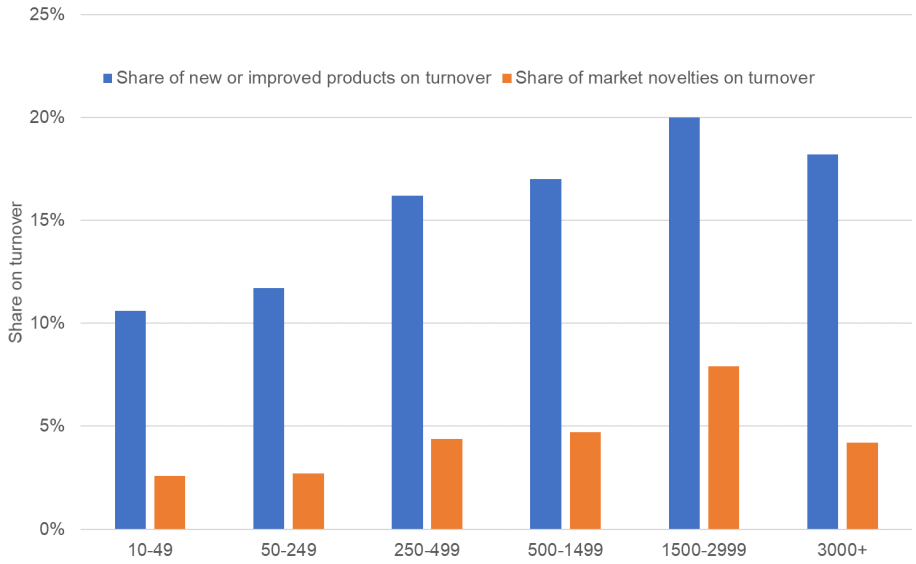
Figure 4.25: Innovation input and R&D input intensity by size classes, 2018



Source: Own elaboration based on Community Innovation Survey, 2018

Innovation intensity can also be measured at the output side, by looking at the share of new and considerably improved products in turnover (Figure 4.26). The higher the turnover share, the more the firm benefits from its past innovation activities. Innovation output gives two main conclusions: first, the turnover share a company gains from innovation is increasing with firm size and is highest for the size class 1,500-2,999, but then decreases again. Second, we find that the share of market novelties on turnover is largest among mid-cap firms, and smaller in SMEs and large firms, so mid-cap firms seem to be quite good in gaining revenue from innovation, even if they are not among the most innovative firms when it comes to innovation input and R&D.

Figure 4.26: Innovation output intensity by size classes, 2018

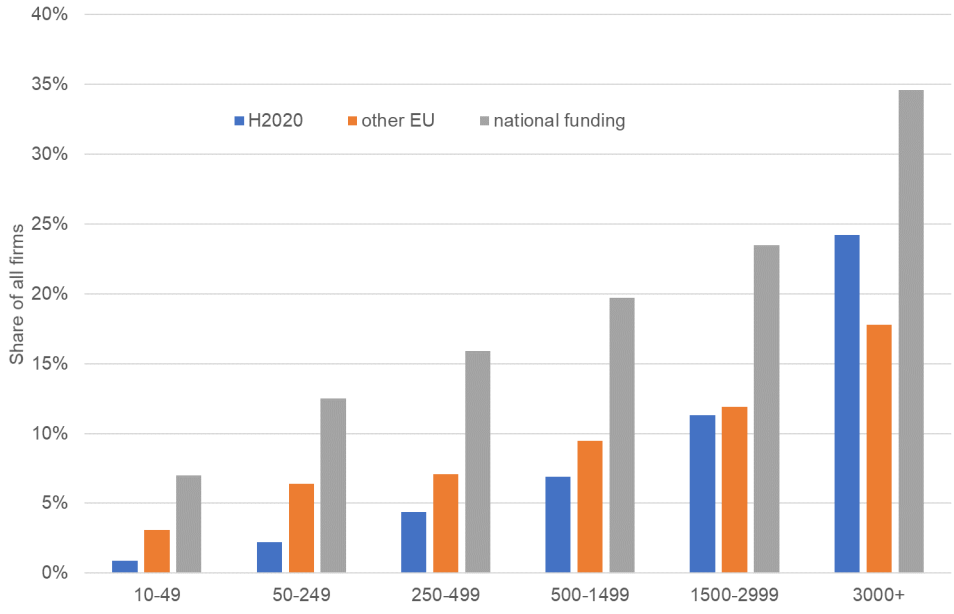


Source: Own elaboration based on Community Innovation Survey, 2018

Finally, the CIS also provides information on public support for innovative firms. In general, the role of public funding for firm innovation is small; according to the OECD Main Science and Technology Indicators (2021b) most of the funds for business R&D are raised by the firms themselves. Within the EU, Hungary and Poland have the highest shares of business R&D funded by the government. For the whole EU, this share was 5.25% in 2019 (OECD 2021b).

The following figure shows the share of firms by size class which made use of three different public funding sources for innovation: H2020, other EU innovation funding (including regional funding by the ERDF and innovation-related funding by EFSI), and national funding. The latter still accounts for the vast majority of R&D and innovation funding in the EU. The data refers to the three years from 2016 to 2018.

Figure 4.27: Innovation funding sources by size classes, 2016- 2018

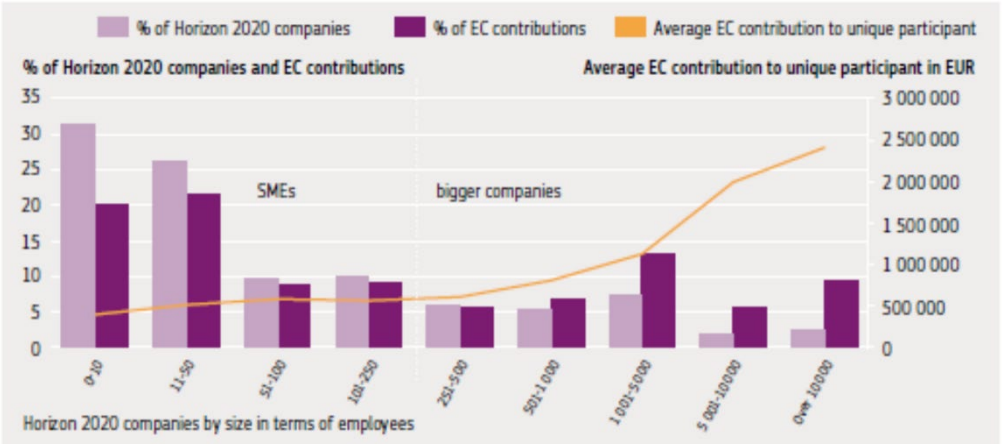


Source: Own elaboration based on Community Innovation Survey, 2018

The likelihood to draw on one of these funding sources increases with firm size, just like innovation activities. In all size classes, national funding dominates. From all three sources, H2020 is the one which is used least frequently. The share of mid-caps which were active in H2020 is considerably below the corresponding share of large firms. The share of large firms that participated in H2020 is nearly three times larger than that of mid-caps, and two times larger than that of very large mid-caps. Horizon 2020 applied the same funding conditions for mid-caps and large companies.

The interim evaluation of Horizon 2020 (European Commission, 2017a) provides more insights on the participation of mid-caps in H2020 (see the Figure 4.28 below). We see that the share of mid-caps among the participants in H2020 is five percent which is above their share on the total number of all enterprises. However, the average EC contribution mid-caps receive seems quite small compared to large firms, and it grows considerably slower for mid-cap categories than for large firms. This may point to some difficulties for mid-caps in H2020 which have also been mentioned in the panels. Panellists see a clear disadvantage of mid-cap firms compared to large companies which have experts who know how to apply for funding and have the resources to organize large consortia for project applications. However, the lack of funding is not considered as the main obstacle for innovation in mid-cap firms, as the interviews of mid-cap firms in Section 5.2 show (see also Figure 5.14). The main challenge for these firms is to master the technology in the innovation process. The lack of funding appears to be of high or medium relevance only for a small proportion of respondents (34%).

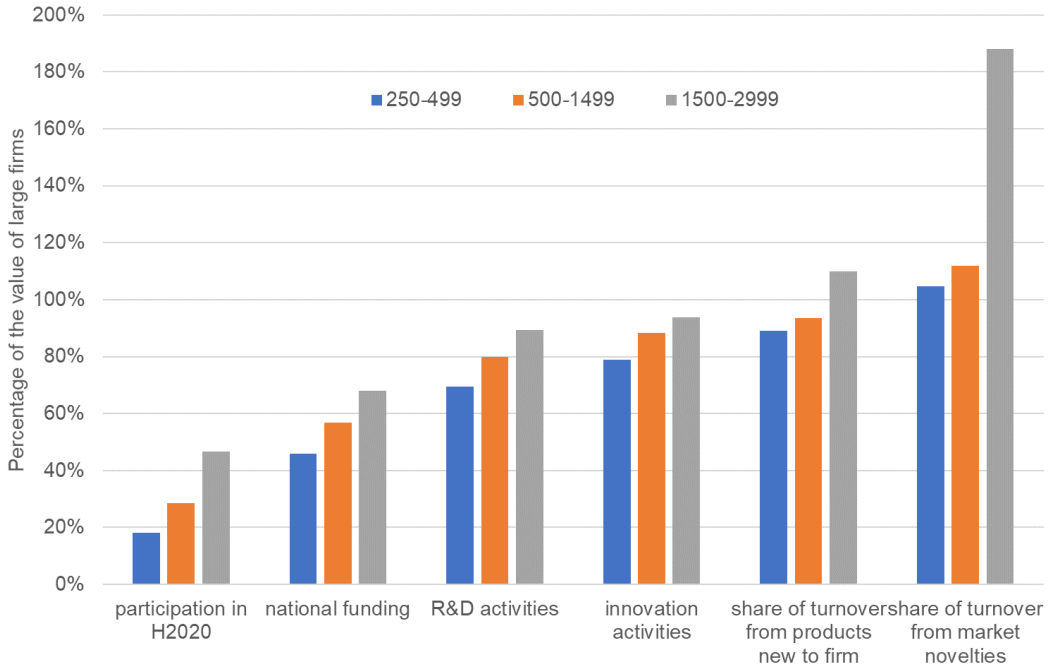
Figure 4.28: Companies funded in H2020 by number of employees and grants



Source: European Commission, Interim evaluation of Horizon 2020 – book version, p- 99; n = 6,738 companies

To sum up, mid-caps are more innovative than SMEs, but less innovative than large firms. The figure below summarizes the differences between mid-caps and large firms in innovation by calculating the indicator values of mid-caps as a percentage of those for large firms. This gap is largest in funding, and smallest in innovation output. Small and large mid-caps seem to be a homogenous group when it comes to innovation and clearly distinguish from other size classes of the enterprise sector. Moreover, mid-caps seem to be proficient in turning innovations and market novelties into turnover: the share of turnover from market novelties reaches the level of large firms and is even higher for mid-caps with 1,500 to 2,999 employees.

Figure 4.29: Innovation gaps between mid-caps and large firms, 2016- 2018



Source: Own elaboration based on Community Innovation Survey, 2018

4.9 Digitalisation in mid-cap firms

Today, many expect a push towards higher productivity and more innovation from a group of new digital technologies in manufacturing (OECD 2017, Frank, Dalenogare et al. 2019, Frank, Mendes et al. 2019). These technologies include the Internet of Things (or Industrie 4.0 in the German context), 3D printing, advanced robotics, as well as new IT-enabled management processes such as real-time enterprise resource planning and production control, data analytics, or applications of artificial intelligence. The central idea behind many of these technologies is the integration of production activities within the factory and along the supply chain by exchanging data between the various stages (Frank, Dalenogare et al. 2019).

These technologies serve different application areas, but all are regarded as key to future productivity increases of European industry. The European Commission (2020b) considers them as 'Key Enabling Technologies' (KETs) which also includes nanotechnology, biotechnology, or biomedicine. Common to all these technologies is that they are strategically important for Europe's industrial future.

This section asks how frequently mid-cap firms use these technologies compared to SMEs and larger firms, and what differences between different types of mid-cap firms can be observed. So far, the empirical evidence on the diffusion of digital technologies provided by Eurostat or the European Investment Bank indicates that the use of digital technologies strictly rises with firm size. Eurostat's survey on the usage of ICT in enterprises[11], for example, reports that in 2020 seven percent of the small enterprises (10-49 employees) in the EU27 use industrial or service robots, compared to 13% in medium-sized enterprises (50-249 employees), and 28% in large enterprises with 250 or more employees. The values for 3D printing are 4% (small enterprises), 9% (medium-sized enterprises), and 17% for large firms. The share of firms which use these technologies increases in the vast majority of member states with firm size, so the relationship between firm size and use seems to be solid. Such a relationship is also confirmed by Frank, Dalenogare et al. (2019) for a larger set of technologies. We may explain it by high fixed cost of investments, a higher ability of larger firms to finance these investments, and a broader range of application areas for these technologies in large firms compared to their smaller counterparts.

11 https://ec.europa.eu/eurostat/databrowser/view/ISOC_EB_P3D__custom_2281817/default/table?lang=en

The 2021 Investment Report by the European Investment Bank (EIB 2021) provides a similar picture: usage of digital technologies increases with firm size. Less than 50% of the small firms (10-49 employees) in the EU have adopted at least one of the digital technologies surveyed by EIB, while 75% of large enterprises (more than 250 employees) have done so. As an explanation, the report points out that investment in digital technologies often entails high fixed costs which makes the adoption of these technologies easier for larger firms that can spread the costs over a larger revenue. We may add that large firms may also have more opportunities to find profitable application areas for digital technologies than their smaller competitors who may be more specialized. The data from both surveys, however, include no information about the propensity of mid-cap firms to adopt digital technologies, so we will provide information regarding mid-caps from another data source, the European Manufacturing Survey (EMS). EMS is a firm-level survey that targets manufacturing firms with 20 or more employees and investigates product, process, service, and organizational innovation in European manufacturing firms. A harmonized questionnaire allows to analyse relationships between variables across countries. Data from the most recent survey (EMS 2018) was collected in late Spring 2018 and relates to the year 2017.

A unique feature of the EMS dataset is the richness of information on digital production technologies. EMS gives detailed information on the implementation of 20 different digital technologies, coded as a binary variable. These variables are one if the firm has installed a certain technology, and zero otherwise.

We utilize this information by grouping together various technologies in technology groups:

- Robots (yes/no, includes handling and production robots),
- Advanced robotics (yes/no, includes mobile, collaborating and autonomous industrial robots),
- Additive manufacturing (yes/no, additive manufacturing for prototyping, and for production),
- Digital elements in products (yes/no, interactive interfaces, automated data exchange, sensor technology, identification tags),
- Industrie 4.0 (five items cardinal variable, includes software for production planning and scheduling, digital exchange of product/process data with suppliers / customers, near real-time production control systems, product-lifecycle-management-systems or product/process data management, virtual reality or simulation for product design or product development, and mobile/wireless devices for programming and controlling).

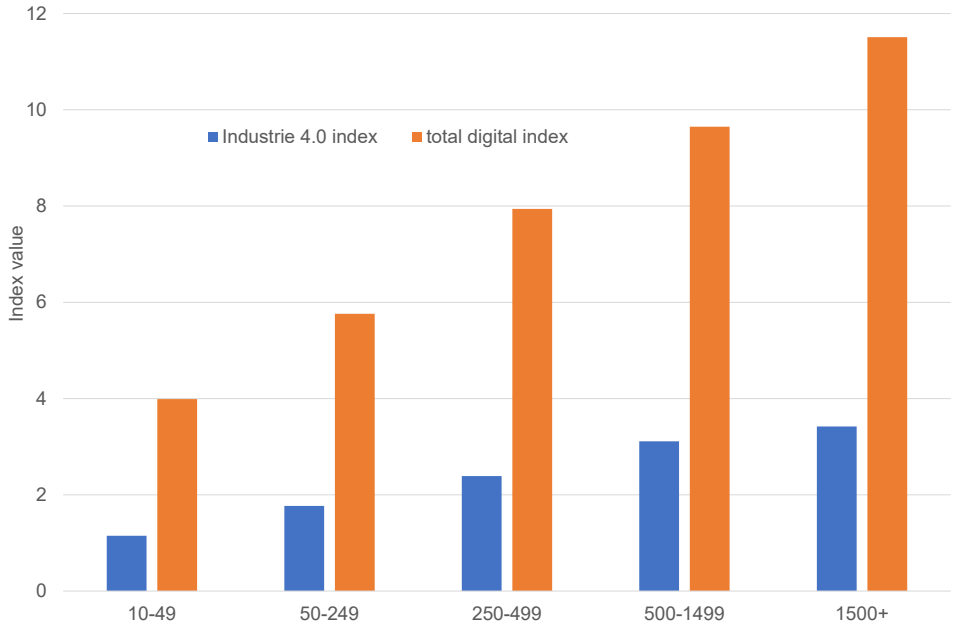
The last technology group includes considerably more technologies than the previous groups, so we apply a five-scale as suggested by Lerch, Jäger et al. (2017). Here, a higher value of the variable is associated with a larger number and more sophisticated technologies in use. Moreover, we calculate an index of the breadth of usage of digital production technologies (*digital*), similar to the information sources index by Laursen and Salter (2006). The index sums up the individual technologies employed so that the degree of technological sophistication of the firm is described by one single indicator. The idea behind this index is that services can emerge from a broad range of technologies, and there may also be some complementarities between technologies that are not accounted for when the analysis employs single technologies.

Overall, the sample used here includes 2,455 firms from Germany, Austria, Switzerland, Lithuania, Slovenia, and Croatia. Due to the size of the sample, it is not possible to publish results for individual countries, so we will restrict the analysis to size classes. The firms in the sample are split into five size classes: small SMEs (20-49 employees), large SMEs (50-249 employees), small mid-caps (250-499 employees), large mid-caps (250-1,499 employees), and large firms (1,500 and more employees). There is another mid-cap category which is mentioned in various documents and also considered in the report – firms with between 1,500 and 2,999 employees – however, due to the limited number of observations in this size class, we merged them into the group of large firms.

We first look at the two indices which aggregate several or all digital technologies into one number for each firm (Figure 4.30). A higher value indicates that the firm uses more digital technologies. These indices are available for all technologies and for Industrie 4.0 in a narrower sense. Figure below shows the share of firms in each size class which use various digital production technologies.

It is easy to see that that usage of digital technologies very much depends on the size class of the firm, and the use of all technologies increases strictly with firm size. Mid-caps, on average, have a higher index value than SMEs which means that the average mid-cap firm uses each technology more often than the average SMEs, but less often than the average large firm with more than 1,500 employees. Moreover, large mid-caps with 250-1,499 employees use all technologies more often than small mid-caps.

Figure 4.30: Diffusion of digital production technologies by size classes, 2018



Source: Own elaboration based on EMS, 2018

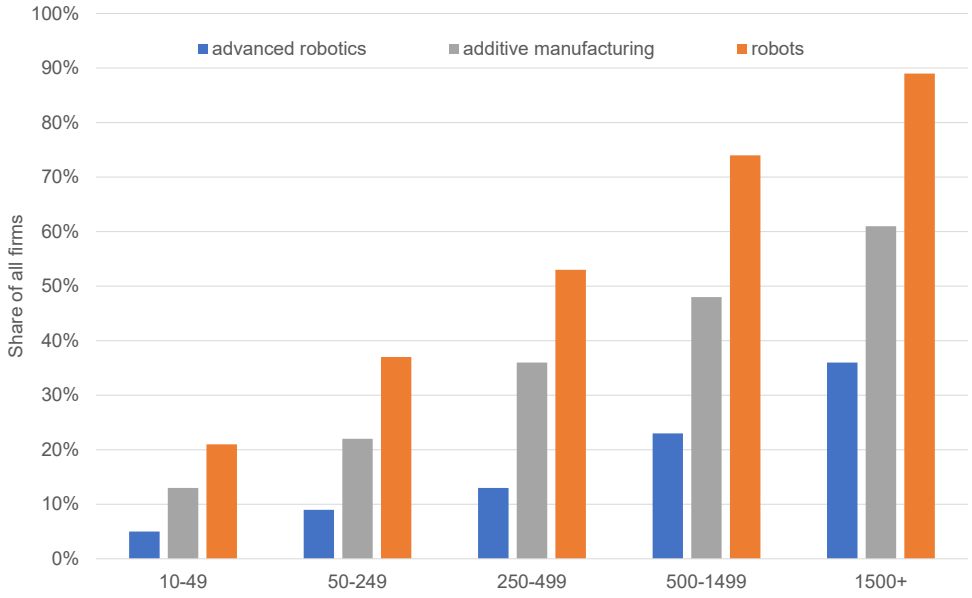
We also get a very similar picture at the level of individual technologies. Figure 4.31 below shows for each size class the share of firms which use robots, advanced robots, or additive manufacturing. In ALL technologies, the share of firms which use a particular technology is larger in the next size class and lower in the previous size class. The share of SMEs with less than 20-49 employees which use robots, for example, is around 20%, and increases to 53% for small mid-caps and 74% for large mid-caps. This is a clear indication that the use of these technologies is related to firm size.

This relationship may be explained by the fixed costs of these technologies which are easier to finance if a firm is larger, by a larger number of application areas for these technologies in larger firms, and certainly also by indivisibilities like the fact that it is hard in small firms to have an employee who specialises in one of these production technologies. There are only two technologies – advanced robotics and additive manufacturing – which are not adopted by the majority of mid-cap companies. The share of mid-cap firms which do not use any of these technologies is below five percent so nearly all of them use one or the other digital technology. Thus, based on these data, the adoption of digital technologies seems very much related to firm size. Larger firms seem to have an advantage over smaller firms or are more inclined to adopt these technologies.

The positive relationship between firm size and digital technologies is quite robust in all presented figures. To control for other factors, we run multivariate regression analysis (not reported here). This means that we test the statistical significance of a relationship between two variables and simultaneously hold the influence of all other variables constant, which allows to isolate the relationship between two variables from the influences of other variables.

The regression results confirm the importance of the firm's size as a highly significant determinant of the diffusion of digital technologies, besides sectoral affiliation. A higher share of mid-cap firms uses digital technologies compared to SMEs, but mid-caps lag also behind large firms when it comes to digitalisation.

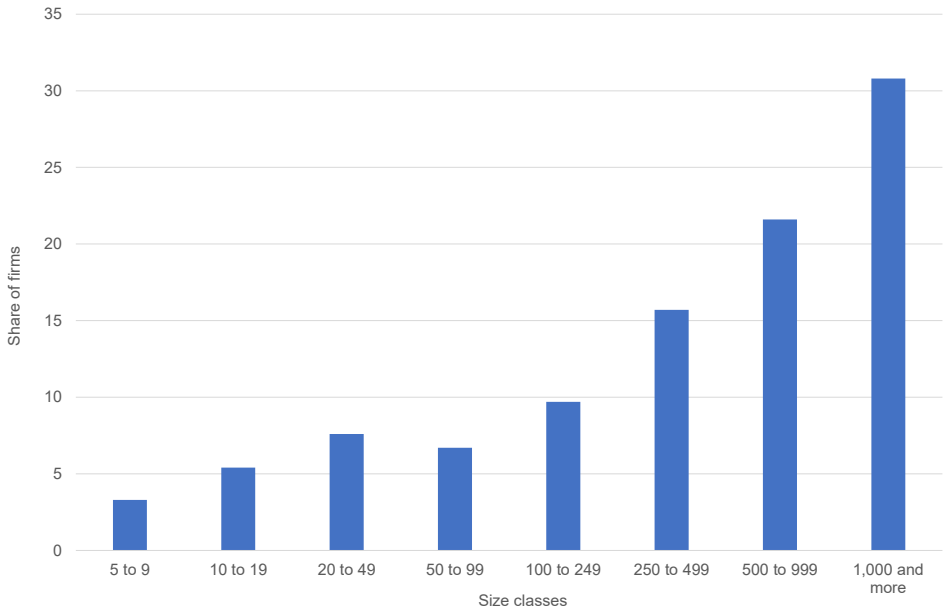
Figure 4.31: Use of individual digital production technologies by size classes, 2018



Source: Own elaboration based on EMS, 2018

EMS data does not include information on the application of artificial intelligence (AI) in firms, so we added this information from another survey, the German Mannheim Innovation Panel (Rammer et al. 2021). The data in Figure 4.32 below reveal a similar picture: the propensity to use artificial intelligence is lowest among the smallest firms and increases with rising firm size. 15.7% of all German small mid-cap firms use AI, this share increases further in large mid-caps. Most likely, it is even higher in large firms, but the survey does not report separate results for firms with 1,500 and more employees. So, the diffusion of AI is quite similar to that of other digital technologies.

Figure 4.32. Adoption of artificial intelligence by size classes, 2019



Source: Own elaboration based on Mannheim Innovation Panel

5 CHALLENGES FOR MID-CAP FIRMS

An important goal of this study is to identify challenges that might hold back mid-cap firms and hamper their growth. In Section 5.1 we discuss some of the challenges that arise for mid-caps, based on our review of academic and policy literature, as well as on two interviews with industrial associations and one interview with a funding agency. Next, Section 5.2 presents a summary of quantitative and qualitative findings, derived from semi-structured interviews. Section 5.3 complements these findings with insights from panel discussions with managers of mid-caps. Finally, Section 5.4 summarises the main takeaways from this analysis and existing policies that tackle these challenges.

5.1 Challenges for mid-cap firms: a survey of the literature

Economic research has long recognized the importance of firm size for the explanation of enterprise behaviour and performance: first, by market power (oligopoly, monopoly) that may influence the behaviour of firms. Second, by the existence of economies and diseconomies of scale and scope which simply means that some things can be done more efficiently with increasing or decreasing size; labour productivity measured by value added per person employed, for example, is generally larger for firms with more than 250 employees than for firms with 50-249 employees (OECD, 2017). An example for diseconomies of scale may be bureaucratic slack which seems to increase with firm size.

An important influence for economies of scale are minimum efficient scales and indivisibilities: some activities require a certain volume to be run efficiently which may make a certain technology or business practice unavailable for firms below a certain size. Moreover, economies of scale can also be the result of an increasing division of labour. It is often difficult for mid-caps to employ a person full-time for a task that requires specific skills like product development, digitalization, market research, or international expansion. Thus, they may not be able to reap the benefits from the division of labour due to their smaller size. Mid-caps may circumvent these limitations by buying-in these activities as services, but this is not always possible due to transaction costs.

The discussion of size advantages should not give the impression that mid-caps are inferior to larger firms. In fact, the previous section has demonstrated that they perform well and have advantages in innovation over SMEs which are related to their larger size. Mid-caps can also benefit from their size when they specialize in a particular market niche. Simon (2012) has labelled these firms 'Hidden Champions' because they are often not well-known since they operate in niche markets where they are world-market leaders (Simon, 2012). What distinguishes Hidden Champions from other Mittelstand businesses, according to Schenkenmann (2022), is their niche strategy. Hidden Champions are often manufacturers of machinery, electronics, medical products, non-metallic mineral products or in engineering and R&D services (Rammer and Spielkamp, 2019).

Rammer and Spielkamp (2019) show that the competitive advantages of Hidden Champions rest on technology leadership and customisation. They do not invest more into innovation than other firms, but achieve higher innovation success, which is also reflected in the results of Chapter 4.9. According to Rammer and Spielkamp (2019), their higher efficiency can be linked to their superior technological capabilities and to higher investments in human capital that mobilise the creative potential of their employees. Hidden Champions benefit in particular from globalization because they earn the vast majority of their turnover in export markets. Among other characteristics, Simon (2012) considers the combination of a narrow market focus with a global orientation customer focus as essential for this strategy. In addition, Kamp (2018) demonstrates that smart services play an increasingly important role in the business models of Hidden Champions.

The example of Hidden Champions shows that mid-caps can also be in an advantagous position compared to large multinationals and SMEs when they are able to leverage their capabilities and find profitable market niches where they can flourish as world market leaders. Mid-caps seem to enjoy an advantage over large firms here, as large firms may find it diffult to specialize on such narrow market niches which may be too small for them. Moreover, Hidden Champions (and also mid-caps) may benefit from their nimbleness (Schenkenmann, 2022), from their lean organization and flat hierarchies which allows quick decision-making. This is a feature mid-caps share with SMEs where the founder is often the manager.

Another perspective to look at challenges for mid-cap firms is by focussing on ownership and governance. We already mentioned foreign ownership Section 4.5. Another type of ownership frequently found among mid-caps is family ownership. According to a recent study (Gottschalk et al., 2019), 33% of all mid-cap firms with 250 to 499 employees in Germany are family-controlled, and 29% have an owner who is also manager. The shares for firms with 500 and more employees are only slightly lower, numbers for mid-caps with 500-1,499 are not reported. Schenkenmann (2022) points out that more than 60% of all Hidden Champions in Germany are family owned.

Family firms bring their own advantages but also disadvantages (European Commission, 2015). The existence of a family management solves the principal-agent problem which can occur when a firm is managed by external, hired managers, who have no or very little ownership rights. Additionally, the profit maximization goal of a family member is motivated by his or her personal economic interest. Consequently, long-term goals and nonfinancial goals such as increasing product quality are typical for family managers (Hennart et al., 2019). Family ownership may also provide a degree of flexibility in taking decisions which is not possible for firms with non-family ownership. Another important benefit of family ownership is the high degree of embeddedness of these firms in their local communities which comes from the personality of the owner/manager.

Family ownership, however, comes at a price. Family firms often struggle to find an appropriate governance model that allows them to combine delegation with family ownership. Socio-emotional goals have a high importance in a family firm and family firms may maximize socio-emotional wealth rather than economic wealth. Socio-emotional wealth means "the utilities family-owners derive from the non-economic aspects of the business" (Gómez-Mejía et al., 2007). These may include esteem within the family, pride in having the family name associated with the company, emotional attachment to the firm, and the wish to work together with family members in the company. The term suggests that family firms try to maximize these aspects rather than economic goals and may try to conform to family norms which may be at odds with monetary benefits, internationalisation, innovation, or corporate change. Family firms benefit more than other firms from their reputation as this is passed on the next generation. The transmission of the firm to the next family generation is one of the reasons for family members willing to maximize socio-emotional wealth including reputation in the long run, keep as much control as possible and reserve firm positions for family members. However, succession is a challenge for many of these firms.

The challenges of succession and to find an appropriate governance model come together when firms require **financing and access to capital**. SMEs, in particular small SMEs, are often restricted to self-funding because of problems to raise external capital (OECD 2021d). Mid-caps, however, may reach the limits of self-funding by the owner or the family and the limits of small-scale bank credit, but may still be too small to access the stock market. When they turn to banks for external finance, it is hard to get funding because of asymmetric information (Almeida and Campello, 2007). This means that firms who apply for external finance have much better information on the value of their (often intangible) assets than the banks, and it is difficult for the firms to communicate the true value of their assets to banks. Large, well-known firms do not have this disadvantage. Additionally, the willingness to keep control inside the family limits the access to external capital and might stop the firm from more financially intensive investments and business models (Hennart et al., 2019).

Evidence for a limited access to finance of smaller firms comes from various sources. According to the EIB investment survey conducted with 12,000 companies across Europe, the probability of being rejected for an investment credit is 50% much higher for innovative, young firms in comparison to older ones (EIB, 2021). A recent report by the OECD on scaling-up in SMEs (OECD 2021f) shows the importance of external funding for fast-growing SMEs – these firms are more indebted than SMEs with no growth ambitions and finance their growth episodes by borrowing before scaling up.

Another area is **employment and skills**. According to the OECD (2017), a main challenge for mid-caps is that large firms, on average, pay higher wages, and may also be more attractive employers than mid-caps and SMEs. Mid-caps may not be able to offer the same compensation packages as the multinationals. It may be difficult for them to hire high-skilled staff, and they have to compete with large firms for skilled and experienced people. This may be a challenge when mid-caps train employees but cannot hold them long-term. To compensate for this disadvantage, mid-caps may provide a better work-life balance, more participation in running the businesses, or value attributed to being part of a project rooted in the own local community. Moreover, in family-owned firms, preferring family members over external employees could lead to a small talent pool and missed chances for better qualified employees.

The ability to tie employees is particularly important when it comes to managers. According to Debellis et al. (2021), a family-owned firm should have highly skilled non-family directors on its board of directors as these bring outside perspective, are not blind to internalization possibilities and have good networks and critical resources in foreign markets. A family-owned firm director normally has most of its connections and information inside of the family circle. However, even family-owned firms which are willing to have non-family directors are facing difficulties and high competition from the large non-family multinationals which employ highly qualified directors by offering them higher salaries and benefits. Banalieva and Eddleston (2011) argue that a non-family leader is mostly beneficial when pursuing a global strategy. On the contrary, a family manager is more suitable for pursuing a regional strategy with a high home-region focus, as in a regional strategy the social capital and reputation will be of high importance.

Another area where firm size and governance is highly relevant is **innovation** and **R&D** (Brouwer and Kleinknecht, 1996; Cohen, 2010). Smaller firms, on the one hand, may be discouraged from being innovative by the high fixed costs needed for R&D, the limited access to external financing, and the economic consequences of failed innovation projects. However, small enterprises can also be highly innovative when they are the vehicle of an entrepreneur or a group of persons who aim to exploit a new technology or a new scientific principle with innovation. Most SMEs, however, do not fall into this category. Mid-caps generally have a higher propensity to introduce new products to the market than SMEs. However, if we look at innovation expenditures as a percentage of turnover, they spend less on innovation than innovative SMEs or large firms. (Röhl, 2018) makes the point that R&D efforts of mid-caps are substantial, but he also sees that the number of innovating mid-caps is declining. Rammer and Schubert (2018) show that a better financial situation and public funding can mitigate the trend towards a falling share of innovating and R&D-performing firms.

Mid-caps are, in some respect, certainly the drivers of **digitalisation** and the use of Industry 4.0 in manufacturing. The share of firms which use robots, 3d printing or cloud service increases with firm size. However, they may face some obstacles when it comes to digitalisation; for example, the share of firms which have problems in recruiting ICT specialists increases with firm size. This can be seen in surveys such as Eurostat's ICT use in enterprises survey.[12]

A higher diffusion rate of certain digital technologies among mid-caps, but also more severe obstacles for mid-cap firms can be explained by several factors. First, mid-cap firms are often highly specialized businesses with limited resources. There may be problems to finance investments, or to find the right solutions for their application field. Some products by software suppliers such as SAP or Salesforce are not available or financially viable for mid-caps. Offers from new players or Open Source may help here. Second, the involvement of family managers may constrain digitalisation in firms where digital technologies are outside their core competences. Family managers may be less willing to change successful business models and invest large amounts in new technologies (Ceipek et al., 2021). Third, just like in the case of innovation, mid-caps may suffer from indivisibilities: pushing forward digital transformation may be one of several tasks of an employee or manager; thus, digitalisation very much depends on the availability, motivation and the skills of an individual which has to share its capabilities between digitalisation and other tasks. This may lead to less specialization in mid-caps, may hamper the build-up of competences, and may mean a severe loss of know-how when this person leaves the firm. Finally, it may also be that some of the niches of mid-caps might be endangered by big corporations due to digitalisation.

Another aspect of digitalisation are network effects and increasing returns to scale (Varian and Shapiro, 1998; Brynjolfsson and McAfee, 2014). These two factors may give large firms an advantage over mid-caps: there seems to be no place for mid-caps in "winner-takes-all" markets like search engines, social networks, or other industries that are dominated by network effects and increasing returns to scale. Some authors like Brynjolfsson and McAfee (2014) assume that more and more markets will become winner-takes-all markets. Thus, it will be not only necessary for mid-caps to adopt digital technologies, but also think about how to make money from these technologies given their effects on markets and business models (Teece, 2018). An answer to this challenge may be the concept of ecosystems

12 https://ec.europa.eu/eurostat/web/digital-economy-and-society/data/comprehensive-database

Legal and regulatory obligations constitute the most frequent challenge SMEs are facing, according to the Eurobarometer 486, a survey conducted by the European Commission (2020) among SMEs. More than half of the firms mention regulations as one of the three most pressing problems they face. The share of large firms that mention regulations is even higher. There is also a discussion on how legal and regulatory obligations discourage small firms to scale-up and grow (lock-in effect, see Sylvest et al., 2018). The argument is that firms that may grow beyond a threshold related to public support may be worse off than firms that stay below this threshold, leading to a behaviour where firms that could grow voluntarily stay small. Such lock-ins may be related to labour laws, taxation, SME targeted state aid support by Member States, etc.

The 2012 evaluation of the SME definition provides some literature suggesting the existence of a lock-in effect. Röhl (2018) presents other examples of size-dependent regulations in the German labour law and makes the case to reduce administrative burdens for mid-caps. There is also some anecdotal evidence from an interview with the manager/owner of a German foundry (BDI, 2018, original text in German): "We notice the effects of not falling under the SME definition directly. Despite being an R&D performing firm, we don't get funding by the AIF programme [German national R&D initiative] since Germany has chosen to consider only SMEs eligible for the support. Most companies in our labour-intensive industry do not reach the turnover criterion despite a high material input. But due to the high number of employees required for the process of deburring castings, the employee criterion is almost always exceeded".

However, there is also evidence that points in a different direction. Results from the SME Survey and the Flash Eurobarometer 486 (European Commission 2020a) cited in the Staff Working Document accompanying the Evaluation of the SME recommendation (European Commission 2021e) suggest that size-dependent legal and regulatory obligations and the lock-in effect may be only a minor obstacle to growth in SMEs.

Many mid-cap firms are also making serious efforts to **internationalise**, enter foreign markets or foster their position in these markets. Data provided by the (OECD 2021e) indicate that in almost all European OECD members more than 80% of all manufacturing firms with more than 50 employees are exporting. The share of service mid-caps exporters is considerably lower. The shares for large companies with more than 250 employees are only slightly higher, so exports do not seem an area where mid-caps differ a lot from larger firms. These differences may be larger when it comes to foreign presence with own subsidiaries abroad. Here, the literature speaks of micro-multinationals (Stoian et al., 2018) - small and medium-sized enterprises that engage in foreign markets by own affiliates or other entry modes, or are born globals (Øyna and Alon, 2018) – small and medium-sized firms that are internationally active from their beginning without prior establishment on the domestic market.

We have not found data on how many mid-caps or SMEs are micro-multinationals so far. The interviews conducted for this project (see next section) indicate that around half of all mid-caps have production activities outside the home country, and 65% have located marketing and sales activities abroad (see Figure 5.16). Foreign direct investment (FDI), however, is less frequent than exporting among mid-cap firms. 93% of all mid-cap firms export to other EU countries (Figure B6). FDI, again, is a question of capabilities and economies of scale. Managers must build a network of different important actors of their industry worldwide, who will give a better understanding of the sector but also of opportunity identification and future investment possibilities. With a capable world-wide network, mid-caps and SMEs will be able to find the most appropriate and promising locations and determine the best entry mode. Relevant knowledge includes knowledge of the key markets, but also culture, the foreign country's legal frameworks and regulations and the rules of conduct which cannot be easily written and transmitted, as they represent tacit cultural market knowledge. Therefore, SMEs and mid-caps have to target employees and international network partners with a very good understanding of the industry and the local foreign market (Stoian et al., 2018). This is, however, costly. We may therefore assume that the challenge of internationalisation for mid-caps is twofold: first, to finance international expansion, second to gain the relevant knowledge to be able to compete in these markets.

5.2 Key findings from semi-structured interviews with managers of mid-caps

This section presents a summary of findings on challenges that mid-caps in the European Union are facing with respect to their growth plans particularly in the areas of employment and skills, innovation, internationalisation, digitalisation, regulatory burdens, and sustainability. The findings are based on quantitative and qualitative data collected with 151 semi-structured interviews with managers of mid-caps across the EU27 member states. The interviews took place from March to May 2022. They targeted mid-caps with 250-1,499 employees from a representative sample of 10,108 mid-caps drawn from the ORBIS Europe database. In line with the other parts of the study, we distinguish between small mid-caps (250-499 employees) and large mid-caps (500-1,499 employees).

The interview questionnaire[13], key characteristics of mid-cap respondents and the full set of the findings are shown in Appendix B. As shown in Table B1, two-fifths of all mid-cap respondents are from manufacturing (41%), 52% from services, 2% from utilities and 5% from the construction sector.

The results of the interviews reveal that the top three challenges the EU mid-caps are facing are as follows (Figure 5.1):

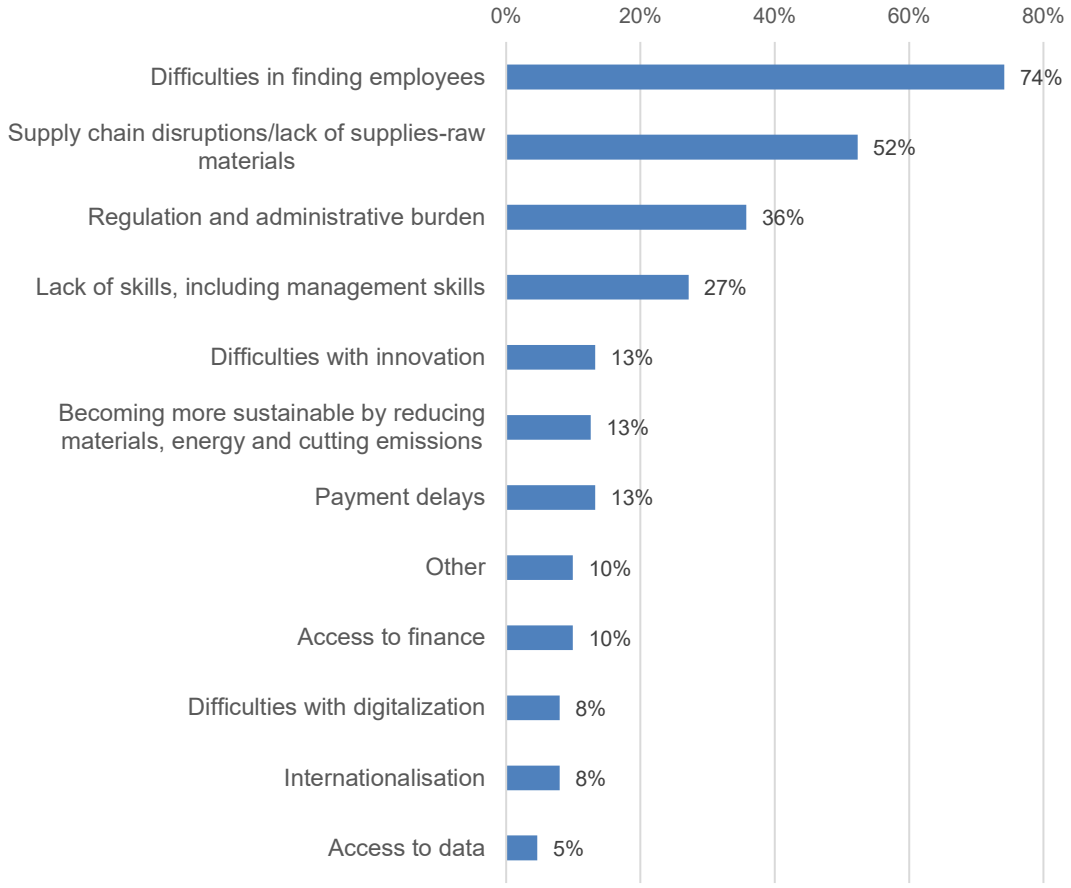
- difficulties in finding employees (74% of all respondents)
- supply chain disruptions and/or the lack of supplies, raw materials (52% of all respondents)
- regulation and administrative burden (36% of all respondents)

The lack of skills including management skills is a main challenge for 27% of respondents. 13% of respondents identify as main challenges difficulties with innovation; becoming more sustainable and payment delays. Only 10% of respondents identify access to finance as a major challenge while difficulties with digitalisation and internationalisation appear to be major challenges for 8% of respondents. Access to data is a key challenge for 5% of respondents.

We can compare these results with the top four challenges SMEs are facing according to the Eurobarometer 486 from May 2020. The most severe challenge for SMEs are regulatory obstacles or administrative burden, followed by payment delays, access to finance, and a lack of skills, including managerial skills. Even if the two surveys have been done at different years, the comparison suggests that mid-caps have less problems with financing their activities, and the skills shortage is more severe for mid-cap firms. Regulation is a serious problem for both SMEs and mid-caps.

13 The Interview Questionnaire has included inputs from interviews with two business associations and one funding agency, and from the European Commission.

Figure 5.1: Main challenges for EU mid-caps: All mid-caps respondents

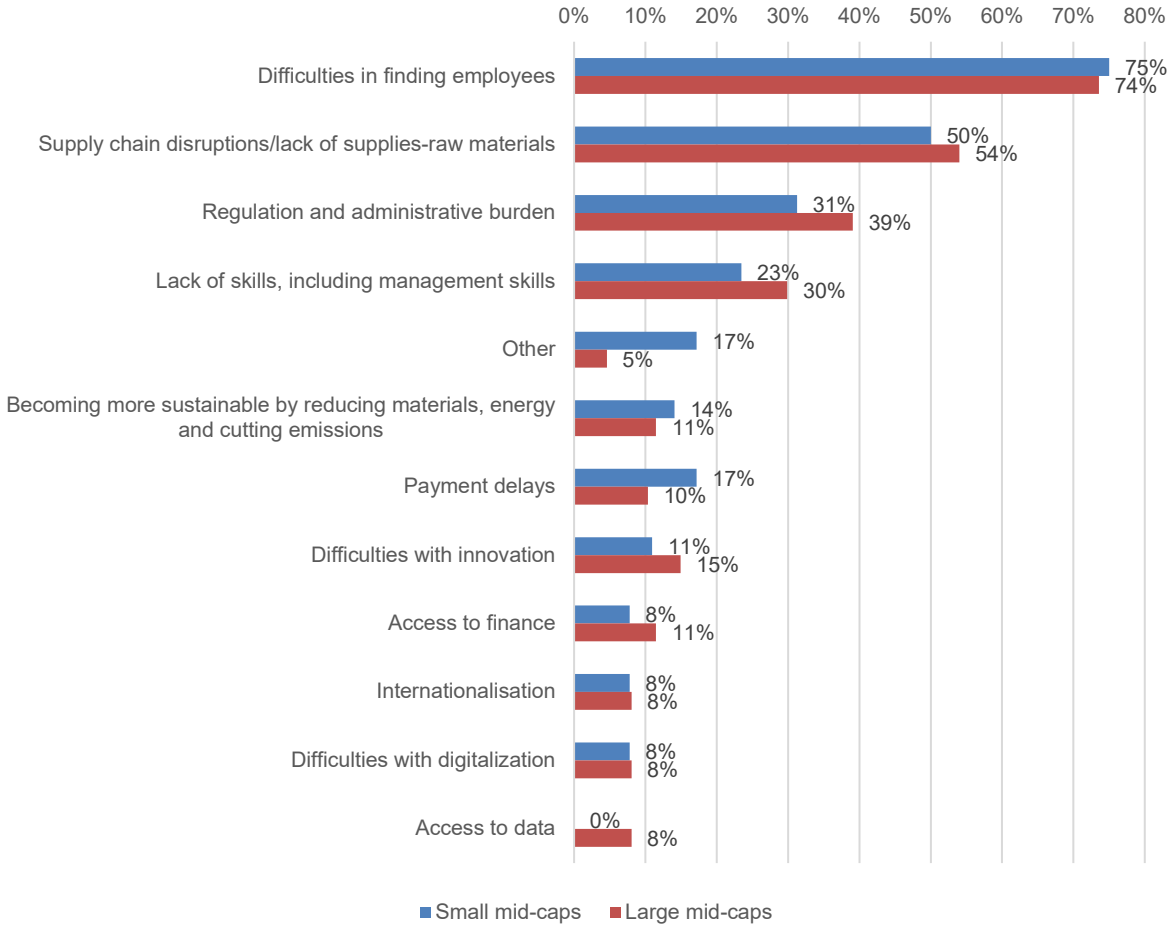


Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: From the following list, please indicate the three key areas which pose the biggest challenge for your enterprise?

Figure 5.2 shows that the top three challenges mentioned above are the same for small and large mid-caps with a greater proportion of small mid-caps affected by difficulties in finding employees while a greater proportion of large mid-caps are affected by supply chain disruptions and by regulation and administrative burdens. With respect to further challenges, relative to large mid-caps, a greater proportion of small mid-caps identify challenges relating to becoming more sustainable, payment delays as well as other areas not mentioned in the interview questionnaire. Relative to small mid-caps, a greater proportion of large mid-caps identify challenges relating to the lack of skills, including management skills, difficulties relating to innovation, access to finance, as well as access to data. Challenges relating to internationalisation and digitalisation appear to affect equally small and large mid-caps.

Figure 5.2: Main challenges for EU mid-caps by size group



Source: Own elaboration based on 151 interviews conducted by Integral Research.

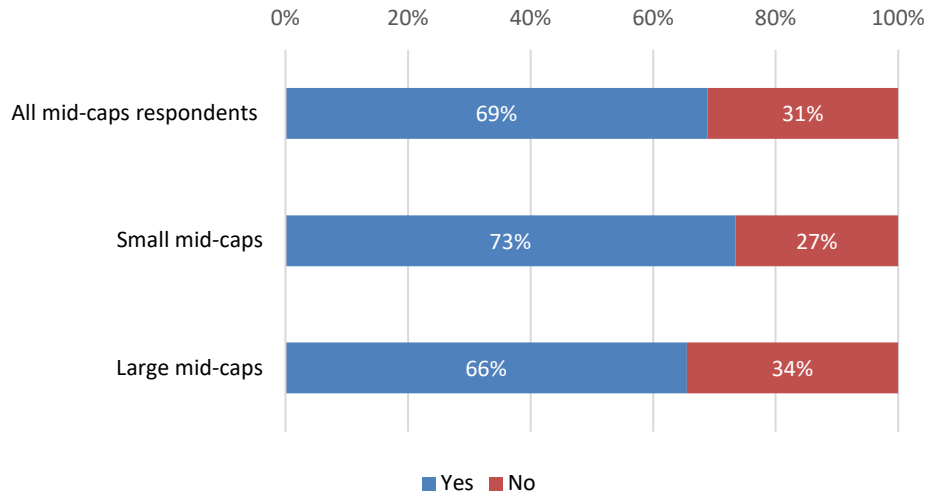
Q: From the following list, please indicate the three key areas which pose the biggest challenge for your enterprise?

COVID-19 and the impact of Russia's invasion of Ukraine

The results suggest that COVID-19 and the measures taken to limit its spread have seriously affected mid-caps. Almost 70% of respondents say that the pandemic triggered or worsened the challenges mid-caps are facing. (Figure 5.3).

Moreover, while the interview questionnaire was designed before the start of Russia's invasion of Ukraine, a number of mid-cap respondents have also identified Russia's invasion of Ukraine as a source of heightened difficulties and challenges (interviews took place in spring 2022). Three respondents referred explicitly to the impact of the war in Ukraine and its implications on energy costs and one identifies political crises together with health pandemics and their impact on international travel as a key challenge to the enterprise. Three further respondents identified the war in Ukraine in combination with the aftermath of the pandemic as worsening difficulties/challenges for mid-caps. The respondents who identified the impact of the war in Ukraine as a key challenge were from Austria, the Czech Republic and Germany. In terms of sectoral affiliations, the respondents were from manufacturing, construction, and professional, scientific, and technical activities.

Figure 5.3: The role of the pandemic in triggering or worsening challenges faced by EU mid-caps



Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Were any of these challenges triggered/worsened by the pandemic?

Difficulties in finding employees

As discussed above, difficulties in finding employees is the top challenge identified by mid-caps (74% of all mid-cap respondents).

As shown in Table 5.1, the top three sectors of the mid-cap respondents who identified difficulties in finding employees are manufacturing (40% of respondents), information and communication (27% of respondents), and professional, scientific, and technical activities (15% of respondents). Services sectors account for 53% of the respondents who identified difficulties to find employees as a major challenge.

Table 5.1: Sectoral distribution of the mid-cap respondents who identify difficulties in finding employees as a major challenge

Sector	Number of mid-caps	% of all mid-caps
Manufacturing	45	40%
Information and communication	30	27%
Professional, scientific, and technical activities	17	15%
Transport	6	5%
Construction	7	6%
Accommodation	5	5%
Real estate	1	1%
Electricity	1	1%
Totals	**112**	**100%**

Source: Own elaboration based on 151 interviews conducted by Integral Research.

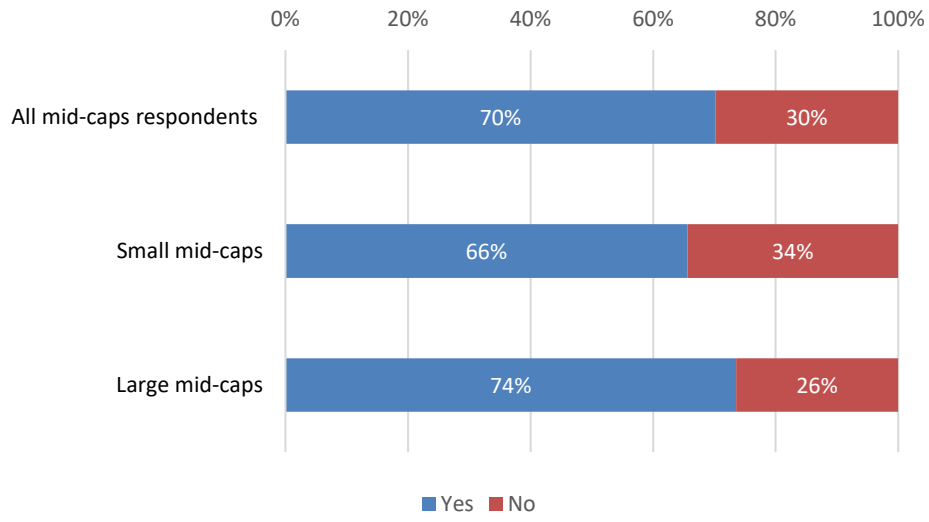
Q: From the following list, please indicate the three key areas which pose the biggest challenge for your enterprise?

27% of all mid-cap respondents who identified difficulties in finding employees as a top challenge, also report the lack of skills including managerial skills as a major challenge. While the overall need for labour may be a cyclical phenomenon due to the ongoing recovery from the COVID-19 crisis, the lack of skills is clearly a structural challenge which hampers long-term firm growth. We discuss next these responses since they are likely to relate to difficulties in finding employees.

Barriers related to employment and skills

The lack of skilled employees is identified as a major obstacle to growth by 70% of all respondents. Looking across the two groups of mid-caps, the lack of skilled employees appears to be a major obstacle to growth for 66% of small mid-caps and 74% of large mid-caps.

Figure 5.4: Lack of skilled employees is a major obstacle for the growth

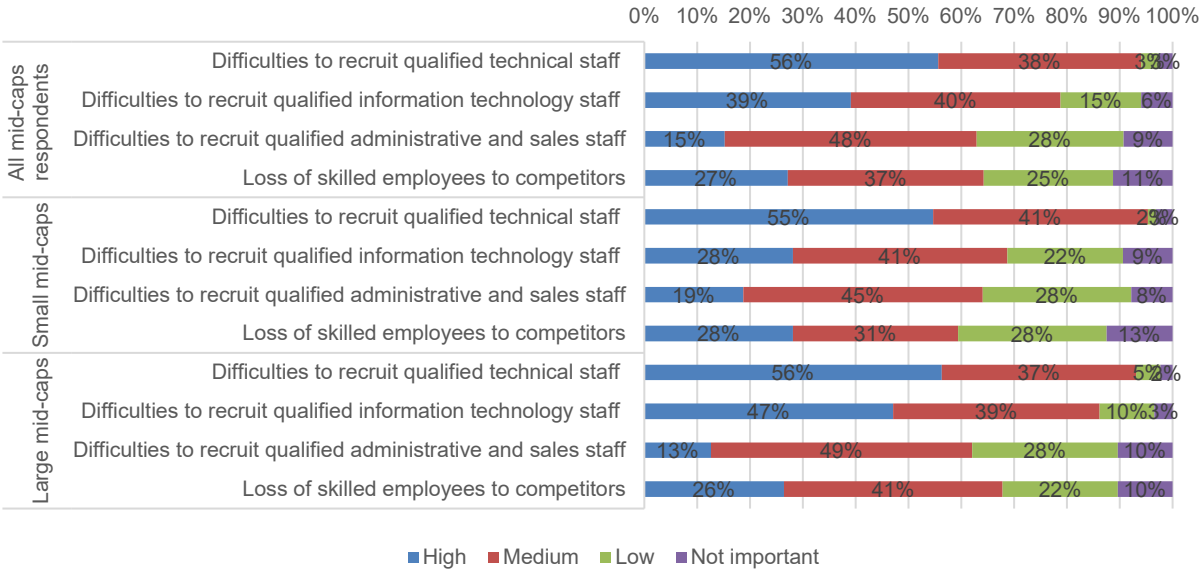


Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Is the lack of skilled employees a major obstacle for the growth of your enterprise?

In terms of specific skills (Figure 5.5), recruitment of qualified technical staff appears to be the most important difficulty (56% of all respondents) followed by recruitment of qualified information and technology (IT) staff (39% of all respondents) and the loss of employees to competitors (27% of all respondents). Recruitment of qualified administrative and sales staff was reported as highly important by 15% of all respondents. The ranking of difficulties related to the aforementioned specific skills is fairly similar across small and large mid-caps. It is worth noting that 47% of respondents from large mid-caps identify difficulties with recruitment of IT staff as being highly important while the corresponding share of respondents from small mid-caps is lower, 28%. This result could reflect the fact that large mid-caps are more likely than small mid-caps to use digital technologies. The evidence provided in this study supports this view (see Figure 5.14).

Figure 5.5: Barriers related to employment and skills



Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: How important are the following barriers related to employment and skills?

Supply chain disruptions

The second most important challenge identified by mid-cap respondents relates to supply chain disruptions (52% of all respondents). Of those who identified supply chain disruption as a challenge, 41% are small mid-caps and 59% are large mid-caps. In terms of the sectoral distribution of respondents, as shown in Table 5.2, 62% of mid-cap respondents are from manufacturing, one third from services and 8% from construction. If we relate this to the total number of mid-caps in each sector, 79% of all mid-caps in manufacturing report this obstacle – so, more manufacturing mid-caps suffer from supply chain disruptions than from difficulties in finding employees. In all other sectors, the share is 33%.

Table 5.2: Sectoral distribution of mid-cap respondents who identified supply chain disruptions as a key challenge area

Sector	Number of mid-caps	% of all mid-caps
Manufacturing	49	62%
Information and communications	11	14%
Professional, scientific, and technical activities	7	9%
Construction	6	8%
Accommodation and food service activities	4	5%
Transport	2	2%
Totals	**79**	**100%**

Source: Own elaboration based on 151 interviews conducted by Integral Research. Base: All respondents who identified supply chain disruptions as key challenge.

Q: From the following list, please indicate the three key areas which pose the biggest challenge for your enterprise: Supply chain disruptions/lack of supplies, raw materials

Of all mid-cap respondents who identified supply chain disruptions as a major challenge, the large majority sell in local, national, and/or international markets while 5% sell their goods and services exclusively in international markets. As shown in Table 5.3, in terms of the export destinations, 92% of respondents report that they sell their goods and/or services in other EU member states. Other European countries are export markets for 84% of respondents, while 71% of respondents sell their goods and/or services in China, India, and other Asian markets. North America is an export market for 68% of respondents who identified supply chain disruptions as a major challenge. 76% of respondents who identified supply chain disruptions as a major challenge sell their goods and services in other markets outside Europe, North America, China, India, and other Asian markets.

Table 5.3: Export markets for goods and services of mid-caps in the EU having identified supply chain disruptions as a major challenge

Export markets	Number of mid-caps	% of all mid-caps
European Union	73	92%
Other European countries	66	84%
North America	54	68%
China, India, and other Asian markets	56	71%
Other markets outside Europe not mentioned above	60	76%

Source: Own elaboration based on 151 interviews conducted by Integral Research. Base: All respondents who identified supply chain disruptions as a major challenge.

Q: From the following list, please indicate the three key areas which pose the biggest challenge for your enterprise: Supply chain disruptions/lack of supplies, raw materials; and

Q: In which geographic markets does your enterprise sell goods and/or services?

Of seven respondents who explained how the pandemic has triggered/has worsened the challenges mid-caps are facing, five identified supply chain disruptions as the main channel (respondents were from Germany, France, and the Czech Republic). All respondents were from the manufacturing sector.

Regulatory and administrative burdens

Regulations and administrative burdens are identified as being the third most important challenge that mid-caps in the EU face (36% of all mid-cap respondents). The distribution of the respondents by the level at which regulations and administrative burdens are identified as a major challenge, is shown in the Table 5.4 below:

Table 5.4: Distribution of mid-cap respondents by the level of regulations and administrative burdens

Level of regulations and administrative burdens	Number of mid-cap respondents	% of all mid-cap respondents
National level only	7	13%
EU level only	9	17%
International level only	12	22%
National and EU level	12	22%
National and international level	3	6%
EU and international level	4	7%
National, EU and international level	7	13%
TOTAL	**54**	**100%**

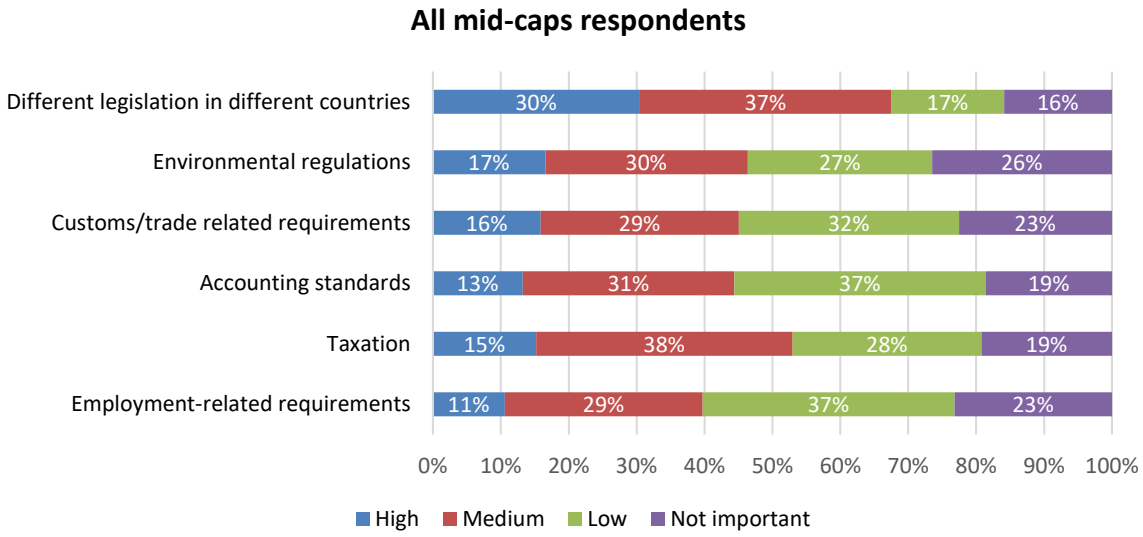
Source: Own elaboration based on 151 interviews conducted by Integral Research. Base: All respondents who identified regulations and administrative burdens as a major challenge.

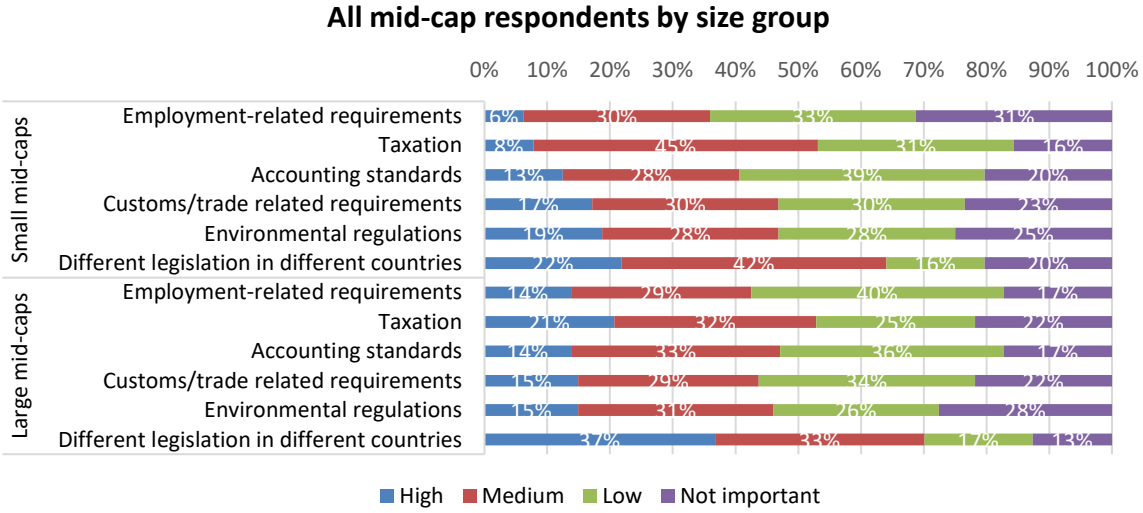
Q: From the following list, please indicate the three key areas which pose the biggest challenge for your enterprise: Regulations and administrative burdens

In terms of the level at which those regulatory burdens apply: 22% are at international level, 17% at EU level and 13% are at national level.

Mid-caps are facing a range of legal requirements which appear to hamper their growth plans (Figure 5.6). The most frequently reported as being highly important is the different legislation in different countries (30% of all respondents; 22% of small mid-caps; 37% of large mid-caps). Of those who identified different legislation in different countries as being highly important, 24% of respondents associate legal requirements with national legislation; 28% of respondents with legislation at the EU level; 30% of respondents with international legislation.

Figure 5.6: Mid-caps' regulatory burdens





Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Some legal requirements (such as reporting) depend on the size of the enterprise. Have you encountered such requirements, and did they hamper your enterprise in its activities or pursue its plans to grow?

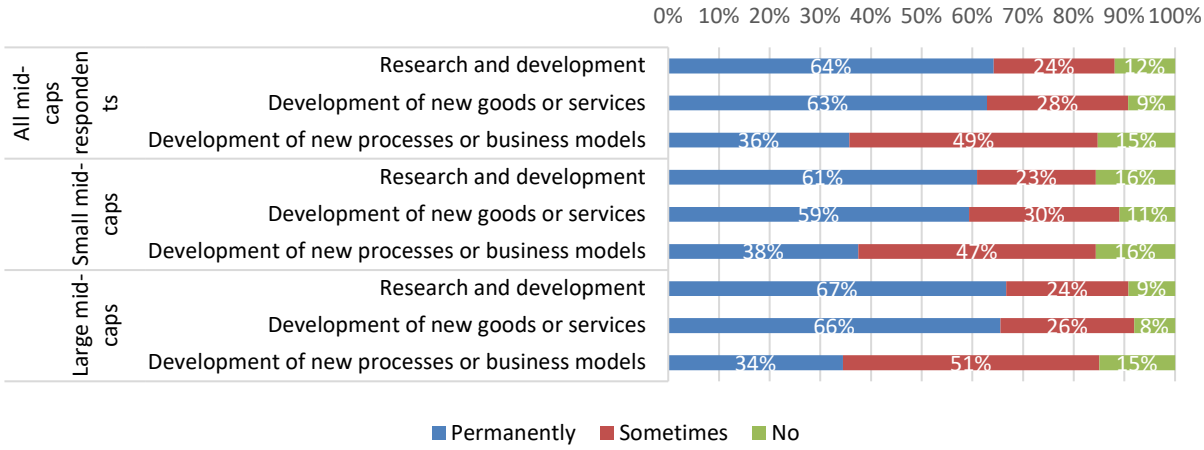
The next regulatory and administrative burdens identified as being challenging for mid-caps are environmental regulations (17% of all respondents; 19% of small mid-caps; 15% of large mid-caps) and customs/trade related legal requirements (16% of all respondents; 17% of small mid-caps; 15% of large mid-caps). Readers should note that the notion of environmental regulation as a 'burden' is strictly from the perspective of the firm faced with the private costs of regulation and is no judgement on the societal need for sustainable transition.

Among the mid-cap respondents who identify environmental regulations as being highly important as a challenge, 40% associate legal requirements with national legislation, 44% with EU legislation and 64% with international legislation. Within the group of mid-cap respondents who identify customs/trade related legal requirements as being highly challenging, 48% associate legal requirements with national legislation, 38% with EU legislation and 71% with international legislation.

R&D and innovation activities

64% of all respondents have been engaged permanently in R&D, 63% in the development of new goods and services and 36% in the development of new processes or business models. The proportion of respondents from large mid-caps engaged in R&D is higher (67%) in comparison to small mid-caps (61%).

Figure 5.7: Activities in research, development, and innovation



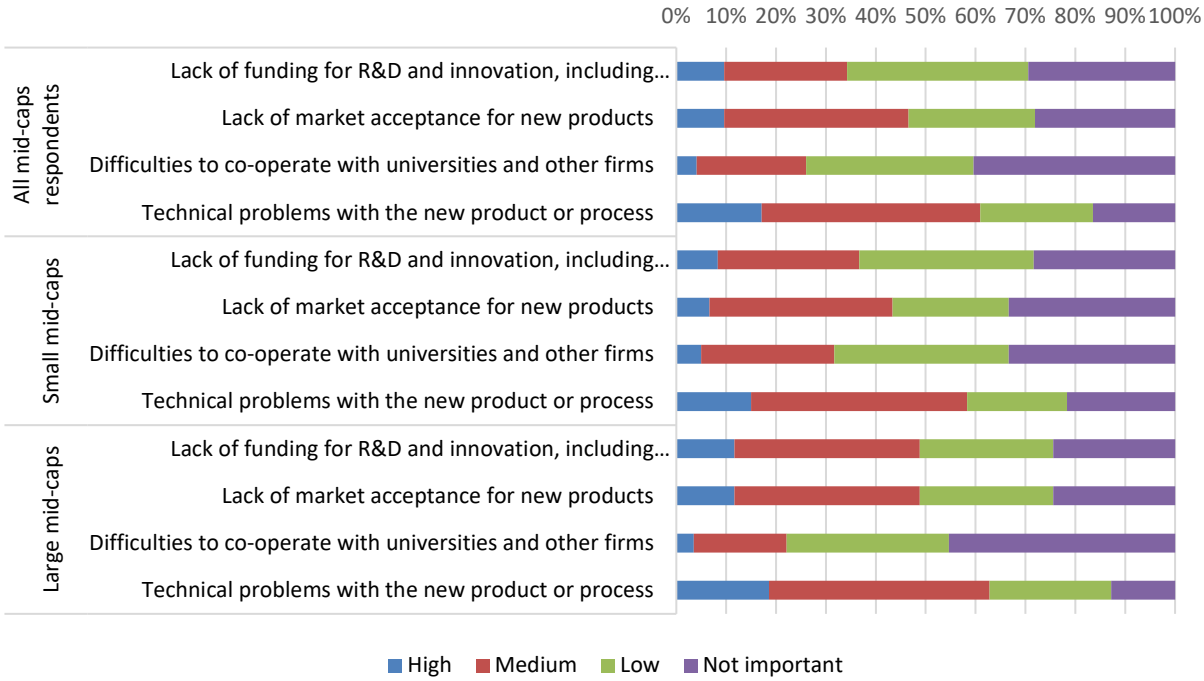
Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Has your company been active in research or the development of new products or processes recently?

In terms of obstacles to R&D and innovation activities (Figure 5.8), technical problems with the new product or process have been identified as being highly important (17%) or medium important (44%) by 61% of all respondents active in R&D and innovation.

The next highly important obstacles to R&D and innovation are the lack of funding for R&D and innovation, including government funding (10%) and the lack of market acceptance for new products (10%). Technical problems with a new product or process have been identified as being of high or medium importance by a larger proportion of respondents from large mid-caps (63%) compared to respondents from small mid-caps (58%). The lack of funding for R&D and innovation appears to be of high or medium importance for a smaller proportion of respondents from small mid-caps (36%) compared to respondents from large mid-caps (49%). This result might reflect the fact that small mid-caps might carry out R&D and innovation projects of a smaller scale in comparison to large mid-caps.

Figure 5.8: Obstacles for R&D and innovation activities



Source: Own elaboration based on 151 interviews conducted by Integral Research.

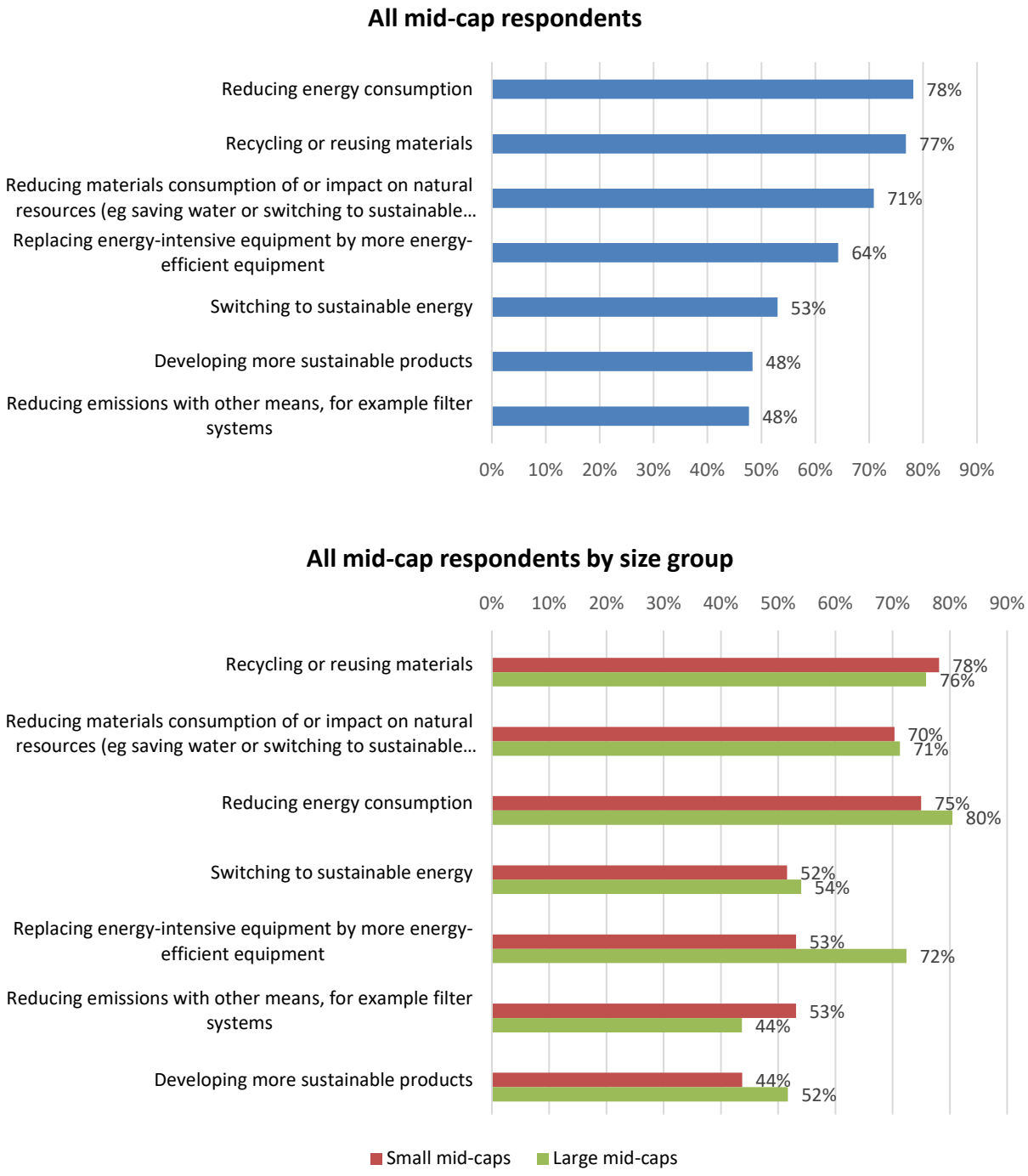
Q: If you are active in R&D and innovation, how important were the following barriers for these activities?

Environmental sustainability

Among the environmental sustainability actions (Figure 5.9), those most frequently undertaken by mid-caps appear to be reducing energy consumption (78% of all respondents; 75% of small mid-caps; 80% of large mid-caps), followed by recycling or reusing materials (77% of all respondents; 78% of small mid-caps; 76% of large mid-caps).

In terms of obstacles preventing mid-caps to become more sustainable (Figure 5.17), the lack of consumer demand is the most frequently reported (32% of all respondents; 20% of small mid-caps; 23% of large mid-caps), followed by the lack of profitability (28% of all respondents; 25% of small mid-caps; 11% of large mid-caps).

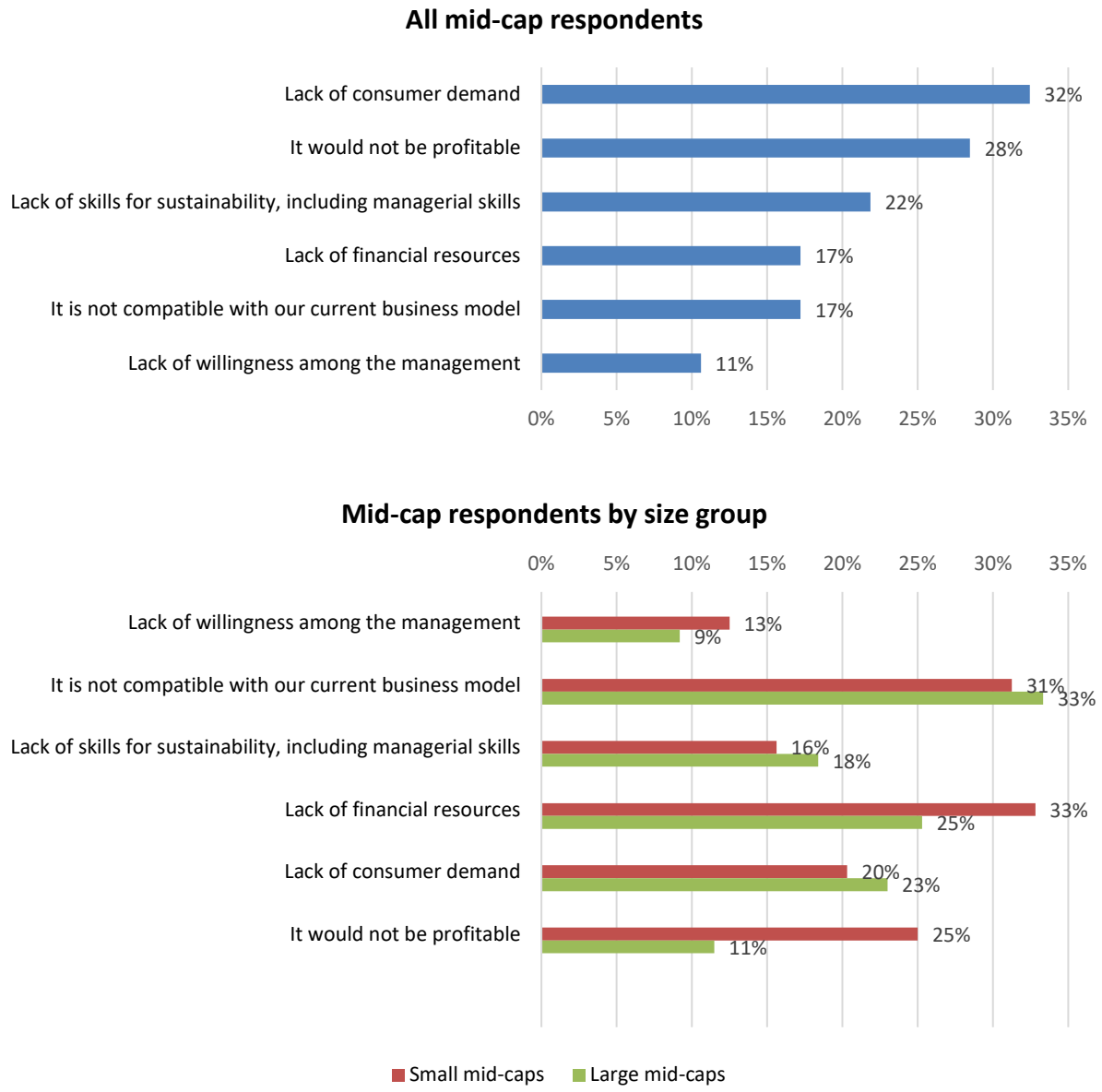
Figure 5.9: Environmental sustainability actions



Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: In terms of environmental sustainability, which of the following actions, if any, is your enterprise actively taking?

Figure 5.10: Obstacles to environmental sustainability actions



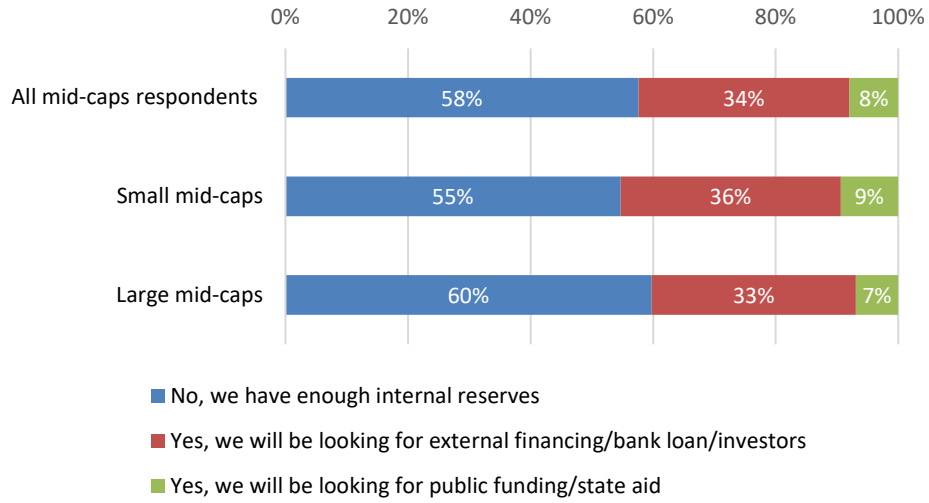
Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Which of the following, if any, are currently preventing your enterprise from becoming more sustainable?

Access to external finance

More than half of the respondents report that internal resources are enough to fund planned growth (58% of all respondents). 34% of respondents are looking for external financing from banks and/or investors and only 8% are looking for public funding and/or state aid to finance their growth plans. The proportion of the respondents who say they have enough internal finance for their growth plans is greater for large mid-caps (60%) relative to small mid-caps (55%).

Figure 5.11: Mid-caps counting on additional external financing for their growth plans

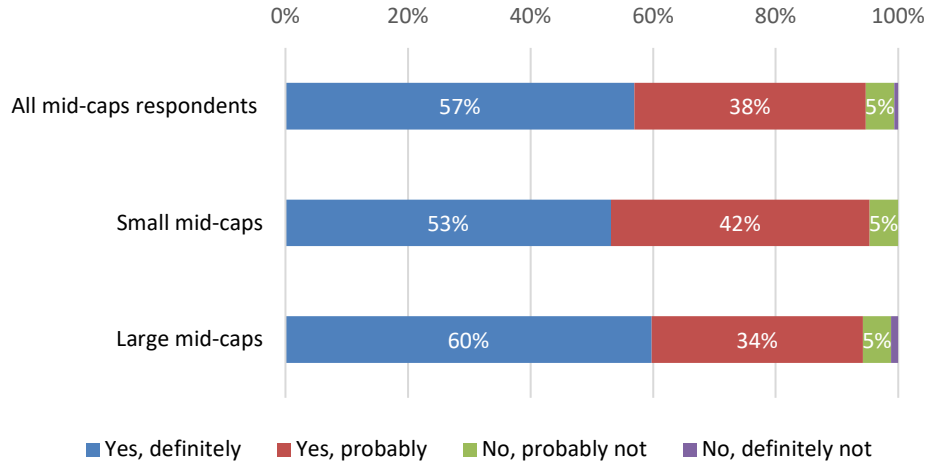


Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: If you intend to grow, will you be counting on additional external financing for this?

Close to two thirds of all respondents (57%) are certain to obtain external funding if needed with a larger proportion of respondents from large mid-caps (60%) compared to respondents from small mid-caps (53%).

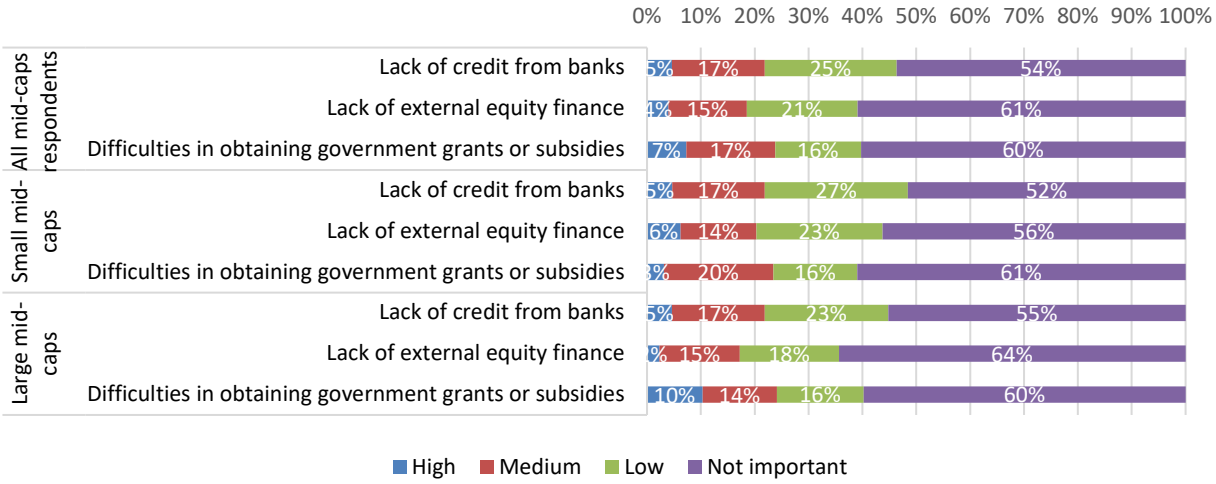
Figure 5.12: Mid-caps' ability to obtain external financing



Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Would your enterprise be able to obtain external financing in case of need?

Figure 5.13: Obstacles for accessing external funding



Source: Own elaboration based on 151 interviews conducted by Integral Research.

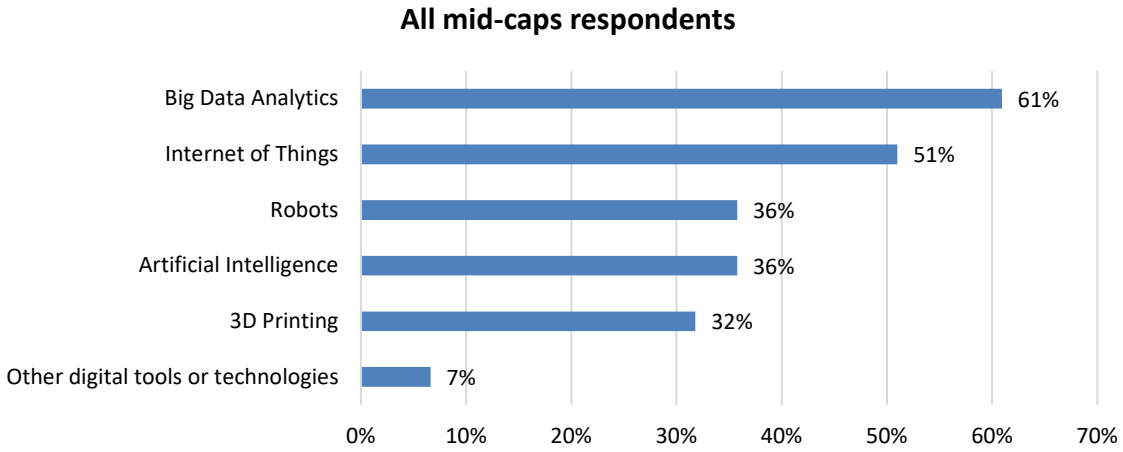
Q: If you were looking for external funding in the past, how important were the following barriers?

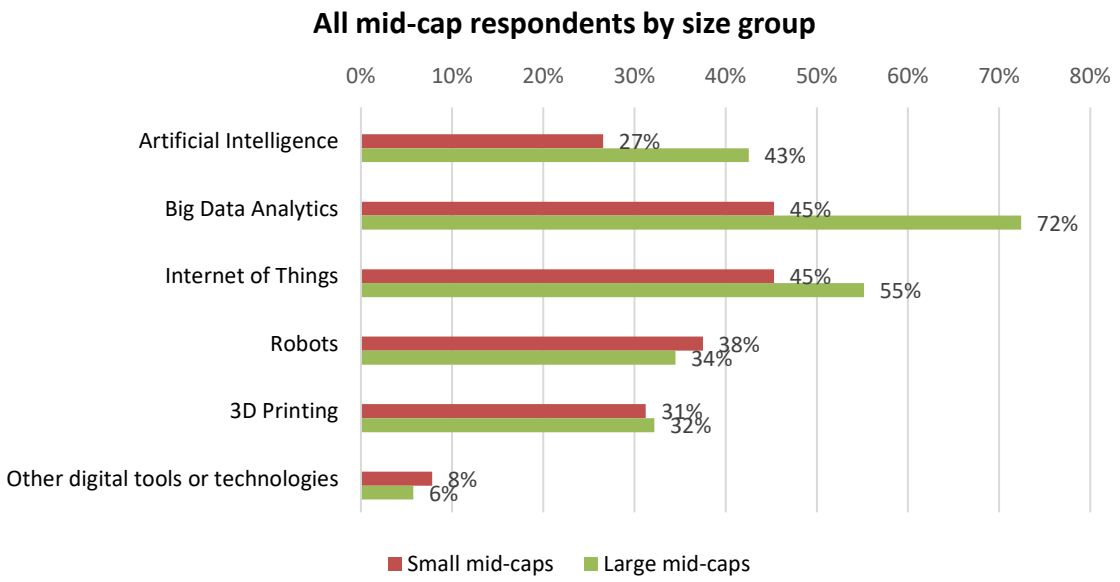
For just over half of all respondents (54%), obtaining credit from banks does not appear to be a major obstacle for accessing external funding. Only 5% of respondents identify obtaining credit from banks as being highly important when looking for this type of external financing in the past. External equity financing was not important as a barrier to external funding for 61% of all respondents and highly important for 4% of all respondents. Government grants and state aid was not important as a financing constraint for 60% of all respondents and highly important for only 7% of all respondents. Obtaining external equity financing was a highly important barrier for access to finance for a greater proportion of small mid-caps (6%) relative to large mid-caps (2%) while difficulties in obtaining government grants or subsidies was highly important as an obstacle for access to external finance for a greater proportion of large mid-caps (10%) compared to small mid-caps (3%).

Digital technologies

Among advanced digital technologies (Figure 5.14), the most frequent usage appears to be Big Data Analytics (61% of all respondents) followed by Internet of Things (51% of all respondents) and Robots (36% of all respondents).

Figure 5.14: Use of digital technologies



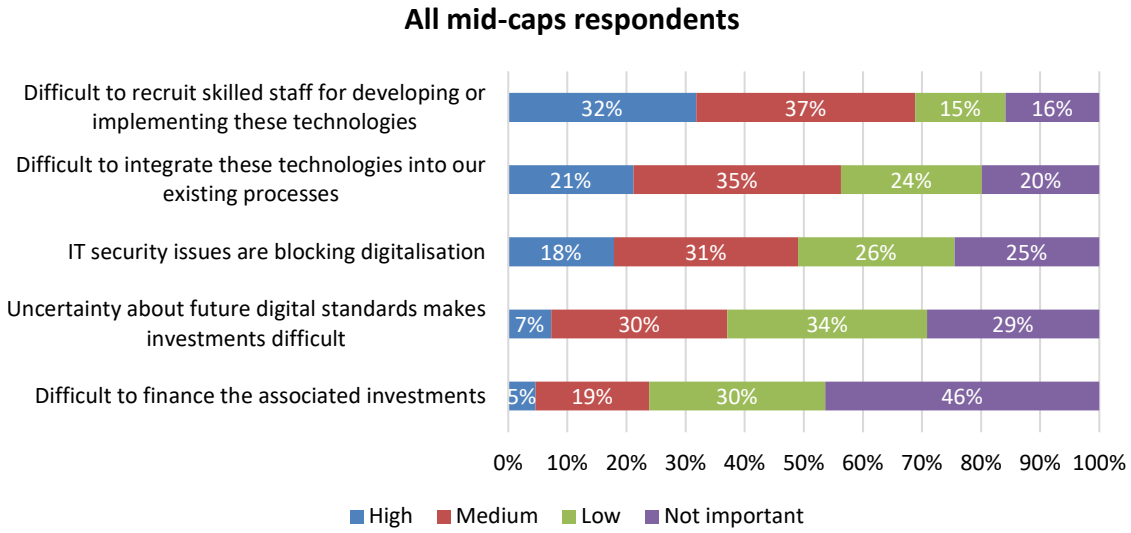


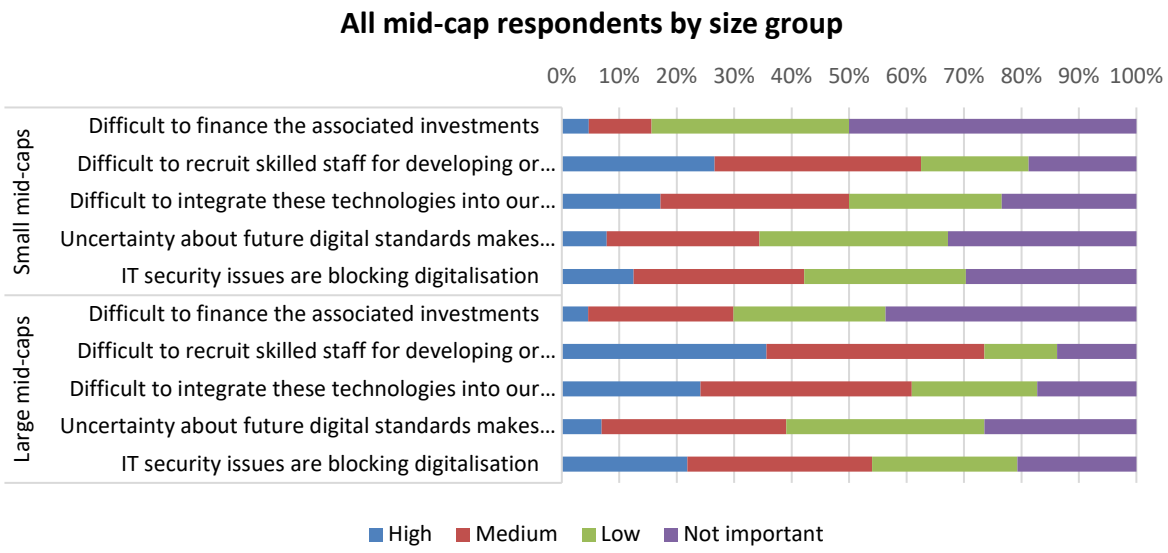
Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Does your enterprise use any of the following digital technologies?

Among obstacles to the adoption and use of digital technologies (Figure 5.15), the most important appears to be the difficulty to recruit skilled staff for developing or implementing these technologies (32% of all respondents; 27% of small mid-caps; 36% of large mid-caps), followed by the difficulty to integrate these technologies into existing processes (21% of all respondents; 17% of small mid-caps; 24% of large mid-caps) and IT security issues (18% of all respondents; 13% of small mid-caps; 22% of large mid-caps).

Figure 5.15: Obstacles in the adoption and use of digital technologies





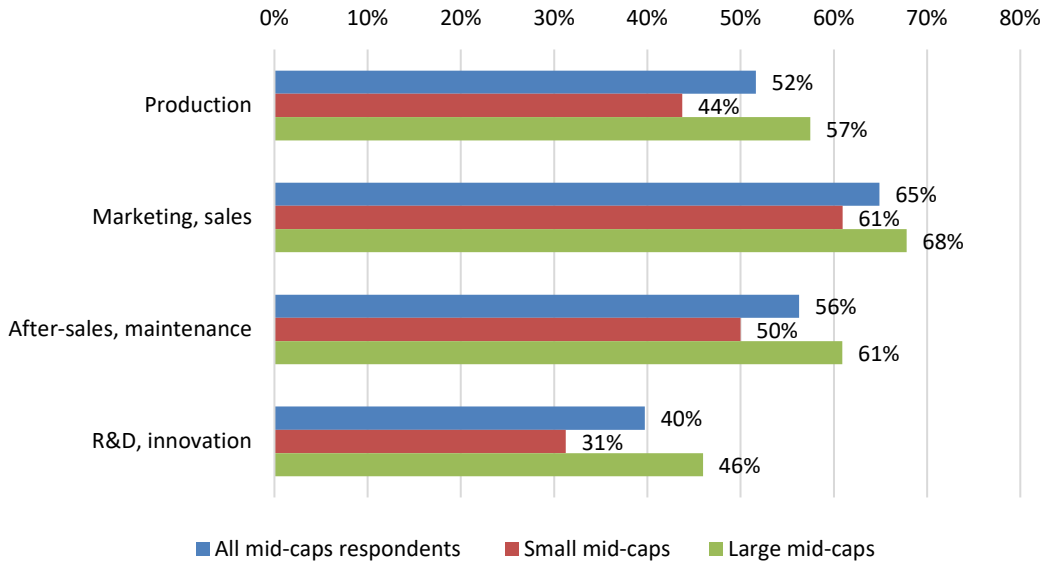
Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Has your enterprise experienced any of the obstacles listed below in the adoption and use of these digital technologies?

Foreign direct investment

Marketing and sales (65% of all respondents; 61% of small mid-caps; 68% of large mid-caps) and after sales maintenance (56% of all respondents; 50% of small mid-caps; 61% of large mid-caps) appear to be the most frequent activities of mid-caps carried out by their affiliates abroad. R&D and innovation activities are the least frequent activities carried out by mid-caps affiliates abroad (40% of all respondents; 31% of small mid-caps; 46% of large mid-caps).

Figure 5.16: Mid-caps' activities outside the home country

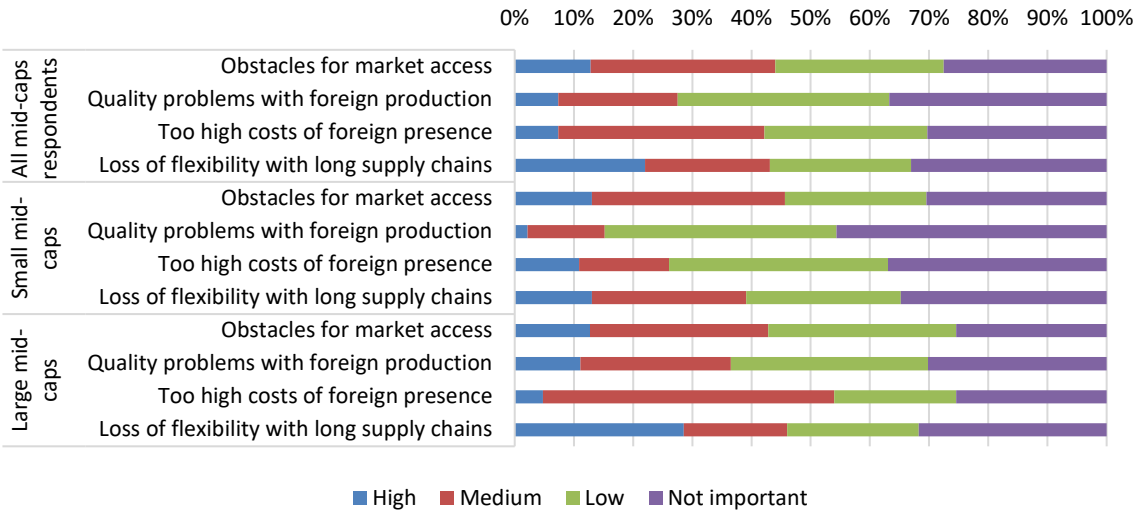


Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Does your company have own affiliates outside your home country carrying out one of the following activities?

In terms of obstacles to FDI inside the EU (Figure 5.17), among mid-caps with affiliates abroad, the most important appear to be the loss of flexibility with long supply chains (22% of all respondents; 13% of small mid-caps; 29% of large mid-caps) and market access (13% of all respondents; 13% of small mid-caps; 13% of large mid-caps). The most frequent obstacles to mid-caps FDI outside the EU (Figure 5.18) are market access (21% of all respondents; 24% of small mid-caps; 19% of large mid-caps) and loss of flexibility with long supply chains (13% of all respondents; 12% of small mid-caps; 21% of large mid-caps).

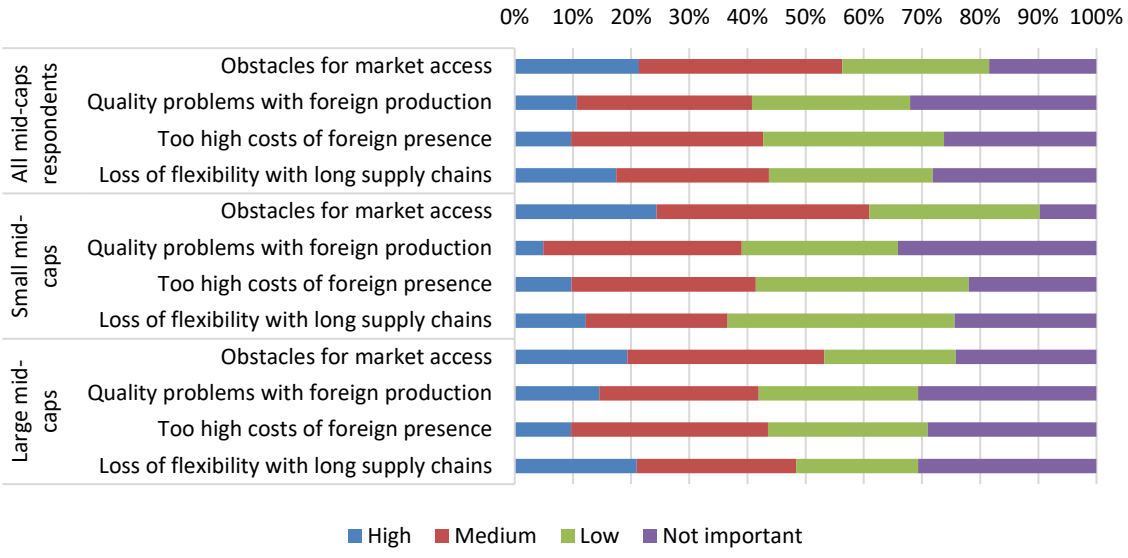
Figure 5.17: Barriers to mid-caps' FDI inside the EU



Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: If you are active abroad with own affiliates inside EU, how important were the following barriers for these activities? Base: All enterprises with affiliates inside the EU.

Figure 5.18: Barriers to mid-caps' FDI outside the EU



Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: If you are active abroad with own affiliates outside the EU, how important were the following barriers for these activities? Base: All enterprises with affiliates outside the EU.

5.3 Challenges for mid-caps: insights from the panel discussions

The project team organized three panel discussions on challenges for mid-cap firms, on June 2nd, June 9th, 2022, and July 7th, 2022. The aim of these panels was to validate the findings on challenges collected in interviews and gain additional insights into the challenges mid-cap firms are facing from people who deal with these on a day-by-day basis.

We invited representatives of mid-cap firms, of industrial associations, policy, funding agencies dealing with mid-cap firms, as well as experts from academia that have contributed to the topic. Representatives of mid-cap firms were identified from the pool of interviewees described in Section 5.2; the selection of experts from academia was based on the literature review in Section 5.1, while industry representatives were identified with the help of the European Commission. In total, 30 persons took part in the three panels. This is hardly enough to get statistically representative results, but sufficient to receive confirmation on the validity of the interview results and add 'flavour' to the interview results in the form of examples.

A first main finding from the panels is that the participants confirmed that the challenges identified in this chapter are indeed the main challenges mid-cap firms are facing. Unanimously, a lack of skilled personnel was identified as the main challenge by the participants in all three panels. Other challenges discussed in the panels were regulation and administrative burden, innovation, and sustainability. With respect to the skills shortage, the participants pointed out that mid-caps are not able to offer career path models with a jump every 3-5 years, which are possible in large companies. Moreover, mid-cap firms may suffer from a lack of visibility and a lack of communication which makes them less attractive to potential employees than large companies.

The participants also identified challenges not covered by the interviews: first, rising energy prices and inflation are matters of concern for the panel participants. These concerns were raised in all three panels. Participants see many mid-cap firms currently trapped between powerful suppliers and powerful customers with little room to adjust their prices or compensate rising prices for energy and other inputs in another way. The data presented in Chapter 4 shows that many mid-caps are operating in energy-intensive sectors. Participants of one panel considered the development of a strong brand which helps to gain a strong market position and allows to increase prices as the only solution to escape rising input prices. Mid-caps which produce 'faceless' products with no brand will find it more difficult to raise prices.

Second, participants in two of the three panels see challenges from structural deficits in mid-cap firms: mid-caps are 'caught in the middle', as one participant pointed out, and combine the disadvantages of both large and small firms: On the one hand, mid-caps do not have the flexibility of start-ups anymore and may be too big to develop certain disruptive ideas besides the 'day-to-day' activities. On the other hand, the management of a mid-cap must deal with everything - qualifications of staff, digitalisation, innovation, regulation, so people are overburdened, and cannot specialize because the firm is too small, and a few people have to solve everything. A large company, in contrast, can hire specialists for all these issues; such a degree of specialization is often not possible in mid-cap firms. Thus, an economic interpretation of 'caught in the middle' are indivisibilities and minimum efficient scales.

Another advantage of large firms is that they can employ specialized staff for R&D and innovation in dedicated departments, while innovation in mid-cap firms is often one of several activities of an employee or manager. This challenge also relates to innovation funding, where the panellists saw a clear disadvantage of mid-cap firms compared to large companies which have experts who know how to apply for funding and have the resources to organize consortia for project applications in Horizon Europe.

Fourth, the panellists also gave some more nuanced impressions on the challenge of regulation burden which seems to be a structural challenge. It seems that the level of regulation as such is only one part of the problem; changes in regulation which require reactions by mid-caps add to the challenge. Moreover, regulation does not stop at the borders of the EU. Another aspect are differences in regulation between the Single Market and non-European countries which make it more difficult to operate in foreign markets. Regulatory burdens grow when mid-cap firms expand internationally. The participants in the third panel even considered red tape and regulatory burdens as the main challenge for mid-cap firms. They mentioned the administrative burden of applying for

innovation funding in Horizon Europe and national funding. One participant even stated that this is the reason why he does not apply for funding and have all innovation self-financed.

It was also pointed out in two panels that many of the challenges mid-cap firms are facing are regional or local which is a result of the strong embeddedness and linkages to the local communities many of these firms have. Mid-caps, for example, are often the main employers in rural areas where large companies do not exist. This means that policies towards mid-caps should also mainly take place at the regional or local level. Moreover, this points to the importance of regional development instruments such as the European Regional Development Fund (ERDF) for the promotion and support mid-cap companies.

Finally, participants in two panels found that succession and cultural change is missing from the list of challenges; this is an area where many family-owned mid-cap firms fail. Succession is also closely related to disruptive innovation in mid-cap firms because the transfer of ownership to a new owner provides opportunities to do things differently. Past success can be an obstacle for radical change in many mid-cap firms, in particular when they are family-owned.

The panellists see a lot of positive developments at the policy level towards mid-caps. The recent Risk Finance Guidelines are seen as a game changer, as well as the EU recommendation on business transfer which paved the way for changes in legislation at member states level favourable for family-owned mid-caps. A policy area which was mentioned in all three panels is regulation and administrative simplification: a more predictive regulatory framework that gives mid-caps more time for implementation, and more proportionality between the administrative effort and the potential effects would be appreciated. One participant suggested a mid-caps filter, similar to the SME filter already implemented at EU level. According to this participant, a pre-condition for such a mid-caps filter would be the recognition of mid-caps as a separate category of enterprises, just like SMEs. This would also pave the way for special funding instruments for mid-caps.

Finally, participants in two panels observed that mid-caps in China, the US or Canada are better supported financially by their governments than EU competitors. Thus, additional efforts of the EU to 'level the playing field' would be appreciated.

5.4 Summary of mid-cap challenges and policy measures at national and EU level to address them

The main takeaways from the semi-structured interviews and panel discussions are as follows:

The top three challenges reported by mid-caps in the EU are: (i) difficulties in finding employees (74% of all respondents); (ii) supply chain disruptions and/or the lack of supplies, raw materials (52% of all respondents); (iii) regulation and administrative burdens (36% of all respondents). The top three challenges mentioned above are the same for small and large mid-caps. A greater proportion of small mid-caps report being affected by difficulties in finding employees while a greater proportion of large mid-caps say they are affected by supply chain disruptions and by regulation and administrative burdens.

Difficulties in finding employees is the top challenge identified by mid-caps (nearly three quarters of all mid-cap respondents). The top three sectors of the mid-cap respondents who identified difficulties in finding employees are manufacturing, information and communication, and professional, scientific, and technical activities.

The lack of skilled employees is identified as a major obstacle to growth by 70% of all respondents. It appears to be a major obstacle to growth for a greater proportion of larger mid-caps than for small mid-caps. In terms of specific skills, recruitment of qualified technical staff appears to be the most important difficulty followed by recruitment of qualified information and technology (IT) staff and the loss of employees to competitors. The ranking of difficulties related to the above-mentioned specific skills is fairly similar across small and large mid-caps. It is worth noting that a greater proportion of respondents from large mid-caps identify difficulties with the recruitment of IT staff as being highly important compared to respondents from small mid-caps. This result could reflect the fact that large mid-caps are more likely than small mid-cap to use digital technologies.

Supply chain disruptions and/or lack of supplies and raw materials. The second most important challenge identified by mid-cap respondents relates to supply chain disruptions (52% of all respondents). A greater proportion of large mid-caps reported supply chain disruptions as being a major challenge compared with small mid-caps. This reflects the fact that larger mid-caps are likely to be more exposed to supply chain disruptions given their involvement in long international supply chains. Such difficulties have been identified mostly in the manufacturing sector with the services sector and other sectors less affected.

Legal and regulatory burdens and obligations have been identified as the third most important challenge for mid-caps in the EU. Among the legal requirements which appear to hamper their growth plans, the most frequently reported as being highly important is legislation differences across countries. One third of respondents associate this difficulty with regulation and administrative burdens at the international level, while nearly a quarter of mid-cap respondents associate this challenge with regulation and administrative burdens at national level. 28% of mid-cap respondents associate difficulties arising from different legislation with regulation and administrative burdens at the EU level. The next most frequent challenges for mid-caps are related to environmental regulation and customs/trade-related legal requirements.

Obstacles to R&D and innovation. Among all respondents active in R&D and innovation, technical problems with the new product or process have been identified as being highly important. The next highly important obstacles to R&D and innovation are the lack of funding for R&D and innovation, including government funding and the lack of market acceptance for new products. Technical problems with a new product or process have been identified as being of high importance by a larger proportion of respondents from large mid-caps compared to respondents from small mid-caps. The lack of funding for R&D and innovation appears to be of high importance for a smaller proportion of respondents from small mid-caps compared to respondents from large mid-caps. These results can be explained by the higher propensity of larger mid-cap to invest in R&D and innovation.

Obstacles to sustainability. In terms of obstacles preventing mid-caps to become more sustainable, the lack of consumer demand is the most frequently reported, followed by the lack of profitability.

Access to finance. More than half of the respondents report that internal resources are enough to fund their growth plans. More than one third of all respondents are looking for external financing from banks and/or investors and only 8% are looking for public funding and/or state aid to finance their growth plans. The proportion of the respondents who say they have enough internal finance for their growth plans is greater for large mid-caps relative to small mid-caps.

Obstacles to digitalisation. Among obstacles to the adoption and use of digital technologies, the most important appear to be the difficulty to recruit skilled staff for developing or implementing these technologies followed by the difficulty to integrate these technologies into existing processes and IT security issues.

Obstacles to FDI. In terms of obstacles to FDI inside the EU, among mid-caps with affiliates abroad, the most important appear to be the loss of flexibility with long supply chains and market access. Most frequent obstacles to mid-caps FDI outside the EU are market access and loss of flexibility with long supply chains.

There are also some differences between large and small mid-caps. Relative to large mid-caps, **a greater proportion of small mid-caps identify challenges relating to becoming more sustainable**, **payment delays as well as other areas** not mentioned in the interview questionnaire. Relative to small mid-caps, **a greater proportion of large mid-caps identify challenges relating to the lack of skills, including management skills, difficulties relating to innovation, access to finance, as well as access to data**. Challenges relating to internationalisation and digitalisation appear to affect equally small and large mid-caps.

The COVID-19 pandemic has triggered or worsened the challenges a large proportion of mid-caps are facing. While the interview questionnaire was designed before the start of Russia's invasion of Ukraine, a number of mid-cap respondents have identified **the impact of Russia's invasion of Ukraine as a source of heightened difficulties and challenges**. Some of these difficulties are associated with higher energy costs and disrupted international travel. The respondents who identified the impact of the war in Ukraine as a key challenge were from Austria, the Czech Republic

and Germany. In terms of sectoral affiliations, the respondents were from manufacturing, construction, and professional, scientific, and technical activities.

What can policy do to help mid-cap firms overcome these challenges?

Many of these challenges are relevant for all types of firms, not just mid-caps. Thus, in most cases there are no policies that only benefit mid-cap firms and leave other types of firms out. An example is the challenge to find skilled personnel: if policy fosters education and training, this will benefit SMEs, mid-caps, and large companies alike. An exception is the access to finance, where the Risk Finance Guidelines consider small and innovative mid-caps as eligible as SMEs, therefore allowing targeted measures for this category of undertakings (defined as specific categories).

Legal framework for State aid

Article 107 of the Treaty on the Functioning of the European Union (TFEU) in principle prohibits the granting of State aid, unless it is exceptionally approved by the Commission as being compatible with the internal market. Article 107 TFEU also lays down in more detail the provisions on the basis of which such aid can be declared compatible by the Commission following a notification by the Member State of a planned State aid measure. As such, the Treaty lays down a general obligation by Member States to notify any planned State aid measures to the European Commission before implementing them ('standstill obligation'). State aid can thus be available for companies of all sizes, at the discretion of the Member States.

Block Exemption Regulations, such as the General Block Exemption Regulation (GBER, Commission Regulation 651/2014), constitute an important exception from this standstill obligation. These regulations lay down *ex ante* compatibility conditions for cases for which competition distortions are limited, on the basis of which Member States can directly, and without a prior notification of the planned measure to the Commission, implement State aid measures. The GBER covers a wide range of State aid measures, including aid for the economic development of regions where the standard of living is abnormally low, aid to SMEs, aid for access to finance for SMEs, aid for research, development and innovation, for training, and for different investments related to energy efficiency and environmental goals.

The vast majority of EU State aid measures (more than 95% of new measures) are today block exempted under the GBER and can be implemented by Member States directly and on the basis of clear criteria. This increases legal certainty and decreases the administrative burden. The Commission has revised the GBER several times in recent years. In particular, an amendment was adopted in 2021 to align the GBER with the new Multiannual Financial Framework and to facilitate the implementation of the Recovery and Resilience Facility. This amendment, for example, extended the scope of the GBER to block exempt State aid via the InvestEU fund. InvestEU supports SMEs, small mid-caps, and larger companies in the following policy areas: broadband; energy generation and infrastructure; social, educational, cultural, and natural heritage infrastructure and activities; transport and transport infrastructure; other infrastructures than transport; environmental protection, including climate protection; research, development, innovation and digitalization. Further new provisions introduced in this amendment cover aid for research, development and innovation projects, European Territorial Cooperation projects, energy efficiency measures, clean mobility, and broadband investments.

In addition, the Commission is currently amending the GBER to align it with State aid Guidelines that were recently revised in light of the Green Deal and the digital transition. This covers the areas of regional aid; climate, environmental and energy aid; research, development and innovation; risk finance aid and aid for broadband. This amendment of the GBER is planned for adoption at the end of 2022.

Difficulties in finding employees

The most pressing challenge for mid-cap firms is to find employees, in particular difficulties to recruit qualified technical staff and information technology staff. Thus, the challenge of finding employees is also an obstacle for other activities, for example innovation or digitalisation. One third of all mid-caps consider difficulties to recruit skilled staff for implementing digitalisation as a highly relevant obstacle for their digitalisation activities.

Labour markets are mostly national or regional, so the EU Member States or regions are in charge of education policies, and the European Commission has a co-ordinating and supporting role. At the level of EU Member States, a large number of measures exist towards training and skills, which are monitored and compared on annual basis by various reports including the Education and Training Monitor 2021 (European Commission 2021b). Member States have agreed on that at least 47% of adults aged 25-64 should participate in learning by 2025 and at least 60% of adults should participate in learning by 2030. COVID-19, however, has interrupted already-slow progress in adult learning across the EU, according to the Education and Training Monitor 2021.

An example of EU policies is the 2030 Policy Programme "Path to the Digital Decade" where the EU proposes, among other measures, at least 20 million employed information and communications technology (ICT) specialists in the European Union by 2030 (European Commission 2021d). This means additional efforts by the member states in an area where mid-caps suffer particularly from labour shortage. This goal is part of a larger set of targets that will be laid out in the digital decade strategic roadmaps in which the Member States outline policies.

In order to ease skills shortages, the EU may focus on lifelong learning and re-training of adults to complement national policies. The Education and Training Monitor 2021 published by the European Commission has identified adult learning as a potential gap in national policies. In addition, the EC could focus on facilitating immigration within the EU. However, firms in all Member States suffer from personnel shortage, so more intra-EU migration may only have a limited benefit and may even have adverse effects for disadvantaged regions in the EU. The EU also supports student and staff mobility and cooperation in the education and training via ERASMUS+. In addition, the GBER block exempts training aid, so Member States have the freedom to introduce new measures to support training activities directly without the need of a prior notification to the Commission if the conditions set out in the GBER are fulfilled.

A major push for more digital skills can also be expected from the Recovery and Resilience Facility (RRF), an instrument worth 723.8 billion EUR initiated by the European Commission (2021a) to help the Member States to emerge stronger and more resilient from the COVID-19 crisis. In the countries where the RRF plans have been approved so far more than 26% of the national RRF budgets have been allocated to digital transition[14] which also includes the development of digital skills. The Education and Training Monitor 2021 published by the European Commission estimates that education and skill-related reforms and investments are expected to make up about 13 % of total RRF expenditure. Thus, also mid-cap firms will benefit from increased efforts by the Member States financed via the RRF to improve the skills base.

Moreover, education and training were also one of the eleven priorities for Cohesion Policy in 2014-2020, so skills development is also in the focus of EU Cohesion Policy. Support is organized through the European Social Fund (ESF) and the European Regional Development Fund (ERDF).

Supply chain disruptions

Supply shortages and supply chain disruptions have become a major challenge since the outbreak of COVID-19 for many firms including mid-caps. Russia's invasion of Ukraine has exacerbated shortages in some industries; an often-cited example is the supply of wire harness from the Ukraine to the European automotive industry.[15]

The European Commission has taken steps to identify strategic dependencies of the EU economy with the goal of reducing them and to increase Europe's capacities in these fields (European Commission 2021g). Examples are the Supply Chain Task Force set up by DG GROW and the Supply Chains Network of Member States Ministers. This is, however, a long-term process. As short-term remedies, firms already have increased stockpiling and diversified their supply chains. Some countries have also taken measures such as export restrictions for medical goods, but these are

14 https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en, accessed May 19, 2022

15 https://www.faz.net/aktuell/technik-motor/motor/keine-kabelbaeume-aus-der-ukraine-welche-auswege-gibt-es-17913677.html

exceptions only relevant for a very small share of overall supply chains. Aside from that, it seems that there is very little to do to in the short term to relax supply chain disruptions of firms.

Over the long term, the EC suggests to diversify the sourcing of supplies. Moreover, Europe has to build or rebuild some of the strategic capacities currently missing. To increase efficiency and avoid duplication, solutions at the European level, where they are possible, should go together with diversification of external sources of supplies. A European approach should also be favoured for the recent gas supply disruptions and price increases. This may include new international partnerships with supplier countries to increase supply chain security and the availability of diversified sourcing options.

In the long term, bringing back production from outside the EU to locations in the Member States, also known as backshoring, may also be a remedy for supply chain disruptions. This, however, requires substantial investments by firms, which might be supported by national governments and the EU. So far, such financial support for backshoring – to our best knowledge – does not exist in the European Union. However, firms may use other forms of national investment support, or investment support as part of the EU Cohesion policy. An example for national investment support is Austria's Investitionprämie (investment premium). The Investitionsprämie grants to companies of all sizes a non-repayable subsidy of seven percent for investments and doubles this subsidy to 14% for investments in sustainability, digitalisation, and life sciences. The most recent budget forecast by the Austrian Ministry of Finance estimates that the final volume of the Investitionsprämie may be around 5.7 billion EUR (BMF 2021, p. 121). Another concern relating to backshoring is the loss of market diversification in terms of suppliers and increased exposure and vulnerability to domestic shocks.

Regulation and administrative burden

Regulation and administrative burden may increase with firm size, so this is a challenge which is more specific to mid-caps. Size-dependent regulation may lead to a situation where regulation discourages small firms to scale-up and grow (lock-in effect, Sylvest, Yding Sørensen et al. 2018). Röhl (2018) presents examples of size-dependent regulations in the German labour law and makes the case to reduce administrative burden for mid-caps. There is also some anecdotal evidence from interviews and panellists about this phenomenon, but still very little systematic firm-level empirical evidence of the effects regulation has on SME growth (Mallet and Wapshott 2018). Regulation tends to be reported as a barrier to firm-level growth although rarely is it identified as a principal hurdle. Results from the SME Survey and the Flash Eurobarometer 486 (European Commission 2020a) suggest that size-dependent regulation and the lock-in effect may be only a minor obstacle to growth in SMEs.

There are also long-term activities of the European Commission to reduce administrative burden in the Member States, like the White Paper on European Governance, the Communication from the Commission on better governance for the Single Market, or the Communication from the Commission on the European Interoperability Framework. An example of such activities at Member States level are various acts to reduce bureaucracy put forward by the German government which are also part of Germany's SME strategy. We may also add the challenge of payment delays here, as these delays are related to governments.

Challenges from regulation and administrative burden can also arise outside the Single Market. Mid-cap firms frequently operate outside the European Union – two thirds of all mid-caps interviewed are exporting in countries outside the EU. Moreover, 21% of all mid-caps see barriers for market access a highly relevant for their investment activities outside the European Union. In these markets, mid-caps are faced with a number of regulations that differ from those in the Single Market. An example mentioned in the panels is product admission, which is frequently seen as a serious obstacle for market access. In fact, discrimination against foreign competitors has increased since the Global Financial Crisis of 2008/09 (Evenett 2019). One feature of the development in recent years, according to Evenett (2019), has been the growth of localization measures, rules requiring the use of local labour, parts, components, or data storage facilities.

There are of course a lot of ongoing activities in the EU and at Member State level towards administrative simplification, so it is difficult to generalize if there exists a gap or not. Given the high levels of agreement that regulation is a challenge, it seems that more could be done in this area.

Moreover, there are also ongoing activities at the global level to reduce differences in regulation in the form of bilateral and multilateral trade agreements. As Evenett (2019) indicates, however, the trend seems to go in the opposite direction, towards more discrimination against foreign competitors in international trade. Thus, it seems that there is a gap in existing policies here, and less regulation could benefit the growth of mid-caps.

Difficulties with innovation

The majority of mid-cap firms are permanently engaged in R&D activities so difficulties with innovation are highly relevant for this group of firms. Technical problems with new products and processes are most frequent, followed by a lack of funding.

There is an elaborated support system for R&D and innovation in place at the EU and Member State level to help firms in in R&D and innovation. Activities at EU level focus around Horizon Europe, while the Member States have established thousands of different measures, mostly bottom up and supplemented by tax credits for R&D. We found no specific measures for mid-caps (with the exception of risk financing for innovation and digitalisation under InvestEU – SME window - that specifically address small mid-caps and SMEs provided by the EIF through financial intermediaries), but most of the funding and support schemes are open for them as well. This is the case for all EU funding (with the exception of measures targeted towards SMEs).

The vast majority of support for innovation and R&D in the European Union comes from national sources. From scanning the literature, we did not found measures that would address mid-caps. The OECD STI policy compass database[16], for example, lists 1,873 R&D and innovation measures targeted at firms of any size, 743 for SMEs, 208 for micro enterprises, and 71 for multinational enterprises. If restrictions related to firm size exist in national R&D and innovation funding, they are likely to include mid-caps as well as large firms. So mid-caps are eligible for the majority of measures. Mid-caps are also eligible for in the tax credit schemes for R&D the majority of Member States has set up in recent years (Appelt, Galindo-Rueda et al. 2019). There is no country that would exclude mid-caps, however in some countries SMEs get a favourable treatment.

Despite this non-discrimination in access to innovation funding, the data show that mid-caps less frequently apply for national or EU funding for innovation than larger firms (see Section 4.6). Results from interviews and the panels provide some explanation: the considerably lower participation of mid-caps compared to large companies is the result of the lack of resources to monitor funding opportunities, to apply for funding and to administer the projects. Mid-cap firms often cannot afford to employ specialists for funding or the management of funded projects so they have less information on funding opportunities and often can only join a project consortium as a partner, not as co-ordinator. This may be less attractive for many mid-cap firms and may explain the low participation rate of mid-caps compared to large firms in the European Framework programmes.

Sustainability

The biggest push towards sustainability in the next years at EU level can be expected from the Recovery and Resilience Facility (RRF) where the EU has earmarked around 270 billion EUR for the Green Transition. These funds are allocated to the Member States according to plans submitted to the European Commission. The national RRF plans[17] are deeply rooted in the national environmental policies, so they are a good illustration of national efforts towards climate change and sustainability.

The regulation that established the RRF (European Union 2021a) makes no reference to mid-caps, however, some Member States have rules in place that prefer mid-caps or SMEs in some areas of funding. Croatia will use parts of its RRF funding to support mid-caps in the green transition. Bulgaria will support small and medium-sized enterprises and mid-capitalisation companies in modernising their technology and in their transition to green, circular, and digital-oriented business practices with RRF funds. Poland suggested similar funding schemes where SMEs and mid-caps are supported from the RRF to innovate and produce low-emission mobility and alternative energy solutions. Moreover,

16 https://stip.oecd.org/stip/interactive-dashboards;selectedAggregation=policyInstrumentList, accessed June 5, 2022

17 https://ec.europa.eu/info/business-economy-euro/recovery-coronavirus/recovery-and-resilience-facility_en#national-recovery-and-resilience-plans

Poland will also set up a dedicated investment fund which will provide equity or debt support for such solutions, focusing on SMEs and mid-caps.

A second database used in the survey of mid-cap policies towards sustainability is the database on Policy Instruments for the Environment[18] (PINE) provided by the OECD which gathers quantitative and qualitative information on six types of policy instruments in more than 120 countries. PINE allows to search for keywords and types of beneficiaries. A number of measures are related to SMEs, but none to mid-caps, so they are eligible for funding only when all types for firms are eligible.

Access to finance

According to the interviews of Chapter 4, difficulties to access external finance do not seem to be the prime challenge mid-cap firms face. This may be due to additional financial support by public authorities to fight the economic consequences of COVID-19, or more caution in scaling-up and a lack of investment opportunities due to the crisis. Nevertheless, access to finance is a serious issue for many mid-cap firms when it comes to substantial expansion investments, the development of radical, new innovations and business models, or investments in sustainability. Such upscaling activities are important for the further growth of mid-caps; mature firms that have existed for at least six years, and not young enterprises, make up three-quarters of those enterprises that scale-up employment (OECD 2021f, p. 63).

Access to finance is the area where measures that target mid-caps are most frequent. We used the Trade Alert database, a database of 18,137 corporate subsidies, subsidy awards and subsidy policy changes undertaken by public bodies in China, the European Union, and the United States from November 2008 to October 2021. The database lists 333 subsidies that mention mid-caps, almost all of them related to transactions where the EIB provides funds to European banks with the goal to finance SMEs and mid-caps, so these are all state loans or loan guarantees. They include, for example, Venture Debt, a programme by the EIB to address the funding needs of fast-growing innovative companies. Another programme in this area is InvestEU, a financing scheme that aims to mobilise public and private investment through an EU budget guarantee of 26.2 billion EUR. Mid-caps are eligible in three of the four policy areas (in the SME window, small mid-caps are eligible) of InvestEU.

Most of the measures target mid-caps and SMEs; only 54 out of the 333 refer to mid-caps alone. A third of these measures have been introduced after March 2020, during COVID-19 pandemic. There is only one reference to mid-caps outside the EU, a modification of the UK venture capital scheme to include mid-caps. However, this is from 2015, so we may also consider it EU-related. These results can be compared with a similar search for SMEs, which yields considerably more funding schemes, including ones from China and the US.

To sum up, the main challenges for mid-cap firms are all long-standing problems for enterprises of all sizes in the EU, and there exists an elaborated support system at EU and national level to help firms to cope with these challenges. The exception is supply chain disruptions. Moreover, three of the challenges – skills, R&D and innovation, and finance – relate to areas which are exceptions of the state aid rules as laid out in the General Block Exemption Regulation, so Member States are free to increase their support in these areas. The question why these challenges still exist despite public support is beyond the scope of this study and points to the limits of any economic policy.

18 https://pinedatabase.oecd.org/

6 POLICY MEASURES OF THE MAIN TRADE PARTNERS OF THE EU TO SUPPORT MID-CAPS

This chapter investigates how mid-cap firms are supported in the main trade partners of the EU. We cover the United States, the United Kingdom, China, Japan, and Switzerland. The rules for subsidies in these countries differ from the regulations for state aid[19] in the European Union, which may cause distortions and an uneven playing field for EU firms (European Commission 2020c).

Comparisons across countries

A general difficulty of such comparisons is the multitude of public support for enterprises. This support includes not only direct subsidies, state grants and loans, but also state guarantees, preferential interest rates, tax credits, the provision of goods or services on preferential terms, reduction or exemption from charges or taxes, preferred public procurement, consultancy services or even state ownership. On the one hand, this makes comparisons across countries difficult, because data on these other forms of support is not available in many cases, and different types of support are not directly comparable. On the other hand, many of these other types of support are not compatible with EU competition law, so countries which use those types of support do not contribute to a level playing field with regards to competition. Evenett and Fritz (2021) report that such types of support are frequently used by the Chinese government.

Comparisons across countries are also difficult because comprehensive data on state aid in EU member states and subsidies that cover all relevant countries in sufficient detail are not available. Thus, data on the amount of support for mid-cap firms that would allow comparisons is not available, either. A joint paper by the International Monetary Fund, the OECD, The World Bank, and World Trade Organization (IMF, OECD, World Bank and WTO, 2022) finds that information on subsidies overall remains scarce. The paper finds that collectively, China, the EU, and the United States account for over half of the number of global subsidy measures, and subsidies seemed to become more common since the Global Financial Crisis of 2008/09. Moreover, subsidies are provided by national governments as well as sub-national entities, for example, by U.S. states or Chinese provinces (IMF, OECD, World Bank and WTO, 2022). The joint study by the International Monetary Fund, the OECD, The World Bank, and World Trade Organization finds that at the sectoral level, the highest frequencies of subsidies are to be found in the transport equipment sector, in special-purpose machinery, the generation of electricity, steam and gas, electrical machinery & apparatus, basic chemicals and in pharmaceuticals. Some of these, in particular chemicals, pharmaceuticals, and electrical machinery, are sectors in which mid-caps appear frequently according to the analysis in Chapter 4.3 of this report.

As noted above, data on subsidies is only available at a very aggregated level. The European Commission publishes detailed data on state aid (see for example European Commission, 2021f), while the OECD provides data on the size of subsidies as a percentage of GDP for various EU member states and non-Member States (see figure below). From those data, it seems that EU member states often have higher levels of subsidies than non-EU members. However, these data also include agricultural subsidies which may be the reason for the high value for Switzerland because agricultural subsidies constitute a large part of overall subsidies in Switzerland according to the Global Trade Alert Report.

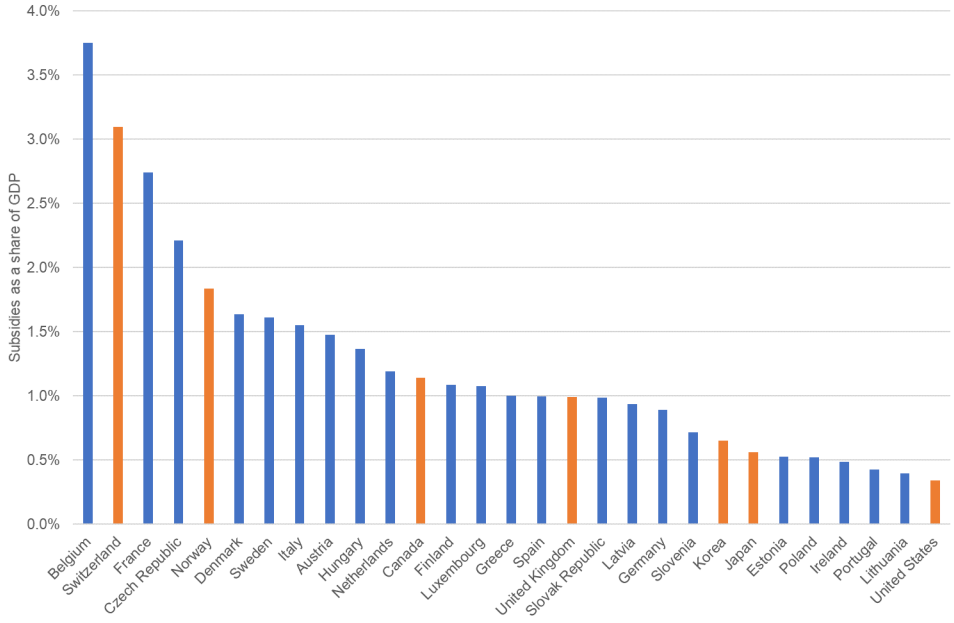
China is missing in the OECD data, and data for the country is not available from the International Monetary Fund[20], either. However, the Global Trade Alert Report (Evenett and Fritz 2021), the most comprehensive collection of subsidies, provides information on China that allows to compare the country with the EU and the US. From the data, it seems that China has less subsidies that affect trade in agricultural goods than the EU, but more subsidies in trade of manufactured goods than the EU and the US: "such is China's extensive resort to subsidies, that by 2020 we estimate that 38.5% of world goods exports were in markets where either import-competing Chinese firms received subsidies or Chinese exporters received greater inducements to export. The corresponding

19 The term state aid only exists in EU legislation, so we will refer to subsidies when we talk about public financial support for enterprises in countries outside the EU.

20 https://data.imf.org/regular.aspx?key=60991457

percentages for the EU and the USA are 24.4% and 13.4%, respectively" (Evenett and Fritz 2021, p 37). Moreover, office, accounting & computing machinery is the sector in China with the second most subsidy awards recorded by the Global Trade Alert Report, followed by electrical machinery. According to the analysis in Chapter 4.3 of this report, these are sectors where mid-cap firms are strong. Thus, subsidies for manufactured goods in sectors where mid-caps have a high share on overall firms should be substantially larger in China than in the EU and the US.

Figure 6.1: Government subsidies as a percentage of GDP, 2019



Source: OECD, Government expenditures by function (COFOG)21, includes central and local governments

Another factor which contributes to the difficulties in comparing subsidies is state ownership which is much more relevant in China than in other OECD countries. For the example of R&D subsidies, Boeing and Peters (2021) found that government funding of business R&D expenditures in China accounted for only 3.7% on average between 2011 and 2020, considerably below OECD average. However, this doubles to 7.1% once R&D funding through state-owned enterprises (SOEs) is added, and further increases when the authors consider self-raised R&D funds by semi-SOEs. This example demonstrates the possible pitfalls of international comparisons.

In addition, there is also evidence that the Chinese government influences the allocation as well as the prices of various production factors including energy and raw materials, in a "very significant manner" (European Commission 2017b, p. 3). Such interventions may be of a considerable advantage for Chinese mid-caps – China has a programme in place to support "Little Giants" – but are difficult to quantify and to sum up with direct subsidies.

Nevertheless, these data give some indirect evidence that mid-cap firms receive subsidies. We will present some more evidence below, although there is little information available on measures that directly target mid-cap firms. We searched various databases for such evidence, including the Global Trade Alert Report database[22], the EU anti-subsidy rules database[23] of all subsidies investigated by the EU, the WTO database on formal disputes concerning subsidies[24], or the OECD tracker of policy responses to COVID-19[25]. Nearly all hits for the terms "mid-caps" or "mid-sized" are related to EIB

21 https://stats.oecd.org/Index.aspx?DataSetCode=SNA_TABLE11

22 https://www.globaltradealert.org/

23 https://circabc.europa.eu/ui/group/2e3865ad-3886-4131-92bb-a71754fffec6/library/0b8b5cb5-af24-40b9-9385-125ee7b9d61e/details

24 https://www.wto.org/english/tratop_e/dispu_e/dispu_subjects_index_e.htm

25 https://www.oecd.org/coronavirus/en/policy-responses

funding of mid-cap firms. This lets us assume that the term mid-caps is only used in the EU in the context of public support for enterprises.

United States of America

Mid-cap firms accounted for around 13% of total employment in the United States in 2017 according to the US Business Census. This is around the same share as mid-cap firms have in total employment in the European Union.

There is no official mid-caps definition in the United States, so no specifically dedicated mid-caps support neither. However, the definition of small and medium-sized enterprises (size standards) brought forward by the U.S. Small Business Administration (SBA) also includes firms with more than 250 employees as described in Chapter 3. Some of these thresholds go well into mid-cap territory with thresholds of 1,500 employees, and there are very few industries, mostly in utilities, with thresholds of 250 employees. SBA supports small businesses in numerous ways including through loans, contracting programs, counselling, and other funding opportunities and grant programs. It was, however, not possible to get data that would quantify their support for mid-caps from the SBA.

As a result, mid-caps are also eligible for SME funding in some sectors in the US, which may give them an advantage over EU competitors of the same size. These include various forms of guarantees, loans, export loans and advise, procurement assistance, counselling and training, and disaster relieve. Moreover, the SBA was also involved in various funding activities in response to the COVID19 pandemic. This has increased its portfolio of outstanding guaranteed loans considerably to 713 billion USD in 2021 according to SBA's financial report (U.S. Small Business Administration 2022). As a comparison, InvestEU plans to mobilise some 372 billion EUR of public and private investment through an EU budget guarantee. Even if the two organisations are not fully comparable, the difference in size is obvious.

SBA's programmes were already considerably larger than their EU counterparts in the past (Dilger 2016). The COSME Loan Guarantee Facility had a planned volume between 14 and 21 billion EUR over seven years, and the goal of the InnovFin SME Guarantee program was to provide 24 billion EUR of debt and equity financing to innovative SMEs and small mid-caps by 2020. In comparison, the SBA's loan guaranty programs provide between 20 and 25 billion USD in loan guarantees to small businesses each year. COSME's goal with the Equity Facility for Growth program was to provide between 2.6 and 4 billion EUR in venture capital financing to SMEs over seven years (2014-2020). The SBA's Small Business Investment Company program provides that amount of venture capital financing to small businesses each year. In addition, support for business R&D via direct government funding and tax support is higher in the US than in the EU (OECD 2022). Moreover, mid-caps in the US are of course also eligible for general support measures that address enterprises of all size. Particularly relevant for mid-caps may be venture capital and entrepreneurship support that addresses fast-growing firms of all sizes. The OECD (2021a) provides some examples for these policies.

The sources cited in Section 6.1, including Figure 6.1, suggest that the United States provide considerably less subsidies to enterprises than the EU or China. However, the considerably higher thresholds in the US SME definition and larger available funding volumes for SMEs suggest that mid-caps – as a distinct group of firms – may enjoy more public support in the US than companies of comparable size in the EU. Empirical evidence that would allow a test of this assumption, however, is not available.

People's Republic of China

There is no definition of mid-caps in China. However, firms that are considered as mid-caps in the EU may fall into the Chinese SME category, as the thresholds for SMEs in China are higher in many sectors compared to those in the EU. Therefore, we focus on large medium-sized companies in analysing China's subsidies policies.

SME definitions vary by sector in China. According to the legal document issued by the Ministry of Industry and Information Technology of the People's Republic of China[26], a medium-sized firm in industrial sectors has between 300 and 1,000 employees and with annual turnover between 20 million and 400 million Yuan (roughly, 2.8 million to 57 million EUR). Industrial sectors in China include mining, manufacturing, and energy (the production and supply of electricity, gas, and water). However, the threshold of medium-sized company in software and information technology services is lower, which consists of firms with 100-300 employees and with annual turnover between 10 million and 100 million Yuan (1.4 million to 14 million EUR).

To support the development of SMEs, the "Law of the People's Republic of China on the Promotion of Small and Medium-Sized Enterprises"[27] (SMEs promotion law, thereafter), was issued in 2002. It came into force in 2003 and was revised in 2017. [28] According to the SMEs promotion law, China regards the development of SMEs as a long-term development strategy, and will provide a mix[29] of supports, including fiscal and tax support, financial support, innovation support, market development support, and special supports for start-ups. Based on the law, a number of policies were implemented. Among them, the most relevant and important one that relates to the promotion of large medium-sized firms (which could be considered as mid-caps in the EU definition) are the 12th, 13th, and 14th "Five-Year Plan for Promoting the Development of Small and Medium-Sized Enterprises" (12th, 13th and 14th Five-Year Plan, thereafter). The 12th Five-Year Plan highlights the state's objectives between 2011-2015. The 13th Five-Year Plan is for 2016-2020 and the 14th Five-Year Plan is for 2021-2025.

The 12th Five-Year Plan introduced the term "specialized and sophisticated enterprises"[30]. The term refers to the SMEs that focus on specific market and their main business, that are specialized in an industry, that are sophisticated in production and management, that are distinguishable from other companies, and that are innovative. Many of them are upper-stream firms in the production chain and are not well known to consumers. The term is similar to the concept of "Hidden Champions" [31] introduced by Hermann Simon (2012). The 12th Five-Year Plan states that the government regards the "specialized and sophisticated enterprises" stage as the main stage in the SMEs' development path. The government will provide special support to help SMEs to grow into the "specialized and sophisticated enterprises" stage, such as helping them to optimise the allocation of resources and facilitating the construction of industrial clusters. This idea has been re-emphasized in the 13th and 14th Five-Year Plans.

Additionally, during the 13th Five-Year Plan period (2016-2020), two important policies were implemented to promote "specialized and sophisticated" SMEs.[32] In line with the "Made in China 2025" plan, in 2016, the Ministry of Industry and Information Technology published "The implementation plan of the special action plan for the promotion of the champion enterprises in individual fields in the manufacturing industry"[33] (the Implementation Plan, thereafter). It aims to select 200 champion enterprises in individual fields in the manufacturing industry by 2025, and the government will help them to achieve a global leading position. Additionally, the Implementation Plan states that the government will also select 600 companies with the potential to scale-up as Champions, and the government will provide support for their growth. However, little data is available on how these special supports are implemented and exercised, at least, to the public. In addition, it

26 Ministry of Industry and Information Technology of the People's Republic of China (2011). http://www.gov.cn/zwgk/2011-07/04/content_1898747.htm

27 Law of the People's Republic of China on the Promotion of Small and Medium-Sized Enterprises (2002).

http://www.scio.gov.cn/ztk/xwfb/2013/gxbjxlscxqdfzzldfmqkfbh/xgzc/Document/1347429/1347429.htm

28 Law of the People's Republic of China on the Promotion of Small and Medium-Sized Enterprises. 2017 revision. http://www.mofcom.gov.cn/article/jiguanzx/201904/20190402851412.shtml

29 The original Chinese world means "basket", which is a widely used term in describing Chinese policies

30 The 12th Five-Year Plan for Promoting the Development of Small and Medium-Sized Enterprises (2011). http://www.gov.cn/gzdt/2011-09/23/content_1955213.htm

31 Dong Jinmei (2021). 新发展格局构建下的隐形冠军培育路径. https://www.ndrc.gov.cn/wsdwhfz/202111/t20211129_1305672.html?code=&state=123

32 The 13th Five-Year Plan for Promoting the Development of Small and Medium-Sized Enterprises (2016). http://www.mofcom.gov.cn/article/bh/201610/20161001542549.shtml

33 The implementation plan of the special action plan for the promotion of the champion enterprises in individual fields in the manufacturing industry (2016). https://www.miit.gov.cn/zwgk/zcwj/wjfb/zh/art/2020/art_f514aa7e7a954ba6bad6bfb5e345b6d4.html

is unclear whether the implementation would be carried out by the central government, or whether the local government would have the right to adjust their actions according to local specific features.

In 2018, another concept of large and successful SMEs, "Little Giants", is introduced in a "Note from the Ministry of Industry and Information Technology in the cultivation of specialized and sophisticated little giant companies".[34] "Little Giants" refers to outstanding companies in the "specialized and sophisticated enterprises" category. They should have annual turnover between 100 and 400 million Yuan and have an annual turnover growth rate greater than 10%. They should also focus on their main business, should be innovative, and should have delicacy management. Although the document states that selected firms would benefit from several supports, details are not given.

More details on the support for "Little Giants" are provided in the "Note from the Ministry of Finance and the Ministry of Industry and Information Technology regarding Supporting the High-quality Development of Technologically Advanced Small and Medium-sized Enterprises" (thereafter, Note), issued in 2021. Specifically, the Note states that the central government finance will arrange over 10 billion Yuan (1.43 billion EUR) between 2021-2025 as grants or subsidies to local governments (mainly governments at the province and municipality level) to support the development of national level "Little Giant" companies. The funding will also be used to facilitate the growth of around 10,000 SMEs, and to help them grow into "Little Giants". However, it is unclear whether the 10 billion Yuan grants will be used directly as awards or subsidies to SMEs or will be used to improve the assistance policies and the public service system of the local governments, through which they provide better services to SMEs.

The most recent updates about the policies on mid-caps and SMEs in China is the 14th Five-Year Plan[35]. It re-emphasises the importance of "specialized and sophisticated enterprises" and "Little Giants" and points out the need to have a "classified cultivation" of SMEs based on their development stages, features, and special needs. Following that, the "Interim measures for the administration of the "gradient cultivation" of high-quality Small and Medium-sized Enterprises"[36] (Interim Measures, thereafter) has been approved this year, 2022. The Interim Measures require governments at all levels to select high-quality SMEs, "specialized and sophisticated enterprises", and "Little Giants" on their own, and provide customized supports. The goal is to select and cultivate one million innovative SMEs, 100,000 "specialized and sophisticated enterprises", and 10,000 "Little Giants" during 2021-2025, the years covered by the 14th Five-Year Plan. The customized support will include, but will not be limited to, direct and indirect finance and tax support, technology and training support, human resources recruitment support, provision of industrial land and buildings, and reduction of regulatory burden.

There is little data on the total aid that the government provided to mid-caps and SMEs in China. Nevertheless, in the 14th Five-Year Plan, some statistics about the support on "specialized and sophisticated enterprises" and the "Little Giants" are revealed. Until the end of 2020, 1,832 companies were selected as "Little Giants", and more than 30,000 companies were selected into the "specialized and sophisticated enterprises" category (at the province level). Further, the document states that between 2016-2020, the Special Funds for the Development of SMEs in the central government finance spent 36.2 billion Yuan (5.2 billion EUR) to support the growth of SMEs. Additionally, the central government also spent 46.7 (6.7 billion EUR) billion Yuan on the Special Funds for the Development of Inclusive Finance, which benefits SMEs mostly. Moreover, 70% of the government procurement is from SMEs, which is considered as an indirect support to SMEs. In 2020, the total government procurement in China was 3,697 billion Yuan (526.8 billion EUR), accounting for 3.6% of GDP.[37] Therefore, the indirect support to SMEs from government procurement in China was more than 368.8 billion EUR in 2020.

34 工业和信息化部办公厅关于开展专精特新"小巨人"企业培育工作的通知 (2018). http://zxqyj.sz.gov.cn/attachment/0/368/368411/4524575.pdf

35 The 14th Five-Year Plan for Promoting the Development of Small and Medium-Sized Enterprises (2021). http://www.gov.cn/zhengce/zhengceku/2021-12/17/5661655/files/b3a2c31e3ed44c7f8a120d1e9a8d4d53.pdf

36 Interim measures for the administration of the gradient cultivation of high-quality Small and Medium-sized Enterprises (2022). http://www.gov.cn/zhengce/zhengceku/2022-06/02/5693548/files/b688da806d224e828076e99a2cbb9151.pdf

37 Ministry of Finance (September 2021). http://www.gov.cn/xinwen/2021-09/04/content_5635396.htm

Finally, one should note that other direct and indirect support at the provincial level is not counted in the above figures.[38] Additionally, financial support through tax reduction, special loans, and special funds for specific industries, such as high-tech companies[39], are also not included in the figure.

United Kingdom

Small mid-caps with between 250 and 499 employees account for five percent of all businesses in the private sector in the UK according to business population estimates for the UK and regions 2021 by the UK government. This is a bit below the value for the EU (5.7%). A share for large mid-caps is not available.

Until leaving the European Union in January 2020, state aid to enterprises in the United Kingdom was subject to the regulations of Article 107 of the Treaty on the Functioning of the European Union (TFEU), the General Block Exemption Regulation and other legal documents. The UK also applied the EU definition of SMEs - any enterprise that has fewer than 250 employees and a turnover of less than 50 million EUR or a balance sheet total less than 43 million EUR.

After Brexit, the UK announced to replace EU state aid laws by the rules of the World Trade Organisation on subsidies and other international commitments[40]. The SME definition, however, is still in place in the UK[41], and funding for enterprises still follows the thresholds laid out in the SME definition. SME and entrepreneurship policies are part of the UK Industrial Strategy. The UK Department for Business, Energy & Industrial Strategy provides a comprehensive list of financial and other support for business which can be searched according to size classes.[42] The list provides 164 measures in total, 32 of them are open for businesses of all sizes, and three of them extend support for SMEs to business with 250 to 500 employees: Innovate UK EDGE, a programme which gives advice for businesses looking to commercialise new ideas and succeed in international markets; Productivity Through Innovation, a programme that spurs co-operation with three regional universities, and a Regional Growth Loan Scheme for the East of England.

This indicates that the support for mid-caps should not differ considerably from that in the EU. Until 2019 data for the UK were part of the annual State aid Scoreboard published by the European Commission (2021f), so we have a good idea of the size of public support for businesses at this time. With a share of 0.51% of GDP at current prices, the United Kingdom ranks in the lowest third of all EU countries ranked by the size of state aid. We may assume that this has not changed substantially in the two years since Brexit, and support for mid-caps may remain well below EU average. However, support for business R&D via direct government funding and tax support is considerably higher in the UK compared to the EU (OECD 2022). The UK Industrial Strategy (UK Government 2021a) published in 2021 after Brexit makes references to SMEs support to increase venture capital funding, management capabilities, strengthen digitalisation and innovation, or SMEs internationalisation, but makes no reference to mid-caps or medium-sized firms outside the SME definition.

Japan

Similar to the US or China, Japan has adopted a different SME definition than the EU. In manufacturing, construction, and transportation, any firm whose regular workforce does not exceed 300 persons, or whose capital or total amount of investment does not exceed 300 million Yen is considered an SME (Small and Medium Size Enterprise Agency, 2019). In wholesale trade and services, the threshold is only 100 persons, in retail trade even 50. This means that mid-caps in manufacturing, construction and transport are partly covered by the Japanese SME definition, but

38 Notice by the General Office of the State Council of Further Intensifying Efforts to Assist Small and Medium-Sized Enterprises in Alleviating Difficulties (2021). http://www.gov.cn/zhengce/content/2021-11/22/content_5652485.htm

39 Notice of the Ministry of Finance, the Ministry of Industry and Information Technology, the Ministry of Science and Technology, and the Ministry of Commerce on Issuing the Interim Measures for the Administration of the Special Fund for Development of Small and Medium-Sized Enterprises (2014). https://www.miit.gov.cn/datainfo/fgk/gytxyxxhlycsfg/zxqy/art/2020/art_fbafe601f183466f9ed7e36e4645ad14.html

40 https://www.gov.uk/government/news/government-sets-out-plans-for-new-approach-to-subsidy-control

41 https://www.gov.uk/government/publications/fcdo-small-to-medium-sized-enterprise-sme-action-plan/small-to-medium-sized-enterprise-sme-action-plan, accessed June 3rd, 2022

42 https://www.gov.uk/business-finance-support?

not in services industries. Thus, manufacturing mid-caps between 250 and 300 employees are eligible for SMEs support.

We searched available information on the web on subsidies for businesses in Japan, including the Small and Medium Size Enterprise Agency, the OECD, the EU-Japan Center for Industrial Corporation, the IMF, and the World Bank. There is no mid-cap definition in the Japanese system of state subsidies for enterprises. We could not retrieve information on the size of governmental support for mid-caps in Japan. However, from the existing data, we uncover two facts: first, Japan historically provides relatively few subsidies to industry, ranking below the levels of the EU but above that of the US (WTO 2006). Second, the proportion of SMEs receiving financial and non-financial governmental support since the start of the COVID-19 pandemic was highest in Japan among all OECD countries according to the OECD (OECD 2021d) which indicates that more public support may also be available for mid-caps due to the pandemic. Support for business R&D via direct government funding and tax support is lower in Japan compared to the EU (OECD 2022). However, we found no measures that mention mid-caps for Japan in policy databases like the OECD tracker of policy responses.[43] Altogether, there is no indication that Japanese mid-cap firms would enjoy specific advantages compared to their counterparts EU.

Switzerland

Small mid-caps with between 250 and 499 employees account for 7.2 percent of all employment in Switzerland according to the Swiss Federal Statistical Office, which is above the corresponding share in the EU (5.7%). Another 6.7% are in firms with 500 to 999 employees, so the mid-cap segment in Switzerland seems substantial.

Switzerland has adopted the employment threshold for SMEs of 250 employees of the European Union but does not follow the legal framework for state aid of the EU or the GBER. Subsidies are provided by the Federal as well as at the provincial (Kanton) level which makes it difficult to get an overview. For example, the OECD (2019) reports that there are 87 different measures at the Kanton level for financing firms and start-ups. There seems to be no mid-caps definition related to public funding of enterprises in Switzerland.

Government subsidies as a percentage of GDP are higher in Switzerland than in other countries, but government support for enterprises seems to be at the level of OECD average if we take SME support as a benchmark (OECD 2021c). The Swiss Federal government provides a full spectrum of support measures from financing to innovation support, support for digitalisation, regional support, start-up support etc. In addition, the Kantone are active in various areas of enterprise support. To ease the economic consequences of COVID-19, a loan programme was introduced which aims to bridge firms' liquidity shortfalls that have resulted from the pandemic. This programme aims at all firms with a turnover of below 500 million Swiss Francs (around 500 million EUR), so it is also relevant for mid-caps. According to Fuhrer et al. (2021) 20% of all firms in the country were participating, resulting in a total volume of 2.4% of GDP.

Support for business R&D and innovation is provided by Innosuisse at the federal level, however, direct government funding and tax support is much lower in Switzerland than in the OECD or the EU (OECD 2022). Support for R&D mainly goes to universities. The Swiss Parliament approved a plan to invest 28.1 billion Swiss Francs in education, research, and innovation over the next four years.[44] Switzerland is not (yet) associated to Horizon Europe which means that Swiss partners are not funded by the EU; however, the Swiss government provides substitute funding for participation.

To sum up, the thresholds for SMEs in the US, China and in Japan are higher than in the EU, exceeding them by a wide margin in some industries. Companies that are considered (small) mid-caps in the EU are thus eligible for SMEs support in these countries. Moreover, the financial means for SMEs support are higher in the US than in the EU. China has even installed the 'Little Giants' category in China to support "Hidden Champions", many of them mid-cap firms. Thus, it seems likely that overall support for mid-caps in the US and China is more generous than in the EU. This is also confirmed by

43 https://www.oecd.org/coronavirus/en/policy-responses

44 https://www.parlament.ch/de/services/news/Seiten/2020/20201215080736598194158159038_bsd039.aspx

anecdotal evidence collected in the panels. Data that would allow a precise estimation of the gap, however, does not exist. More and better data on subsidies for firms of different sizes would be needed to confirm that there is indeed a gap between the support within the EU compared to that in the main trade partners, and to estimate its dimension. In order to create a level playing field for mid-cap firms – if there is indeed a gap in support – the EU should help to improve the evidence base. This would allow for a clearer assessment of the potential need to push for a reduction of subsidies in these countries.

7 MAIN RESULTS OF THE STUDY

Empirical results

There are around 25 million enterprises of different sizes in the European economy. Most of them are micro enterprises with fewer than 10 employees, or small and medium-sized enterprises with less than 250 employees. On the other side of the spectrum, we find a number of large enterprises with thousands of employees and global presence.

Middle-sized enterprises (or mid-caps) lie between these two groups. We consider mid-caps as those enterprises with 250 or more, but less than 1,500 employees. This definition is laid down in the EU Risk Finance Guidelines. There are also alternative definitions which include larger firms; these firms, however, are more like large corporations in a number of aspects, so the threshold of 1,500 employees fits the purpose.

Mid-caps are certainly not the most frequent type of enterprises in Europe. However, they are an essential part of the European economy. We estimate that small mid-caps (250-499 employees) and large mid-caps (500-1,499 employees) together account for more than 13% of overall employment in the European business sector. The share of mid-cap firms is particularly high in industrial ecosystems that are key to the European Union's competitiveness: Electronics, Aerospace & Defence, Energy, Energy-intensive Industries, and Health. There are also differences between countries in terms of the economic importance of mid-caps measured as their share in total employment. Mid-caps employ around 20% of all employees in the Nordic countries, Luxembourg, Germany, and Austria, while their share in employment is 10% or less in Spain, Portugal, France, Poland, Greece, or Cyprus.

Firm-level data reveal that mid-caps are often established firms which have already survived the 'up or out'-stage of early firm evolution. They perform better than SMEs in many indicators and reveal higher employment growth rates than the total enterprise population in the vast majority of EU member states. The Single Market is their home market, but the majority of them are also active on markets outside the EU. Ownership structures are heterogenous: on the one hand, family ownership is frequently found among mid-cap firms; on the other hand, around a quarter of them are subsidiaries of foreign-owned[45] multinational companies – half of these are affiliated to a parent company that resides outside the EU. All these findings suggest that mid-caps constitute a separate group within the business sector.

Mid-caps can benefit from their size when they specialize in a particular market niche. Such firms are often called 'Hidden Champions' because they are mostly unknown to a wider public since they operate in niche markets where they are world-market leaders. The example of Hidden Champions shows that mid-caps can be in an advantageous position compared to large multinationals and SMEs when they are able to leverage their capabilities and find profitable market niches where they can flourish. Mid-caps seem to enjoy an advantage over large firms here, as large firms may find it difficult to specialize on narrow market niches which may be too small to yield reasonable turnover.

Results from the interviews provided in this study indicate that the growth of mid-cap firms in the European Union appears to be hampered by different cyclical and structural obstacles: difficulties in finding employees, supply chain disruptions, regulation and administrative burden, difficulties with innovation, the challenge of becoming more sustainable, or access to finance. Another challenge mentioned in panel discussions with mid-caps firms is succession in family-owned mid-caps. In addition, panel discussions also revealed that rising prices for energy and other inputs for production emerged as a major challenge for mid-caps in energy-intensive industries in recent months. Most of these challenges are not specific to mid-cap firms, but rather generic challenges that can negatively affect the growth of firms of all sizes.

[45] Non-national, including Member States.

Strengthening **education and vocational training** to overcome the main challenges mid-cap firms face, in particular in technical areas, is key. Statements by representatives of mid-cap companies suggest that mid-caps are often not able to offer career paths similar to those in large corporations which makes them less attractive. EU member states are funding large education and training programmes, so the EU is best positioned to complement these activities by tackling issues related to enabling mobility of people between member states.

The European Commission has also proposed measures to tackle **supply chain disruptions** including a diversification of sourcing, and the development of new capacities in strategic areas. These activities could be further intensified if the disruptions turn out to be long-term. Furthermore, given network externalities and information asymmetries firms face, developing and deploying risk assessment tools to understand vulnerabilities and exposure to risks will help firms to become more resilient to supply chains shocks.

Another major challenge for mid-caps is **regulation and administrative burden**. Beyond the benefits of reducing regulation, a more predictable regulatory framework that gives mid-caps more time to adapt to changes in regulation would also help these firms. Regulation also becomes an obstacle for mid-caps when they expand into markets outside the EU and have to deal with differences in regulation between the Single Market and host markets abroad. According to the interviews with managers of mid-caps conducted for this study, the majority of mid-cap firms are active in markets outside Europe. There is some indication that mid-cap firms receive higher financial support in China and the US, but the empirical evidence is less robust here.

Innovation and digitalisation are important for mid-cap firms, and their innovation performance is above that of SMEs. However, there are also some challenges related to innovation: on the one hand, several mid-cap firms, occupied with their day-to-day-business, seem to be too small to have the financial means, market power, and capabilities of large firms to maintain these activities in the long-term. On the other hand, after surviving the 'up or out'-phase, mid-caps may have lost some advantages of SMEs such as a high degree of flexibility or the ability to focus on small market niches.

The participation of mid-caps in the European RTD Framework programmes, such as Horizon Europe, remains below their potential: the share of innovative mid-caps is considerably higher than the share of mid-caps that participate in the FWPs. This may be due to lacking the capacities to co-ordinate a project within the RTD FWP, and too little benefits mid-caps derive from participating as one among many project partners. This may indicate a lot of underused potential for research collaboration in Europe, given that mid-caps are well-represented in high-technology sectors.

Overall conclusions and suggestions

This study contributes to policy by presenting a detailed overview of European mid-caps in the European Union. From the empirical evidence we conclude that mid-caps should be considered as a segment of the business sector that clearly distinguish themselves from SMEs and large firms in terms of performance, innovation, growth paths over time, but also the challenges they face.

The challenges mid-cap firms are facing are relevant for firms of all sizes, not just mid-caps. Moreover, they are not new (with the exception of supply chain disruptions), and an elaborated set of measures are in place at member states and at EU level to tackle almost all of these challenges. In four fields (innovation, sustainability, digitalisation, finance) the European Commission has kicked-off major new instruments recently: the Recovery and Resilience Facility, Horizon Europe, and InvestEU. These initiatives will have a major positive impact on mid-cap firms, even if they are not designated as mid-cap support activities. For example, the Recovery and Resilience Facility helps firms to manage the 'twin' – digital and climate – transition, which is also a major challenge for mid-cap firms but will also support training and the development of digital skills.

From this perspective, **new instruments** to support mid-cap firms are not an immediate concern; rather, policy should carefully monitor and evaluate how existing initiatives benefit mid-cap firms and adapt these initiatives if necessary. New support measures should only be initiated if the current initiatives do not reveal positive effects on mid-cap firms. This conclusion is also supported by the finding that mid-caps perform better than SMEs in many indicators.

If policy wants to consider targeted financial support for mid-cap firms, these measures should focus on specific situations, for example when capacities for substantial improvements and for scaling-up are not available in mid-cap firms. This may be the case during particular growth periods, when mid-caps pursue activities that go beyond their day-to-day-business and may require financial and organizational capacities they do not have but need to mobilize. Mature firms that have existed for at least six years make up three-quarters of firms that scale-up (OECD 2021f, p. 63).

Another example where targeted intervention may be feasible is regulation; when mid-caps grow, they also have to deal with new regulatory obligations. For example, there may be size-dependent regulation in labour law once firms grow out of the SME into the mid-caps category. Another example is internationalisation; when mid-caps enter foreign markets, they face regulatory obligations that may differ from regulations in the EU. Thus, it would help firms in their growth process if 'hard' thresholds in firm size are softened.

Finally, a wider application of the existing mid-cap definition – for instance the one in use in the Risk Finance Guidelines, would help streamline the approach towards these companies throughout the different policy areas. Furthermore, the development of a broader (statistical) knowledge base would enhance our understanding of mid-caps and the role they play in the economy, which is a pre-condition for possible policy interventions in the future.

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APPENDIX A DATA AND DESCRIPTIVE STATISTICS

In this Appendix, we first provide more details on the preparation of the ORBIS Europe database and the comparison between the ORBIS Europe and the SBS data. We then list the weights that used in the analysis, which are used to restore the representativeness of the ORBIS Europe data. Next, we introduce the concordance between the defined ecosystems and NACE Rev.2 sectors. We last provide additional statistics as discussed in the main content.

Data preparation

The extraction of the ORBIS Europe data

In Section 4.1 and 4.2, the criteria for the preparation of the firm-level data from the ORBIS Europe data to be used in the empirical analysis were as follows:

- firms that are still active (in April 2022, when the data was retrieved from the ORBIS Europe online platform);
- firms that are registered in the EU27 member states;
- firms with unconsolidated financial statements and with limited financial statements;
- firms with employment information available in 2019;
- to compute turnover and labour productivity, only firms that have turnover information available in 2019 were included.

In Section 4.3, in addition to the rules listed above, a few additional rules are applied to clean the data further and to ensure a better representativeness of the extracted firm-level information. The selection procedure of the cohort of mid-caps in 2019 follows the same rule as that used in Section 4.1 but with few additional steps. We first select all active EU27 firms with unconsolidated or limited financial statements. Firms are dropped if they do not have employment or financial data available after 2017 (1.46% of all firms). Firms' last available data is used in the analysis if their last available data is in 2018 (3.08%). If firms have data for the last available year in 2020 (58.74%) and 2021 (0.13%), their 2019 data is used, unless such data is missing. If their 2019 data is missing, 2020 data will be used. If their 2020 data is also missing, data in 2021 will be used. We then selected firms with 250-499 employees (definition 1) or 250-1,499 employees (definition 2) in 2019 as the cohort of our analysis objectives. These additional steps can significantly improve the quality of our data and can enable us to include more firms in the analysis.

Comparing the ORBIS Europe and SBS databases

To validate the constructed data set extracted from ORBIS Europe, we aggregate the micro-data by country and compare summary statistics of various indicators by firm size distribution to aggregated official statistics from the Eurostat's Structural Business Statistics (SBS) data set. To this purpose, for each EU country, two levels of aggregation are used: (1) at country level; and (2) at country-sector level, where a sector is defined by the 2-digit NACE Rev.2 classification. In addition, at each level, the comparison is conducted by three firm size groups based on their number of employees in 2019: micro firms (0-9 employees), SMEs (10-249 employees), and large firms (more than 250 employees).

The economic indicators used in the multi-dimension comparison between the ORBIS and the SBS data are the following:

- sector coverage (NACE Rev.2 2-digit classifications),
- number of firms,
- aggregated turnover,

- aggregated employment,
- aggregated average labour productivity.

Overall, using the above indicators and the SBS as a benchmark, we found that the ORBIS data has a high-quality coverage for large firms. However, the SMEs and micro forms are less covered in the ORBIS Europe database.

The sectoral coverage in the ORBIS Europe database is wider than in the SBS: while the ORBIS Europe database is broken down by 88 sectors, there are only 68 sectors in the SBS data. The full list of sectors included in the two data sets is reported in Table A6. Therefore, the comparison of other indicators will be limited to the common sectors in both data sets.

We discuss below our main findings. Table A1 reports the average ORBIS Europe to SBS ratio of the above-mentioned indicators across EU27 member states. The full set of comparisons are shown in Tables A2-A5. To conduct the comparison at the country level, we aggregate the indicators (number of companies, aggregated turnover, aggregated employment) of a country by firm size group in each data set and we calculate the ratios as the aggregated indicators in the ORBIS Europe to those in the SBS. To conduct the country-sector level comparison, we first calculate the aggregated indicators for each country-sector-size category for both data sets, and we compute the ORBIS to SBS ratios. We then summarize the ratios by country and firm size group. The computation of labour productivity ratio is slightly different. Labour productivity is not constructed at firm level but rather is computed by using aggregated turnover divided by aggregated number of employees in each country-size or country-sector-size category. Therefore, it is the aggregated average labour productivity of a category. We then compute the ORBIS Europe to SBS ratios of labour productivity, and we summarize the ratios by country and size group.

In terms of the number of companies, our results suggest that in general the ORBIS Europe data set has a limited coverage of micro firms compared to the SBS data, while the ORBIS Europe and the SBS have similar coverages of SMEs and large firms. At country level, the average ORBIS Europe to SBS ratio of number of companies is 0.32 for micro firms, 0.69 for SMEs and 0.74 for large firms. At country-sector level, the average ORBIS Europe to SBS ratio is 0.43 for micro firms, 0.90 for SMEs and 0.85 for large firms.

However, the coverage of the ORBIS Europe data varies by country. For example, the ORBIS Europe data set has a very high coverage in Bulgaria and Romania (the ratios are close to or greater than 1 for all size groups), while its coverage is very low for Luxembourg and Malta (the ratios are close to 0 for all size groups). In some countries, the coverage of large firms and SMEs in the ORBIS data is high, while that of micro firms is much lower. For example, the ORBIS Europe to SBS ratio is very high for SMEs and large firms in Belgium, Croatia, Hungary, Ireland, Lithuania, Portugal, and Slovakia, while that ratio is much lower for micro firms in these countries. A similar pattern appears if the comparison is conducted at the country-sector level.

The ORBIS Europe to SBS ratio of the number of employees and turnover by firm size group show a similar pattern as that of the number of companies. As shown in Table A1, generally, the ORBIS Europe to SBS ratios of both indicators have higher values for SMEs and large firms than that for micro firms at both country level and country-sector level. Notably, the ratios are higher for SMEs than for large firms, and sometimes the ratios are greater than 1 at country-sector level. It suggests that, in comparison to the SBS data, the ORBIS Europe tends to report higher values of number of employees and turnover for SMEs in some sectors. However, it is not possible to identify whether the discrepancy results from that some firms report higher numbers to the ORBIS Europe than to the SBS or it is because different firms are selected in the ORBIS Europe and the SBS.

Labour productivities of micro firms implied by the two data sets are quite different, whereas those of SMEs and large firms are comparable. At country level, the average labour productivity of micro firms computed with the ORBIS Europe data is 8.68 times larger than that computed with the SBS data. It suggests a significant selection bias of micro firms in the ORBIS Europe data where successful micro firms are more likely to be included than their less successful (in terms of productivity) counterparts. On the contrary, labour productivity in the ORBIS is only 1.71 times larger than that in the SBS for SMEs, and the ratio is only 1.23 for large firms. These ratios indicate that the selection bias of the ORBIS Europe data is much reduced for SMEs and large firms if the total population of firms are those included in the SBS data.

Overall, the ORBIS Europe data has good quality in terms of covering of large firms. However, the quality of the ORBIS Europe data is less satisfactory for SMEs and for micro firms.

Table A1. A comparison between the ORBIS Europe and the SBS data sets

Country				Country-sector			
Number of enterprises				**Number of enterprises**			
Overall	Micro	SME	Large	**Overall**	Micro	SME	Large
Mean	0.32	0.69	0.74	**Mean**	0.43	0.90	0.85
SE	0.06	0.06	0.05	**SE**	0.01	0.02	0.02
Employees				**Employees**			
Overall	Micro	SME	Large	**Overall**	Micro	SME	Large
Mean	0.44	0.75	0.72	**Mean**	0.56	1.11	0.76
SE	0.06	0.06	0.06	**SE**	0.01	0.03	0.02
Turnover				**Turnover**			
Overall	Micro	SME	Large	**Overall**	Micro	SME	Large
Mean	0.49	0.81	0.77	**Mean**	0.65	1.45	0.82
SE	0.07	0.06	0.08	**SE**	0.02	0.11	0.03
Productivity				**Productivity**			
Overall	Micro	SME	Large	**Overall**	Micro	SME	Large
Mean	8.68	1.71	1.23	**Mean**	7.54	2.04	1.17
SE	4.94	0.20	0.11	**SE**	3.49	0.24	0.02

Source: Own elaboration based on the ORBIS Europe and the Eurostat's SBS data.

Note: SE reports the standard error of t-test that the corresponding rate equals to 1. The 2019 average USD to EUR exchange rate 0.8931 is used.

Table A2. ORBIS Europe and SBS comparison: Ratio of number of enterprises

Overall	Micro	SME	Large	**Overall**	Micro		SME		Large	
Mean	0.32	0.69	0.74	**Mean**	0.43		0.90		0.85	
SE	0.06	0.06	0.05	**SE**	0.01		0.02		0.02	
By EU member state				**By Eu member state**	Mean	SE	Mean	SE	Mean	SE
AT	0.23	0.60	0.82	**AT**	0.33	0.05	0.75	0.06	0.92	0.10
BE	0.15	0.88	0.94	**BE**	0.25	0.02	1.19	0.09	0.93	0.05
BG	0.96	1.25	1.16	**BG**	0.95	0.01	1.50	0.10	1.11	0.04
CY	0.01	0.07	0.28	**CY**	0.01	0.00	0.12	0.02	0.28	0.22
CZ	0.07	0.51	0.72	**CZ**	0.08	0.01	0.56	0.03	1.09	0.16
DE	0.25	0.57	0.75	**DE**	0.40	0.04	0.90	0.09	0.71	0.03
DK	0.43	0.66	0.60	**DK**	0.50	0.03	0.76	0.03	0.67	0.04
EE	0.64	0.88	0.69	**EE**	0.69	0.03	1.31	0.41	0.81	0.08
EL	0.02	0.32	0.62	**EL**	0.04	0.01	0.88	0.17	0.61	0.08
ES	0.15	0.72	0.75	**ES**	0.28	0.02	0.92	0.06	0.71	0.03
FI	0.41	0.63	0.72	**FI**	0.49	0.02	0.65	0.01	0.83	0.06
FR	0.02	0.34	0.73	**FR**	0.03	0.00	0.58	0.07	0.80	0.05
HR	0.40	0.91	0.89	**HR**	0.47	0.03	1.02	0.04	0.95	0.07
HU	0.27	0.97	1.00	**HU**	0.35	0.02	1.01	0.03	0.93	0.04
IE	0.14	0.77	1.02	**IE**	0.20	0.03	1.37	0.22	0.65	0.08
IT	0.51	0.78	0.76	**IT**	0.64	0.06	0.91	0.03	0.78	0.04
LT	0.30	0.99	0.98	**LT**	0.52	0.04	1.01	0.02	0.95	0.06
LU	0.00	0.01	0.02	**LU**	0.01	0.00	0.05	0.01	0.70	0.30
LV	0.62	0.93	0.83	**LV**	0.72	0.03	1.08	0.11	0.86	0.05
MT	0.00	.	.	**MT**	0.02	0.01	.	.	.	.
NL	0.23	0.85	0.51	**NL**	0.25	0.01	0.86	0.03	0.77	0.18
PL	0.37	0.45	0.89	**PL**	0.42	0.01	0.60	0.04	0.95	0.06
PT	0.24	0.92	0.90	**PT**	0.37	0.02	0.90	0.01	0.94	0.04
RO	1.17	0.92	0.92	**RO**	1.27	0.03	0.93	0.01	0.90	0.03
SE	0.60	0.86	0.61	**SE**	0.61	0.04	0.97	0.03	0.69	0.04
SI	0.31	0.88	0.86	**SI**	0.35	0.02	0.90	0.01	0.94	0.06
SK	0.13	0.97	1.04	**SK**	0.17	0.01	1.14	0.06	0.83	0.03

Source: Own elaboration based on the ORBIS Europe and the Eurostat's SBS data.

Note: All firms with non-missing employment information in 2019 in ORBIS Europe data are included in the analysis. SE reports the standard error of t-test that the corresponding rate equals to 1.

Table A3. ORBIS Europe and SBS comparison: Ratio of total number of employees

Overall	Micro	SME	Large	**Overall**	Micro		SME		Large	
Mean	0.44	0.75	0.72	**Mean**	0.56		1.11		0.76	
SE	0.06	0.06	0.06	**SE**	0.01		0.03		0.02	
By EU member state				**By EU member state**	Mean	SE	Mean	SE	Mean	SE
AT	0.27	0.80	0.93	**AT**	0.38	0.06	0.96	0.06	0.75	0.07
BE	0.29	0.92	0.80	**BE**	0.47	0.04	1.17	0.10	0.81	0.05
BG	1.22	1.21	1.15	**BG**	1.20	0.03	1.63	0.28	1.08	0.04
CY	0.02	0.13	0.35	**CY**	0.02	0.00	0.18	0.03	0.12	0.07
CZ	0.19	0.60	0.79	**CZ**	0.21	0.01	0.80	0.10	0.92	0.09
DE	0.26	0.71	0.76	**DE**	0.41	0.03	1.08	0.16	0.85	0.15
DK	0.51	0.67	0.52	**DK**	0.57	0.02	0.81	0.04	0.53	0.04
EE	0.77	1.10	1.01	**EE**	0.77	0.02	1.58	0.20	0.82	0.11
EL	0.05	0.43	0.49	**EL**	0.10	0.02	1.01	0.14	0.54	0.09
ES	0.27	0.78	0.68	**ES**	0.48	0.03	0.88	0.03	0.63	0.03
FI	0.56	0.68	0.68	**FI**	0.59	0.02	0.92	0.12	0.64	0.06
FR	0.07	0.52	0.50	**FR**	0.09	0.01	0.73	0.05	0.51	0.04
HR	0.52	0.95	0.76	**HR**	0.64	0.05	1.20	0.20	0.83	0.07
HU	0.46	1.02	0.85	**HU**	0.53	0.02	1.25	0.12	0.93	0.10
IE	0.29	0.81	1.25	**IE**	0.49	0.08	2.16	0.44	0.87	0.15
IT	0.53	0.84	0.61	**IT**	0.80	0.13	1.04	0.10	0.70	0.06
LT	0.63	1.11	1.19	**LT**	0.68	0.03	1.65	0.24	0.91	0.08
LU	0.00	0.03	0.03	**LU**	0.01	0.00	0.11	0.05	0.09	.
LV	0.84	0.91	0.73	**LV**	0.93	0.03	1.29	0.31	0.81	0.05
MT	0.00	0.00	0.00	**MT**	0.00	0.00	.	.	.	.
NL	0.31	0.66	0.30	**NL**	0.38	0.02	0.75	0.04	0.46	0.08
PL	1.03	0.65	0.73	**PL**	1.04	0.03	0.78	0.04	0.83	0.09
PT	0.46	0.94	0.98	**PT**	0.56	0.02	0.94	0.02	0.91	0.03
RO	0.78	0.93	0.89	**RO**	0.80	0.01	0.95	0.01	0.87	0.03
SE	0.79	0.82	0.55	**SE**	0.83	0.02	1.26	0.13	0.60	0.08
SI	0.50	1.04	0.96	**SI**	0.52	0.02	1.60	0.19	0.77	0.04
SK	0.25	1.02	1.08	**SK**	0.27	0.01	1.49	0.21	0.78	0.05

Source: Own elaboration based on the ORBIS Europe and the Eurostat's SBS data.

Note: All firms with non-missing employment information in 2019 in ORBIS Europe data are included in the analysis. SE reports the standard error of t-test that the corresponding rate equals to 1.

Table A4. ORBIS Europe and SBS comparison: Ratio of total turnover

Overall	Micro	SME	Large	**Overall**	Micro		SME		Large	
Mean	0.49	0.81	0.77	**Mean**	0.65		1.45		0.82	
SE	0.07	0.06	0.08	**SE**	0.02		0.11		0.03	
By EU member state				**By EU member state**	Mean	SE	Mean	SE	Mean	SE
AT	0.24	0.72	1.07	**AT**	0.23	0.04	0.70	0.08	0.73	0.08
BE	0.15	0.95	0.89	**BE**	0.23	0.05	1.70	0.39	0.87	0.06
BG	0.89	1.08	1.06	**BG**	0.92	0.03	1.44	0.11	1.10	0.10
CY	0.28	0.48	0.36	**CY**	0.20	0.08	0.29	0.06	0.20	0.14
CZ	0.24	0.67	0.81	**CZ**	0.31	0.08	1.07	0.27	1.29	0.28
DE	0.27	0.55	0.41	**DE**	0.75	0.27	0.93	0.25	0.52	0.07
DK	0.14	0.35	0.75	**DK**	0.12	0.03	0.36	0.04	0.59	0.04
EE	0.73	1.09	0.94	**EE**	0.83	0.04	1.66	0.24	0.83	0.09
EL	0.20	0.78	0.44	**EL**	0.20	0.02	1.57	0.30	0.58	0.07
ES	0.52	0.98	0.76	**ES**	0.75	0.05	1.36	0.30	0.68	0.03
FI	0.70	0.84	0.64	**FI**	0.82	0.14	1.02	0.10	0.78	0.11
FR	0.13	0.80	0.57	**FR**	0.37	0.13	1.08	0.10	0.56	0.05
HR	0.76	1.08	0.93	**HR**	0.81	0.03	1.49	0.30	0.83	0.08
HU	0.78	1.20	0.90	**HU**	0.84	0.04	1.49	0.17	0.96	0.10
IE	0.26	0.75	2.15	**IE**	0.47	0.22	2.14	0.59	2.12	0.71
IT	0.90	0.91	0.61	**IT**	1.04	0.08	1.26	0.15	0.65	0.05
LT	0.81	1.08	1.12	**LT**	0.75	0.03	1.84	0.35	0.85	0.09
LU	0.01	0.05	0.06	**LU**	0.03	0.01	0.09	0.04	0.21	.
LV	0.94	1.07	0.83	**LV**	1.09	0.07	2.93	0.69	0.68	0.10
MT	.	.	.	**MT**	.	.	.	.	.	.
NL	0.06	0.35	0.32	**NL**	0.23	0.13	3.41	2.40	0.35	0.08
PL	0.17	0.79	0.70	**PL**	0.28	0.04	0.93	0.05	0.80	0.07
PT	0.75	0.98	0.96	**PT**	0.76	0.05	1.01	0.02	1.04	0.09
RO	0.98	1.01	0.90	**RO**	1.05	0.06	1.04	0.04	1.00	0.09
SE	1.00	1.09	0.68	**SE**	1.57	0.24	1.70	0.27	0.72	0.10
SI	0.74	1.19	0.98	**SI**	0.75	0.02	1.71	0.20	0.85	0.05
SK	0.49	1.06	0.97	**SK**	0.46	0.02	2.16	0.47	0.83	0.05

Source: Own elaboration based on the ORBIS Europe and the Eurostat's SBS data.

Notes: All firms with non-missing employment and turnover information in 2019 in ORBIS Europe data are included in the analysis. SE reports the standard error of t-test that the corresponding rate equals to 1. The 2019 average USD to EUR exchange rate 0.8931 is used.

Table A5. ORBIS Europe and SBS comparison: Ratio of average labour productivity

Overall	Micro	SME	Large		**Overall**	Micro		SME		Large	
Mean	8.68	1.71	1.23		**Mean**	7.54		2.04		1.17	
SE	4.94	0.20	0.11		**SE**	3.49		0.24		0.02	
By EU member state					**By EU member state**	Mean	SE	Mean	SE	Mean	SE
AT	4.75	2.10	1.24		**AT**	3.77	0.89	1.75	0.18	1.04	0.05
BE	4.81	1.71	1.15		**BE**	5.00	1.52	1.98	0.31	1.22	0.08
BG	0.75	0.91	0.97		**BG**	0.84	0.05	1.04	0.04	1.02	0.04
CY	20.64	3.63	1.01		**CY**	2.42	0.45	1.79	0.28	1.50	0.22
CZ	1.76	1.23	1.03		**CZ**	1.81	0.11	1.23	0.07	1.24	0.10
DE	3.48	1.98	0.98		**DE**	6.92	2.38	2.00	0.46	1.16	0.10
DK	7.89	2.36	1.50		**DK**	4.61	2.32	1.86	0.13	1.21	0.06
EE	0.96	1.01	0.95		**EE**	1.09	0.06	1.05	0.03	1.10	0.05
EL	3.94	1.82	0.90		**EL**	2.19	0.20	1.49	0.10	1.19	0.09
ES	1.91	1.26	1.12		**ES**	1.54	0.07	1.44	0.22	1.12	0.06
FI	1.42	1.29	0.95		**FI**	1.81	0.40	1.24	0.07	1.18	0.07
FR	2.64	1.73	1.16		**FR**	2.41	0.32	1.60	0.08	1.09	0.03
HR	1.45	1.14	1.23		**HR**	1.44	0.07	1.47	0.25	1.08	0.04
HU	1.69	1.18	1.06		**HU**	1.69	0.15	1.16	0.05	1.19	0.11
IE	9.77	2.36	1.83		**IE**	3.22	0.89	2.65	0.46	2.58	0.74
IT	1.79	1.09	1.02		**IT**	1.90	0.28	1.20	0.09	1.11	0.10
LT	1.55	1.02	0.97		**LT**	1.27	0.06	1.05	0.04	0.97	0.04
LU	15.89	2.97	3.62		**LU**	5.93	.	2.24	0.88	2.28	.
LV	1.17	1.17	1.13		**LV**	1.36	0.14	3.10	0.84	1.08	0.15
MT	.				**MT**	.	.	.	.	.	.
NL	134.96	5.49	1.97		**NL**	262.36	166.52	14.75	5.65	1.37	0.16
PL	3.46	1.30	0.96		**PL**	3.17	0.27	1.29	0.04	1.00	0.04
PT	1.66	1.05	0.98		**PT**	1.24	0.06	1.10	0.02	1.12	0.06
RO	1.26	1.09	1.01		**RO**	1.30	0.12	1.09	0.03	1.21	0.09
SE	1.30	1.34	1.24		**SE**	2.14	0.48	1.29	0.06	1.19	0.05
SI	1.50	1.14	1.01		**SI**	1.42	0.08	1.20	0.08	1.11	0.04
SK	2.04	1.05	0.92		**SK**	1.85	0.16	1.35	0.18	1.12	0.06

Source: Own elaboration based on the ORBIS Europe and the Eurostat's SBS data.

Notes: All firms with non-missing employment and turnover information in 2019 in ORBIS Europe data are included in the analysis. SE reports the standard error of t-test that the corresponding rate equals to 1. The 2019 average USD to EUR exchange rate 0.8931 is used.

Table A6. Sector coverage comparison between the ORBIS Europe and the SBS

ORBIS Europe	SBS
01. Crop and animal production, hunting and related service activities	.
02. Forestry and logging	.
03. Fishing and aquaculture	.
05. Mining of coal and lignite	B05
06. Extraction of crude petroleum and natural gas	B06
07. Mining of metal ores	B07
08. Other mining and quarrying	B08
09. Mining support service activities	B09
10. Manufacture of food products	C10
11. Manufacture of beverages	C11
12. Manufacture of tobacco products	C12
13. Manufacture of textiles	C13
14. Manufacture of wearing apparel	C14
15. Manufacture of leather and related products	C15
16. Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	C16
17. Manufacture of paper and paper products	C17
18. Printing and reproduction of recorded media	C18
19. Manufacture of coke and refined petroleum products	C19
20. Manufacture of chemicals and chemical products	C20
21. Manufacture of basic pharmaceutical products and pharmaceutical preparations	C21
22. Manufacture of rubber and plastic products	C22
23. Manufacture of other non-metallic mineral products	C23
24. Manufacture of basic metals	C24
25. Manufacture of fabricated metal products, except machinery and equipment	C25
26. Manufacture of computer, electronic and optical products	C26
27. Manufacture of electrical equipment	C27
28. Manufacture of machinery and equipment nec	C28
29. Manufacture of motor vehicles, trailers and semi-trailers	C29
30. Manufacture of other transport equipment	C30
31. Manufacture of furniture	C31
32. Other manufacturing	C32
33. Repair and installation of machinery and equipment	C33
35. Electricity, gas, steam and air conditioning supply	D35
36. Water collection, treatment and supply	E36
37. Sewerage	E37
38. Waste collection, treatment and disposal activities; materials recovery	E38
39. Remediation activities and other waste management services	E39
41. Construction of buildings	F41
42. Civil engineering	F42
43. Specialised construction activities	F43
45. Wholesale and retail trade and repair of motor vehicles and motorcycles	G45

46. Wholesale trade, except of motor vehicles and motorcycles	G46
47. Retail trade, except of motor vehicles and motorcycles	G47
49. Land transport and transport via pipelines	H49
50. Water transport	H50
51. Air transport	H51
52. Warehousing and support activities for transportation	H52
53. Postal and courier activities	H53
55. Accommodation	I55
56. Food and beverage service activities	I56
58. Publishing activities	J58
59. Motion picture, video and television programme production, sound recording and music publishing activities	J59
60. Programming and broadcasting activities	J60
61. Telecommunications	J61
62. Computer programming, consultancy and related activities	J62
63. Information service activities	J63
64. Financial service activities, except insurance and pension funding	.
65. Insurance, reinsurance and pension funding, except compulsory social security	.
66. Activities auxiliary to financial services and insurance activities	.
68. Real estate activities	L68
69. Legal and accounting activities	M69
70. Activities of head offices; management consultancy activities	M70
71. Architectural and engineering activities; technical testing and analysis	M71
72. Scientific research and development	M72
73. Advertising and market research	M73
74. Other professional, scientific and technical activities	M74
75. Veterinary activities	M75
77. Rental and leasing activities	N77
78. Employment activities	N78
79. Travel agency, tour operator reservation service and related activities	N79
80. Security and investigation activities	N80
81. Services to buildings and landscape activities	N81
82. Office administrative, office support and other business support activities	N82
84. Public administration and defence; compulsory social security	.
85. Education	.
86. Human health activities	.
87. Residential care activities	.
88. Social work activities without accommodation	.
90. Creative, arts and entertainment activities	.
91. Libraries, archives, museums and other cultural activities	.
92. Gambling and betting activities	.
93. Sports activities and amusement and recreation activities	.
94. Activities of membership organisations	.
95. Repair of computers and personal and household goods	S95
96. Other personal service activities	.

97. Activities of households as employers of domestic personnel	.
98. Undifferentiated goods- and services-producing activities of private households for own use	.
99. Activities of extraterritorial organisations and bodies	.

Source: Own elaboration based on ORBIS and Eurostat's SBS data.

The weights used to ensure the representativeness of the ORBIS Europe data

Table A7. Weights computed by country and firm size group

EU member state	Micro	SMEs	Large
AT	4.37	1.67	1.22
BE	6.64	1.14	1.06
BG	1.05	0.80	0.86
CY	147.19	13.59	3.56
CZ	14.64	1.95	1.39
DE	4.04	1.74	1.32
DK	2.35	1.52	1.68
EE	1.56	1.14	1.44
EL	56.06	3.16	1.61
ES	6.47	1.39	1.34
FI	2.47	1.58	1.39
FR	46.98	2.90	1.37
HR	2.52	1.10	1.13
HU	3.71	1.04	1.00
IE	6.92	1.30	0.98
IT	1.98	1.28	1.31
LT	3.31	1.01	1.02
LU	415.96	85.12	49.00
LV	1.60	1.08	1.21
MT	6958.94	.	.
NL	4.26	1.17	1.96
PL	2.68	2.24	1.12
PT	4.11	1.09	1.11
RO	0.85	1.09	1.09
SE	1.65	1.17	1.64
SI	3.22	1.13	1.16
SK	7.42	1.03	0.96

Source: Own elaboration based on ORBIS Europe and Eurostat's SBS data.
Notes: All firms with non-missing employment information in 2019 in ORBIS Europe data are included in the analysis.

The concordance between the defined ecosystem and Nace Rev.2 sectors is given in the following table. This table also reports the share of each Nace Rev.2 sector, which represents a sector's contribution to the corresponding ecosystem.

Table A8. Industrial Ecosystems and NACE Rev.2 sectors

Ecosystem	Code	Nace Rev.2	Description	Share
Aerospace & Defence	E1	C25	Manufacture of fabricated metal products, except machinery and equipment	0.03
Aerospace & Defence	E1	C26	Manufacture of computer, electronic and optical products	0.44
Aerospace & Defence	E1	C27	Manufacture of electrical equipment	0.23
Aerospace & Defence	E1	C30	Manufacture of other transport equipment	0.68
Aerospace & Defence	E1	C33	Repair and installation of machinery and equipment	0.09
Aerospace & Defence	E1	H51	Air transport	0.09
Aerospace & Defence	E1	H52	Warehousing and support activities for transportation	0.18
Aerospace & Defence	E1	J61	Telecommunications	0.07
Aerospace & Defence	E1	N80	Security and investigation activities	1
Agri-food	E2	A	Agriculture, forestry and fishing	1
Agri-food	E2	C10	Manufacture of food products	1
Agri-food	E2	C11	Manufacture of beverages	1
Agri-food	E2	C12	Manufacture of tobacco products	1
Construction	E3	C31	Manufacture of furniture	1
Construction	E3	F	Construction	1
Construction	E3	M71	Architectural and engineering activities; technical testing and analysis	1
Construction	E3	N81	Services to buildings and landscape activities	1
Cultural and Creative Industries	E4	C18	Printing and reproduction of recorded media	1
Cultural and Creative Industries	E4	C32	Other manufacturing	0.08
Cultural and Creative Industries	E4	G47	Retail trade, except of motor vehicles and motorcycles	0.01
Cultural and Creative Industries	E4	J58	Publishing activities	1
Cultural and Creative Industries	E4	J59	Motion picture, video and television programme production, sound recording and music publishing activities	1
Cultural and Creative Industries	E4	J60	Programming and broadcasting activities	1
Cultural and Creative Industries	E4	J62	Computer programming, consultancy and related activities;	0.004
Cultural and Creative Industries	E4	J63	Computer programming, consultancy and related activities;	0.004
Cultural and Creative Industries	E4	M71	Architectural and engineering activities; technical testing and analysis	0.15
Cultural and Creative Industries	E4	M73	Advertising and market research	1
Cultural and Creative Industries	E4	M74	Other professional, scientific and technical activities and veterinary activities	0.64
Cultural and Creative Industries	E4	M75	Other professional, scientific and technical activities and veterinary activities	0.64
Cultural and Creative Industries	E4	N77	Rental and leasing activities	0.000 6
Cultural and Creative Industries	E4	P85	Education	0.1
Cultural and Creative Industries	E4	R90	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	0.8
Cultural and Creative Industries	E4	R91	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	0.8

Cultural and Creative Industries	E4	R92	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	0.8
Cultural and Creative Industries	E4	S94	Activities of membership organisations	0.02
Cultural and Creative Industries	E4	S95	Repair of computers and personal and household goods	0.26
Digital	E5	C26	Manufacture of computer, electronic and optical products	0.22
Digital	E5	J58	Publishing activities 1 Digital J61 Telecommunications	0.97
Digital	E5	J62	Computer programming, consultancy and related activities	1
Digital	E5	J63	Information service activities	1
Digital	E5	S95	Repair of computers and personal and household goods	0.48
Electronics	E6	C26	Manufacture of computer, electronic and optical products	1
Electronics	E6	C28	Manufacture of machinery and equipment n.e.c.	0.1
Energy - Renewables	E7	C27	Manufacture of electrical equipment	0.38
Energy - Renewables	E7	D35	Electricity, gas, steam and air conditioning supply	0.29
Energy Intensive Industries	E8	C16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	1
Energy Intensive Industries	E8	C17	Manufacture of paper and paper products	1
Energy Intensive Industries	E8	C19	Manufacture of coke and refined petroleum products	1
Energy Intensive Industries	E8	C20	Manufacture of chemicals and chemical products	1
Energy Intensive Industries	E8	C22	Manufacture of rubber and plastic products	1
Energy Intensive Industries	E8	C23	Manufacture of other non-metallic mineral products	1
Energy Intensive Industries	E8	C24	Manufacture of basic metals	1
Health	E9	C21	Manufacture of basic pharmaceutical products and pharmaceutical preparations	1
Health	E9	C32	Other manufacturing	1
Health	E9	Q86	Human health activities	1
Health	E9	Q87	Residential care activities and social work activities without accommodation	1
Health	E9	Q88	Residential care activities and social work activities without accommodation	1
Mobility - Transport - Automotive	E10	C27	Manufacture of electrical equipment	0.03
Mobility - Transport - Automotive	E10	C29	Manufacture of motor vehicles, trailers and semi-trailers	1
Mobility - Transport - Automotive	E10	C30	Manufacture of other transport equipment	0.32
Mobility - Transport - Automotive	E10	G45	Wholesale and retail trade and repair of motor vehicles and motorcycles	1
Mobility - Transport - Automotive	E10	H49	Land transport and transport via pipelines	0.52
Mobility - Transport - Automotive	E10	H50	Water transport	0.78
Mobility - Transport - Automotive	E10	H52	Warehousing and support activities for transportation	0.39
Proximity, Social Economy and Civil Security	E11	G47	Retail trade, except of motor vehicles and motorcycles	0.16
Proximity, Social Economy and Civil Security	E11	I	Accommodation and food service activities	0.14
Proximity, Social Economy and Civil Security	E11	L	Real estate activities	0.08
Proximity, Social Economy and Civil Security	E11	N81	Services to buildings and landscape activities	0.28

Proximity, Social Economy and Civil Security	E11	N82	Office administrative, office support and other business support activities	0.11
Proximity, Social Economy and Civil Security	E11	Q87	Residential care activities and social work activities without accommodation	1
Proximity, Social Economy and Civil Security	E11	Q88	Residential care activities and social work activities without accommodation	1
Proximity, Social Economy and Civil Security	E11	S95	Repair of computers and personal and household goods	1
Proximity, Social Economy and Civil Security	E11	S96	Other personal service activities	1
Proximity, Social Economy and Civil Security	E11	T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	1
Retail	E12	G46	Wholesale trade, except of motor vehicles and motorcycles	1
Retail	E12	G47	Retail trade, except of motor vehicles and motorcycles	1
Retail	E12	H53	Postal and courier activities	1
Textile	E13	C13	Manufacture of textiles	1
Textile	E13	C14	Manufacture of wearing apparel	1
Textile	E13	C15	Manufacture of leather and related products	1
Tourism	E14	H49	Land transport and transport via pipelines	0.45
Tourism	E14	H50	Water transport	0.22
Tourism	E14	H51	Air transport	0.91
Tourism	E14	I	Accommodation and food service activities	1
Tourism	E14	N79	Travel agency, tour operator and other reservation service and related activities	1
Tourism	E14	N82	Office administrative, office support and other business support activities	1
Tourism	E14	R90	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	0.66
Tourism	E14	R91	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	0.66
Tourism	E14	R92	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities	0.66
Tourism	E14	R93	Sports activities and amusement and recreation activities	1

Source: Own elaboration based on EC Annual Single Market Report 2021.

Assessing Mid-Caps definitions by EU member states

Table A9. The share of enterprise entities by country and by firm size group

EU member state	Micro	SMEs	250-499	250-1,499	250-2,999	3,000+
	(per 100)		(per 10k)			(per 1 Million)
AT	87.3	12.3	23.9	36.9	39.4	17.2
BE	95.1	4.7	9.1	14.3	15.3	7.5
BG	92.4	7.4	9.6	15.9	17.1	4.4
CY	92.9	7.0	8.2	10.9	10.9	5.5
CZ	95.0	4.9	9.1	14.5	15.5	4.7
DE	83.2	16.2	31.4	49.4	53.3	19.8
DK	91.9	7.9	12.3	20.4	21.9	3.9
EE	92.0	7.8	11.3	16.0	17.4	1.5
EL	94.4	5.6	4.5	6.6	6.8	1.1
ES	94.1	5.7	7.8	12.3	13.1	7.4
FI	91.3	8.4	15.2	24.5	25.8	8.3
FR	94.6	5.2	9.2	14.5	15.5	6.9
HR	92.0	7.8	12.9	20.1	21.2	5.7
HU	94.6	5.2	8.5	14.6	16.5	6.2
IE	92.8	7.0	8.4	14.0	15.3	7.4
IT	95.0	4.9	5.7	8.4	9.0	2.9
LT	93.1	6.7	11.5	17.4	18.4	3.4
LU	80.2	18.2	68.0	129.2	142.8	136.0
LV	91.5	8.3	14.1	19.4	20.3	4.6
MT	100.0					
NL	96.8	3.1	6.6	10.3	11.1	3.6
PL	95.1	4.7	9.1	14.5	15.6	4.4
PT	95.4	4.5	6.0	9.1	9.8	4.8
RO	89.9	9.8	16.9	26.3	28.3	11.6
SE	95.1	4.7	10.8	17.4	18.7	13.7
SI	94.5	5.4	8.9	14.8	15.4	3.6
SK	96.9	3.0	5.5	8.7	9.2	3.3

Source: Own elaboration based on the ORBIS database.
Note: All firms with non-missing employment information in 2019 in ORBIS data are included in the analysis.

Table A10. The share of total employees by country and by firm size group

EU member state	Micro	SMEs	250-499	250-1,499	250-2,999	3,000+
AT	22.0	42.2	7.7	17.4	22.3	13.5
BE	46.3	27.8	5.5	12.9	16.8	9.2
BG	35.0	41.6	5.8	14.7	19.1	4.2
CY	49.7	40.6	3.1	5.1	5.1	4.6
CZ	47.2	32.3	5.0	12.1	15.3	5.2
DE	15.1	43.0	7.5	17.6	23.1	18.9
DK	25.3	45.8	7.6	19.4	24.8	4.1
EE	36.1	44.2	7.2	13.7	18.7	1.0
EL	63.9	29.3	2.3	4.8	5.7	1.1
ES	47.5	29.3	4.5	10.6	13.4	9.8
FI	28.1	41.8	8.1	19.5	23.8	6.4
FR	45.8	31.6	4.3	10.1	13.0	9.6
HR	37.2	37.7	7.0	16.0	19.8	5.3
HU	43.8	29.1	5.2	14.0	20.9	6.2
IE	43.6	33.9	4.5	11.4	15.2	7.3
IT	45.5	35.9	5.0	10.8	13.5	5.1
LT	41.2	38.6	6.3	13.8	17.1	3.1
LU	7.9	35.6	8.7	26.9	36.0	20.5
LV	36.7	42.1	7.7	14.2	17.4	3.8
MT	100.0					
NL	45.5	29.0	6.6	15.0	19.8	5.7
PL	57.6	26.6	3.9	9.3	12.0	3.8
PT	52.7	28.5	4.3	9.5	12.6	6.2
RO	17.4	45.7	8.6	19.6	26.0	11.0
SE	21.8	32.1	8.3	20.2	26.3	19.8
SI	45.2	34.2	6.0	15.3	17.6	3.0
SK	57.0	25.7	4.3	10.4	12.7	4.7

Source: Own elaboration based on the ORBIS Europe database.
Note: All firms with non-missing employment information in 2019 in ORBIS Europe data are included in the analysis.

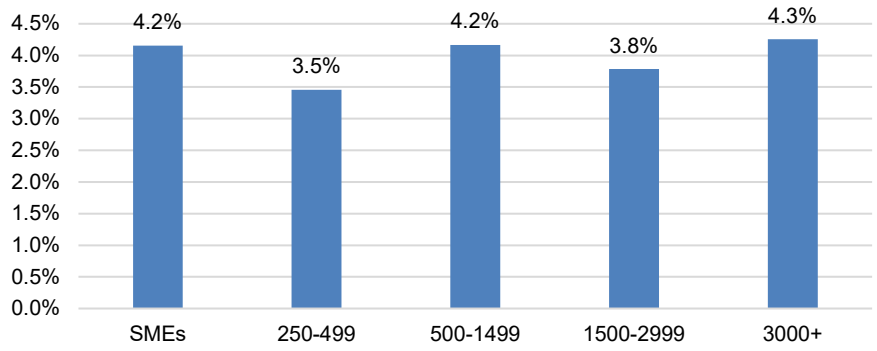
Table A11. The share of total turnover by country and by firm size group

EU member state	Micro	SMEs	250-499	250-1,499	250-2,999	3,000+
AT	12.6	42.9	14.9	27.2	32.6	11.8
BE	26.3	38.9	9.7	19.7	26.8	8.0
BG	23.2	46.4	6.6	20.7	26.5	3.9
CY	84.7	14.5	0.5	0.7	0.7	0.1
CZ	36.4	32.6	8.1	18.0	22.8	8.1
DE	13.2	35.6	11.0	30.1	38.4	12.8
DK	7.4	30.2	19.0	37.5	48.6	13.9
EE	36.5	45.3	6.0	13.0	17.3	1.0
EL	69.8	25.3	2.3	3.8	4.4	0.4
ES	41.8	31.3	6.2	15.1	17.5	9.4
FI	21.0	43.2	8.6	22.6	26.9	8.9
FR	44.8	30.4	4.6	11.4	14.6	10.2
HR	30.3	41.5	8.4	19.6	24.2	4.0
HU	38.7	33.0	5.2	14.7	20.6	7.6
IE	32.5	25.3	7.0	20.8	32.3	10.0
IT	33.0	40.7	9.1	17.5	20.9	5.4
LT	37.8	40.3	6.0	16.5	18.9	3.0
LU	8.1	35.7	1.3	5.1	7.3	48.8
LV	30.0	51.5	7.1	12.2	14.7	3.9
MT	100.0					
NL	9.4	36.9	19.2	45.5	49.8	3.8
PL	8.6	55.3	9.1	19.8	26.2	9.8
PT	46.2	33.1	6.1	11.9	15.6	5.2
RO	13.5	44.6	9.6	21.8	28.4	13.5
SE	17.7	34.5	10.0	22.5	29.7	18.1
SI	39.0	38.8	7.8	17.0	18.1	4.1
SK	53.5	22.9	4.8	11.7	15.3	8.3

Source: Own elaboration based on the ORBIS Europe database.
Note: All firms with non-missing employment and turnover information in 2019 in ORBIS Europe data are included in the analysis.

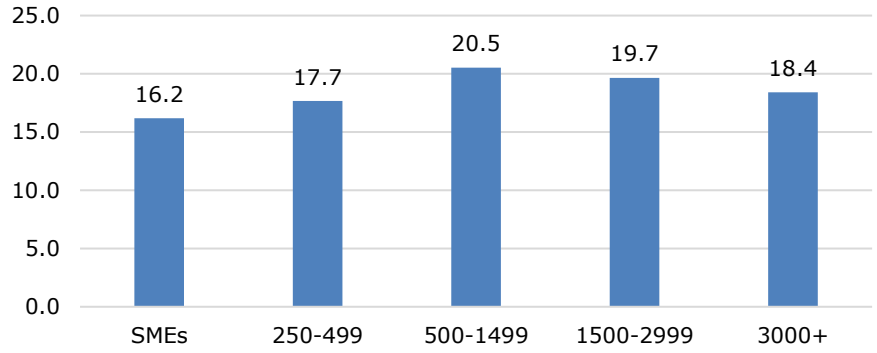
Key features of mid-caps

Figure A1. Profit margin by size group



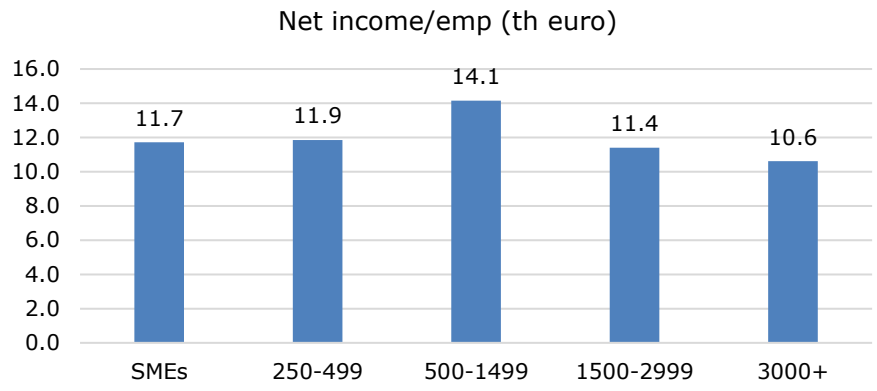
Source: Own calculations based on the ORBIS Europe database.
Notes: The 2019 average USD to EUR exchange rate 0.8931 is used. Luxembourg and Malta are excluded due to limited observations.

Figure A2. Cash flow (1,000 EUR) per employee



Source: Own calculations based on the ORBIS Europe database.
Notes: The 2019 average USD to EUR exchange rate 0.8931 is used.

Figure A3. Net income (1,000 EUR) per employee



Source: Own calculations based on the ORBIS Europe database.
Notes: The 2019 average USD to EUR exchange rate 0.8931 is used.

Descriptive statistics of mid-caps by EU member state

Table A12a. The share of foreign-owned mid-caps in all mid-caps by EU member state and by size group (domestic)

Domestic							
EU member state	**Micro**	**SMEs**	**250-499**	**500-1499**	**500-2999**	**3000+**	**All**
AT	0.93	0.90	0.78	0.81	0.76	0.85	0.93
BE	0.81	0.76	0.55	0.52	0.55	0.48	0.80
BG	0.95	0.92	0.71	0.64	0.67	0.58	0.95
CY	0.70	0.75	0.50	0.33			0.70
CZ	0.93	0.87	0.47	0.37	0.33	0.30	0.92
DE	0.94	0.94	0.91	0.91	0.88	0.91	0.94
DK	0.97	0.87	0.72	0.69	0.76	0.71	0.96
EE	0.07	0.29	0.36	0.43	0.67	0.00	0.09
EL	0.81	0.78	0.65	0.58	0.70	0.67	0.81
ES	0.45	0.67	0.74	0.76	0.74	0.78	0.47
FI	0.68	0.61	0.72	0.73	0.65	0.83	0.67
FR	0.71	0.84	0.85	0.87	0.86	0.91	0.73
HR	0.56	0.58	0.58	0.53	0.43	0.88	0.56
HU	0.95	0.82	0.36	0.32	0.28	0.30	0.93
IE	0.21	0.41	0.48	0.37	0.32	0.54	0.23
IT	1.00	0.94	0.78	0.76	0.75	0.67	0.99
LT	0.86	0.84	0.61	0.67	0.87	1.00	0.85
LU	0.61	0.41	0.33	0.50			0.54
LV	0.92	0.84	0.67	0.59	0.90	0.40	0.91
MT							
NL	0.87	0.92	0.84	0.88	0.84	0.93	0.88
PL	0.98	0.76	0.55	0.52	0.50	0.34	0.97
PT	0.20	0.41	0.59	0.62	0.67	0.76	0.21
RO	0.89	0.79	0.49	0.37	0.37	0.37	0.88
SE	0.94	0.89	0.74	0.78	0.67	0.85	0.93
SI	0.20	0.57	0.62	0.59	0.57	0.17	0.22
SK	0.48	0.55	0.36	0.30	0.20	0.43	0.48
EU27	0.81	0.84	0.75	0.74	0.73	0.76	0.81

Source: Own calculations based on the ORBIS Europe database.

Table A12b. The share of foreign-owned mid-caps in all mid-caps by EU member state and by size group (intra-EU foreign ownership)

Foreign, Intra-EU							
EU member state	**Micro**	**SMEs**	**250-499**	**500-1499**	**500-2999**	**3000+**	**All**
AT	0.04	0.06	0.13	0.10	0.17	0.15	0.05
BE	0.08	0.13	0.24	0.29	0.24	0.30	0.08
BG	0.01	0.04	0.16	0.17	0.15	0.17	0.01
CY	0.12	0.11	0.13	0.33			0.12
CZ	0.04	0.09	0.34	0.33	0.39	0.53	0.04
DE	0.03	0.03	0.04	0.04	0.03	0.04	0.03
DK	0.02	0.07	0.13	0.21	0.17	0.29	0.02
EE	0.02	0.11	0.48	0.32	0.33	1.00	0.02
EL	0.06	0.08	0.21	0.20	0.20	0.33	0.06
ES	0.02	0.05	0.11	0.12	0.12	0.17	0.02
FI	0.02	0.07	0.15	0.15	0.27	0.11	0.02
FR	0.05	0.05	0.06	0.07	0.09	0.04	0.05
HR	0.02	0.09	0.27	0.40	0.43	0.13	0.03
HU	0.03	0.11	0.41	0.36	0.32	0.52	0.04
IE	0.02	0.03	0.11	0.11	0.12	0.15	0.02
IT	0.00	0.03	0.10	0.11	0.16	0.28	0.00
LT	0.07	0.10	0.24	0.18	0.00	0.00	0.08
LU	0.25	0.23	0.33	0.50			0.25
LV	0.04	0.10	0.24	0.24	0.00	0.60	0.04
MT							
NL	0.02	0.03	0.06	0.05	0.06	0.04	0.03
PL	0.01	0.15	0.28	0.28	0.24	0.39	0.02
PT	0.01	0.06	0.18	0.23	0.25	0.20	0.01
RO	0.03	0.09	0.30	0.38	0.39	0.37	0.04
SE	0.03	0.05	0.12	0.13	0.25	0.09	0.04
SI	0.01	0.07	0.24	0.30	0.14	0.50	0.02
SK	0.05	0.19	0.41	0.41	0.44	0.43	0.05
EU27	0.02	0.05	0.13	0.14	0.14	0.16	0.02

Source: Own calculations based on the ORBIS Europe database.

Table A12c. The share of foreign-owned mid-caps in all mid-caps by EU member state and by size group (extra-EU foreign ownership)

Foreign, extra-EU							
EU member state	**Micro**	**SMEs**	**250-499**	**500-1499**	**500-2999**	**3000+**	**All**
AT	0.02	0.04	0.09	0.08	0.07	0.00	0.02
BE	0.12	0.11	0.21	0.20	0.22	0.21	0.12
BG	0.03	0.04	0.13	0.19	0.17	0.25	0.04
CY	0.18	0.14	0.38	0.33			0.18
CZ	0.03	0.04	0.19	0.30	0.28	0.17	0.03
DE	0.03	0.03	0.05	0.06	0.09	0.05	0.03
DK	0.02	0.06	0.16	0.10	0.07	0.00	0.02
EE	0.91	0.59	0.15	0.25	0.00	0.00	0.89
EL	0.13	0.13	0.15	0.23	0.10	0.00	0.13
ES	0.53	0.28	0.16	0.12	0.14	0.05	0.51
FI	0.30	0.32	0.14	0.12	0.08	0.06	0.30
FR	0.24	0.11	0.09	0.07	0.06	0.05	0.23
HR	0.42	0.33	0.15	0.07	0.14	0.00	0.41
HU	0.02	0.07	0.24	0.32	0.40	0.17	0.03
IE	0.77	0.56	0.41	0.51	0.56	0.31	0.76
IT	0.00	0.04	0.11	0.12	0.10	0.06	0.00
LT	0.07	0.06	0.14	0.15	0.13	0.00	0.07
LU	0.14	0.35	0.33	0.00			0.21
LV	0.05	0.06	0.09	0.17	0.10	0.00	0.05
MT							
NL	0.11	0.04	0.10	0.07	0.10	0.04	0.10
PL	0.01	0.09	0.17	0.20	0.25	0.28	0.02
PT	0.79	0.54	0.23	0.15	0.09	0.04	0.78
RO	0.07	0.12	0.20	0.26	0.24	0.26	0.08
SE	0.03	0.06	0.14	0.09	0.07	0.06	0.04
SI	0.78	0.36	0.14	0.11	0.29	0.33	0.76
SK	0.47	0.26	0.23	0.29	0.36	0.14	0.46
EU27	0.17	0.10	0.12	0.12	0.13	0.08	0.16

Source: Own calculations based on the ORBIS Europe database.

Table A13. Total assets intensity (total assets per employee, 1,000 EUR)

EU member state	SMEs	250-499	500-1,499	1,500-2,999	3,000+
AT	350	380	272	274	272
BE	721	759	510	1955	493
BG	66	69	84	113	99
CY	2277	3047	1048		117
CZ	176	284	144	182	177
DE	233	532	847	322	565
DK	1020	1549	1300	521	890
EE	134	102	173	66	69
EL	223	331	191	253	74
ES	271	363	358	193	181
FI	494	244	1492	180	425
FR	628	905	911	872	473
HR	117	284	116	253	138
HU	112	105	168	87	102
IE	927	1446	1727	1363	795
IT	374	683	464	423	435
LT	76	61	381	52	47
LU					
LV	77	73	52	119	34
MT					
NL	1138	700	488	2154	198
PL	121	111	112	130	120
PT	161	164	215	90	88
RO	65	72	93	99	147
SE	722	434	410	244	344
SI	176	715	249	64	159
SK	116	107	193	355	178

Source: Own calculations based on the ORBIS Europe dataset.
Notes: The 2019 average USD to EUR exchange rate 0.8931 is used.

Table A14. Labour productivity (turnover per employee, 1,000 EUR)

EU member state	SMEs	250-499	500-1,499	1,500-2,999	3,000+
AT	534.6	513.7	314.6	278.1	211.0
BE	644.0	505.9	388.1	547.9	287.8
BG	66.4	64.6	92.0	85.7	55.4
CY	581.8	262.3	197.3		27.7
CZ	123.1	186.4	158.0	177.7	178.1
DE	310.7	335.0	394.2	342.9	187.5
DK	649.7	632.7	358.7	479.8	760.3
EE	147.3	121.1	155.3	123.0	137.5
EL	178.5	204.3	123.1	152.2	85.3
ES	212.6	271.2	293.0	165.0	190.8
FI	289.9	290.2	334.6	273.0	373.0
FR	361.4	358.1	403.3	372.2	358.5
HR	103.2	113.1	116.2	112.7	71.9
HU	127.4	114.0	120.6	97.1	138.2
IE	558.3	535.7	640.2	952.6	456.5
IT	248.6	398.4	310.4	273.1	226.2
LT	92.5	73.9	110.0	55.1	78.0
LU					
LV	102.9	77.1	66.4	66.3	86.4
MT					
NL	1775.8	807.4	689.7	216.0	176.7
PL	150.5	158.4	135.2	158.7	172.6
PT	133.6	162.0	128.6	135.6	96.6
RO	86.7	98.8	99.0	91.2	108.9
SE	275.2	301.6	257.6	284.0	222.5
SI	190.8	219.1	165.6	80.1	229.5
SK	157.2	155.7	157.2	247.3	269.4

Source: Own calculations based on the ORBIS Europe database.
Notes: The 2019 average USD to EU exchange rate 0.8931 is used.

Table A15. Assets-turnover ratio (turnover to total asset ratio)

EU member state	SMEs	250-499	500-1,499	1,500-2,999	3,000+
AT	1.53	1.35	1.15	1.01	0.78
BE	0.89	0.67	0.76	0.28	0.58
BG	1.01	0.94	1.09	0.76	0.56
CY	0.26	0.09	0.19		0.24
CZ	0.70	0.66	1.10	0.98	1.01
DE	1.33	0.63	0.47	1.07	0.33
DK	0.64	0.41	0.28	0.92	0.85
EE	1.10	1.19	0.90	1.86	1.99
EL	0.80	0.62	0.65	0.60	1.16
ES	0.78	0.75	0.82	0.86	1.05
FI	0.59	1.19	0.22	1.52	0.88
FR	0.58	0.40	0.44	0.43	0.76
HR	0.88	0.40	1.00	0.45	0.52
HU	1.14	1.09	0.72	1.12	1.35
IE	0.60	0.37	0.37	0.70	0.57
IT	0.66	0.58	0.67	0.65	0.52
LT	1.22	1.21	0.29	1.05	1.67
LU					
LV	1.34	1.06	1.28	0.56	2.53
MT					
NL	1.56	1.15	1.41	0.10	0.89
PL	1.25	1.43	1.21	1.22	1.44
PT	0.83	0.99	0.60	1.51	1.10
RO	1.34	1.37	1.06	0.92	0.74
SE	0.38	0.70	0.63	1.16	0.65
SI	1.09	0.31	0.66	1.25	1.44
SK	1.35	1.46	0.81	0.70	1.52

Source: Own calculations based on the ORBIS Europe database.
Notes: The 2019 average USD to EU exchange rate 0.8931 is used.

Table A16. Efficiency ratio (100 times cash flow to total asset ratio)

EU member state	SMEs	250-499	500-1,499	1,500-2,999	3,000+
AT	11.00	6.41	9.09	9.53	4.47
BE	4.32	4.32	5.97	2.26	6.59
BG	10.38	8.51	9.87	5.12	9.92
CY	142.12	4.07			
CZ	8.34	5.93	9.20	11.15	12.12
DE	8.36	2.30	2.42	3.08	1.64
DK	13.44		5.32	27.40	
EE	8.30	11.56	8.88	17.08	
EL	4.64	1.72	6.79	17.97	9.14
ES	5.82	7.87	4.34	10.96	9.91
FI	3.63	7.13	1.28	4.90	2.13
FR	3.04	1.93	2.34	2.91	2.75
HR	7.78	4.30	9.90	8.12	5.32
HU	9.25	5.26	9.16	14.69	14.56
IE	6.15	4.95	6.81	6.38	31.52
IT	3.90	3.22	6.13	6.31	5.08
LT	-44.37				
LU					
LV	-1.16	1.46			
MT					
NL	4.17	3.08	1.17	0.15	0.76
PL	7.59	7.38	7.71	7.00	5.82
PT	6.35	8.36	6.82	6.34	3.29
RO	11.53	8.28	8.58	8.24	5.30
SE	2.64	7.07	8.19	14.07	6.03
SI	8.48	2.50	8.62	7.43	10.84
SK	7.59	8.14	6.85	4.43	11.93

Source: Own calculations based on the ORBIS Europe database.
Notes: The 2019 average USD to EU exchange rate 0.8931 is used.

Table A17. Profit margin (net income to turnover ratio)

EU member state	SMEs	250-499	500-1,499	1,500-2,999	3,000+
AT	4.7%	3.0%	5.0%	4.9%	1.8%
BE	3.0%	3.8%	2.8%	6.6%	6.6%
BG	6.3%	4.6%	4.9%	1.3%	6.7%
CY	20.2%	11.2%	6.2%		15.7%
CZ	6.6%	5.6%	4.6%	5.9%	5.3%
DE	3.6%	2.3%	1.2%	1.2%	1.5%
DK	4.6%	4.1%	5.7%	6.2%	2.7%
EE	4.8%	4.7%	3.5%	2.7%	-0.7%
EL	2.2%	-1.9%	2.5%	13.9%	4.4%
ES	4.8%	7.1%	1.7%	6.7%	5.1%
FI	4.5%	2.8%	3.0%	9.7%	-4.2%
FR	3.6%	2.7%	3.1%	4.7%	1.6%
HR	3.9%	4.6%	4.7%	8.2%	1.0%
HU	5.3%	1.4%	7.1%	7.2%	4.1%
IE	10.9%	10.4%	9.8%	3.2%	46.8%
IT	2.7%	2.8%	4.8%	3.4%	3.2%
LT	2.6%	4.0%	6.0%	3.5%	3.2%
LU					
LV	4.4%	9.0%	5.8%	3.3%	3.1%
MT					
NL	6.1%	4.7%	17.2%	8.0%	0.6%
PL	3.7%	3.0%	3.5%	2.5%	1.1%
PT	4.3%	4.2%	3.4%	0.8%	-7.7%
RO	5.3%	2.8%	4.3%	2.6%	2.0%
SE	6.8%	8.2%	9.6%	8.7%	14.2%
SI	4.2%	6.1%	5.3%	0.5%	1.9%
SK	2.3%	2.1%	3.5%	1.7%	4.3%

Source: Own calculations based on the ORBIS Europe database.
Notes: The 2019 average USD to EU exchange rate 0.8931 is used.

Descriptive statistics of mid-caps by ecosystems

Table A18. The share of firms by ecosystem and by firm size group

Ecosystem	Micro	SMEs	250-499	250-1,499	1,500-2,999	3,000+
	(per 100)		(per 10k)			
E1	83.6	15.4	55.8	36.0	8.6	5.2
E2	93.7	6.1	11.5	5.4	0.9	0.3
E3	93.2	6.7	6.6	3.6	0.7	0.4
E4	94.8	5.1	7.1	3.4	0.6	0.3
E5	92.7	7.1	13.2	6.6	1.7	0.7
E6	77.3	21.4	72.1	42.8	10.0	4.4
E7	87.9	11.2	43.3	28.4	6.9	4.2
E8	82.1	17.1	49.3	26.6	3.7	1.5
E9	90.9	8.5	31.6	23.0	4.8	2.2
E10	92.3	7.4	12.9	7.2	1.7	1.1
E11	94.0	5.7	12.9	7.8	1.6	0.8
E12	94.4	5.5	6.2	3.7	0.8	0.6
E13	86.2	13.5	21.5	8.9	0.9	0.5
E14	93.1	6.7	6.8	3.6	0.7	0.4

Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: All firms with non-missing employment information in 2019 in ORBIS Europe database are included in the analysis. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14).

Table A19. The share of total employees by ecosystem and by firm size group

Ecosystem	Micro	SMEs	250-499	250-1,499	1,500-2,999	3,000+
E1	13.7%	34.8%	9.2%	14.3%	8.5%	19.5%
E2	41.6%	38.5%	6.7%	7.0%	3.0%	3.2%
E3	49.6%	34.9%	3.9%	4.9%	2.5%	4.1%
E4	48.6%	34.4%	4.7%	5.2%	2.4%	4.7%
E5	37.6%	37.5%	6.5%	7.6%	4.9%	5.9%
E6	12.0%	41.9%	10.5%	15.2%	8.6%	11.7%
E7	15.7%	34.0%	9.7%	14.7%	9.0%	16.9%
E8	19.1%	48.3%	10.3%	12.6%	4.6%	5.1%
E9	21.2%	32.7%	8.8%	15.1%	7.7%	14.5%
E10	37.4%	32.0%	5.3%	6.9%	4.4%	14.1%
E11	36.0%	31.9%	6.2%	8.7%	4.4%	12.7%
E12	48.3%	28.8%	3.6%	5.0%	2.7%	11.7%
E13	29.6%	51.5%	7.5%	7.1%	1.8%	2.5%
E14	48.8%	35.4%	4.0%	4.9%	2.4%	4.6%

Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: All firms with non-missing employment information in 2019 in ORBIS data are included in the analysis. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14).

Table A20. The share of total turnover by ecosystem and by firm size group

Ecosystem	Micro	SMEs	250-499	250-1,499	1,500-2,999	3,000+
E1	13.9%	25.5%	7.9%	13.6%	7.3%	31.7%
E2	26.9%	43.9%	9.8%	12.3%	4.5%	2.5%
E3	47.5%	35.9%	5.2%	5.7%	2.4%	3.4%
E4	41.6%	37.5%	7.4%	7.6%	3.2%	2.6%
E5	23.7%	35.0%	10.2%	9.4%	9.8%	11.9%
E6	7.2%	30.8%	12.7%	22.3%	10.2%	16.8%
E7	13.7%	37.3%	13.4%	16.9%	9.8%	8.9%
E8	11.9%	38.8%	13.0%	18.0%	9.0%	9.2%
E9	17.6%	26.0%	9.9%	22.4%	8.3%	15.7%
E10	20.2%	37.0%	6.9%	7.2%	5.7%	23.0%
E11	45.0%	26.8%	5.6%	8.2%	4.3%	10.3%
E12	44.7%	32.5%	6.4%	8.2%	2.3%	5.8%
E13	21.6%	50.2%	8.5%	12.8%	2.2%	4.7%
E14	46.9%	33.5%	5.1%	6.7%	2.5%	5.2%

Source: Own elaboration based on the ORBIS Europe database and the EC Annual Single Market Report 2021.

Notes: All firms with non-missing employment information in 2019 in ORBIS data are included in the analysis. The ecosystems are: Aerospace & Defence (E01), Agri-food (E02), Construction (E03), Cultural and Creative Industries (E04), Digital (E05), Electronics (E06), Energy-Renewables (E07), Energy Intensive Industries (E08), Health (E09), Mobility-Transport-Automotive (E10), Proximity, Social Economy and Civil Security (E11), Retail (E12), Textile (E13), and Tourism (E14).

APPENDIX B

B1 INTERVIEW QUESTIONNAIRE

Introduction

S1: Do you feel knowledgeable to provide us with some insights on access to finance, innovation, internationalisation or sustainability in your enterprise?

Yes No (End interview)

General information about the enterprise

1. How many employees does your enterprise have?

Less than 250 employees (terminate)
250 - 499 employees
500 - 999 employees
1,000 - 1,499 employees
1,500 or more employees (terminate)

2. What is the sector your enterprise is operating in? [PN: see list in sheet Sector Quotas in sample file]

Hierarchical drop-down menu for the interviewer where he/she can choose the appropriate Nace 2-digit

2.b. What industry best describes your company

3. **Is your enterprise part of an enterprise group***? (two or more legally defined enterprises under common ownership, in the home country or abroad. The head office is also part of the group.)*

Yes ☐ YES – Go to Q3A

No ☐ NO – Go to Q4

3.A. Is your enterprise the Head Office?

Yes ☐ YES – Go to Q4

No ☐ NO – Go to Q3B

3.B. In which country is the Head Office located? (OE) _____

Go to Q4

4. Who owns your enterprise? (multiple possibilities)

It is owned by the founders of the enterprise ☐
It is owned by a number of non-related private shareholders ☐
It is owned by investors such as venture capital or institutional investors ☐

It is a family-owned business ☐

4.a. What is the main advantage of this form of ownership for your company?

4.b. What is the main disadvantage of this form of ownership for your company

5. Thinking about the next few years, how much does your enterprise plan to grow on average per year, if at all, in terms of:

(read out – one answer per line)

	No plan to grow	Grow less than 10%	Grow between 10 and 20%	Grow by more than 20%	Do not know
Number of full-time equivalent employees	☐	☐	☐	☐	☐
Turnover	☐	☐	☐	☐	☐

6. In which geographic markets does your enterprise sell goods and/or services?

	es	No
A. Local / or national	]	☐
B. European Union	]	☐
C. Other European countries		
D. North America	]	☐
E. China, India, other Asian markets	]	☐
F. Other markets outside Europe not mentioned above	]	☐

7. [PN: if Q6=Yes to at least 1 option from B-F; PN: force answer > 0%] What is the **share** of your turnover received from exports?

....%

8. *[PN: force min 1, max 3] From the following list, please indicate the three key areas which pose the biggest challenge for your enterprise*

Access to finance ☐

Payment delays ☐

Lack of skills, including management skills ☐

Difficulties in finding employees	☐
Difficulties with innovation	
Regulation and administrative burden	☐
Supply chain disruptions/lack of supplies-raw materials	☐
Internationalisation	☐
Difficulties with digitalization	☐
Access to data	☐
Becoming more sustainable by reducing materials, energy and cutting emissions	☐
Other – please specify (OE)	☐

9. 8.a. Were any of these challenges triggered/worsened by the pandemic?

es	**No**
]	☐

8.b. Please explain [PN: add DK]

Financing and access to capital

10. If you intend to grow, will you be counting on additional external financing for this? [PN: single select]

No, we have enough internal reserves	☐
Yes, we will be looking for external financing/bank loan/investors	☐
Yes, we will be looking for public funding/state aid	☐

11. Would your enterprise be able to obtain external financing in case of need? [PN: single select]

Yes, definitely	☐
Yes, probably	☐
No, probably not	☐
No, definitely not	☐

12. If you were looking for external funding in the past, how important were the following barriers?

	Degree of importance			
	High	Medium	Low	Not important
Lack of credit from banks	☐	☐	☐	☐
Lack of external equity finance, for example venture capital	☐	☐	☐	☐
Difficulties in obtaining government grants or subsidies	☐	☐	☐	☐

Employment and skills

13. Is the lack of skilled employees a major obstacle for the growth of your enterprise?

es	No
]	☐

14. How important are the following barriers related to employment and skills?

	Degree of importance			
	High	Medium	Low	Not important
Difficulties to recruit qualified technical staff	☐	☐	☐	☐
Difficulties to recruit qualified information technology staff	☐	☐	☐	☐
Difficulties to recruit qualified administrative and sales staff	☐	☐	☐	☐
Loss of skilled employees to competitors	☐	☐	☐	☐
Other please specify (OE)	☐	☐	☐	☐

R&D and Innovation

15. Has your company been active in research or the development of new products or processes recently?

	Permanently	Sometimes	No
Research and development	☐	☐	☐
Development of new goods or services	☐	☐	☐
Development of new processes or business models	☐	☐	☐

⇨ Three no, go to 18

16. If you are active in R&D or innovation, do you spend 10% or more of your total operating cost on R&D?

Yes	No
☐	☐

17. If you are active in R&D or innovation, who is doing these activities in your enterprise?

	Yes	No
This is the task of the R&D or innovation department	☐	☐
This is the task of production or marketing department	☐	☐
This is the task of the management	☐	☐
Not fixed, depends on the topic	☐	☐
Other/external partners	☐	☐

18. If you are active in R&D and innovation, how important were the following barriers for these activities?

	Degree of importance			
	High	Medium	Low	Not important
Lack of funding for R&D and innovation, including governmental funding	☐	☐	☐	☐
Lack of market acceptance for new products	☐	☐	☐	☐
Difficulties to co-operate with universities and other firms	☐	☐	☐	☐
Technical problems with the new product or process	☐	☐	☐	☐

⇨ Go to question 19

19. [PN: Skip if yes to any in Q14] **If you were NOT active in R&D and innovation, what are the reasons?**

	Degree of importance			
	High	Medium	Low	Not important
No need for new products or adaptations	☐	☐	☐	☐

No market for new goods or services	☐	☐	☐	☐
Difficulties to raise funding for R&D and innovation	☐	☐	☐	☐
Other, please specify	☐	☐	☐	☐

Internationalisation

20. Does your company have own affiliates outside your home country carrying out one of the following activities?

	Yes	No
Production	☐	☐
Marketing, sales	☐	☐
After-sales, maintenance	☐	☐
R&D, innovation	☐	☐

⇨ Four times No, go to question 22

21. In how many countries is your enterprise present with own affiliates (excluding the home country)? [PN: sum > 0]

Inside EU

Outside EU

22. A. [PN: inside EU >0] If you are active abroad with own affiliates inside EU, how important were the following barriers for these activities?

	Degree of importance			
	High	Medium	Low	Not important
Obstacles for market access	☐	☐	☐	☐
Quality problems with foreign production	☐	☐	☐	☐
Too high costs of foreign presence	☐	☐	☐	☐
Loss of flexibility with long supply chains	☐	☐	☐	☐
Other, please specify				

21. B. [PN: outside EU >0] If you are active abroad with own affiliates outside EU, how important were the following barriers for these activities?

	Degree of importance

	High	Medium	Low	Not important
Obstacles for market access	☐	☐	☐	☐
Quality problems with foreign production	☐	☐	☐	☐
Too high costs of foreign presence	☐	☐	☐	☐
Loss of flexibility with long supply chains	☐	☐	☐	☐
Other, please specify				

⇨ Go to question 23

22. [PN: Skip if yes to any in Q19] **If you are NOT active abroad with own affiliates, what are the reasons?**

	Degree of importance			
	High	Medium	Low	Not important
Foreign presence is too expensive	☐	☐	☐	☐
Too little market potential for our products	☐	☐	☐	☐
We are happy with exporting	☐	☐	☐	☐
Too complicated	☐	☐	☐	☐

Other: please specify (OE)

Digitalisation

23. Does your enterprise use any of the following digital technologies?

	Yes	No
Artificial Intelligence	☐	☐
Big Data Analytics	☐	☐
Internet of Things	☐	☐
Robots	☐	☐
3D Printing	☐	☐
Other digital tools or technologies please specify (OE)	☐	☐

24. Has your enterprise experienced any of the obstacles listed below in the adoption and use of these digital technologies?

	Severeness of obstacle			
	High	Medium	Low	Not experienced
We found it difficult to finance the associated investments	☐	☐	☐	☐
We found it difficult to recruit skilled staff for developing or implementing these technologies	☐	☐	☐	☐
We found it difficult to integrate these technologies into our existing processes	☐	☐	☐	☐
Uncertainty about future digital standards makes investments difficult	☐	☐	☐	☐
IT security issues are blocking digitalisation	☐	☐	☐	☐
Other, please specify (OE) Only show scale options if data entered in OE box				

Regulatory burden

25. Some legal requirements (such as reporting) depend on the size of the enterprise.

Have you encountered such requirements, and did they hamper your enterprise in its activities or pursue its plans to grow?

	Degree of impact			
	High	Medium	Low	Not important
Employment-related requirements	☐	☐	☐	☐
Taxation	☐	☐	☐	☐
Accounting standards	☐	☐	☐	☐
Customs/trade related requirements	☐	☐	☐	☐
Environmental regulations				
Different legislation in different countries	☐	☐	☐	☐
Other, please specify (OE). Only show scale options if data entered in OE box				

25.a. Are these mainly requirements at: [PN: multi select]

- National level
- EU level
- International level

Sustainability

26. In terms of environmental sustainability, which of the following actions, if any, is your enterprise actively taking?

Recycling or reusing materials	☐
Reducing materials consumption of or impact on natural resources (eg saving water or switching to sustainable resources)	☐
Reducing energy consumption	☐
Switching to sustainable energy	☐
Replacing energy-intensive equipment by more energy-efficient equipment	☐
Reducing emissions with other means, for example filter systems	☐
Developing more sustainable products	☐
Other, please specify	☐

27. Which of the following, if any, are currently preventing your enterprise from becoming more sustainable?

Lack of willingness among the management	☐
Lack of consumer demand	☐
It is not compatible with our current business model	☐
It would not be profitable	☐
Lack of skills for sustainability, including managerial skills	☐
Lack of financial resources	☐
Other, please specify	☐

28. We plan a half-day online workshop to present the results and discuss their implications with enterprise representatives. Would you be interested to take part in such a workshop?

Yes Please enter your email address

No

B2 KEY CHARACTERISTICS OF MID-CAP RESPONDENTS

This Appendix summarises the key characteristics of mid-cap respondents with respect to their distribution by sector and by EU member state, size, ownership, growth plans and engagement in exporting.

Table B1 shows the distribution of all mid-cap respondents by sector. Two-fifths of all mid-cap respondents are from the manufacturing sector (41%), 52% from the services sector, 2% from utilities and 5% from construction.

Table B1: The distribution of mid-cap respondents by sector

Sector	Number of mid-cap respondents	% of all mid-cap respondents
C Manufacturing	62	41%
D Electricity, gas, steam, and air conditioning supply	2	1%
E Water supply; sewerage, waste management and remediation activities	2	1%
F Construction	8	5%
H Transportation and storage	9	6%
I Accommodation and food service activities	6	4%
J Information and communication	36	24%
L Real estate activities	3	2%
M Professional, scientific, and technical activities	23	15%
TOTALS	**151**	**100%**

Source: Own elaboration based on 151 interviews conducted by Integral Research.

Of all 151 respondents, 42% are small mid-caps (250-499 employees) and 58% are large mid-caps (500-1,499 employees). The distribution of the respondents by sector and mid-cap size is shown in Table B2 and Figure B1 below.

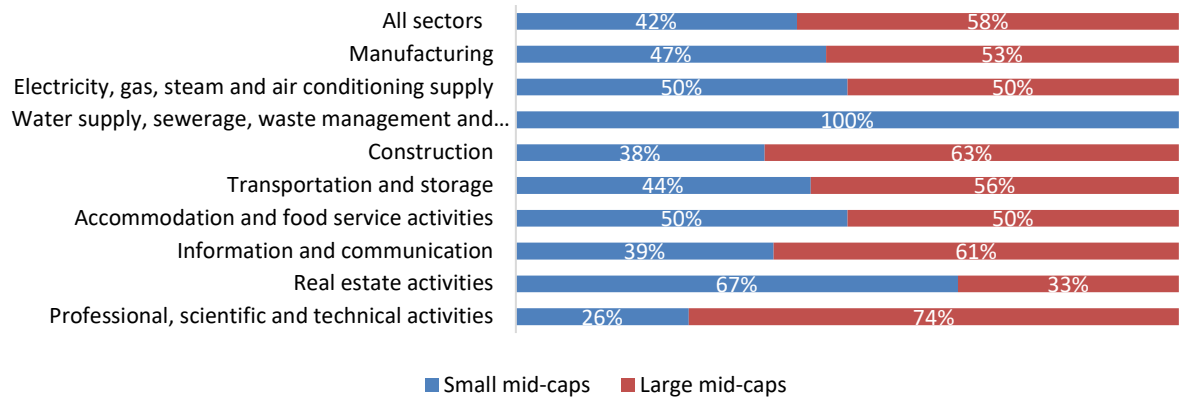
Table B2: The distribution of the mid-cap respondents by sector and group size

Sector	Number of small mid-cap respondents	Number of large mid-cap respondents
C Manufacturing	29	33
D Electricity, gas, steam, and air conditioning supply	1	1
E Water supply; sewerage, waste management and remediation activities	2	0
F Construction	3	5
H Transportation and storage	4	5
I Accommodation and food service activities	3	3
J Information and communication	14	22
L Real estate activities	2	1
M Professional, scientific, and technical activities	6	17
TOTALS	**64**	**87**

Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q1: How many employees does your enterprise have?

Figure B1: The distribution of the respondents by sector and mid-caps size

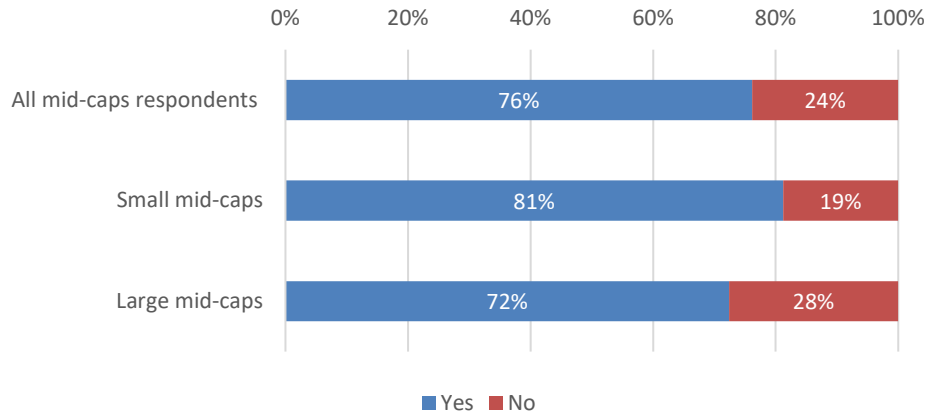


Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: What is the sector your enterprise is operating in?

As shown in Figure B2, three quarters of respondents are from mid-caps that are part of an enterprise group (76%) with a higher proportion of small mid-caps (81%) being part of an enterprise group in comparison to large mid-caps (72%).

Figure B2: The proportion of mid-caps being part of an enterprise group



Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Is your enterprise part of an enterprise group? (two or more legally defined enterprises under common ownership, in the home country or abroad. The head office is also part of the group.)

Table B3 shows the distribution of mid-cap respondents by EU member state. Respondents from large EU member states (Germany, France, Italy, Spain) account for 41% of all respondents while 51% of all respondents are from the other 23 EU member states.

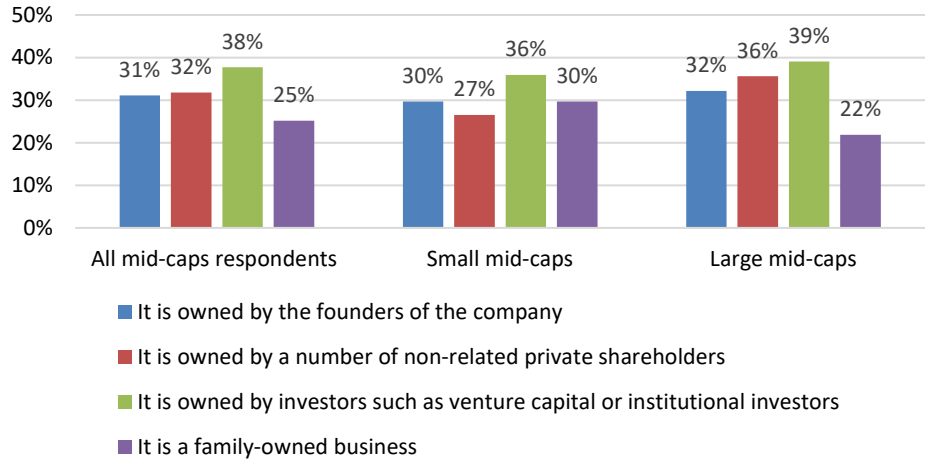
Table B3: The distribution of mid-cap respondents by EU member state

EU member state	Number of mid-cap respondents	% of all mid-cap respondents
Austria	2	1%
Belgium	1	1%
Bulgaria	4	3%
Cyprus	3	2%
Croatia	1	1%
Czech Republic	12	8%
Denmark	1	1%
Estonia	2	1%
Finland	7	5%
France	11	7%
Germany	37	25%
Greece	3	2%
Hungary	7	5%
Ireland	1	1%
Italy	1	1%
Latvia	2	1%
Lithuania	2	1%
Luxemburg	2	1%
Malta	1	1%
Netherlands	1	1%
Poland	20	13%
Portugal	13	9%
Romania	1	1%
Slovakia	1	1%
Slovenia	2	1%
Spain	12	8%
Sweden	1	1%
Total	**151**	**100%**

Source: Own elaboration based on 151 interviews conducted by Integral Research.

The ownership type varies across the respondent mid-caps: ownership belongs to the founders of the company in the case of 31% of all mid-cap respondents (30% of small mid-caps; 32% of large mid-caps); ownership by a number of non-related private stakeholders in the case of 32% of all respondents (27% small mid-caps; 36% of large mid-caps); ownership by venture capital or institutional investors in the case of 38% of all respondents (36% of small mid-caps; 39% of large mid-caps); family-owned mid-caps in the case of 25% of all respondents (30% of small mid-caps; 22% of large mid-caps).

Figure B3: The ownership of mid-caps respondents

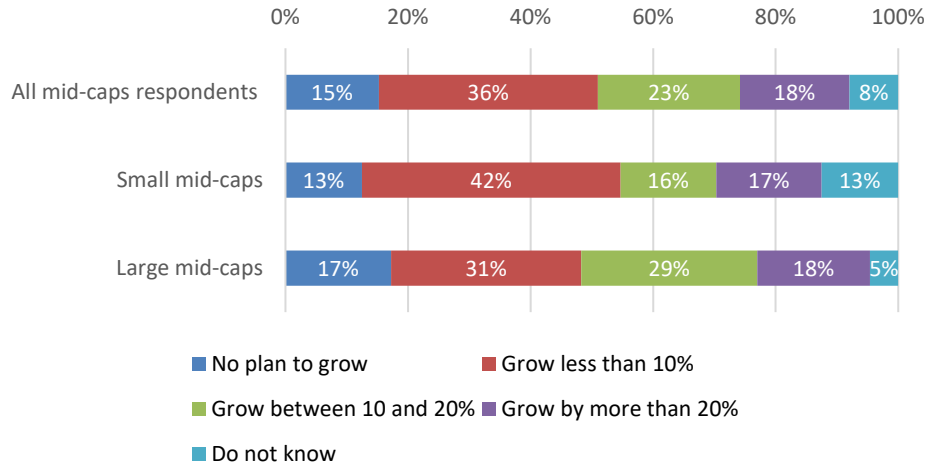


Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Who owns your company?

A large proportion of mid-caps have growth ambitions in terms of employment for the next few years (Figure B4) ranging from less than 10% (36 % of all respondents; 42% of small mid-caps; 31% of large mid-caps), between 10% and 20% (23% of all respondents; 16% of small mid-caps; 29% of large mid-caps), to more than 20% (18% of all respondents; 17% of small mid-caps; 18% of large mid-caps).

Figure B4: Growth plans of mid-caps in terms of employment

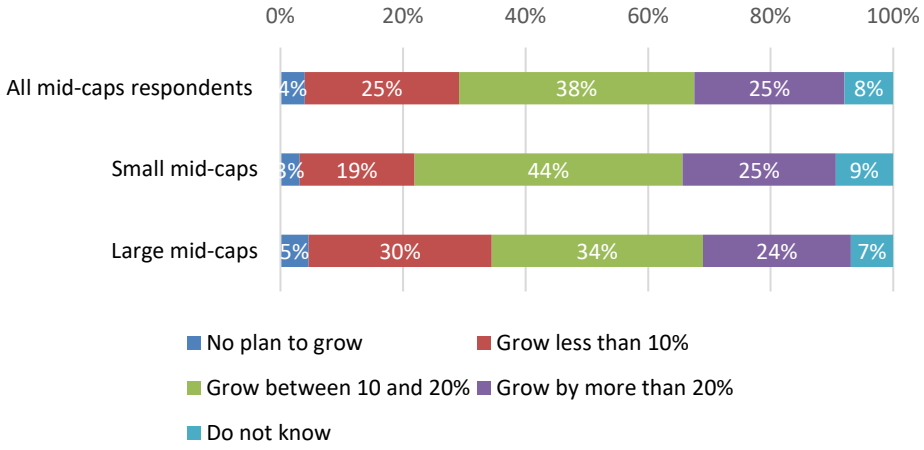


Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Thinking about the next few years, how much does your enterprise plan to grow on average per year, if at all, in terms of the number of full-time equivalent employees?

Looking at growth in terms of turnover (Figure B5), a quarter of all respondents plan to grow less than 10% (19% of small mid-caps; 30% of large mid-caps). The proportion of mid-caps planning to expand in particular between 10% and 20% (38% of all respondents; 44% of small mid-caps; 34% of large mid-caps) and over 20% (25% of all respondents; 25% of small mid-caps; 24% of large mid-caps) is larger in comparison to employment growth plans suggesting that growth would be driven by productivity gains.

Figure B5: Growth plans of mid-caps in terms of turnover

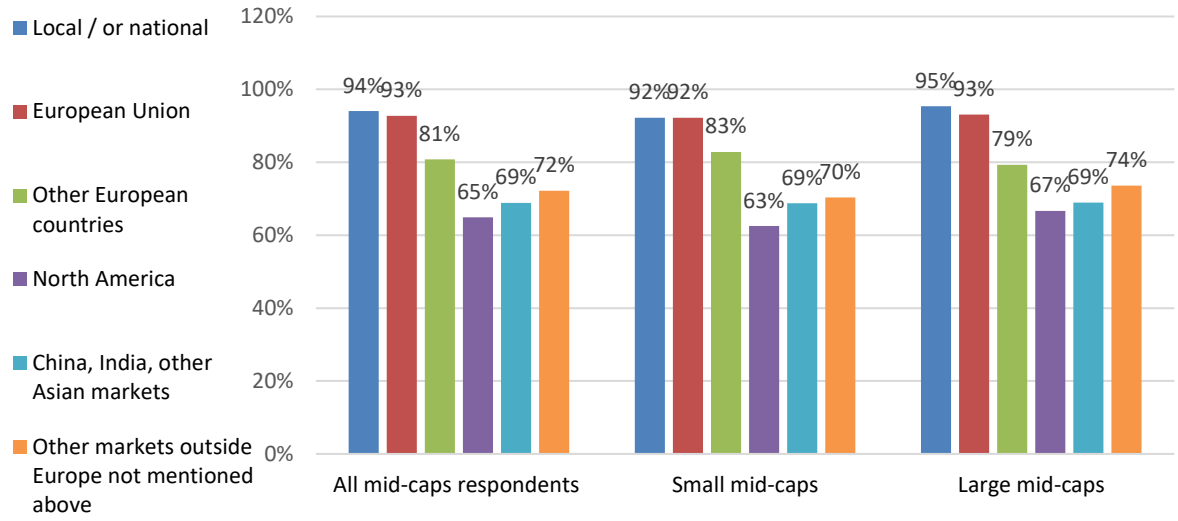


Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: Thinking about the next few years, how much does your enterprise plan to grow on average per year, if at all, in terms of turnover?

Exporting is a key feature of mid-caps. Over 93% of all respondents report selling goods and/or services within EU (94% of small mid-caps; 93% of large mid-caps). Exports to other destinations are also very frequent: other European countries (81% of all respondents), North America (65% of all respondents), China, India, other Asian markets (69% of all respondents), other markets outside Europe (72% of all respondents).

Figure B6: Mid-caps' local/national sales and exporting destinations



Source: Own elaboration based on 151 interviews conducted by Integral Research.

Q: In which geographic markets does your enterprise sell goods and/or services?

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