OECD SME and Entrepreneurship Papers

Understanding SME heterogeneity: Towards policy relevant typologies for SMEs and entrepreneurship

An OECD Strategy for SMEs and Entrepreneurship

Stephan Raes

The heterogeneity and highly diverse nature of the SMEs population represent a core challenge for SME policy frameworks. This paper discusses if and how typologies can help policy makers to better understand the wide diversity of SMEs and entrepreneurs. It proposes a policy perspective for analysing typologies, and reviews 169 typologies to assess their relevance for policy making. The paper presents a number of actionable typologies, as examples of how policy relevant SME and entrepreneurship typologies could be developed. The paper was developed in the context of the OECD SME and Entrepreneurship Strategy.

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Executive Summary

SMEs are defined by what they have in common, which is their relatively smaller size in relation to other businesses, as measured by employment, turnover, value of assets, or other metrics. The smaller size may lead to greater agility, but may also affect their access to resources or may hamper the playing field in which they operate vis-à-vis larger entities. Although many SMEs share these size-related advantages or challenges, it is at least as important to consider that SMEs and entrepreneurs are very different and diverse in terms of organisation, behaviour and performance. There are differences between micro, small and medium sized firms. Differences between sectors and technology areas. And differences between various types and backgrounds of entrepreneurs.

This paper aims to contribute to a better understanding of SME heterogeneity by the development of SME and entrepreneurship typologies, to enable policy makers to take differences between SMEs and entrepreneurs better into account. A typology in essence is a means of classification with the aim of ordering entities in classes or groups according to similarities. The paper proposes a four step framework to assess if typologies are relevant for policy making:

- First, the dimensions and attributes a typology encompasses should be relevant from the perspective of the **objectives** that policy makers pursue.
- Second, for typologies to be meaningful to policy makers, they should be based on **reliable and comparable data**.
- Third, to be of relevance across OECD countries, a typology should be usable in the **multiple contexts** of different country settings.
- Fourth, for typologies to be meaningful tools they should **not be too complex**, and include types that are easy to understand and recognizable for both policy makers and entrepreneurs themselves.

These four requirements were used to analyse 169 typologies identified in the literature, which were grouped in two different categories according to the policy objectives they could potentially serve: typologies with relevance to policy objectives regarding specific groups of entrepreneurs (such as women, minority or social entrepreneurs) and typologies with relevance for more horizontal policy objectives regarding economic performance, such as innovation, digitalisation, high growth and the environment, to which SMEs and entrepreneurs through their behaviour can contribute. The paper concludes that according to the different criteria used, the articulation of typologies on high growth, innovation and start-ups appears to be at a most advanced stage and most promising for further work and testing.

In order to further explore possibilities for typology development, the paper includes a number of examples of what such policy relevant typologies could look like in practice. They include the following:

- An online SME Diversity Assessment Tool to raise awareness on SME diversity in impact assessments and consultations;
- A matrix of SME attributes that provides an empirical toolbox for understanding differences in the drivers of SME performance;

- A methodology to go beyond the binary classification of frontrunners and laggards, that highlights dynamics of performance of the ‘peloton’ of more average performers;
- A classification tool to better understand the SME Ordinaire;
- A typology for effective post COVID-19 recovery policies;
- A targeted approach to SME skills development;
- A typology for better understanding the greening of SMEs and entrepreneurs;
- A financing tool, to understand financing needs of different groups of SMEs;
- A classification of business journeys to support SME internationalisation.

This paper was developed as part of the OECD SME and Entrepreneurship Strategy, which aims to contribute to more effective, efficient and coherent SME and entrepreneurship policies. The Strategy aims to deliver a set of guiding principles supported by dedicated operational tools to help policy makers better navigate SME and entrepreneurship policies in the post COVID-19 era.

1 Introduction

The heterogeneity and highly diverse nature of the SMEs population represent one of the main challenges for SME policy frameworks. The rationale behind a firm size perspective within policy frameworks of course lies in the *commonalities* firms share according to their size, even though the precise definitions of what constitutes an SME vary across OECD countries[1]. The relatively smaller size of businesses may be their advantage or their challenge. Smaller entities can be agile and innovative. They may be able to make use of opportunities when they arise and adjust smoothly to changes in circumstances. At the same time, size can be a burden. SMEs may have less access to resources because of their size and lack capabilities compared to larger entities. Fixed costs, for instance due to regulation, but also for making investments, can weigh relatively more on small firms, putting them on an uneven playing field vis-à-vis their larger competitors.

However, SMEs also *differ* along many dimensions, both with respect to size (micro firms, larger SMEs, mid-caps) as well as other attributes, such as organisational aspects (age, sector, technological intensity, ownership type, domestic and foreign linkages), behaviour (opportunity recognition, creation, evaluation and exploitation, strategy, motivation) and performance (innovation, growth, impact, social goals) as well as characteristics of the entrepreneur (age, gender, background). These characteristics may capture critical drivers of firm performance or aspects of vulnerability and exposure to market failures, which are relevant for policy-making.

This paper focuses less on what SMEs have in common and rather on how they differ, and on how frameworks to classify and interpret these differences can help policy makers. Better understanding SME heterogeneity is important for policy makers for several reasons. First, it may help to better assess the impact of regulations or other policy instruments on various segments of the firm population. That impact may vary according to characteristics of firms and entrepreneurs, in part because their responsiveness to policy making may differ. Second, it may help in assuring a more representative participation by SMEs and other firms in consultations and other government communication. Communicating towards the average, the frontrunners or the ones with the loudest voices may not be conducive to balanced policy design. Third, better understanding SME heterogeneity can make policies more effective, if it allows them to better take the specific circumstances of firms and entrepreneurs into account. Better understanding SME variety can also enable policy makers to identify and better articulate their policy objectives. It may allow for tailor made and inclusive solutions in the cases where that is needed, for setting priorities, and for sound means of mainstreaming the perspectives of the variety of SMEs and entrepreneurs in more horizontal policy making. Developing classifications to better understand the variety of the firm population does not equal designing a toolkit for targeted policy making. Rather, it aims to do justice to SMEs not as a mathematical cohort or textbook abstraction, but as a richly diverse and varied community of woman and men and the organisations they lead, with different resources, strategies, backgrounds and aspirations.

This paper explores the possibilities of developing SME typologies as a means to help policy makers better understand the differences between SMEs. It aims to answer the following questions:

1 See Annex Table A.A.2 in the OECD SME Finance Scoreboard for an overview of SME definitions (OECD, 2020[271]).

I. How can the development of typologies as classifications schemes of SMEs and entrepreneurs help policy makers better understand and navigate SME heterogeneity?

II. What can be learned from existing SME and entrepreneurship typologies proposed in the literature?

III. What could policy relevant SME and entrepreneurship typologies look like in practice?

The paper includes three parts, following these three questions. The first part discusses the types of both SME and entrepreneurship typologies and their development over the last decades, and reflects on how typologies can be made most useful for policy. The second part reviews the literature on existing typologies, according to their relevance for various policy objectives. The third and last part of the paper discusses a number of existing and potential typologies in a variety of policy domains of relevance to SME policy frameworks, which link to various challenges policy makers face with regard to SME heterogeneity.

This paper was developed as part of the OECD SME and Entrepreneurship Strategy. The OECD SME and Entrepreneurship Strategy aims to contribute to more effective, efficient and coherent SME and entrepreneurship policies. The Strategy aims to deliver a set of guiding principles supported by dedicated operational tools to help policy makers better navigate SME and entrepreneurship policies in the post COVID-19 era.

2 Towards typologies for policy-making

What is a typology?

Various classification systems for SMEs exist, one being a typology. A typology in essence is a means of classification with the aim of ordering entities in classes or groups according to similarities (Bailey, 1994[1]; Smith, 2002[2]). Typologies are (mostly) *multidimensional* and *conceptual*. Typologies seek to classify entities not on the basis of a single attribute (for instance, young-old, high/medium/low tech, sector), but propose a classification based on at least two dimensions (for instance, age [young-old] and firm strategy [continuity-value creation] (Verhoeven, Span and Prince, 2015[3]). Because typologies are tools to help the understanding of complexity, it is also important that the number of dimensions included remains manageable and 'simple'. Furthermore, a typology should propose categories that are ideally both exhaustive (all firms should be included) and mutually exclusive (all firms should only be part of one category), and therefore minimize within group variance, and maximize between group variance.

As compared to taxonomies, typologies are *conceptual*, in the sense that their dimensions represent concepts rather than empirical cases, often on the basis of 'ideal types' with a theoretical underpinning, which provide a systematic basis for comparison (Smith, 2002[2]). Typologies, therefore, have an idea or objective behind them. Taxonomies, on the other hand, generally classify items according to empirically observable and measurable characteristics, often based on cluster analysis. In this regard, typologies have been criticized for being descriptive instead of explanatory, for being unfit to deal with dynamic change in the population they try to categorize, and for reifying the objective and categories the typologies propose. However, in practice, typologies are often used to empirically test the relevance of the idea or the types they propose (for instance, do the characteristics distinguished in the typology help in explaining the impact of policy on aspects of firm success?). On the other hand, the term taxonomy is sometimes used in analysis that is not primarily empirical, especially regarding firm strategies (Rizzoni, 1991[4]). Although taxonomies have been criticized for their lack of theoretical underpinning (Miller, 1996[5]), the categories within taxonomies often reflect ideas. In other words, although methodologically distinct, in practice the terms taxonomy and typology are often used interchangeably. The paper will discuss both existing typologies and taxonomies of SMEs and entrepreneurs.[2]

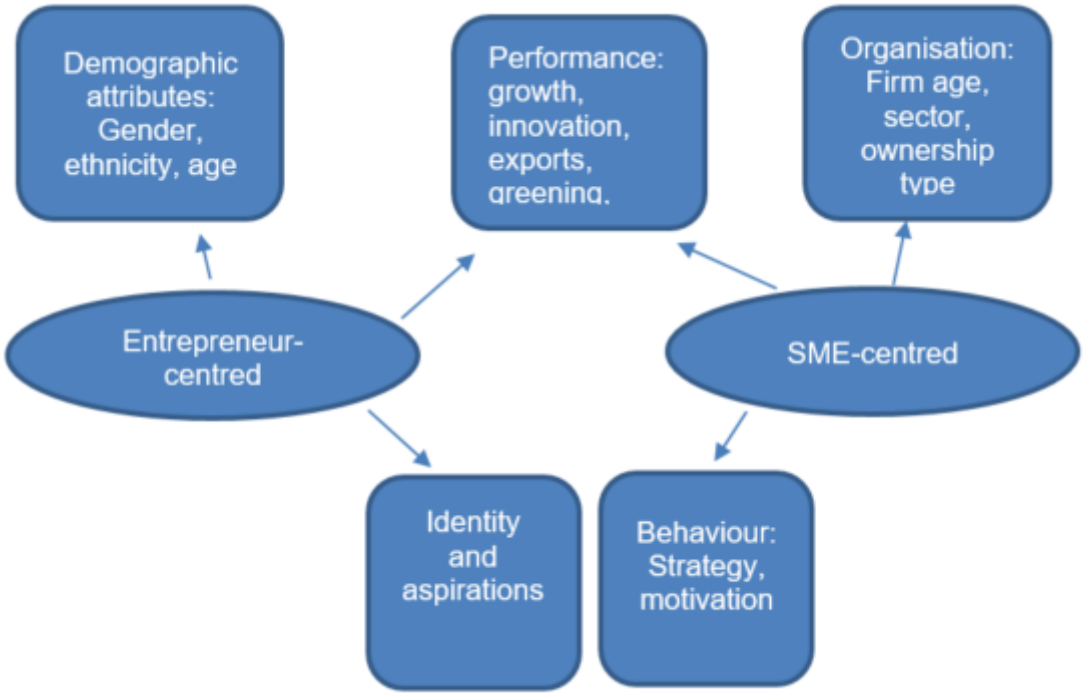
[2] Following (Filion, 2000[8]), this paper uses the term typology as a generic term for SME and entrepreneurship classifications.

Types of SME and entrepreneurship typologies

SME- and entrepreneur-centred typologies

The landscape of SME and entrepreneurship typologies proposed in the literature is vast and varied. The most pertinent distinction among them is between typologies that focus on the ***entrepreneur*** and typologies that focus on the ***SME***. Typologies on entrepreneurs often reference demographic attributes such as age, gender, or ethnicity, as well as characteristics that relate to their identity and aspirations, and to their entrepreneurial performance. SME typologies mostly relate to either organisational characteristics (firm age, sector, type of ownership), behaviour (opportunity recognition, creation, evaluation and exploitation, strategy, motivation) and performance (innovation, growth, impact, social goals etc.). Although distinct, SME and entrepreneurship typologies thus partly overlap and interlink via motivational and performance attributes (see Figure 1).

Figure 1. Two Types of Typologies



Evolution of SME and entrepreneurship typologies over time

The development and use of these three different SME and entrepreneurship typologies has evolved over time[3], reflecting insights and interests within various academic disciplines (entrepreneurship, small business studies, management, psychology, economics etc.) and wider societal and policy views on entrepreneurship and small business. From Schumpeter's distinction between Mode I and II

[3] See (Andersén, 2012[7]) (Filion, 2000[8]) (Filion, 1998[9]) (Daval, Deschamps and Geindre, 1999[10]) (Stephan, Hart and Drews, 2015[11]) (Tang, Tang and Lohrke, 2008[12]) (D'Amboise and Muldowney, 1988[13]) (Julien, 1990[14]) (Reboud, Mazzarol and Clark, 2011[6]) (Morris et al., 2018[15]) (Rauch and Frese, 2000[16]) (Miner, 1997[17]) for overviews.

entrepreneurship to contemporary Gazelles, Zombies and Muppets, scholars have – with lots of inspiration – attempted to classify the characteristics, strategies and performance of entrepreneurs and SMEs according to their research interest.

From World War 2 to 1980

During the first period (from the end of World War 2 to the 1970s), firm size was hardly considered an important issue in economic policy-making. Implicitly or explicitly, the focus was on large firms, with an evolutionary perspective on firm growth. This contributed to the development of some typologies that took a life-cycle or sectoral perspective without size-specific reference (Greiner, 1998[16]).

Typologies were much more popular in entrepreneurship analysis, where, following Schumpeter, many classifications were proposed that distinguished the 'real' entrepreneur from managers/business owners/investors, and showed the non-growth oriented/non entrepreneurial personality characteristics of some entrepreneurs. (Smith, 1967[17])'s distinction between the craftsman-entrepreneur and the opportunistic-entrepreneur is probably the archetypical example of such typologies (see (Carland et al., 1984[17]) for an overview of such characteristics of entrepreneurs distinguished in the literature). Such typologies where mostly non-size specific, and often conceptual instead of empirical (though supported by firm case studies and interviews).

1980-1990

The seminal study by David Birch (Birch, 1979[18]) and his distinction between mice, elephants and gazelles can be seen as the start of the second period, where interest in firm size in research and policy strongly increased, which remained within an evolutionary framework (Lewis and Churchill, 1983[19]). According to (Aldrich and Ruef, 2018[31]), the start of the annual Babson College Entrepreneurship conferences in 1981 contributed to the development of classifications and typologies on entrepreneurship. The distinction between craftsman and opportunistic entrepreneur (now complemented by the independent entrepreneur (Dunkelberg and Cooper, 1982[22])) remained the dominant framework for classification. At the same time, during the 1980s the 'traits' perspective on entrepreneurship, where characteristics of the entrepreneurs themselves were used in typologies and analysed in relation to their impact on performance, was increasingly criticised (Wortman, 1986[32]) (Chell, 2008[33]).

This period also heralded the transition from a managed economy to new entrepreneurial economy (Audretsch and Thurik, 2000[20]), including a research interest in new modes of production where small firms and craft played a renewed role (Piore and Sabel, 1984[21]). Inspired by the Austrian School, economic policy-making shifted to supply-side policies which some called 'the era of the entrepreneur' (Wortman, 1987[22]) (Nightingale and Coad, 2014[23]), which obviously went hand in hand with the need to better understand and classify this 'entrepreneur'. The seminal example is the distinction between opportunity-driven and necessity-driven entrepreneurs (first proposed by (Stoner and Fry, 1982[153])), which departs from the idea that all entrepreneurs took off as classic Schumpeterian entrepreneurs. It contributed to increasing interest in women entrepreneurship whose objectives for entrepreneurship did not always fit the Schumpeterian model (see (Goffee and Scase, 1983[26]), against the background of the rise in female labour market participation after the 1970s crisis (Akehurst, Simarro and Mas-Tur, 2012[24]). Likewise, from the early 1980s onwards, interest in minority entrepreneurship increased (Jones, Barrett and McEvoy, 2000[42]). It also led to critical perspectives on the role of the small firm in this entrepreneurial era, for instance by (Rainnie, 1985[190]) and (Rainnie, 1985[130]) who label SMEs as either the 'furry animals' and/or the 'shock troops of capitalism'.

Furthermore, there was a rapid increase of typologies proposed in the management literature (Porter, 1980[26]) on firm strategies, opening the black box of the firm and classifying management approaches to boost growth and competitiveness. (Miles et al., 1978[23])'s distinction between prospectors, reactors, defenders and analyzers can be seen as an influential example. Third, both in policy and research,

technology and innovation gained in importance, leading to sectoral typologies according to technology level, including the taxonomy developed by Pavitt (Pavitt, 1984[27]).

1990-2000

During the third period from late 1980s onwards, there was an increasing appreciation (including by Birch himself) that there was more to growth than size, and that growth performance by small firms was highly heterogeneous and concentrated in a limited number of young firms, rejecting thereby also the prevailing one-size-fits-all evolutionary perspective on firm growth. Although (Vesper, 1980[32]) in 1980 already proposed a classification of new ventures, the research and policy interest in start-ups and new/young firms was reflected in a growing literature on new firm typologies (for example (Gartner, Mitchell and Vesper, 1989[33]) and several studies by Westhead, Birley and others (Birley and Westhead, 1993[34]).

Interestingly, the observation of differences in (small) firm performance, let to a congruence of classification from different disciplines, where firm size was combined with other firm or entrepreneurial attributes to better understand differentiation. Notable examples are (Storey, 1994[35]) (failures, trundlers, fliers) and (Baumol, 1996[35]) (productive, unproductive, destructive entrepreneurship). Psychological research suggested typologies that relate more to (differences in) attitudes and ambitions of entrepreneurs (Jenkins and Johnson, 1997[37]), (Chell, 2008[38])). The breakthrough of institutional economics contributed also to an increasing interest from the early 1990s onwards in how entrepreneurs and firms were embedded in institutions, including the types of institutions in place, for instance in applications of the varieties of capitalism literature on entrepreneurship (Herrmann, 2019[28]). Many of the typologies developed continued to rely on small sample studies, or statistical data at sector level (for instance on innovation), although increasingly data from larger scale statistical surveys became available. For instance, data on innovation become more widely available with the development of the Community Innovation Survey in 1992, which contributed (after Pavitt's taxonomy (Pavitt, 1984[27]) to an increasing number of classifications that provided empirically based typologies (de Jong and Marsili, 2006[31]) (Bogliacino and Pianta, 2016[32]).

2000-2008

In many ways the fourth period that started at the beginning of the 21st century, can be seen as a continuation of the previous one, although with changing vigour due to the availability of data and a further appreciation of the significance of heterogeneity in macroeconomics and beyond. The interest in high-growth firms further increased with the success of Silicon Valley and US tech entrepreneurs. The 'Silicon Valley Business Model' for many studies became the anchor point for classification and explanation (OECD, 2010[25]), which itself was criticised for being mono-dimensional and not reflecting sufficiently the differences between firms (see (Reboud, Mazzarol and Clark, 2011[6]) with a strong call for more attention for the SME Ordinaire). Next to a focus on start-ups, there was an increasing interest in the scaling-up of firms. The launch of the Global Entrepreneurship Monitor (GEM), in 1999, fuelled the development of typologies aimed at capturing entrepreneurial motivation, including the widely discussed opportunity-necessity dichotomy. Similarly, the first European Commission Eurobarometer, launched in 2000, contributed to comparable data on entrepreneurial perspectives and behaviour (Ahmad and Hoffman, 2007[33]), as did the US Panel Study of Entrepreneurial Dynamics of which the first wave started in 1998. The Kaufman Firm Survey (which includes data on the background of entrepreneurs, finance, strategy and motivation) started in 2004, and Amway's surveys on entrepreneurial attitudes and potential started in 2010. Furthermore, in 2006, the Eurostat/OECD Entrepreneurship Indicators Programme was launched, which stood at the basis of a better definition and measurement of entrepreneurship data and led to the Entrepreneurship at a Glance publications since 2011 (OECD, 2017[34]). Furthermore, the increasing availability of (micro) data allowed for further insight in the drivers of high growth including the use of ICT (and typologies therein), but also showed the diverging productivity performance between frontier and laggard firms.

2008-now

The fifth and final period starts with the watershed of the 2008 crisis, and can best be seen as a period of further (interest in) differentiation. For instance, differences in how SMEs and other firms perform and recovered from the crisis, including the perceived widening of productivity growth differentials amongst firms; differences in firm age, next to size; differences in the background of entrepreneurs, and how entrepreneurship of underprivileged groups can be strengthened; differences in the objectives of entrepreneurs, for instance towards sustainability or social entrepreneurship; and differences in how ecosystems and geographies support entrepreneurship and firm growth. Typologies have been used in various ways to better understand this heterogeneity. Newly available data supported this, for instance on access to finance. The first Safe Survey by the European Central Bank on SME access to finance was launched in 2009. The first OECD Financing SMEs and Entrepreneurs Scoreboard was launched in 2012.

This period witnessed a further increased availability of micro-data allowing for more granular insights in aspects of firm performance, which – together with new statistical methods from the machine-learning literature - enabled new possibilities for classification. For instance, the OECD innovation micro-data project started in 2006. Several commercial firm-level databases became available around that time as well (ORBIS, AMADEUS, BANKSCOPE, CRUNCHBASE) (Pinto Ribeiro, Menghinello and De Backer, 2010[35]). In particular, micro data on the productivity distribution of firms, their size and age provide rich insights in the performance of frontier or laggard firms and the attributes relevant to this. Although this led to the identification and labelling of specific firm types, such as the Zombie firms (Adalet McGowan, Andrews and Millot, 2017[35])), apparently the increasing availability and use of micro data have not fuelled new typology development. This suggests an interesting ambivalence in the interaction between data availability and typologies. The greater availability of data has strengthened the potential for data-based typologies and increased possibilities to test them empirically. In practice, however, it may have made typologies less popular and necessary. Instead of fuelling typologies, which are first and foremost theoretical concepts, micro data have boosted econometric research on firm performance at more granular level, for which typology-style classification is possibly perceived to be less needed. At the same time, possibilities for the linking of micro data with information from surveys may simply have not been explored just yet, and may be used more in the coming period.

Finally, in this period the use of typologies on SMEs and entrepreneurship broadened in several ways. For instance, increasingly studies on SMEs and entrepreneurship in emerging or developing economies brought forward typologies. Also, the dimensions taken into account in typologies widened, from the heterogeneity of board configurations (Karoui, Khlif and Ingley, 2017[221]) to illegal entrepreneurship (McElwee and Smith, 2015[215]) and from entrepreneurial narratives (O'Connor, 2002[42]) to entrepreneurs exit strategies (DeTienne, McKelvie and Chandler, 2015[206]), inter-firm alliances of SMEs (Franco and Haase, 2015[216]), and SME brand management (M'zungu, Merrilees and Miller, 2017[227]).

A policy perspective on typologies

Several attempts have been made to classify this wealth of SME and entrepreneurship typologies developed through time. (Julien, 1990[14]), for instance, distinguishes between two forms of typologies: quantitative typologies (for instance on size classes), and multi-criteria typologies (on ownership, on strategic objectives and potential, life-cycle, markets). (Daval, Deschamps and Geindre, 1999[10]) analyse various typologies discussed in the literature, and propose a framework for classifying them in five broad categories that characterize entrepreneurs: background, attitude, needs/resources, strategic orientation, and management. (Reboud, Mazzarol and Clark, 2011[6]) distinguish between typologies on governance (owner-managers versus executive managers; family business versus entrepreneurial firm), on strategy (craft, entrepreneurial, managerial, conservative, entrepreneurial, small business venture, entrepreneurial venture), and on growth (growth cycle) and market. (Stephan, Hart and Drews, 2015[11]) identify three

'streams' of typologies that have been proposed: a) necessity versus opportunity studies, b) multi-dimensional typologies, c) growth motivation typologies. (D'Amboise and Muldowney, 1988[13]) distinguish five perspectives in the small business management literature (task environment, organisational configuration, managerial characteristics, success-failure and evolution) and discuss how for each of these perspectives classifications and typologies have been proposed.

These classifications offer meaningful insights into different attributes and the way different academic disciplines have categorized them. However, for the purpose of the OECD SME Strategy a different approach is required, which could be described as a *user-perspective* on SME and entrepreneurship typologies: what types of SME and entrepreneurship typologies are most relevant for policy-makers to better understand the heterogeneity of firms and entrepreneurs? Four key requirements stand out, that make typologies most suitable for policy making:

- First, the dimensions and attributes a typology encompasses should be relevant from the perspective of the **objectives** that policy makers pursue.
- Second, for typologies to be meaningful to policy makers, they should be based on **reliable and comparable data**.
- Third, to be of relevance across OECD countries, a typology should be usable in the **multiple contexts** of different country settings.
- Fourth, for typologies to be meaningful tools they should **not be too complex**, and include types that are easy to understand and recognizable for both policy makers and entrepreneurs themselves.

This section will further explore these four requirements.

Policy objectives

The starting point for assessing and developing SME and entrepreneurship typologies that are relevant for policy are the policy objectives policy makers aim to pursue. To quote a recent OECD study on typologies on digital platforms (OECD, 2019[39]): 'The most sensible first step is to start with the policy issue that is of interest and let it guide the selection, adaptation, or creation of the typology that is most helpful.'

SME policy frameworks pursue several policy objectives with regards to SMEs and entrepreneurship. Some of these objectives focus on (specific groups of) entrepreneurs themselves. Examples are women or migrant/minority entrepreneurs. Such policies generally aim to improve access of these groups to entrepreneurship. The second category regards more horizontal policy objectives such as (productivity) growth, innovation, digitalisation, nascent entrepreneurship, access to finance and greening/sustainability, to which SMEs and entrepreneurs through their behaviour can contribute. Policy makers may want to influence or foster this through a variety of generic or more targeted means (OECD, 2020[54]). Examples include policies to support (high) growth of SMEs, innovation, digitalisation, start-up, access to finance and greening/sustainability. Box 1 outlines the classification scheme to categorize SME and entrepreneurship typologies used in this paper, which will provide the structure for the review of the different typologies in the next section.

Box 1. Classification of typologies according to policy objective

I. Policy objectives regarding specific groups of entrepreneurs

a. Women entrepreneurs

b. Minority/Migrant entrepreneurs

c. Social entrepreneurs

II. Policy objectives regarding economic performance

a. Innovation

*typologies of high-tech firms and sectors

*typologies of types of innovation

*developers, followers

b. (High)-growth

*craftsmen-entrepreneur

*typologies of firm strategies

*life/growth cycle models

*necessity, opportunity-driven entrepreneurship

*life style-other aspirations

c. Digitalisation

*typologies of digital strategies and competences of SMEs

d. Internationalisation

*typologies of internationalisation strategies

e. Start-ups

*novice, serial, portfolio

*necessity, opportunity-driven entrepreneurship

f. Greening and sustainability

Classifying SME and entrepreneurship typologies according to policy objectives is from an academic perspective somewhat eclectic, since it mixes up classifications that use very different data, methodologies or theoretical underpinnings. Inevitably, there will be overlap between the use-categories proposed. For instance, supporting women entrepreneurship may aim at improving access of women to entrepreneurship as well as supporting firm growth or innovation more generally. Although (high)-growth, innovation or internationalisation of SMEs can be seen as distinct objectives for policy, obviously some SMEs will grow fast based on innovation or international expansion. Some types of typologies may relate to more than one of the categories. The classic distinction between opportunity- and necessity-driven entrepreneurship originates from pre-venture analysis of nascent entrepreneurship, but is also widely used in identifying the growth pathways of groups of firms.

Data

The second prerequisite for policy relevant typologies is for these to be based on reliable and comparable data. This is not only important for the credibility of the proposed types and the possibility to compare them across countries, but also for the ability to relate the types and attributes to differences in performance. For a policy maker, the types and attributes distinguished in a typology are particularly relevant when they provide insight in the (expected) performance of those firms and entrepreneurs.

Some typologies, especially in entrepreneurship, are primarily conceptual, based on the experience and vision of the scholar in question, or of a reading of the literature. Although this has led to colourful categorisations of entrepreneurial types, which in themselves provide useful inspiration and can help raise awareness of variety (to quote (Miller, 1996[5]): 'Typologies at their best are memorable, neat and evocative'), they contribute less to an evidence-based assessment of heterogeneity as such.

Many typologies, especially in the domain of management and psychology, are based on surveys and case studies of smaller populations of firms/entrepreneurs in national or local contexts, frequently combined with interviews. This literature provided useful classifications of entrepreneurs, their motivations and strategies, as well as, from the 1980s onwards, of SMEs. In some cases, these typologies were empirically tested in explaining performance differences. However, given their dependence on rather specific and sometimes small datasets, possibilities for extrapolating the results may be limited, especially across countries.

Other scholars developed classifications based on official statistics, for instance on the basis of size, sector, or level of technological sophistication. For instance, many studies made use of sectoral data to categorize firms, also on size (reference) and technological intensity. Some of the studies on high-growth firms fit in this category (OECD, 2002[29]) (OECD, 2010[30]). (Verhoeven, Span and Prince, 2015[3]) provide a more recent example of a typology that explicitly makes use of official statistics. Generally, data on SME performance and organisational structure are more readily available than data on SME behaviour. The availability of new big data and algorithms may also have an impact on classifications like typologies in the future. More generally, making better use of, and connecting existing data (including micro data) needs to be further explored for developing relevant typologies. The work on typologies itself could provide a useful impetus for bringing forward the data agenda on granularity.

Context

The third prerequisite regards the need for typologies to take context well into account and to be applicable in the diverse contexts of OECD countries and regions. It is widely acknowledged that SME and entrepreneurship performance not only depends on the firm/entrepreneur's action and resources, but is also is contingent on the context in which SMEs and entrepreneurs operate. These contexts can be described as ecosystems, as institutional frameworks, as market structures or as the nature and intensity of technology at sectoral level. For the development of an SME typology, this raises a number of questions. If contextual factors matter so much, should an SME typology include dimensions and attributes that relate to this context? Does this imply that typologies are necessarily context/location specific, or can typologies be constructed in a way that they provide a cross contextual meaningful classification that can be used and applied in different locational settings? Should the relevant level of analysis in typology building be the level of ecosystem or institutional arrangements, instead of the level of the firm and/or entrepreneur? This contextuality constitutes a formidable challenge for the development of a typology, since *in stricto sensu* the idea behind a typology is that the types distinguished are of relevance across country contexts.

Interestingly, in some cases typologies have been developed that focus on the context or system in which SMEs and entrepreneurs operate. Some of these relate to wider institutional structures and models. (Audretsch and Thurik, 2000[33]), for instance, distinguish between a managerial and entrepreneurial economic model, and document how western economies undergo a shift towards an entrepreneurial

economy. (Ebner, 2010[119]) distinguishes between a liberal market economy and a coordinated market economy from the perspective of entrepreneurship, and argues that 'the institutional embeddedness of entrepreneurial activity requires a design of entrepreneurship policy that is sensitive to the specificities of historically rooted varieties of capitalism'. (Ács, Autio and Szerb, 2014[120]) explore national systems of entrepreneurship (analogue to innovation systems) and try to characterize and categorize them. (Dilli, Elert and Herrmann, 2018[122]) propose four country groupings according to their institutional set-up for entrepreneurship. (Elert, Henrekson and Stenkula, 2017[121]) compare the institutional set-up of European countries in relation to the prevalence of necessity based entrepreneurship, opportunity entrepreneurship, and aspirational entrepreneurship. An increasing number of studies focus on entrepreneurial ecosystems in which firms operate. Such classifications are often inspired by systems approaches in innovation and by regional innovation studies, and increasingly are empirically tested (Neck et al., 2004[229]) (Stam, 2015[116]) (Stam, 2017[117]) (Spigel and Harrison, 2018[123]). They are not always presented as typologies as such, in part because their attempt to balance structure and agency indicators contributes to rather complex types of systems, but can be interpreted as typologies.

Simplicity to use and understand

Finally, for typologies to be useful they should be as simple to use and understand as possible. Although many evocative types proposed have an intuitive credibility that is easy grasp, and typologies more generally are tools to better understand complexity, they can themselves get rather complex as well. For instance, when the number of types distinguished gets too large, policy makers are likely to struggle to use and apply them in a meaningful way.

However, linking typologies to policy objectives and keeping typologies simple for policy makers are not easy to combine. Since policies aim to influence different aspects of firm performance, and since different SMEs perform in different ways and face distinct challenges according to the performance dimension chosen, a typology of relevant attributes is likely to differ according to the policy objective. For example, a typology of attributes for the policy objective of local inclusive growth differs from that for internationalisation. Moreover, the attributes of such a typology may differ by type of market failure and selected policy instrument. Taking the policy objective of internationalisation of SMEs as a concrete example, the categories of SMEs that most benefit from export credits could differ from those that would benefit from better information on opportunities in foreign markets. This would require a plethora of typologies that might do justice to the variety in objectives and firms, but at the same time be unmanageable for policy makers. Similarly, whatever the distinction of types it can never fully address the heterogeneity challenge, since, even in the case of a rather fine categorisation, diversity may still play a role within each group or type. Moreover, segmentation and inclusion of SMEs into types imply exclusion of those firms that do not fit the type. Useful typologies keep these complexities to the minimum, and are also recognisable for entrepreneurs themselves, which is essential for societal support for the use of such typologies. The chance that an entrepreneur can identify with types such as 'laggards' or 'furry animals' are frankly quite small.

3 Review of typologies according to policy objectives

In this section, the typologies proposed in the literature (Box 1) are systematically analysed according to the four prerequisites for making them suitable for policy makers (link to policy objectives, data, context and simplicity), formulated in the previous section. In total, a review of 169 studies has been prepared. Annex A includes the detailed literature review results.

Typologies for policy objectives with regard to specific groups of entrepreneurs

Typologies on women entrepreneurship

Typologies on women entrepreneurship have been proposed since the early 1980s in particular (Moore, 1990[40]). Many of these studies focus on the differences in motivation, goals and ambitions of women entrepreneurs, sometimes in comparison or in reaction to more supposedly generic, but often male-oriented, studies and typologies on these attributes ((Goffee and Scase, 1983[45]) (Goffee and Scase, 1985[46]) (Cromie and Hayes, 1988[47]) (Langan-Fox and Roth, 1995[49]) (Mitra, 2002[50]) (Bruni, Gherardi and Poggio, 2004[51]) (Morris et al., 2006[52]) (Hughes, 2006[54]) (Zarina and Osman, 2007[55]) (Akehurst, Simarro and Mas-Tur, 2012[24]) (Reichborn-Kjennerud and Svare, 2014[56]) (Owalla, 2017[57]), see (D'andria and Gabarret, 2016[41]) for an overview).

Several of these studies propose entrepreneur-types, which are less aimed at pursuing financial objectives, and more often see entrepreneurship as a means to combine making a living and having children. (Goffee and Scase, 1983[45]) and (Goffee and Scase, 1985[46]) classify women entrepreneurs according to their entrepreneurial values and their perspective on conventional female roles, and distinguish four types: conventionals (high commitment to entrepreneurial and domestic values), radicals (less attached to those values, pursue the ventures to promote female issues), innovators (prioritize entrepreneurial values, and opt for entrepreneurship due to restricted career prospects elsewhere), and domestics (prioritize domestic roles and see their – often small - business as secondary). Others distinguish between more traditional or modern women entrepreneurs (Moore, 1990[40]), women entrepreneur achievement focus (aimless, success oriented, strongly success oriented, dualists, return workers, radicals and traditionalists (Bruni, Gherardi and Poggio, 2004[51])) and their motivation (necessity driven, opportunity driven and *mampreneurs* (D'andria and Gabarret, 2016[41])). These perspective has also been criticised, for instance by (Davis and Abdiyeva, 2012[44]), arguing that whilst similarities between women entrepreneurs exist, differences are too large, which make typologies not only simplistic but even sexist.

Many countries pursue ***policy objectives*** related to women entrepreneurship (OECD/European Union, 2019[77]), which could potentially make typologies in this area policy relevant. For instance, typologies could help better understand differences among women entrepreneurs, and assure that policies take these differences into account. At the same time, the orientation of policy makers is more towards what women entrepreneurs have in common (for instance in lack of skills or access to finance) and less in the differences between them, which may make existing typologies of lesser use to them. As to ***data***, most of the studies

on women entrepreneurship are based on surveys and interviews, where the empirical analysis is used to test and validate the types distinguished, not to analyse its relevance for firm performance. The prevalence and development of women entrepreneurship is ***context*** dependent, for instance related to labour market institutions. However, the typologies proposed reflect distinctions that are likely to play a role across many country contexts. The distinctions made in women entrepreneurship in many cases are relatively straight forward, and relate to the basic classifications made in the entrepreneurship literature (opportunity/necessity based, achievement focus) although some may be analytically sound but too **complex** for policy makers (for instance the various types proposed by (Owalla, 2017[74]): solution seeker entrepreneur, self-actualizer entrepreneur, bona fide entrepreneur, missionary entrepreneur, informed entrepreneur, transition entrepreneur and mixed entrepreneur).

Typologies on minority/migrant entrepreneurship

Research on minority, ethnic or immigrant entrepreneurship, which started-off in the United States since the 1970s, primarily focused on the ethnic and immigrant background of entrepreneurs and their mode of incorporation and exclusion in host societies (Light, 1972[84]). Although these studies not always propose typologies per se, some of the types distinguished, such as the middleman entrepreneur by (Bonacich, 1973[89]) and the ethnic enclave (Wilson and Portes, 1980[86]), had a strong impact on classifications in later years (see for instance (Portes, 1995[97]) (McEvoy and Hafeez, 2009[86]) and (Valenzuela-Garcia, Parella and Güell, 2017[87]).

This focus in the literature on the origin or ethnicity of the entrepreneur has been criticized as misleading and reifying of such factors above other relevant variables (Raes, 1998[86]) (Rath and Kloosterman, 2000[92]). Since the early 1990s, scholars have brought the body of minority entrepreneurship research closer to the generic entrepreneurship studies, for instance in addressing opportunity-necessity driven entrepreneurship (Chrysostome and Lin, 2010[95]). Others distinguish between ventures according to their market (the migrant community or the wider population), or the integration of the immigrant entrepreneur (Kesteloot and Mistiaen, 1997[91])(Labrianidis and Hatziprokopiou, 2010[68]). Instead of firm/entrepreneur oriented typologies, some publications provide heuristic frameworks that capture the different factors of relevance to ethnic and migrant entrepreneurship: opportunity structures, group characteristics and ethnic strategies (Waldinger, Aldrich and Ward, 1990[63]). Although such frameworks may lack the simplicity of a typology, they reflect the complexity of immigrant entrepreneurship, and avoid a reification of attributes that neither from an economic nor policy perspective seems justified. Finally, some scholars approached minority entrepreneurship in the context of transnational enterprise, and developed typologies accordingly (Bagwell, 2015[97]) (Landolt, Autler and Baires, 1999[92]) (Rusinovic, 2008[94]) (Sequeira, Carr and Rasheed, 2009[97]).

Various countries pursue **policy objectives** with regard to minority or migrant entrepreneurship (OECD/European Union, 2019[77]). The typologies proposed could help taking the differences between those entrepreneurs better into account. However, similar to women entrepreneurship, policies towards minority entrepreneurship focus more on the challenges these groups have in common, and do not necessarily aim to differentiate among them. As to **data**, typologies on minority entrepreneurship are primarily based on case studies of minority entrepreneurs from one or more specific origins, often in large cities, also because statistics on the ethnic background of entrepreneurs were not available. That lack of data probably contributed to the fact that typology-building was less wide-spread, although some studies did address variety amongst minority entrepreneurs. Examples are (Rubinstein, 2000[85]), who gives a historical account of types of minority entrepreneurs world-wide and the variety therein, and (OECD, 2010[62]) which shows the diversity of immigrant businesses in size, growth rate, sector, skill level and innovation. Although data availability has significantly improved (OECD/EU, 2017[59]), this does not seem to have changed the prevalence of typologies nor their orientation towards ethnicity and immigrant integration patterns. Very few of the typologies proposed, test if the types relate to differences in the performance of firms. Differences in **context** between countries regarding their demography and

immigration history are substantial, making the survey based types less easily transferable across countries. As to simplicity, the typologies propose analytical stratifications that appear to be relatively **complex** to use in policy contexts.

Typologies of social entrepreneurs

Typologies have not been developed frequently in the area of social entrepreneurship, and are of a fairly recent date. The typologies resemble other sets of typologies that aim to classify the ambitions and objectives of entrepreneurs (growth or other), and the strategies they use. For instance, (Vena, 2007[69]) uses two dimensions (drive – passion versus business; and desired return – financial or social) to distinguish between four types of entrepreneurs: the incubating entrepreneur, enterprising entrepreneur, deeds social entrepreneur and dollars social entrepreneur. (Alter, 2007[108]) is the seminal study that includes a wide variety of classifications of social ventures on the basis of their missions, business integration, their operational model, structure and strategies. (Neck, Brush and Allen, 2009[73]) propose a typology along two firm dimensions: mission and outcome of a venture. The four resulting types are the social purpose venture (for profit, but with a clear focus on solving a social problem), traditional ventures (primarily economic mission), social consequence venture (close to corporate social responsibility) and enterprising non-profits. (Zahra et al., 2009[72]) propose a typology of three types of social entrepreneurs: the social bricoleur (focused on addressing small local social needs), the social constructionist (fill gaps and market failures and help innovate and reform the broader social system) and the social engineer (address more systemic challenges with revolutionary solutions).

A number of countries pursue **policy objectives** with regard to social entrepreneurship. The dimensions distinguished (motivations, strategies) seem to reflect well the considerations for policy makers. As to **data**, typologies on social entrepreneurs are often conceptual, or based on surveys of small samples, and are mostly not tested to performance. **Contexts** for social entrepreneurship vary significantly across countries, for instance by welfare state institutions, although the distinction between for profit and not for profit is relevant across countries. However, many of the types distinguished (such as the social bricoleur) appear to be **complex** from a policy perspective.

Typologies with regard to policy objectives regarding economic performance

Typologies and innovation

Since the early 1980s, many studies have tried to classify SMEs and entrepreneurs according to innovation and technology. These typologies can be distributed in four groups.

The first group aims to classify firms (or, as a proxy, sectors) according to their innovation or technological intensity and sophistication, using R&D and other innovation indicators, or delineating them as leaders or followers. (Hatzichronoglou, 1997[75]) and (Galindo-Rueda and Verger, 2016[85]) distinguish (and test) five major groups of sectors: high R&D intensity industries, medium-high R&D intensity industries, medium R&D intensity industries, medium-low R&D intensity industries, and low R&D intensity industries. (Greene and Brown, 1997[128]), on the basis of an innovation and a growth axis, distinguish four groups of firms (not necessarily small firms). Glamorous firms combine a high business innovation and growth rate, and stand for Silicon Valley style firms, which others have called ‘high potential’ or ‘entrepreneurial’ (Carland et al., 1984[17]). In ambitious firms, growth is high but innovation relatively low or moderate. Constrained firms weigh in strongly on innovation, but do not show high growth performance. Finally, ‘core firms’ neither grow fast nor innovate strongly.

A second and related category of studies, use an entrepreneurship perspective for classification, identifying for instance different types of tech entrepreneurs. (Miller and Friesen, 1982[205]) analyse innovation in conservative and entrepreneurial firms in France. In conservative firms, (product) innovation takes place

mainly in response to external challenges. In entrepreneurial firms, innovation is more constantly and aggressively pursued. (Jones-Evans, 1995[74]) analyses different types of technical entrepreneurs, and develops a typology of technology based entrepreneurs, which primarily regards their backgrounds. The four broad categories distinguished accordingly are: the research technical entrepreneur (with an academic or industrial research background), the producer technical entrepreneur (with a background in commercial development or production), user technical entrepreneur (with demand side experience), and the opportunist technical entrepreneur (with no technical background in the sector at all). (Mazzarol and Reboud, 2009[203]) investigate the management of innovation in small firms. Distinguishing two dimensions (the level of uncertainty and complexity the management is facing and the type of innovation they seek), they propose four types: the shopkeeper (static traditional innovation), the salesman (technology-based innovation), the administrator (imitative innovation) and the CEO (new technology-based innovation).

In an extensive study on SMEs, entrepreneurship and innovation, (OECD, 2010[25]) explores the differences in SME innovation performance and potential from a policy perspective. It distinguishes between a science, technology and innovation mode (focused on R&D and breakthrough innovation) on the one hand, and a 'doing, using, and interacting' mode of (incremental) innovation on the other. The study also refers to further OECD work in the context of the Entrepreneurship Indicators Programme (see (Ahmad and Seymour, 2008[89]) (Ahmad and Hoffman, 2007[33])) which flags other innovative entrepreneurial types from the literature: the entrepreneur as a disruptor; the entrepreneur as an opportunity identifier; the entrepreneur as a risk taker; the entrepreneur as a resource shifter; and the entrepreneur as a breakthrough innovator.

The third group focuses on the type of innovation undertaken by firms (process, product etc.). (Pavitt, 1984[27]) has proposed what is probably the best known taxonomy in this field. His aim was to explain sectoral patterns of technological change, and characteristics of firms therein. The taxonomy he proses is at firm level (supplier-oriented, production-intensive, and science-based), and includes reference to firm size. For instance, innovative small firms are prevalent in supplier-oriented types, as well as specialised suppliers within the production intensive groups, whereas firms in the science based group are usually large. Differences between the types relate for instance to sources of technology, user preferences and possibilities for appropriation. (de Jong and Marsili, 2006[31]) build on the Pavitt taxonomy in classifying patterns of innovation, including innovative activities, business practices and strategies. They distinguish through a cluster analysis between four categories of small innovative firms: science-based (most innovative and most 'open' in interaction with other actors), specialised suppliers (high innovativeness, especially in product innovation), supplier-dominated (the least innovative category) and resource-intensive firms (with dedicated resources for innovation and high score).

Finally, some typologies focus on the strategies SMEs undertake to innovate. (Rizzoni, 1991[4]) propose a taxonomy that is centred on the behaviour of small firms towards technological innovation and includes 6 types: static small firms (cost-competitiveness, no innovation strategy), traditional (tech adopters), dominated (specialised incremental innovators), imitative (incremental product innovators), technology-based (advanced technologies, rapid growth), new technology-based (new high-tech sectors). (Galbraith, Rodriguez and DeNoble, 2008[80]) analyse the technology strategies of high-tech SMEs, and through cluster analysis propose a typology of two groups of firms: technology leaders and technology followers. (Srholec and Verspagen, 2012[82]) explore types of innovation strategies of firms through cluster analysis. They find five groups of strategies, on the basis of four ingredients, namely research (R&D), use (f.i. design), external (embodied technology) and production (process). The 'high profile' strategies (scoring high on all four ingredients), the 'low profile group (scoring low), and the more varied user-driven, externally-sourced and opportunistic groups. (Veugelers et al., 2018[86]) analyse the innovation profiles of SMEs in Europe, with specific interest in young SMEs. They distinguish between five groups of SMEs (basic, adopting, developers, incremental innovators and leading innovators) and analyse for each of these groups the main barriers for innovation. 'Basic firms' are more common amongst young SMEs, whereas

'innovators' are more often older and larger firms. Credit constraints may in part explain why young SMEs are not more active in innovation.

Innovation is one of the central **policy objectives** in SME and entrepreneurship policies. The typologies proposed, aim to capture key drivers of SME innovation performance with relevance for policy. As is the case for other typologies, many typologies for innovation are based on survey **data**, although including often larger samples, particularly since the availability of data sources like the CIS, which deepened the empirical base for such typologies. In comparison to other typologies, typologies on innovation are often empirically tested to performance. Although the prevalence of the different types of firms identified will differ by country **context**, it seems likely that the underlying characteristics they aim to capture are relevant across countries. Finally, the types distinguished are mostly relatively **simple** to use and understand.

Typologies of SMEs and digitalisation

Typologies on SMEs and digitalisation are a more recent phenomenon. They mostly aim to distinguish between the degree of uptake of digital technologies by SMEs or the competences and strategies of the entrepreneurs. An early example of a taxonomy is the study by (Meckel et al., 2004[144]) who analyses e-business strategies of SMEs in the UK. Using a cluster analysis based on responses from questionnaires, five types are proposed. E-business strategy leaders, which are the only group to have an explicit e-business strategy. On the other end, old fashioned SMEs lack such (e-business) strategy, nor use e-business technology. Blind e-business users use the technology but without the strategy, whereas e-adoption leaders rank high in use but without a strategy. Finally formal strategy leaders use business strategies, but not on e-business. The types are not tested in relation to firm performance. Similarly, (Hull et al., 2007[164]) present a typology of digital ventures, characterizing them as mild, moderate and extreme. (Cerchione and Esposito, 2017[212]) study the use of knowledge management systems by SMEs in Italy, and propose a taxonomy of the different strategies used. They distinguish between the guidepost, explorer, exploiter, and latecomer.

Other studies, aim to look into the types of entrepreneurs, their competences and capabilities with regard to digitalisation. For instance, in a study entrepreneurship in the ICT sector, (Robert et al., 2010[173]) assess what types of entrepreneurs operate in this sector. They identify four types: the expert (highly educated professional), the freshman (young entrepreneurs), the well-prepared "provident" (experienced former employees in the sector) and the "risqué-tout" (experience outside ICT sector). The typology is tested, but not in relation to performance. (Vieru et al., 2015[130]) analyse digital competences in SMEs which they use to construct a typology of digital competence archetypes: Technical expert, Organizer and Campaigner. (Ramón-Jerónimo and Herrero, 2017[194]) aim to study firm heterogeneity according to their capabilities in operating efficiently in dynamic environments, with specific attention to ICT capabilities and marketing of SMEs. They distinguish four classes of firms according to their adaptation to a changing macro-economic environment. The first class responds by adjustment in size. Class 2 invest in ICT, by decrease investment in marketing and R&D. Class 3 react by increasing their investment in R&D and new markets. Finally, class 4 improve their efficiency by investing in ICT in particular.

The number of countries that pursue SME digitalisation **policy objectives** has strongly increased. As to **data**, most of these typologies are survey-based and non tested. The pervasive impact of digitalisation across countries suggests that the differences these typologies aim to capture are relevant across country **contexts**. The types distinguished seem from a policy perspective **complex** and not necessarily reflecting the policy relevant drivers of SME digitalisation.

Typologies of new ventures and start-ups

Typologies on new ventures and start-ups take different forms. Some of these focus on characteristics of entrepreneurs before they start a new venture, and their expectations and aspirations. These often build

upon the opportunity or necessity driven entrepreneurship distinction (Stoner and Fry, 1982[19]) (Block and Koellinger, 2009[185]). (Morris et al., 2018[15]) give what they call an identity-based perspective on types of entrepreneurial new ventures. The four types they propose are: Survival Ventures (necessity driven, provides basic subsistence), Lifestyle Ventures (no strong growth drive), Managed Growth Ventures (seeks stable growth over time), Aggressive Growth Ventures (Gazelles, often technology based, opportunity driven). (Desiage, 2010[131]) focuses on entrepreneurs' objectives when starting a business and the impact of entrepreneurial and firm characteristics on these objectives. Two types of entrepreneurs are distinguished**:** self-protectors: those who start businesses to create and secure their own jobs (protection motive); and developers: those who want to develop their firms in terms of investment and personnel (developing motive).

Various studies classify nascent entrepreneurs after according to their experience (novice, serial, portfolio). (Birley and Westhead, 1993[162]) and (Westhead and Wright, 1998[161]) distinguish between founders of new independent owner-managed businesses. Novice founders have no previous experience, whereas habitual founders have started at least one other business before. Whereas the study establishes important differences between the groups, it does not conclude that serial entrepreneurs are advantaged or more successful than novice entrepreneurs. (Westhead, Ucbasaran and Wright, 2005[159]) further assess differences between novice and serial and portfolio entrepreneurs using new evidence. The results suggest that the three types of entrepreneurs differ along a number of dimensions, including in the barriers they encounter, which warrants a policy perspective that takes that into account. (Westhead et al., 2005[160]) find that portfolio entrepreneurs offer more attractive growth prospects than the other two types.

Further typologies focus on the process of starting a new business (Gibb and Ritchie, 1982[222]). Taking the perspective on entrepreneurship as a social process, they look into the tasks and activities that prospective entrepreneurs have to undertake. They propose what they call a social typology of prospective entrepreneurs, distinguishing four groups: Improvisors are still young, open, with little to lose and an exploratory outlook. Revisionists are somewhat older and have more experience, and in starting a firm will change the practice of their life and the dilemma's this brings upon. Superseders are more realistic about past and current opportunities, with a gradual way of planning. Finally, the Reverters through starting a firm may seek to relive some previous life experience. (Gartner, Mitchell and Vesper, 1989[223]) use a cluster analysis to develop and test a taxonomy of new business ventures. They use 4 dimensions (individual background, organisation, environment and process) to distinguish eight types of new business ventures. Escaping to Something New, Putting the Deal Together, Roll Over Skills/Contacts, Purchasing a Firm, Leveraging Expertise, Aggressive Service, Pursuing the Unique Idea, and Methodical Organizing.

(Diambeidou et al., 2006[156]) constitutes an interesting study in the growth trajectories of start-up firms. Through a cluster analysis they classify firms along two axis (performance and resources) into four groups. Questions are firms that combine low resources and performance. Seeds are firms with high resources but low performance. Boutiques vice-versa pair high performance with low resources, whereas stars combine high performance and resources. See also (Biga Diambeidou and Gailly, 2011[157]).

Many countries pursue **policy objectives** regarding start-ups. The relevance of the proposed typologies is that they aim to shed light which of these new ventures are most promising to succeed. As to **data**, virtually all typologies on nascent entrepreneurs are based on surveys of samples of (prospective) entrepreneurs, data for which has increased significantly since the late 1990s. Almost all typologies are tested, in the sense that they relate the firm/entrepreneur attributes they distinguish to aspects of performance. **Contexts** for starting a new business differ significantly across countries, although barriers to entry have been reduced in most countries. Attitudes to risk taking and entrepreneurialism differ significantly. As to **simplicity**, the more basic types distinguished (necessity/opportunity driven, novice/serial/portfolio) have a strong and easily understandable logic, whereas the more elaborate typologies with multiple types probably go beyond what a toolkit for policy makers could include.

Typologies and (high-)growth

This is by far the largest and most varied set of typologies presented in the literature. It includes the typologies on high-growth firms per se, but also the different typologies that try to capture firms or entrepreneurs attributes according to their growth (potential).

First, several typologies focus on high growth performance itself, or the lack thereof. The classic example is (Birch, 1979[18]), who proposes a classification of firms in an animal analogy, distinguishing between mice (small firms that tend to stay small), elephants (large firms that do not grow rapidly) and gazelles (firms that growth both rapidly and account for a large share of employment or revenue growth). (Acs and Mueller, 2006[195]) (Acs and Mueller, 2007[196]) discuss Birch's mice, gazelles and elephant typologies in the context of business dynamics and employment in the US. They find that only start-ups with greater than twenty employees have persistent employment effects over time and only in large diversified metropolitan regions, and conclude that both the type of entry and the characteristics of the region are important for employment growth.

(O'Farrell and Hitchens, 1988[219]) propose a classification in three types of small firms, which in their view does more justice to the heterogeneity of small-firms: fast-growers, satisfiers and those which attempt fast growth but fail. (Storey, 1994[95]) in his classic study on the small business sector proposes three types of small firms according to their growth performance: Failures, trundlers (those that survive but do not add to job creation) and fliers (rapid growth in employment). (OECD, 2002[29]) provides an analyses of the defining features of high-growth small and medium-sized enterprises (SMEs) in the manufacturing sector. It includes a French case study, which distinguishes eight different growth trajectories of high-growth SMEs between 1985 and 1994. The eight groups are clustered in three 'families'. Family A showed an even trajectory of high growth over the whole period. Family B showed rapid growth, followed by a decline at the end of the period. Finally, Family C showed stability over most of the period, with rapid growth at the end. The growth trajectory in part differs by firm size. The study concludes that there are a variety of trajectories of high-growth. (McMahon, 2001[136]) studies SMEs in the manufacturing sector in Australia to develop a taxonomy, and puts forward three categories of firms: traditional or lifestyle businesses (with a low growth pathway, and having few if any growth aspirations); capped growth SMEs (having a moderate growth and development pathway); and entrepreneurial SMEs (following the high growth development pathway).

(Delmar, Davidsson and Gartner, 2003[90]) explore different growth patterns in high-growth firms in Sweden. Using 19 different measures of firm growth, they identify seven different types of firm growth patterns: Super absolute growers (high growth in employment and sales); Steady sales growers (strong growth sales, negative employment); Acquisition growers; Super relative growers (highest share of high-growth years); Erratic one shot growers; Employment growers (negative sales growth, positive employment); and Steady over-all growers, characterized by a relatively strong development in absolute sales and employment growth (total and organic), but weaker relative (percentage) development.

(Crutzen, 2010[203]) classifies the differing reasons why small businesses fail. Through a cluster analysis and on the basis of two dimensions (endogenous/exogenous factors, and ability to adapt to the environment) she proposes five types. Shocked firms fail because of an external shock. In firms that serve other interests the reason for failure lies in the predominance of the entrepreneurs personal interests above that of the firm. Apathetic firms fail to respond to their external environment, whereas the last two groups (punctual management error or badly managed firms) point at different degrees of mismanagement.

(Verhoeven, Span and Prince, 2015[3]) (Span and Wortelboer, 2018[219]) use a cluster analysis on the basis of a large set of firm data in in the Netherlands on the background and performance of SMEs. They distinguish two dimensions to classify SMEs; the first relates to the objective of firms (continuity or value creation): 'survivors' versus 'strategic growers'. The second dimension regards age (young-old). This results in four (partly overlapping) types of SMEs: i) self-employed firms, ii) 'regular SMEs', iii) innovative

SMEs and iv) young SMEs. Subsequent analysis tested the typology for its explanatory power for productivity and found that although innovative firms were more productive than the other types, within group productivity differentials were larger than between group (Span and Wortelboer, 2018[219]).

A second group of typologies focuses on the entrepreneurship orientation of high growth firms. There is a long tradition in classifying firms and their owner-managers in terms of their entrepreneurship orientation. In a classic entrepreneurship study, (Smith, 1967[145]) explores the relation between the type of "man" and type of "company'. With background, education, work experience and social/business behaviour as the main distinguishing characteristics, Smith proposes two ideal types of entrepreneurs: the craftsman-entrepreneur, and the opportunistic-entrepreneur: 'The Craftsman-Entrepreneur tends to be focused on the present and past, has specialized technical education, and has low levels of confidence and flexibility. Conversely, the Opportunistic-Entrepreneur tends to have advanced education and social awareness, a high degree of flexibility, and an orientation to the future.' The study suggests that opportunistic-entrepreneurs will be the most effective in innovation and growth. In the study, Smith also suggests the existence of an inventor-entrepreneur type, although data on this type are limited. (Laufer, 1975[172]), like Smith, proposes a typology on entrepreneurs along two dimensions : their growth aspirations and their desire for independence. The manager or innovator favours growth, but places less emphasis on independence. The growth-oriented owner-entrepreneur also seeks growth, but attaches more importance to independence. The craftsman entrepreneur values this independence too, but is less growth oriented, whereas the entrepreneur-technician seeks primarily efficiency. (Dunkelberg and Cooper, 1982[181]) distinguish between craftsman (drawn to a particular type of business), growth-oriented (driven by the desire for substantial growth) and independent entrepreneurs (driven to avoid working for others). (Smith and Miner, 1983[146]) build on (Smith, 1967[145]) distinction of craftsman and opportunistic entrepreneurs, and explore both types of entrepreneurs and types of firms (adaptive and rigid). Their study confirms the association between opportunistic entrepreneurial types and growth-oriented firms.

Entrepreneurial perspectives exist beyond the craftsman opportunistic entrepreneur distinction. (Baumol, 1996[141]) distinguishes between productive, unproductive and destructive types of entrepreneurship. The typology was largely conceptual, but has been widely tested in the literature (see (Aeeni et al., 2019[142]) for an overview). The psychological study of (Miner, 1997[17]) (Miner, 1997[149]) (Miner, 2000[150]) investigates entrepreneurial personality, and distinguishes four personality patterns of entrepreneurs: personal achievers, real managers, expert idea generators, and empathic supersalespeople. The studies show that possessing a greater number of these psychological patterns enhances the chances of success of the entrepreneur.

(Hessels, van Gelderen and Thurik, 2008[189]) study to what extent entrepreneurial aspirations are driven by entrepreneurial motivations, and how these relate to economic performance. They consider three types of start-up motivations: the independence motive, the increase-wealth motive, and the necessity motive. They find that countries with a higher incidence of increase-wealth-motivated entrepreneurs tend to have a higher prevalence of high-job-growth and export-oriented entrepreneurship and that a country's level of social security relates negatively to the prevalence of innovative, high-job-growth, and export-oriented entrepreneurship.

(Gibcus, Vermeulen and De Jong, 2009[192]) study different types of entrepreneurial decision makers in small firms. Using a number of dimensions to categorize decision-makers (confidence, innovativeness, risk perception, the consideration of alternatives, the problematic decision-making process and the economic situation) they propose through a cluster analysis a taxonomy of five types: the Daredevils (high perceived risk), the Lone Rangers (independent decision makers), the Doubtful Minds (limited strategic decision making), the Informers' Friends (asking the help of others) and the Busy Bees (experienced decision makers). They conclude that decision-making amongst small firms differs significantly, and that this may be relevant for growth.

(Nightingale and Coad, 2014[23]) review the analysis of entrepreneurship since the 1980s, and evaluate the performance of 'entrepreneurial-type' firms along a number of criteria. They conclude the category of entrepreneurial firm is too broad and biased and suggest instead to break up this type along a continuum from a large number of less productive and poor performing enterprises (marginal undersized poor performance enterprises, or Muppets) to the small number of high performance Gazelles.

A third group of typologies focuses on the different strategies entrepreneurs/firms employ. For instance, (Miles et al., 1978[58]) analyse strategies that firms – not just SMEs - use to overcome the entrepreneurial, engineering and administrative problems they encounter. From a strategic choice perspective, they distinguish between four types of strategies firms use: prospectors, reactors, defenders and analyzers. The classification is conceptual, but has been tested by other authors (Reichborn-Kjennerud and Svare, 2014[56]). (Porter, 1980[26]) distinguishes between different firm strategies to foster competitiveness: differentiation strategies, cost leadership strategy, or a focus strategy, which have been widely used and tested by other authors. (Kathuria, 2000[178]) focuses on manufacturing strategies and competitive priorities (cost, delivery, quality, flexibility) in small firms in the US. He proposes a taxonomy of four groups of firms—Do All, Speedy Conformers, Efficient Conformers, and Starters—each with different priorities even if from the same sector. (Borch, Huse and Senneseth, 1999[184]) use a resource-based view of the firm in exploring firm resources and strategic orientations of small firms. They distinguish between managerial firms (analysers, use market strategies), technological firms (prospectors, use product and growth strategies) and traditional firms (avoid risk or growth strategies). They find coherence between resources and firm strategies, and underline the importance of a firm behaviour (as compared to an entrepreneurial or management) perspective. (Fuller and Lewis, 2002[182]) analyse and classify the different strategies owner-managers of small firms use in dealing with their external environment. The five types they distinguish (on the basis of different competences, attributes, themes and orientations) are: network, contract, personal service, personalized and strategic development. (Sum, Kow and Chen, 2004[148]) develop a taxonomy of operation strategies of high-performing SMEs in Singapore. The three types they distinguish on the basis of strategies towards costs, quality, delivery and flexibility through a cluster analysis are: all-rounders (which score well across the board), efficient innovators (with very high scores on costs, delivery and flexibility), and differentiators (with strong performance in quality, delivery and flexibility but not in costs).

(Lewis, 2008[133]) studies the ambitions and strategies of small firm owners in New Zealand. In the context of the often proposed typology between 'growth enthusiastic' and 'growth rejecting' (or 'lifestyle') SME owners, the analysis proposes the notion of 'freestyle owners'. Where 'lifestyle' owners are portrayed as having a no growth orientation, 'freestyle' owners are interested in growing their firm, but weigh this against other objectives in their personal life. (Jaouen and Lasch, 2015[174]) study to what extent the views of owner-managers of micro firms regarding lifestyle and growth influence their entrepreneurial behaviour. On the basis of interviews, they propose a typology in four types: success (growth-oriented), subsistence (isolated, necessity-driven reluctant entrepreneurs), hedonism (both accomplished and more bohemian type) and paternalism (prudent, incremental often craft style). They find that only the success and paternalism types are pursuing growth.

(Andersén, 2012[7]) develops a resource-based taxonomy of micro-, small- and medium-sized enterprises, to better understand performance differences between these firms. In his view, the frequently used entrepreneurial-conservative typology may be an oversimplification. Through a cluster analysis he distinguishes six different groups of MSMEs: IKEAs (innovative product development, low cost products), conservatives (non-entrepreneurial, simple production, below average innovation and marketing), technocrats (technological production capabilities, little marketing), marketeers (market-oriented, complex products, but average innovation), craftsmen (highly skilled, but below average in other resources and capabilities), and nomads (below average in all resources). Interestingly, although the IKEAs and Technocrats stand out as the highest performing firms, no differences in return on assets (profitability) could be found amongst the six groups, suggesting there is a variety of resource configurations that can lead to high-performance.

A fourth group, approaches typologies from a life-cycle perspective. (Lewis and Churchill, 1983[19]) propose a five stage life cycle model of firm development that can be interpreted as a typology. These stages are: (1) existence (2) survival (3) success (4) take-off and (5) resource maturity. This last stage they had also called big business (Churchill and Lewis, 1982[163]). Each stage is characterized by an index of size, diversity, and complexity, and described by a range of management attributes. (Greiner, 1998[16]) delineates five phases of firm growth: creativity, direction, delegation, coordination, collaboration. (Lichtenstein and Lyons, 2008[191]) give an overview of the literature on models of the business life-cycle, and propose a new six stage model (pre-venture, existence or infancy, early growth, expansion or sustained growth, maturity and decline).

Finally, there are typologies that combine aspect of strategy, entrepreneurship and organisation. For instance, (Dincer, Yildirim and Dil, 2011[180]) explore if there is a linkage between the (Dunkelberg and Cooper, 1982[181]) entrepreneurship (craftsman, growth-oriented and independent) and (Miles et al., 1978[58]) strategy typologies (prospector, defender, analyzer and reactor). Through interviews, they find some implicit linkage between entrepreneurial and strategy groupings, but not for all types. Although the evidence is limited, they suggest that the craftsman entrepreneurial type connects to the defender strategy, whereas the growth-oriented type corresponds to the analyzer strategy.

(Reboud et al., 201[8[219]]) develop an empirical taxonomy of the 'ordinary SMEs'. They use a set of attributes (size, management characteristics, organisational configuration, governance, strategy, market and growth factors) to identify seven classes of SMEs, and suggest policy approaches that suit best the characteristics of these firms. The types distinguished are participative SMEs, anti SMEs, entrepreneurial SMEs, established SMEs, ad hoc SMEs, operationally focused SMEs and reactive SMEs (see also (Reboud, Mazzarol and Clark, 2011[6]) and (Reboud and Mazzarol, 2013[200])).

As to policy, fostering high growth is an important **policy objective**. The different types of typologies capture relevant aspects of what drives high growth of SMEs. Most of the studies are based on survey **data** and interviews with a sample of firms/entrepreneurs at national level, although data sets are usually relatively large and some typologies are constructed using official statistical sources. Various typologies have been tested to their relevance for SME performance. Although high growth performance is **context** dependent, it seems likely that the attributes that the typologies identify have relevance across countries. Finally, typologies on high growth are often relatively **simple** to use and understand.

Typologies of SMEs and environmental sustainability/greening

Typologies of SMEs in relation to greening and the environment are a fairly recent phenomenon (see (Bergset and Fichter, 2015[100]), (OECD, 2013[101])and (Parker, Redmond and Simpson, 2009[102]) (Schaper, 2010[212])for overviews). They typically aim to classify different types of SMEs or (frequently) start-ups on the basis of their environmental awareness, motivation and green innovation and business practice, as well as – although not often – their environmental footprint. The focus is mostly on classifying firms that are already green in some form, not to provide a classification of all SMEs and entrepreneurs.

(Walley and Taylor, 2002[103]), building on (Thompson, 1999[112]), for instance, propose a framework for investigating the attitudes and strategies of green entrepreneurs according to their internal motivations and external structural influences, which includes a typology of four ideal types: innovative opportunists, visionary champions, ethical mavericks and ad hoc enviropreneurs. (Harbi, Anderson and Ammar, 2010[108]) use a survey and cluster analysis to test this typology, and can only find evidence for one type (ethical maverick).

In a 2002 special issue of *Greening Management International*, several contributions proposed environmental typologies of SMEs and entrepreneurs. (Schaltegger, 2002[106]) proposes a framework to distinguish five forms of firms according to their environmental orientation and market impact: Environmental administrators, Environmental managers, Alternative activists, Bioneers, and Ecopreneurs. (Linnanen, 2002[105]) provides both a classification of 'eco-businesses' (nature-oriented enterprises,

producers of environmental technology, providers of environmental management services, and producers of environmentally friendly products) and the challenges they face, as well as a typology of environmental entrepreneurs according to their profit and/or 'change the world' motivation (non-profit business, successful idealist, self-employer, opportunist).

(Parker, Redmond and Simpson, 2009[102]) discuss the impact of SMEs on the environment, and develop a toolkit for policy intervention, taking into account the large differences between four types of SMEs they distinguish: Profit driven, Advantage driven, Environment driven and Compliance driven.

(Ghisetti and Rennings, 2014[235]) test two types of eco-innovation strategies of firms: strategies aimed at reducing energy and resource use and strategies aimed at reducing externalities. They find that only the first category leads to higher profitability, whereas the second depends on regulatory measures for that potentially to be the case.

The number of countries pursuing **policy objectives** with regard to SMEs and the environment is increasing. The primary relevance of the typologies proposed is on different types of environmental entrepreneurs, although some help identify between those SMEs that are more or less able or likely to pick-up new environmental technologies or working methods. As to **data**, the typologies developed are largely conceptual, and have not (yet) been tested empirically, but intend to offer frameworks to policy makers and direction for further research. Many of the challenges SMEs face with regard to greening are similar across country **contexts**. The types proposed appear to be **complex** from a policy perspective.

Typologies of SME internationalisation

Several studies classify SMEs from the perspective of their internationalisation strategies and performance, distinguishing strategies and further characteristics of those firms, and underlining the significant differences between SMEs. (Huppert, 1981[175]) uses sector data to analyse the strategy and growth of French SMEs. He distinguishes between SMEs that are sheltered or exposed to international competition. (Baum, Schwens and Kabst, 2011[158]) use two dimensions (number of countries involved, and share of exports in total sales) to distinguish between four types if firms: the Export Start-up, Geographically Focused Start-up, Multinational Trader, and Global Start-up and tests these empirically. Results show that growth orientation, prior international experience, knowledge intensity, product differentiation, and learning orientation distinguish significantly between the different types. (Julien, 2012[198]) analyses the heterogeneity in international activities and behaviour of manufacturing SMEs. Distinguishing two dimensions (local/international market, and the local/international use of resources/inputs), they propose 4 types of SMEs: Local SMEs, Glocal SMEs (selling at local markets but using resources internationally), International SMEs (international market, local resources), and Global SMEs (international market and resources). (Swoboda and Olejnik, 2013[176]) focus on the internationalization of small- and medium-sized family businesses. Analyzing firm culture, strategy and structure, they distinguish between four groups of firms: (Domestic-Focussed Traditionalists, Global Standardisers, Multinational Adapters and Transnational Entrepreneurs) and find considerable difference in international performance, with transnational entrepreneurs being the most successful and domestic-focused traditionalists the least. (Baldegger, 2013[247]) classifies Swiss SMEs internationalisation strategies along two dimensions: their geographical scope and their start during the firm's life-cycle. He distinguishes between Born Globals (whom from start operate globally), born international (who focus from start on nearby markets), Born Again Globals and Internationals (who go international later in their life-cycle) and those firms that show a more gradual internationalisation.

Many countries pursue the internationalisation of SMEs as a **policy objective**. The typologies developed show how different the scope and process of internationalisation works for different groups of SMEs. The typologies mostly rely on surveys and interviews, as well as on statistical **data** on export performance. As such, they rather describe different patterns in performance instead of explaining these. Although different country **contexts** will matter for SME internationalisation, the types are likely to be relevant across

countries. The types proposed have a relative **simplicity** that makes them easy to comprehend in a policy context, although they are not likely to enable the identification of types of firms whose internationalisation can be expected to be most promising.

Implications for typology development

Table 1 summarises the outcome of the screening of existing SME and entrepreneurship typologies as to their suitability for policy making. In total 169 studies were reviewed (see also Annex A). Half of those regard typologies that relate to innovation or high-growth, but a significant number of typologies were found also in relation to other policy objectives.

Table 1. Overview of SME and entrepreneurship typologies

Type of policy objective	Number	Empirical	Tested	Policy objectives	Context	Simplicity
Policy objectives on specific groups of entrepreneurs						
Women	15	12	7	+	+-	+-
Migrant/minority	12	8	2	+	-	-
Social	8	3	0	+	+-	-
Policy objectives on firm performance and behaviour						
Innovation	29	22	18	++	+	+
Digitalisation	9	7	2	+	+	+-
Start-up	15	14	10	++	+	+-
High-growth	64	49	31	++	+	+
Environment	13	6	5	+	+	-
Internationalisation	4	4	1	+	+	+-
Total	169	125	76			

Most of the typologies discussed are not only conceptual but have some form of empirical basis (125). The vast majority of those, however, are based on case studies and/or on (often small) samples at national or local level where groups of firms/entrepreneurs are surveyed and interviewed. Relatively few studies make use of official national statistics. Since the end of the 1990s, more extensive use has been made of large-scale cross-country surveys (such as GEM and CIS), but overall this remains limited in typology building. The reliance on case studies and interviews of relatively small samples in countries, regions and cities makes the typologies often rich in detail and local flair. At the same time, this constitutes a challenge for typology making and -use in the context of the OECD SME Strategy, since it makes it harder to generalise conclusions and use them across countries.

Over 40% of the typologies reviewed were tested in some way for their relevance to explain differences in firm performance. 75% of those that were tested regard high-growth, innovation or start-ups. In fact, over time, typologies have become more empirically grounded and have more often been tested, although methods used vary significantly, from econometric methodologies to interview- and survey-based assessments of causality and impact.

Furthermore, all typologies reviewed can be related to prevailing objectives of SME and entrepreneurship policies. The typologies for high growth, innovation and start-ups in particular articulate attributes and types that are relevant from a policy perspective. Typologies that relate to policy objectives towards specific groups of entrepreneurs may not be easily transferable and usable in other countries than where they were developed, given differences in context. Although such differences in context play a role for performance oriented policy objectives as well, it is likely that the underlying mechanisms these typologies aim to capture are more easily transferrable across borders. Finally, some typologies appear to be particularly complex from a policy point of view, for instance those related to minority and social entrepreneurship as well as

environmental performance. Typologies on high growth and innovation appear to be the easiest to use in a policy context.

In summary, according to the different criteria used, the typologies on high growth, innovation and start-ups appear to be most promising for the development of policy relevant SME and entrepreneurship typologies.

Furthermore, the analysis offers some further interesting insights in the types and attributes of relevance to these three types of typologies:

- Regarding motives and aspirations, the typologies discussed clearly indicate that not all entrepreneurs and owner-managers of SMEs aspire to rapid growth or innovation. For some, running a firm stands for gaining independence, some have objectives that are more related to lifestyle and/or a desire to better combine work and private life. Obviously, aspirations and ambitions do not always translate into success, as other factors impact on performance. Nevertheless, identifying attributes related to motivation appear to be relevant. Similarly, the distinction between necessity and opportunity driven types of nascent entrepreneurs has been widely used and tested, in part because of data availability, although its relevance for performance is not straight-forward.
- Likewise, typologies have been developed that reflect the 'type' of entrepreneur, such as the distinction between craftsman and opportunistic entrepreneur. Several attributes of such opportunistic entrepreneur – whom allegedly would be more growth-oriented - have been suggested such as education, flexibility, risk-taking, innovativeness and future orientation, although again, the literature suggests there is no one-on-one relation between such entrepreneurial orientation and firm performance.
- The typologies on nascent entrepreneurship that distinguish between novice-portfolio-serial new ventures have received much attention, with experienced entrepreneurs (serial, portfolio) often performing better. Although the age of a firm plays an important role in the debate on sources of SME growth, as far as could be established no typologies exist that take firm age as a distinguishing factor.
- Several typologies from the management and business strategy domain appear relevant, such as the prospector, reactor-defender-analyser typology. In some studies, these have been combined with resource-based analysis of the firm, showing how in various resource contexts some strategies lead to better performance than others.
- A further conclusion is that there is limited cross-fertilisation between the typologies produced from different disciplines and methodologies. For instance, it could be potentially useful to combine data on entrepreneurial traits and motivation with information on firm structure, linkages, strategies and performance. This is particularly striking in the different typologies on innovation, high-growth and nascent entrepreneurship, where typologies from various disciplines have been developed but combinations in attributes from different disciplines seem to be largely absent. Although this is partly due to a lack of comparable data, it may also be the result of a lack of interdisciplinary perspective.

A final general consideration regards the focus of firm typologies. Typologies are often intended to distinguish 'special types' of firms or entrepreneurs (e.g. high-growth, innovative, etc.) from the 'rest', which is then approached as a homogenous category, although within this (large) cohort of firms substantial differences (may) exist. As discussed in this report, better understanding such 'special types' through typologies may be relevant for instance for guiding targeted policies (such as policies for innovative firms). At the same time, for effective policy-making, typologies could also help in better understanding what Reboud, Mazzarol and Clark call the 'SME Ordinaire' (Reboud, Mazzarol and Clark, 2011[14]), by not considering those a "residual" category, but as a group which in fact hides a wide variety of firms and entrepreneurs that needs to be better understood.

4 Examples of SME and entrepreneurship typologies for policy making

The previous two sections discussed in what way typologies can best support policy making, and which kind of SME typologies proposed in the literature in this respect look most promising. This section aims to present a number of existing and potential examples of policy relevant SME and entrepreneurship typologies that build on these insights. The examples, which could be further developed into actionable typologies and tools, link to various challenges policy makers face with regard to SME heterogeneity.

Raising awareness

A first challenge with regard to SME heterogeneity, which a typology could help address, involves awareness about firm variety and capacity to harness this diversity. Such awareness and sensitivity towards SME heterogeneity is particularly relevant in the context of regulation design, and the role of consultations, regulatory impact assessments and SME tests therein. The work on the stock take of existing SME policy frameworks in the context of the SME Strategy includes a number of examples of how countries try to ensure that, in their consultations and SME tests, they obtain a balanced view of how different segments of the SME population view a regulatory proposal, for instance through the use of panels with diverse SME membership.

Several studies show that the impact of regulation is likely to differ between types of SMEs, for instance between growth-oriented firms and other firms (see for instance (Peck, Jackson and Mulvey, 2018[169]), (Lee, 2014[170]) (Kitching, 2006[171]) (Kitching, Hart and Wilson, 2015[172]). According to (Peck, Mulvey and Jackson, 2018[173]), growth-oriented firms are not only innovative in developing products and markets but they are also pro-active in finding better ways to address regulatory challenges. In a different study they argue that although intuitively one might expect high growth firms to be especially affected by regulatory obstacles, there is limited empirical evidence for this (Peck, Jackson and Mulvey, 2018[169]). In fact, (Kitching, Hart and Wilson, 2015[172]) argue that high growth firms are more likely to be proactive and opportunity seeking with regard to regulation. (Lee, 2014[170]) distinguishes between actual high growth firms, potential high growth firms and firms with lower growth potential, and concludes that high growth firms and (even less) potential high-growth firms are less likely to see regulation as a problem than other firms. He suggests that the experience of growth itself is a demonstration that high growth firms can overcome regulatory challenges. (Levie and Autio, 2011[174]) distinguish between ‘strategic entrepreneurs’ and ‘non-strategic entrepreneurs’, where strategic entrepreneurs are more proactive to exploit regulation as a competitive advantage whereas non-strategic entrepreneurs may perceive those as burdens. Growth firms are more likely to be strategic entrepreneurs. (Peck, Mulvey and Jackson, 2018[173]) distinguish between four distinct business attitudes towards regulation: reactive and negative, reactive but positive, proactive and negative, and proactive and positive.

Other studies suggest the impact of regulation is dependent on the age of firms, with young firms bearing the brunt more than older firms. (OECD, 2015[175]), for instance, in a study on SMEs and taxation, suggests

that 'there may be a particular case for targeting preferences and simplification measures toward younger SMEs, who are most affected by finance and cash flow difficulties, face barriers to entry and growth from incumbent firms, are more likely to grow than older SMEs, face the highest compliance cost burdens and are likely to have higher spill-over effects from innovation.' (Van Stel, Storey and Thurik, 2007[176]) assess how regulatory barriers to start-up and to growth affect different types of firms (nascent opportunity entrepreneurs, nascent necessity entrepreneurs, young businesses, established SMEs) in different ways.

(Mallett and Wapshott, 2018[177]) discuss how different types of regulation affect firms differently. 'Particular regulations, and how they are interpreted, will affect businesses in different ways owing to differences in firm size, age and sector as well as to competitive conditions, degrees of regulatory enforcement and the responses of others in the firm's external and internal environments.' They particularly point at the fact that impacts depend on agency: on the ability and strategies of SMEs to adapt and make use of regulation. They propose a framework with seven aspects ('dimensions') inside and outside the firm. For instance, the degree of labour market flexibility in a country or the availability of finance can be of relevance for the capacity of an SME to respond to new regulation. Similarly, the management style and capacity of an SME, the networks it can draw on or the degree of flexibility in internal work processes may all be factors that help structure the impact of regulation on a firm's ability to pursue growth.

A way to further support awareness of such SME heterogeneity could be the development of a digital tool that leads policy makers through a set of questions related to SME diversity and provides resources on the implications and possible ways to address this (Box 2). This would enable policy makers to identify relevant aspects of SME diversity and access resources on how to interpret this, without however providing concrete actionable answers for individual situations. The tool could be part of guidelines for consultations, impact assessments and SME tests as they exist in various countries.

Box 2. A potential Online SME Diversity Assessment Tool for Policy Makers

Objective:

- Awareness raising among (SME and non SME) policy makers on the diversity of SMEs;
- Diagnostic tool to help assess relevant aspects of SME diversity;
- Guidance on possible approaches to take SME diversity into account;
- Hands-on vehicle to support policy makers' decision making processes based on analysis undertaken the WPSMEE SME Strategy work, including attribute matrix, typology literature review, synthesis analyses and stocktake towards policy makers' decision-making processes.

Target group:

- SME and non-SME policy makers.
- The tool could be used in a variety of policy domains. By means of a possible pilot and experiment, a first focus could be on policy domains covered in the SME Strategy context, for instance internationalisation, innovation, digitalisation, skills, environment.

Description:

The diversity of SMEs and entrepreneurs constitutes a challenge for policy-makers. Policies may have a very different impact on different groups of firms. Some SMEs may be more responsive to policy measures than others. And for some policy objectives it may be more important to reach certain groups of entrepreneurs than others. The online SME diversity assessment tool would aim to raise awareness among policy makers of this diversity, and to provide the means to better understand and respond to those differences. As an online tool, it would offer a systematic set of questions a policy maker is invited to answer to take SME and entrepreneur heterogeneity into account. Following the answers, the tool

would direct policy makers towards resources and possible policy tools that may help better understand and respond to this diversity. The tool would build on experiences the OECD has with similar instruments and should fit different contexts. It could help countries further improve their SME testing in (regulatory) impact assessments and consultations by taking SME heterogeneity better into account, the need for which is for instance expressed in the European Commission's better regulation toolkit.[4]

Examples of stylized questions and resources:

1. In what policy domain do you operate?

   Resource: two pager background notes per policy domain (internationalisation, innovation, digitalisation, skills, or environment), on the basis of the synthesis studies that give insight on how market failures can work out differently for types of SMEs in a policy domain.

2. What policy objective do you want to pursue in this policy domain?

   Resource: two pager per policy objective that (on the basis of a matrix of attributes) lays out which attributes of SMEs are important to take into account in policy design.

3. What type of policy instrument are you considering: targeted (on specific groups of) SMEs or horizontal?

   Resource: note with examples of good policy practices across OECD countries to take SME diversity into account in general framework and more targeted policy design and implementation.

4. Are there specific groups of SMEs you want to particularly reach, and which are they?

   Resource: examples of existing SME and entrepreneurship typologies of relevance for the policy objective and types considered, based on the literature review

5. Have you considered how the intended policy measures work out for those specific groups as well as other groups of SMEs?

   Resource: note (across policy domains) that sets out relevant distinctions between types of SMEs and possible impacts that invites policy makers (for instance in impact assessments and consultations) to take a more granular view.

Proto-Typologies: A Matrix of Attributes

Policy relevant typologies take a given policy objective as a starting point, and then classify SMEs into types according to the dimensions and attributes most relevant for achieving that objective. That classification into types should be both exhaustive and mutually exclusive, which can be quite a challenge. In some cases, the data and analysis on the relevant attributes of SMEs and their impact of a policy objective may be readily available, without such exhaustive classification into types being possible. Nevertheless, insight in the attribute-objective combinations could as a 'proto-typology' be of relevance for policy makers in understanding SME heterogeneity, because it would provide an empirically based toolkit to use when designing policies towards a certain objective.

Such toolkit could take the form of a matrix, combining policy objectives and relevant SME attributes. The relevant attributes per objective could be distilled from OECD analysis and wider analysis underlying the SME policy frameworks. Box 3 gives an example of what such matrix could look like for the policy objective of internationalisation.

[4] https://ec.europa.eu/info/sites/info/files/file_import/better-regulation-toolbox-22_en_0.pdf

Box 3. Relevant SME attributes for internationalisation

Table 2 provides an example of how heterogeneity plays out in the context of the objective of scaling up through internationalisation. It lists a set of measurable attributes relevant for this objective. Furthermore, it identifies the set of attributes that are likely to be associated with challenges on the SME side in pursuing the desired strategy, and that should be considered therefore relevant. The attributes considered are a subset of a longer list that could include size, age, sector, technological intensity, entrepreneur characteristics, ambitions and motivations, entrepreneurial strategy, legal form & (domestic and foreign) linkages, among others.

Table 2. Relevant firm attributes for internationalisation

	Policy objective 1: Enhancing access to international markets	Other objectives
Size	Micro/Small/Medium	…
Age	Young/Old	…
Position in the value chain	Upstream/Downstream	…
Experience of entrepreneur	Inexperienced/Experienced	…
Sector	Manufacturing/Services	…
Technological intensity	High/Low technological content	…
Motivation of entrepreneur	Out of necessity/Entrepreneurial spirit	…
Location	Within/Outside industrial clusters	…
Other attribute	…	…

Following the identification of the set of policy-relevant attributes, the next step could be the determination of which subset of SMEs within each attribute/policy objective pair is likely to experience the biggest challenges in the context of internationalisation.

For example, SMEs run by inexperienced entrepreneurs, such as those with no established track record in the loan market, face big challenges when it comes to competing in the global market. The evidence shows that imperfect access to finance is a key element weighing down on SMEs' export opportunities: according to a survey, in 2016 SMEs represented 58% of rejections while accounting for just 44% of total trade finance proposals (Di Caprio et al., 2016[100]). Informational asymmetries limiting access to finance are likely to be more acute for entrepreneurs that have no established borrower and/or exporter's track record, such as inexperienced founders. Imperfect access to finance therefore weighs down on SMEs' export opportunities especially during the entry stage, which is the stage when access to finance is most needed.[5]

Another group of SMEs facing substantial challenges related to internationalisation are young SMEs. Imperfect property rights protection weighs down on firms' choice to export due to the higher imitation risk incurred when competing in the global market (Direzione Studi e Ricerche Intesa Sanpaolo, 2018[101]). The intellectual property rights protection system does not eliminate the legal risks associated with imitation, and young firms are more exposed to such imperfectness owing to the more limited time they had to establish a reputation with their competitors and potential imitators.[6]

[5] Financial constraints are a limiting factor only at the time of entry, while there is no evidence showing that they affect the quantity exported or the probability of remaining an exporter.

[6] Given the magnitude of litigation costs, repeatedly interacting with the same set of competitors can foster cooperation over time, thus raising the incentives to innovate.

As a last example, a third group that may deserve specific policy attention are supplier SMEs in the context of global value chains (GVCs). The rise of trade in intermediate inputs has in fact set the stage for the emergence of GVCs and a broader notion of exporting. Next to *direct* exporting, *indirect* participation to the export market is in fact a salient feature of many SMEs that are often very well plugged into GVCs as domestic suppliers of exporting firms in high and middle-income countries (OECD/The World Bank, 2017[20]). Total export volumes benefit from an efficient division of labour along the value chain, with large firms with the technological advantage competing in the international market for final goods, and SMEs specialising in the production of high quality intermediate inputs, therefore further reinforcing the positioning of the final product. An internationalisation strategy for SMEs must therefore also consider this alternative access route to international markets. Action could be taken in this respect to foster the transfer of know-how from large downstream exporters to upstream SMEs and counteract their potential underinvestment caused by holdup problems, thus benefiting both parties and not last total exports (Tirole, 1988[102]).

Beyond frontrunners and laggards

Section 5 of this report shows that data availability for typologies that relate to SME performance is better than that for organisational or behavioural aspects. In many typologies, this is reflected by means of a dichotomy between those firms that excel in growth, innovation etc. and those for whom that is less the case and operate in a more stable manner. Examples are numerous: laggards versus frontrunners, traditional/conservative versus more entrepreneurial firms, mice versus gazelles, craftsman versus entrepreneur, necessity driven versus opportunity driven. At the same time, various typologies have gone beyond these dichotomies to show that SME performance and its drivers is more than a binary process.

A possible focus for the development of an SME and entrepreneurship typology could build on this, combining two perspectives. First, it would classify into three (or more) groups according to performance in growth or innovation. Second, it would aim to combine performance data with information on motivation and ambition, in particular for the 'middle' group, for instance to identify 'potential followers':

- The frontrunners, showing significantly better than average performance.
- The potential followers, which exhibit average performance but have the ambition to perform better.
- The stable peloton, which lag behind in performance and have little or no ambition to change this.

The policy relevance of this classification is that it helps articulate three groups of firms with a strong intuitive logic, which each have distinctive prospects in contributing to the policy objective of performance, and face different opportunities and challenges thereto. Policy makers could aim for monitoring the impact of regulation on each of these groups, and ensure they are represented in consultations. Policy makers could also assess to what extent tailor made measures are needed for each of the three (or more) groups of SMEs.

Which businesses are frontrunners, followers or the peloton will vary by performance related policy objective (for instance innovation or internationalisation) although it could be expected that some cross policy objective consistency is observed in these groupings. The data challenge lies primarily in finding the right data on ambition and motivation. The categories should not be seen as static, since firms may move between them. Furthermore, although the distribution of SMEs across the three categories is context dependent and will vary significantly across countries, each country will have its own frontrunners, potential followers and more stable peloton at different innovation or productivity levels.

Understanding the *SME Ordinaire*

SME policy frameworks in various countries have underlined the need for policies to not only focus on frontrunners and highly innovative SMEs and start-ups, but also the more regular SME, which has been

labelled the *SME Ordinaire* (Reboud, Mazzarol and Clark, 2011[38]) (Reboud et al., 2018[152]). These 'regular SMEs' constitute the vast majority of the SME population, with special types like Gazelles or Unicorns only making up for a very small proportion of firms and employment. Essential to this, is that the *SME Ordinaire* does not exist, but represents a widely varied group of firms and entrepreneurs. Again, to better understand the 'average SME' policy makers need to transcend from that notion of average and take their heterogeneity into account.

The authors use a variety of dimensions (size, managerial characteristics, organisational configuration, governance, strategy, market orientation and growth) to develop a taxonomy of seven classes of *SMEs Ordinaires*: i) Reactive SMEs; ii) Operationally Focused SMEs; iii) Ad Hoc SMEs; iv) Established SMEs; v) Entrepreneurial SMEs; vi) Anti-SMEs; and vii) Participative SMEs. Table 3 presents the main characteristics of the seven types.

Table 3. Main characteristics of seven classes of *SME Ordinaire*

Reactive SME (8.6%)	Operationally Focused SME (11.1%)	Ad hoc SME (13.6%)	Established SME (22.0%)	Entrepreneurial SME (17.0%)	Anti SME (13.5%)	Participative SME (14.1%)
*Produced in response to customer demand, their strategic outlook was therefore short-term. *Tried to maintain a competitive position based on lower pricing and reliability *Felt they do not have any particular competitive advantage *Displayed relatively little innovation, export orientation or long-term strategic vision	*Were generally much larger and older *More likely to be sub-contractors for big firm customers, were dependent on their customers *Their management teams are mostly male, specialized in production, HR, quality *Among the oldest and largest firms in the sample *Not very dynamic in terms of strategy, not very innovative (low market expectations) *But high expectations on time, quality and reliability *Felt more often than average that business perspectives were unfavorable	*The youngest, smallest and least structured firms in the sample *Had no management team, no formal description for any of their jobs *Favoured informal processes (strategic management, competences development) *Were also not internationalised *Were more likely to sell customised products/services to individual clients *Perceived many obstacles to innovation.	*Were the most widespread type in the sample, mainly in the manufacturing sector, medium-sized firms and yet were among the older SMEs *Were also very much customer oriented and put high value on the quality of their products *Focused strongly quality, by including innovation *Majority (63%) of these SMEs had dedicated service managers (responsible for stock management, purchasing, etc.), Including a manager for QSE	*More likely to be active in the service sectors *Most were small, very young and employed no workers operate in niche markets (67% against 49% in the total sample) with a rather high growth rate *Reported constantly exploring new knowledge and exhibited a fairly high level of empowerment from their employees. Product and Innovations (high market's expectations) *IP Protection *Integrated in network	*Mainly manufacturers and operating business-to-business *Have many characteristics of large companies *Very internationally oriented *Among the larger, older and more structured firms of our sample. *Management teams composed of men and women in 70% of cases *Believed their value proposition was performing better than the market average, which was often a growing niche market	*Put employees at the heart of their development *High level of structural empowerment, with high delegation of authority and accountability of employee *Owner-managers very comfortable with the definition of roles and responsibilities of their teams and with conflict management *Human resource management and CSR are very important *Strategy is built from their resources and skills *Innovate more than the average

Source: (Reboud et al., 2018[152])
Note: percentages refer to the share of the sample of each class.

The authors attempt to link the seven classes of SME to their needs for types of policy support. Following (Carré and Levratto, 2009[182]), they distinguish four types of public support for SMEs: to the individual growth of the SME, to a more efficient organization, to the pooling of resources, and to the improvement of collective competitiveness, for instance:

- support to individual growth (in terms of investment aid, reduction of social security contributions, access to public procurement, etc.) would benefit mainly to *Reactive SMEs, Operationally focused SMEs*, *Established SMEs* and *Entrepreneurial SMEs*;
- support to organisational efficiency (in terms of advice, innovation support, support for R& D, etc.) would be more effective for *Ad-hoc SMEs* and *Established SMEs*;
- support to the pooling of resources (in terms of collective actions, cost-sharing, etc.) would mainly concern *Operationally focused SMEs*;
- support to collective competitiveness (in terms of support for collective research within clusters, for example) would benefit the *Entrepreneurial SMEs.*

The framework of the *SME Ordinaire* could be used to develop tools to better take into account the various perspectives of 'regular SMEs' in policy design, consultations and impact assessments (see Box 4).

Box 4. A potential tool for understanding the SME Ordinaire in public consultations and (regulatory) impact assessments

Objective:

- Enable policy makers and other stakeholders to better understand the variety of *SME Ordinaires* in policy design and implementation.
- Contribute to good practice policy tools on distinguishing relevant types of *SME Ordinaires*, and translating this into effective and efficient public consultations and (regulatory) impact assessments.
- Allow for further forms of communication and dialogue between policy makers and groups of SMEs that are often less heard.

Target group:

- SME and non-SME policy makers

Description:

In all OECD countries, SMEs make up for the vast majority of companies. However, in many cases the attention of policy makers and media focuses on those SMEs and start-ups that stand out, because they are for instance highly innovative and/or fast growing, or on the laggards or unproductive firms that may trap resources and drag down aggregate productivity and growth. The vast majority of 'other' SMEs (often called 'traditional' or 'regular' SMEs, the 'peloton' or '*SME Ordinaire*') typically receive less attention, and are treated as a homogeneous 'rest' group. At the same time, there is a growing interest among policy makers in better understanding the differences among the *SME Ordinaire*, for instance how different types of 'regular' SMEs are affected by sets of policy, and how governments can ensure that in their communications and consultations they reach those different groups of firms.

Examples of deliverables:

Work could be developed to develop tools and good policy practices in three steps:

i) It could distil from the typology literature review those types of *SME Ordinaire* of most relevance from a policy perspective;

ii) It could collect good policy practices in countries on how the variety of *SME Ordinaire* is taken into account in consultations and impact assessments; and

iii) It could subsequently develop a tool – such as in the form of a handbook - with resources for policy makers. Such handbook could provide guidance on the use and composition of representative panels of SMEs in public consultations, including through the use of digital communication. Similarly, it could include a checklist and specification of relevant types of *SME Ordinaire* for (regulatory) impact assessments and evaluations.

Raising SME productivity: a tailor made approach to post-COVID-19 recovery

Raising SME productivity is a policy priority across many countries. Post COVID-19 recovery support will only make that objective more widely shared. However, there are wide differences in patterns, capacities and ambitions of SMEs with regard to productivity growth. Recent studies suggest that, whereas in the emergency phase of the pandemic a one-size-fits-all approach to SME support was possible, policies supporting recovery need to be tailor made for different types of SMEs. For example, (Juergensen, Guimón and Narula, 2020[183]) distinguish between three types of SMEs in manufacturing (stand-alone SMEs, specialist-supplier SMEs, and knowledge-based SMEs). The authors argue that *"stand-alone SMEs will benefit more from policy support to enter new international markets, while the best policy approach towards specialized-supplier SMEs might be to strengthen local networks and clusters, promoting the embeddedness of their customers (often multinational firms) in the territory. All types of SMEs will benefit from strong innovation support schemes, but the focus required might be different. Specifically, product and marketing innovations are most relevant for stand-alone SMEs, including those that differentiate themselves (or operate in niches) and those which—due to the nature of their industry—do not. For the latter group, marketing innovations may be particularly valuable to retain existing and attract new customers. For specialized-suppliers, the main focus will need to be on process and organizational innovations, enabling them to compete on price and quality. Meanwhile, stronger investments in entrepreneurship and start-up support will turn critical to promote knowledge-based SMEs*."

To further illustrate the potential use of classification schemes to understand SME heterogeneity in productivity, innovation and digitalisation, Box 5 presents a classification in four types of SMEs developed in the context of SME recovery proposals from COVID-19 in the Netherlands and developed by the Committee for Entrepreneurship to assist policy makers.

Box 5. A typology for post-COVID-19 SME recovery. An example from The Netherlands

In the Netherlands, there is significant interest in classifications on the SME population in order to better understand SME heterogeneity ((Span and Wortelboer, 2018[106]) (Verhoeven, Span and Prince, 2015[107])). The Committee for Entrepreneurship, the main advisory body to the government on SME and entrepreneurship policies, in August 2020 presented advice on post COVID-19 SME recovery, which uses a classification of different types of SMEs, and the policy response that is needed to support them (Nederlands Comité voor Ondernemerschap, 2020[108]). The classification uses two dimensions. The first dimension regards productivity growth, the second refers to employment growth. For the classification, SME data pre COVID (2015-2017) are used. The arrows indicate the suggested direction in SME development that policies should try to support.

Matrix 1: Core requirements for recovery by SME type

	Productivity decline	Productivity growth
Employment growth	***IV. Renew*** *Characteristics of SMEs:* *31% of SMEs *aggregate decline of EUR 1 billion in VA *Policy perspective:* *Entrepreneurship and management coaching *Digitalisation support *Enhance efficiency *Training support	***I. Accelerate and expand*** *Characteristics of SMEs:* *27% of SMEs *aggregate growth of EUR 15 billion in VA *Policy perspective:* *Improve access to finance and equity *Attractive business environment for investment *Attract talent
Employment decline	***III. Reform*** *Characteristics of SMEs:* *14% of SMEs *aggregate decline of EUR 6 billion in VA *Policy perspective:* *Ease of entry and exit *Reskilling support	***II. Grow*** *Characteristics of SMEs:* *28% of SMEs *aggregate growth of EUR 4 billion in VA *Policy perspective:* *Ensure access to finance for growth *Provide expert advice and stimulate cooperation to expand

Source: (Nederlands Comité voor Ondernemerschap, 2020[108])

The first group pairs high productivity growth and employment growth. To accelerate and expand their performance, policies should strengthen the availability of capital to grow (equity) and make access to international talent and investment easier.

The second group consist of SMEs that have become more productive, but for which the improved productivity has not translated into employment and sales growth over the same period. For these types of SMEs, access to finance is important, as is the availability of expertise and the strengthening of linkages with other companies and organisations.

Segment III – the smallest one of the four - pairs low productivity and employment growth. Well-functioning business dynamics are of the essence, with easy entry and exit, as well as support for reskilling to allow employees to find new jobs, and of reallocation.

Finally, SMEs in segment IV have experienced growth, without, however, becoming more productive. Government support should focus on making these firms more efficient by skills enhancement (in particular for management and entrepreneurship) and support for digitalisation

A targeted approach to skills and SMEs

Better insight into the various types of SMEs and their skills requirements and investments is important. It could enable a better diagnosis for which types of SMEs (and workers) the skills mismatch is largest, which skills are most needed and for which types of SMEs and skills the rationale for public policy is strongest. It may help policy makers to better target those SMEs that could most benefit from support in skills development. Better insight in how skills development and training take place in types of SMEs (for instance through informal or formal training) can be instrumental in determining how skills development can best be supported.

Table 4 conceptually classifies the skills challenges for SMEs with a view to better understand the different dimensions of the SME skills challenges. It distinguishes between two types of SMEs (those with higher

growth potential, and those with less growth potential/ambition) and two types of skills (firm-specific and transversal skills) for both high and lower skilled employees.

Table 4. Conceptual classification of firm and skill type in relation to SME skills challenge

Type of skill: Type of SME:	Firm specific skills	Transferable skills
Growth potential SMEs	**Skills mismatch diagnosis:** *Substantial shortages, in particular in medium and high level firm specific professional and technical skills. *Significant shortages in lower skilled craft and technical skills. *Substantial training investment in productivity building skills for high skilled employees, and firm specific technical skills for low and medium skilled employees. **Incentives/policy rationale:** *Strong incentive for ensuring demand-driven supply of relevant high, medium and low skills. *Significant incentives for SMEs to invest in firm specific training, although hampered by size contingent barriers. *Significant societal rationale to support skills development because of externalities high growth/innovative firm development, for instance through targeted measures to support training in growth/innovation relevant niches.	**Skills mismatch diagnosis:** *Substantial skills shortages, in particular in medium and high level cognitive, non-routine, managerial, communication skills *Medium perceived skills shortage and recruitment needs from an SME perspective for lower skilled employees. *Significant training investment by SMEs particular in transversal skills of higher skilled employees, moderate for lower skills employees. **Incentives/policy rationale:** *Significant incentive for training, in particular for higher skilled employees, given the importance of transversal skills for SME growth ambitions, however, tempered by the challenge for SMEs to appropriate the return on transversal skill investment and poaching. *Medium SME incentive to invest in transversal skills for lowers skilled employees. *Next to ensuring adequate demand-driven skills supply, strong rationale for policy intervention due to size contingent barriers, positive externalities of high growth and innovation, and societal externalities in transversal skills development through (growth oriented SME) targeted policies. *Substantial societal rationale to support upskilling of lower skilled workers transversal skills in the context of megatrends.
SMEs with less growth potential/ambition	**Skills mismatch diagnosis**: *Moderate skills shortages, concentrated in technical and craft skills and access to low skilled employees at low cost. *Moderate SME training investment for high skilled employees mostly focused on firm specific technical and management skills. *Limited SME training for low skilled employees focused on cost reduction and obligatory health and safety training, often through informal intra-firm training. **Incentives/policy rationale:** *Significant incentive for ensuring demand-driven supply of relevant high, medium and low skills, including through labour market reform. *Moderate incentives for SMEs, and awareness of SMEs, to invest in firm specific training, although hampered by size contingent barriers.	**Skills mismatch diagnosis:** *Limited perceived skills shortage from an SME perspective in both high and low skilled employees *Limited training investment by SMEs in transversal skills of medium and higher skilled employees. *Strong underinvestment in transversal skills of lower skilled employees. **Incentives/policy rationale:** *Limited perceived incentives for SMEs to invest in training of transversal skills by lack of growth ambitions, the challenge for SMEs to appropriate the return on transversal skill investment, poaching and size contingent barriers. *Strong societal rationale for upskilling lower skilled workers transversal skills in SMEs in the context of megatrends, for instance through employee targeted policy measures. *Significant rationale for SME awareness raising of the relevance of transversal skills investment for productivity.

The table highlights that growth potential SMEs are likely to need to expand their workforce, which can be challenging because of skills shortages. These shortages are likely to occur in firm-specific technical skills, but mostly in higher transversal skills. Growth potential SMEs are likely to be 'strategic employers' with regard to their training efforts for firm specific skills, but – because of their significance for successful growth and innovation – also in high cognitive, management transversal skills, in particular for higher skilled employees. Alongside in-house training, these firms are more likely to seek more formal training supplied outside the firm. However, like small and often younger firms, growth potential SMEs may encounter

barriers in both recruitment and skills development. Given the potential importance of these firms for innovation, governments may seek to foster the conditions to make their growth ambitions a success (as well as levelling the playing field to mitigate their size disadvantages). Such policies include ensuring sufficient skills supply that matches the firms demand (for instance in technical and ICT skills), as well as targeted support for training, in particular for transversal skills given the relevance of such skills sets for both firm growth and societal challenges.

SMEs with less growth ambition and/or potential are less likely to encounter skills shortages, although the tight labour market can pose recruitment challenges for such firms, and deficiencies in the supply of technical and craft skills may constitute a hurdle. Training investment by these SMEs is likely to be more limited, whereas 'tactical' or 'restrictive employers' they may be less likely to pursue high road strategies in skills development, and encounter size specific barriers to skills development. Training efforts (often informal and workplace based) may tend focus on firm specific technical or managerial skills for higher skill levels, and cost reducing or 'obligatory' skills regarding health and safety for lower skills levels, again with an emphasis on in-house informal training methods. The strengthening of transversal skills, in particular of low skilled employees, is likely to be neglected, since from a firm perspective the perceived net benefits are too low. However, from a social perspective, incentivising lower skilled employees in such firms to upskill is highly important. The policy approach for skills development in less growth-oriented firms is threefold. First, potential skills shortages could be addressed by ensuring sufficient supply of the relevant skills by education systems as well as labour market reform that makes hiring less costly and risky. Second, policies to raise awareness and help overcome resources constraints in skills investment may be warranted, in order to level the playing field for smaller firms. Last but not least, policies are needed to reach lower skilled employees in such firms to strengthen their transversal skills in order to better equip them in dealing with the challenges that megatrends pose.

Greening SMEs of many colours: self-assessment tools for different types of SMEs

Several studies point at the lack of appreciation of the heterogeneity of SMEs and their environmental actions and challenges as a core knowledge gap for more effective policies at the SME and environment nexus. (Rizos et al., 2015[71]), in a literature review, analyse barriers and opportunities for SMEs to embrace circular economy business models, point at the large heterogeneity in SME managers as to their environmental awareness. Similarly, (Gibb and O'Neill, 2014[28]) show that the category of green entrepreneurs is very heterogeneous and that entrepreneurs move over time between green and conventional business practice. (Aragón-Correa et al., 2008[10]) show that environmental strategies of SMEs vary widely from reactive regulatory compliance to pro-active pollution prevention and environmental leadership. (Blundel, Monaghan and Thomas, 2013[15]) suggest that the existence of trade-offs between financial and environmental objectives depends on geographical, sectoral and firm-level specificities.

(Parker, Redmond and Simpson, 2009[50]) translate SME heterogeneity in what this implies for policy, and discuss how environmental policy tools work out very differently for different groups of SMEs. They point at the paradox where SMEs exhibit widely differing characteristics and commitment where environmental issues are concerned, whilst at the same time they are all expected to engage in environmental improvement. They propose a toolkit of intervention strategies that might be deployed within each category of SMEs, and suggest that future research needs to evaluate and monitor 'mixed interventions' targeted at different types of SMEs to ensure such policies are effective and are tailor-made for the needs of groups of SMEs, for instance by developing a taxonomy of SMEs. Similarly, (Bradford and Fraser, 2008[72]) distinguish between different groups of SMEs and offer policy options for local authorities per category of SMEs to achieve energy savings.

Taking the heterogeneity of SMEs and their environmental challenges and opportunities better into account may contribute to more effective environmental policy making and the realisation of more win-wins between

environmental and business objectives. A relevant step to achieve is through the availability of self-assessment tools for SMEs that allows them to scan and understand their environmental performance, identify ways to reduce their environmental footprint and access resources for support to implement this. Various governments, business organisations and non-governmental organisations, have set up numerous websites and tools to help SMEs with their transition.[7] The Green Industry Platform provides an overview of various existing self-assessment tools for SMEs.[8] These tools not only can provide tailor-made assistance to various groups of SMEs, they may also provide insight in the varying needs of types of SMEs to participate in the green transition.

Finance: better understanding your customers

(Public) banks are among the public institutions that most often use and develop typologies to better understand their SME clients (Signore, 2016[185]) (Veugelers et al., 2018[111]) (Moritz, Block and Heinz, 2015[186]) (Masiak, Moritz and Lang, 2017[187]). Identifying different groups of SMEs can help a bank's efforts to address different demands and target lending, not just for frontrunners but also for averagely performing SMEs. The British Business Bank in the United Kingdom has developed a typology of its SME population based on attitudes and needs, as a tool to help target its activities (Box 6). The more public institutions look at the SME population as 'customers', the more such segmentation schemes can be expected to be of relevance, as the strong use of classification tools in marketing shows.

Box 6. The British Business Bank approach to SME attitudinal and needs based segmentation

The British Business Bank has undertaken a cluster-based segmentation analysis of the overall SME population, based on a UK demand-side survey (British Business Bank, 2018[114]). The aim of this exercise is to better inform and target future policies. Rather than speaking about the nature of "average" SMEs, the segmentation groups SMEs with similar tendencies together, especially separating those with high ambition and growth mind-sets from the others. The analysis groups SMEs with similar characteristics, considering SME need for, and use of finance, as well as their openness to external information about finance and how to secure it. Based on this analysis, SMEs can be broadly categorised according to the following segments:

- Contented: These SMEs are undemanding and unworried and the least likely to be innovative and active internationally. These SMEs have low growth ambitions, are relatively financially confident, but generally not well informed;
- Fighters: SMEs trying to overcome obstacles and grow. They tend to be somewhat ambitious, international and innovative, likely to report obstacles to the operation of their businesses, including those relating to cash flow, skills, politics, the economy, and access to finance;
- Savvy Entrepreneurs: These SMEs are innovative, international, and formal. They are the most confident in their own abilities to access different sources of finance and are likely to have a finance qualification;
- Quicksilvers: These are SMEs that can be categorised as successful and growing, but somewhat vulnerable, due to their ambitious growth plans. They are often active in markets beyond the United Kingdom, somewhat confident in their abilities to access finance options,

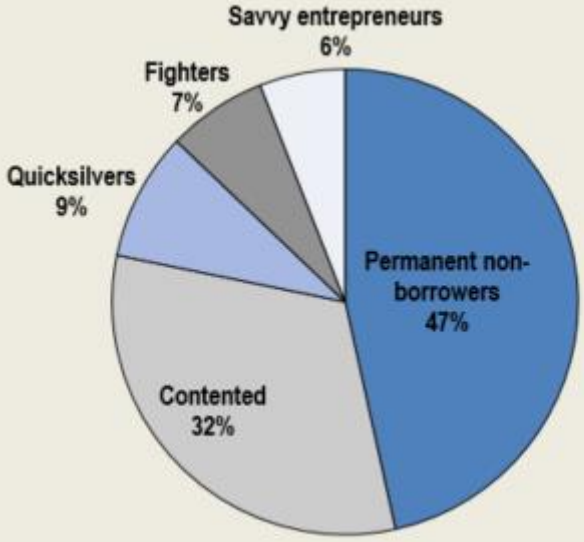
[7] See for instance https://www.carbontrust.com/small-to-medium-enterprises/; https://www.hiscox.co.uk/business-blog/carbon-neutral-easy-for-the-big-guns-but-how-can-small-businesses-do-it/; https://coolcalifornia.arb.ca.gov/small-business; https://www.eib.org/en/stories/energy-efficiency-bank-loan

[8] https://www.greenindustryplatform.org/tools-and-platforms/search

and relatively likely to employ someone with a formal finance qualification. Nevertheless, they may face financial constraints, for example following a decline in a credit application.

- Permanent non-borrowers: This group can be defined as those who (1) do not currently use external finance, (2) are not considering applying for external finance in the next three months, (3) have not applied or wanted to apply for finance in the past year, and (4) have not used finance in the past five years.

Figure 2. Composition of the SME population in the United Kingdom



Source: (British Business Bank, 2018[114]) (OECD, 2019[115])

Traders, non-traders and not-yet-traders

Directly or indirectly engaging in international trade is important for SMEs. It can help lower costs, and contribute to SME productivity growth and competitiveness. Whereas openness to trade can benefit economies at large, its impact may differ by type of SME. Some SMEs are actively engaged in trade via import and exports, and could see tangible benefits if barriers to trade were reduced. Some SMEs may currently not trade, but have the ambition and capacity to start export and imports given the right incentives. However, the large majority of SMEs is not engaged in trade, and has little inkling to do so. The impact of measures to liberate trade is likely different for these three groups.

This differentiated impact can be particularly challenging since measures to enable trade can also involve costs for SMEs. Liberalisation of trade revolves less and less on the reduction of border related barriers such as tariffs or non-tariff barriers, but increasingly on measures to reduce regulatory obstacles and differences in doing business across borders. In some cases this involves the mutual recognition of existing regulation and standards. In other cases, for instance in the European Union Single Market, trade is facilitated by the harmonisation of these regulations and standards. Evidence shows this can benefit exporting and importing companies, including SMEs. However, harmonisation of regulation in a national context in many cases also means changes in regulation to which SMEs have to adapt. Although the quality of the regulatory environment in some cases may benefit from harmonisation, it may also lead to new regulatory practice, which is less in tune with local circumstances, which could provide costs for non-

trading SMEs. Better insight in the benefits and costs of trade liberalisation through regulatory adjustment for non-trading SMEs is important.

Furthermore, although both trading and potentially trading SMEs may benefit from such liberalisation, it is not self-evident that this will benefit them all to the same extent. In fact, the share of (indirectly or directly) exporting SMEs has been rather constant, with SMEs also being focused more on nearby than faraway markets. Taking this more differentiated potential and impact of trade liberalisation on various types of SMEs into account is important, also to better identify what trade supportive measures best suit their ambitions. Governments increasingly use a 'business journey' perspective to identify the variety in SME needs (Box 7).

Box 7. A business journey perspective to trading

Governments and agencies increasingly use a company journey perspective – sometimes called a 'customer' or 'user' journey – to assess SMEs needs for internationalisation support. Such business journey approach takes the perspective of a business as a starting point, and then follows the business process in preparing and implementing doing business across borders to identify where obstacles lie. This practice is, for instance, adopted by Enterprise Netherlands, and contributes to internationalisation support that is much more tailor made to the needs of individual SMEs.

(Panteia, 2020[116]) maps such journeys for Dutch entrepreneurs exporting to Belgium, France, Germany and Poland. On the basis of this, they distinguish three types of business journeys:

- **Opportunity takers**: This group sees opportunities and will act on them. Mostly there is no extensive preparation process. Because of that these entrepreneurs relatively often experience problems in the start-up phase due to underestimation of differences in culture and regulations/procedures.
- **Pioneers**: These are (younger) entrepreneurs with a base in the Netherlands, who themselves leave for other countries in Europe and from there set up / expand their business. Challenge is an important driver here. Usually this is preceded by extensive preparation. Characteristic is a more network oriented approach to their activities.
- **Planners/ strategist**: This mainly concerns larger companies (>100 employees), which operate more systematically. They are characterized by a thorough preparation for export activities and often have experience with this in other countries as well. Planners/strategists often involve consultants in taking decisions and implementing them.

A business journey perspective allows policy makers to ensure that the support they offer is in line with the different phases SMEs follow in their internationalisation and the different types of strategies they undertake therein. It also allows for exploring what types of support is most suitable for types of SMEs in a more experimental setting, as was for instance done for the construction services sector in Estonia. The European Commission uses a business journey perspective in the identification of barriers within the Single Market (European Commission, 2020[117]).

5 Conclusion

This paper focused on SME heterogeneity, and on designing means to help policy makers better understand this. There are clear reasons why this is important. It may help to better assess what the impact is of regulations or other policy instruments on various segments of the firm population. It may help in assuring a more representative participation by SMEs and other firms in consultations and other government communication. Better understanding SME heterogeneity may make policies more effective, if it allows policies to be better able to take the specific circumstances of firms and entrepreneurs into account. Better understanding SME variety can also enable policy makers to identify and better articulate their policy objectives.

The central focus of the paper was on SME and entrepreneurship typologies as a means to understand SME variety. A typology is a means of classification with the aim of ordering entities in classes or groups according to similarities along various dimensions. The paper showed how the development and use of such typologies has evolved, and formulated four key criteria typologies need to fulfil to be of relevance to policy makers:

- First, the dimensions and attributes a typology encompasses should be relevant from the perspective of the **objectives** that policy makers pursue.
- Second, for typologies to be meaningful to policy makers, they should be based on **reliable and comparable data**.
- Third, to be of relevance across OECD countries, a typology should be usable in the **multiple context** of different country settings.
- Fourth, for typologies to be meaningful tools they should **not be too complex**, and include types that are easy to understand and recognizable for both policy makers and entrepreneurs.

These four criteria were subsequently used to review 169 typologies identified in the literature, with respect to two sets of policy objectives: objectives regarding specific groups of entrepreneurs (women, minority, social) and objectives regarding the performance of SMEs (innovation, digitalisation, start-ups, high growth, environment and internationalisation). The advancements in typologies on high growth, innovation and start-ups appear to be most promising for the development of policy relevant SME and entrepreneurship typologies.

Finally, building on the analysis on SME policy frameworks and their analytical underpinning, this paper sketched a number of existing and potential typologies that could be further developed. These include means to strengthen awareness among policy makers on SME diversity and a toolbox of objective/attribute combinations, and focus on productivity, greening, skills, and trade. It also includes possibilities for using typologies to better understand ‘ordinary SMEs’. These examples, in combination with the review of the literature and the four step approach to policy relevant typology development, may help steer further work on SME and entrepreneurship typologies to better understand the heterogeneity of SMEs and entrepreneurs.

Annex A. Stylised overview of SME and entrepreneurship typologies by policy objective

This paper is based on a review of the literature on SME and entrepreneurship typologies.[9] For each policy objective discussed in Section 3, this annex presents an inventory of typologies proposed in the literature along four dimensions:

- The types of entrepreneurs/SMEs distinguished
- The underlying objectives for the typology
- The data on the basis of which the typology was developed
- The question if the types distinguished were tested according to their relevance for explaining (aspects of) firm performance

Table A A.1. Typologies on women entrepreneurs

Author(s)	Types	Objective	Data	Tested
(Goffee and Scase, 1983[45]) (Goffee and Scase, 1985[46])	Conventionals Radicals Innovators Domestics	Classification according to women's entrepreneurial values versus traditional roles	54 interviews in the UK	No
(Cromie and Hayes, 1988[47])	Innovators Dualists Returners	Testing of Goffee and Scase typology on women's motivation to start new business venture	Sample of 34 female entrepreneurs	No
(Moore, 1990[40])	Traditional Modern	Proposing chronological typology, aiming to contribute to further research agenda on female entrepreneurship	Literature review	No
(Carter and Cannon, 1992[48])	Drifters Young achievers Achievers Returners Traditionalists	?	Sample of 60 UK women business owners	No
(Langan-Fox and Roth, 1995[49])	Need achievers Pragmatic Managerial	Identifying three psychological types of female entrepreneurs	Survey and interviews of 60 Australian business women, followed by cluster analysis	Yes
(Mitra, 2002[50])	Young achievers Block-factor entrepreneurs Family-driven entrepreneurs Income-driven entrepreneurs	Classification of women entrepreneurs according to motivation, acceptance of gender roles, positions in lifecycle and relational support factors	Survey and interviews with 48 women entrepreneurs in India	Yes

[9] OECD (2019) Literature Review SME and Entrepreneurship Typologies; OECD SME Strategy, CFE/SME(2021)8/ANN2

Author(s)	Types	Objective	Data	Tested
(Bruni, Gherardi and Poggio, 2004[51])	Aimless Success oriented Strongly success oriented Dualists Return workers Traditionalists Radicals	Investigation of entrepreneurial mentality of women entrepreneurs	Conceptual, literature review	No
(Morris et al., 2006[52])	High growth entrepreneurs Modest growth entrepreneurs	Investigation of the motivation for growth of women entrepreneurs	Mail survey among 500 woman business owners in NY and interviews with 50 entrepreneurs	Yes
(Constantinidis, Cornet and Asandei, 2006[53])	Women entrepreneurs with low levels of human, social and financial capital Women who took over the family business Women with high levels of human, social and financial capital	Investigating financing patters and gender	Survey 1100 women entrepreneurs and 25 interviews in Belgium	Yes
(Hughes, 2006[54])	Classic entrepreneurs Forced entrepreneurs Work-family entrepreneurs	Investigating motivation of women to start a business and relation with success	Survey by Statistics Canada of 3840 people	Yes
(Zarina and Osman, 2007[55])	Type 1: shift from less to strong economic orientation Type 2: less economic motivation Type 3: shift from strong to less economic orientation Type 4: strong economic motivation	Classification on the basis of goal orientations of women entrepreneurs	Mail survey amongst 239 women entrepreneurs in Malaysia	No
(Akehurst, Simarro and Mas-Tur, 2012[24])	No explicit typology	Explores the motivation, barriers and success factors of women entrepreneurs	Survey, interview and data on women entrepreneurs in Spain	Yes
(Reichborn-Kjennerud and Svare, 2014[56])	Prospectors Defenders Artists Hobbyists	Investigation of male/female entrepreneurship ambitions and strategies	6 case studies	No
(D'andria and Gabarret, 2016[41])	Necessity driven Opportunity driven Mampreneurs	Classification of women entrepreneurs according to motivation	Literature review	No
(Owalla, 2017[57])	Solution seeker entrepreneur Self-actualizer entrepreneur Bona fide entrepreneur Missionary entrepreneur Informed entrepreneur Transition entrepreneur Mixed entrepreneur	Classification of entrepreneurial identities and motivations	57 case studies and interviews in Sweden and Tanzania	Yes

Table A A.2. Typologies on minority/migrant entrepreneurs

Author(s)	Types	Objective	Data	Tested
(Bonacich, 1973[85])	Middleman entrepreneur	Classification of incorporation of immigrants	Case studies	No
(Waldinger, McEvoy and Aldrich, 1990[64])	Ethnic niche Middleman Minority Replacement Minority Economic Assimilation	Classify stages of ethnic business patterns according to changes in ethnic communities	Conceptual	No
(Portes, 1995[97])	Middleman Ethnic enclave Ethnic occupational niches	Classification of modes of incorporation of immigrant entrepreneurs	Case studies	No

Author(s)	Types	Objective	Data	Tested
(Kesteloot and Mistiaen, 1997[91])	Ethnic niche Protection Exoticism Economic assimilation	Classification of (the evolution of) ethnic enterprises	Conceptual, tested in case study on Turkish restaurants in Brussels	No
(Landolt, Autler and Baires, 1999[92])	Circuit entreprises Cultural entreprises Ethnic entreprises Return migrant entreprises Elite expansion entreprises	Classification of ethnic minority enterprises	Conceptual based on case studies in the US	No
(Chaganti and Greene, 2002[65])	High/low involvement ethnic entrepreneurs	Explore within-group differences of ethnic entrepreneurs	Data on 112 Latino and Asian entrepreneurs in US	Yes
(Rusinovic, 2008[94])	Limited, moderate or substantial transnational involvement	Classification according to the degree of transnational involvement	Interviews with 252 immigrant entrepreneurs in the Netherlands	No
(Chrysostome and Lin, 2010[66])	Three classifications: Necessity/ Opportunity immigrant business entrepreneur High, middle, low level of integration in host society Fully integrated, contemporary diaspora, transnational entrepreneurship, ethnic enclave	Explore three classifications towards a taxonomy of immigrant businesses	Conceptual	No
(Curci and Mackoy, 2010[67])	High, middle, low level of integration in host society	Classifies immigrant entrepreneurship according to the level of integration of the entrepreneur	Based on 199 interviews with Hispanic entrepreneurs in the US	No
(Labrianidis and Hatziprokopiou, 2010[68])	"Disadvantaged" survival entrepreneurs "Integrating" value entrepreneurs "Ethnic" entrepreneurs "Migrating" entrepreneurs	Investigation of the diversity of entrepreneurial strategies and practice	Literature, descriptive statistics, fieldwork and 59 interviews in Greece	No
(Edelman et al., 2010[60])	Black and white nascent firms	Analysis of differences in motivations to start and grow a new venture between white and black entrepreneurs	Sample of 401 black and white nascent entrepreneurs	Yes
(Bagwell, 2015[97])	Extensive level of transnational embeddedness Moderate level Limited level No transnational embeddedness	Classification along a continuum of transnational entrepreneurship	Interviews with 24 Vietnamese entrepreneurs in London	No

Table A A.3. Typologies of social entrepreneurs

Author(s)	Types	Objective	Data	Tested
(Vena, 2007[69])	Incubating entrepreneur Entrepreneurial entrepreneur Deeds social entrepreneur Dollars social entrepreneur	Classifying entrepreneurs according to drive and desired return on investment	80 new venture creators	No
(Kusyk and Lozano, 2007[71])	Customer dependent Moral leader Non-participant Observer	Classification of SME social performance according to key drivers and barriers	Literature review on drivers/barriers and descriptive statistics	No
(Zahra et al., 2009[72])	Social bricoleur Social constructionist Social engineer	Classify social entrepreneurs according to how they define opportunities, their mission, resources and how they address social illnesses	Conceptual	No
(Neck, Brush and Allen, 2009[73])	Social purpose ventures Traditional ventures Social consequence ventures Enterprising non-profits	Classify social enterprises according to their mission and outcome	Illustrative case studies and GEM data	No
(Conger, 2012[99])	Economically-oriented Socially-oriented Relationally-oriented	Classification of entrepreneurs according to values	Conceptual	No
(El Ebrashi, 2018[113])	Controlled growth Social franchising Program licensing System change Value chain partnership Stakeholder capacity building	Classification of social venture growth strategies	Interviews with 17 entrepreneurs of social ventures in Egypt	No
(Margiono, Zolin and Chang, 2018[114])	Lock-in centred business models Novelty-centred business models Efficiency-centred business models	Classification of the business models of social ventures	Conceptual	No

Table A A.4. Typologies of new ventures and start-ups

Author(s)	Types	Objective	Data	Tested
(Vesper, 1980[109])	Solo self-employed individuals Team builders Independent innovators Multipliers of existing models Economy of scale exploiters Capital aggregators Acquirers Artists who buy and sell Conglomerate builders Speculators Manipulators of apparent values	Classify new venture types and strategies	Conceptual	No
(Gibb and Ritchie, 1982[108])	Improvisors Revisionsists Superseders Reverters	Classify the perspective of prospective entrepreneurs	Interviews with 52 prospective entrepreneurs	No
(Gartner, Mitchell and Vesper, 1989[108])	8 types of new business ventures	Classification of new business ventures	Interviews/questionnaires with 102 entrepreneurs	Yes
(Lafuente and Salas, 1989[150])	Craftsman Risk-oriented Family-oriented Managerial	Classification of new entrepreneurs according to their characteristics and expectations	Sample of 360 owner managers in Spain, cluster analysis	Yes
(Birley and Westhead, 1993[107])	Novice founder Habitual founder	Comparison of two types of nascent entrepreneurs	Sample of 408 UK new businesses	Yes

Author(s)	Types	Objective	Data	Tested
(Birley and Westhead, 1994[108])	The insecure The follower The status avoider The confused The tax avoider The community The unfocused	Analysis and classification of motives to start a new venture and relevance for growth and size	Sample of 405 principle owner-managers of new independent business in UK	Yes
(Westhead and Wright, 1998[109])	Novice Portfolio founder Serial founder	Classification of founders of new ventures	Sample of 621 principle owner-managers in the UK	Yes
(Alstete, 2002[122])	Perceptions on becoming an entrepreneur: Greater control Greater satisfaction More money Legacy	Classification of perceptions of potential entrepreneurs	Survey among 54 MBA students and interviews	No
(Erikson, 2003[109])	Potential entrepreneurs Nascent entrepreneurs Novice entrepreneurs Parallel entrepreneurs Serial entrepreneurs	Classification of entrepreneurial types according to learning experience	Conceptual	No
(Diambeidou et al., 2006[156]) (Biga Diambeidou and Gailly, 2011[157])	Questions Seeds Boutiques Stars	Classification of start-up growth trajectories	Longitudinal analysis of 741 Belgian start-ups	Yes
(Westhead, Ucbasaran and Wright, 2005[110])(Westhead et al., 2005[111])	Novice Portfolio founder Serial founder	Classification of founders of new ventures	Sample of 354 firms in UK	Yes
(Raposo, do Paço and Ferreira, 2008[158])	Accommodated independents Confidents	Classification of attributes and motivations of potential entrepreneur students	Sample of 316 students in Portugal	No
(Block and Koellinger, 2009[124])	Opportunity entrepreneurs Necessity entrepreneurs	Analyse job satisfaction of nascent entrepreneurs	Survey among 1547 nascent entrepreneurs in Germany	Yes
(Desiage, 2010[107])	Self-protectors Developers	Analysis and classification of entrepreneur objectives in starting a firm	SINE survey in France	Yes
(Signore, 2016[166])	Under-performers Moderate performers Sale-based growers Patent-based growers	Classification of growth patterns of EIF supported start-ups	Dataset of 2951 EIF backed VC start-ups, cluster analysis	Yes
(Morris et al., 2018[15])	Survival venture Lifestyle venture Managed growth venture Aggressive growth venture	Classification of entrepreneurial new ventures	Survey 120 entrepreneurs in the US	Yes

Table A A.5. Typologies and innovation

Author(s)	Types	Objective	Data	Tested
(Miller and Friesen, 1982[75])	Conservative firms Entrepreneurial firms	Analyse and classify innovation in two types of firms	Sample of 52 Canadian firms	Yes
(Pavitt, 1984[27])	Supplier dominated Production intensive Science based	Analyse sectoral patterns of technical change	Sectoral data from UK	Yes
(Rizzoni, 1991[4])	Static small firms Traditional firms	Classification of SMEs according to their behaviour towards technological innovation	Conceptual	No

Author(s)	Types	Objective	Data	Tested
	Dominated firms Imitative firms Technology-based firms New technology-based firms			
(Jones-Evans, 1995[74])	Researcher Producer User Opportunist	Classification of different types of technical entrepreneurs	Sample of 61 technical entrepreneurs in the UK, 38 interviews	No
(Westhead, 1995[77])	Four types of owner-managed high-tech business	Classification of types of high-tech firms and relate this to performance	Sample 354 firms in UK	Yes
(Hatzichronoglou, 1997[75])	High, medium, medium-low and low tech industries	Classification of sector according to R&D intensity and purchases of embodied technology	Empirical	Yes
(Greene and Brown, 1997[76])	Glamorous Ambitious Constrained Core	Dynamic capitalism approach to classify firms according to innovation and growth	Conceptual	No
(Arvanitis and Hollenstein, 1998[76])	Innovation clusters: a) medium innovation intensity with product/process innovation, b) low intensity with product innovation, c) low intensity with process innovation, d) high with product/process innovation, and e) high with product innovation; Knowledge clusters: a) supplier, b) market, c) science, and d) science&other	Firm level classification of Swiss manufacturing firms according to their innovative activities	Survey among 2966 Swiss manufacturing firms and cluster analysis	Yes
(Autio and Lumme, 1998[87])	Application, market, technology and paradigm innovators	Classify new technological firms	n.a.	n.a.
(Risker, 1998[123])	Breakthrough Breakthrough imitative Modified breakthrough Incremental Incremental imitative Modified incremental imitative	Classification of entrepreneur/innovation types building on (Gartner, 1985[124])	Conceptual, literature review	No
(Covin and Miles, 1999[81])	Sustained regeneration Organisational rejuvenation Strategic renewal Domain redefinition	Distinguish types of corporate entrepreneurship and its relevance for innovation	Conceptual	No
(Tidd, 2001[82])	Differentiated Innovative Networked Complex	Classification of innovation practice in SMEs	Conceptual	No
(Mangematin et al., 2003[77])	Type 1: high tech, global market, IPO Type 2: smaller, segmented, more local market	Classification of French biotech SMEs according to their business model	Sample of 60 French biotech SMEs	Yes
(de Jong and Marsili, 2006[31])	Science-based Specialised-suppliers Supplier-dominated Resource-intensive	Classification of small firms according to their innovative activities, business practice and strategies	Survey among 1234 small and micro firms in the Netherlands	Yes
(Avlonitis and Salavou, 2007[78])	Active entrepreneurs Passive entrepreneurs	Analysis and classification aimed at product innovation	Survey 149 manufacturing SMEs in Greece	Yes
(Gilman and Edwards, 2008[77])	Modern firm Traditional family firm Classic sweatshop	Classification of small high tech firms	4 case studies	No
(Castellacci, 2008[79])	Advanced knowledge providers	Classification of sectoral patters on	CIS data on 24	Yes

Author(s)	Types	Objective	Data	Tested
	Supporting infrastructure services Mass-production goods Personal goods and services	innovation	European countries	
(Galbraith, Rodriguez and DeNoble, 2008[80])	Technology leader Technology follower	Classification of technology strategies of SMEs	Survey of 44 Scottish high tech manufacturing SMEs and cluster analysis	Yes
(Mazzarol and Reboud, 2009[84])	Shopkeeper Salesman Administrator CEO	Classification of small firms according to innovation type	Conceptual	No
(Minniti and Lévesque, 2010[81])	Research-based entrepreneurs Imitative entrepreneurs	Classification of innovative entrepreneurs broader than R&D	Theoretical	Yes
(OECD, 2010[25])	Two types of SMEs: a) Science, technology and innovation mode b) Doing, using and interacting mode	Classification of SMEs according to their innovation performance and potential	Conceptual	No
(Srholec and Verspagen, 2012[82])	High profile User-drive Externally sourced Opportunistic Low-profile	Classification of innovation strategy of innovative firms	CIS data on 13035 innovative firms in 13 European countries, cluster analysis	Yes
(Brunswicker and Vanhaverbeke, 2015[83])	Minimal searcher Supply-chain searcher Technology-oriented searcher Application oriented searcher Full-scope searcher	Classification of SMEs according external knowledge sourcing strategy	Sample of 1411 SMEs	Yes
(Taran, Boer and Lindgren, 2015[136])	Open/pro-active Closed/pro-active Open/reactive (Partially) closed/reactive	Classification of business models for innovation	Case studies of 10 (large and small) firms	Yes
(Hervas-Oliver, Boronat-Moll and Sempere-Ripoll, 2016[84])	Advanced SMEs Followers	Classification of SMEs according to process innovation capabilities	Survey among 4208 SMEs based on CIS data	
(Galindo-Rueda and Verger, 2016[85])	High, medium-high, medium, medium-low and low R&D intensity industries	Classification of sectors according to R&D intensity	Empirical	Yes
(Libaers, Hicks and Porter, 2016[138])	Bioscience development stage model R&D firms Product solutions provider Service solutions provider Highly specialised component supplier Specialised subcontractor	Classification of business models for technology commercialisation of small firms	407 high tech firms in the US, factor analysis	No
(Veugelers et al., 2018[86])	Basic Adopting Developers Incremental innovators Leading innovators	Classifying SMEs according to their innovation profile, in part aimed at assessing role of finance	EIB investment survey data 8900 firms	Yes
(Sadegh Baradaran et al., 2019[87])	Technological competences Entrepreneurial competences Managerial competences	Classification of technology entrepreneurs according to competences	Literature review	No

Table A A.6. Typologies and (high) growth

Author(s)	Types	Objective	Data	Tested
(Smith, 1967[108])	Craftsman-entrepreneur Opportunistic-entrepreneur	Analysis and classification of types of entrepreneur	Sample of 110 firms in the US, 15 interviews	Yes
(Laufer, 1975[120])	Growth oriented entrepreneur Craftsman entrepreneur			
(Stanworth and Curran, 1976[135])	Artisanal identity Classical entrepreneur identity Manager identity	Classification according to different owner-manager identities	Conceptual	No
(Preston, 1977[120])	Rare successes	Classify small firms activities and relate this to success	Sample 200 small firms	Yes

Author(s)	Types	Objective	Data	Tested
	Firms in small business industries Firms built on successful specialisation Satellite firms Turnover firms			
(Miles et al., 1978[62])	Prospectors Reactors Defenders Analyzers	Classification of firm strategies	Conceptual	No
(Filley and Aldag, 1978[126])	Craft Promotion Administrative	Develop a typology of firms/organisations anchored in their adaptive strategies	Surveys among 85 manufacturing SMEs and 272 manufacturing/retail firms	Yes
(Birch, 1979[18])	Mice Elephants Gazelles	Analysis of the growth behaviour of individual firms and classification according to growth	Dun & Bradstreet data US	Yes
(Porter, 1980[26])	Differentiation strategy Cost leadership strategy Focus strategy	Classification of firm strategies for competitiveness	Conceptual	No
(Candau, 1981[137])	Artisan Strong centralisation Familiale Medium Transition	Classification of small firms	Sample of 209 firms in Canada	No
(Dunkelberg and Cooper, 1982[120])	Craftsman entrepreneur Growth-oriented entrepreneur Independent entrepreneur	Classification according to the motivation of entrepreneurs	Conceptual	No
(Smith and Miner, 1983[108])	Craftsman-entrepreneur Opportunistic-entrepreneur	Analysis and classification of types of entrepreneur	Sample 38 entrepreneurs in the US, interviews	Yes
(Lewis and Churchill, 1983[19])(Churchill and Lewis, 1982[163])	Existence Survival Success Take-off Resource maturity/big business	Identifying stages of growth	Sample of 83 firms, questionnaires	Yes
(Carland et al., 1984[18])	Small business venture Entrepreneurial venture Business owner Entrepreneur	Analyse and classify differences between entrepreneur and small business owner	Conceptual	No
(O'Farrell and Hitchens, 1988[128])	Fast-growers Satisfiers Attempt at fast growth but fail	Classification of small firms according to growth path	Conceptual	No
(Hornaday, 1990[139])	Craft Professional manager Promotor	Classification of small business owners	Conceptual, literature review	No
(Woo, Cooper and Dunkelberg, 1991[126])	Craftsman Opportunistic	Assessment of craftsman and opportunistic entrepreneur typology	Literature review	No
(Chell, Haworth and Brearley, 1991[140])	Caretakers Professional Managers Quasi-entrepreneurs Entrepreneurs	Classification according to entrepreneurial behaviour	Conceptual	No
(Miner, Smith and Bracker, 1992[108])	Craftsman-entrepreneur Opportunistic-entrepreneur Inventor-entrepreneur	Define and test inventor-entrepreneur type	Sample 147 NSF grants	Yes
(Storey, 1994[108])	Failures Trundlers Fliers	Explaining growth in small firms	Empirical	Yes
(Siu, 1995[108])	Senior citizen	Classifying profiles of owner-managers	Interviews with 50 private entrepreneurs in China	No

Author(s)	Types	Objective	Data	Tested
	Workaholic Swinger Idealistic High flyer			
(Baumol, 1996[120])	Productive entrepreneurship Unproductive entrepreneurship Destructive entrepreneurship	Classification of entrepreneurship according to its value for society	Conceptual	No
(Jenkins and Johnson, 1997[123])	Realised entrepreneur Unrealised entrepreneurs Realised non-entrepreneur Emergent entrepreneur	Classification of entrepreneurial intentions and growth outcomes	30 sole-trades/owners of independent retail in UK	Yes
(Miner, 1997[108]) (Miner, 2000[109]) (Miner, 1997[17])	Personal achievers Real managers Expert idea generators Empathic supersalespeople	Analysis of types of entrepreneurial personalties	Sample 100 entrepreneurs in US	Yes
(Baines, Wheelock and Abrams, 1997[70])	Growth rejecting Growth ambivalent Growth enthusiastic Non-employment growth	Classifying the growth ambitions of micro-businesses	n.a.	n.a.
(Thompson, 1999[129])(Thompson, 1999[140])	Cowboy Adventurer Entrepreneur Entrepreneurial manager Bureaucratic manager	Classification of entrepreneurial types	Conceptual with illustrative cases	No
(Greiner, 1998[16])	Creativity Direction Delegation Coordination Collaboration	Identifying stages of firm growth	Conceptual	No
(Bantel, 1998[118])	Six clusters of SMEs	Classification of adolescent SMEs according to success factors and performance	Sample 162 firms in US, cluster analysis	Yes
(Kathuria, 2000[135])	Do all Speedy conformers Efficient customers Starters	Analyse and classify manufacturing strategies and competitive priorities of small firms	Survey 158 firms in US	Yes
(Borch, Huse and Senneseth, 1999[126])	Managerial firm Technological firm Traditional firm	Analysis of strategic orientation and resources of small firms	Sample of 660 small firms in Sweden	No
(McMahon, 2001[93])	Traditional/lifestyle Capped growth Entrepreneurial SMEs	Analysis and classification of growth paths of SMEs	Australia Business Longitudinal survey, cluster analysis	Yes
(Kunkel, 2001[136])	Ten classes of entrepreneurial activity	Classification of entrepreneurial activity	Conceptual	No
(OECD, 2002[29])	8 groups firms in 3 'families' (stable high growth over the whole period, stable growth followed by growth spurt, rapid early growth followed by stable growth)	Classification according to the growth trajectories of high growth firms	Sample of 500 high-growth firms in France	Yes
(Fuller and Lewis, 2002[175])	Network relationship strategy Contract relationship strategy Personal service relationship strategy Personalized relationship strategy Strategic development relationship strategy	Classification of strategies towards the relationships with the external environment of small firm owner-managers	36 interviews	No
(Delmar, Davidsson and Gartner, 2003[90])	Super absolute growers Steady sales growers	Classification of patterns of a high growth performance	Sample of 1501 high growth firms in Sweden, cluster	Yes

Author(s)	Types	Objective	Data	Tested
	Acquisition growers Super relative growers Erratic one shot growers Employment growers Steady overall growers		analysis	
(Bridge, O'Neill and Cromie, 2003[111])	Lifestyle Comfort zone Growth	Classification of small business according to ambition	Conceptual	No
(Sum, Kow and Chen, 2004[105])	All-rounders Efficient innovators Differentiators	Classification of operation strategies of high-performing SMEs	Survey amongst 43 award winning SMEs in Singapore	No
(Barringer, Jones and Neubaum, 2005[91])	Rapid-growth companies Slow-growth companies	Analysis and classification of firm attributes that make up for rapid growth	Sample of 50 rapid and 50 slow growth firms	Yes
(Aragón-Sánchez and Sánchez-Marín, 2005[120])	Defender Prospector Analyser	Classify SMEs according to strategic orientation and performance	Sample of 1351 SMEs in Spain	Yes
(Chan, Bhargava and Street, 2006[92])	'Small rapid growing firms' can be seen as a homogenous type according to their management challenges and practice	Analysis of management challenges and practice of rapid growing small firms	Sample of 50 best managed firms in Canada	Yes
(Acs and Mueller, 2007[119]) (Acs and Mueller, 2006[118])	Mice Elephants Gazelles	Analyse business dynamics and firm growth to test Birch typology	MSA/LEEM/CES data US	Yes
(Keh, Nguyen and Ng, 2007[143])	Managerial orientation Entrepreneurial orientation	Application of the managerial/entrepreneurial orientation to SMEs	Survey among 294 small businesses in Singapore	Yes
(Lewis, 2008[113])	Growth rejecting (or lifestyle) SMEs Growth enthusiastic SMEs	Analysis and classification of the ambitions and strategies of SMEs	Interviews with 50 entrepreneurs in New Zealand	No
(Tang, Tang and Lohrke, 2008[14])	True believer The clueless entrepreneur The practical entrepreneur The reluctant entrepreneur	Classification of entrepreneurs according to entrepreneurial alertness and attributional styles	Sample of 315 nascent entrepreneurs in the US	Yes
(Lichtenstein and Lyons, 2008[143])	Pre-venture Existence/infancy Early growth Expansion/sustained growth Maturity/decline	New business life cycle model	Conceptual	No
(Hessels, van Gelderen and Thurik, 2008[118])	Three start-up motive types: Independence motive Increase wealth motive Necessity motive	Classify start-up motives and relate to growth performance	GEM data 36 countries	Yes
(Sharma and Wadhawan, 2009[130])	Stable independent survivors Innovators with continuous growth Network intensive units	Classify SMEs according to growth mode and strategy	SME data in India	Yes
(Schoar, 2009[120])	Subsistence entrepreneurs Transformational entrepreneurs	Analysis of obstacles to transformational entrepreneurship	Literature review and interviews with managers in 20 emerging economies	No
(Amorós et al., 2009[149])	Necessity based and opportunity based entrepreneurship	Analysis of entrepreneurship volatility for types of entrepreneurship	GEM data	Yes
(Gibcus, Vermeulen and De Jong, 2009[126])	Daredevils Lone Rangers Doubtful minds Informers' friends Busy Bees	Classify small business owners decision makers	Sample 646 small business owners in the Netherlands, cluster analysis	No
(Crutzen, 2010[202])	Shocked firms Firms serving other interests	Classification of forms of small business failure	106 distressed firms in Belgium	No

Author(s)	Types	Objective	Data	Tested
	Apathetic firms Firms that fail after managerial error Badly managed firms			
(Douhan and Henrekson, 2010[148])	Business entrepreneurship Institutional entrepreneurship	Include institutional entrepreneurship in Baumol typology	Conceptual	No
(Giacomin et al., 2011[127])	Opportunity entrepreneurship Necessity entrepreneurship Hobby entrepreneurship	Analyse the impact of socio-economic characteristics of entrepreneurs on existing typologies	Sample of 538 Belgian entrepreneurs	No
(Ferreira, Azevedo and Cruz, 2011[130])	Expansion stage Diversification stage Decline stage	Combine a life-cycle and resource-based perspective to classify SMEs to better understand growth	Survey 28 firms in Cape Verde	Yes
(Dincer, Yildirim and Dil, 2011[126])	Craftsman, opportunistic, independent entrepreneur and Prospectors, Reactors Defenders, Analyzers strategies	Analyse linkage between entrepreneur and strategy typologies	15 interviews	No
(Reboud, Mazzarol and Clark, 2011[6])	SME Ordinaire SME Enterpreneuriale	Analysis and classification of non high-growth/high-tech SMEs	Literature review, conceptual	No
(Jaouen, 2012[121])	Career oriented manager Hedonistic manager Survivalist Paternalistic	Develop a typology of managers in very small firms	68 interviews	Yes
(Hosseini, Dadfar and Brege, 2012[143])	Non-entrepreneurial firms Forced entrepreneurial firms Latent entrepreneurial firms Actual entrepreneurial firms	Classification of entrepreneurial firms	Survey 30 firms in Iran	No
(Andersén, 2012[11])	Ikeas Conservatives Technocrats Marketeers Craftsmen Nomads	Develop a resource-based taxonomy on MSMEs	Sample of 186 manufacturing MSMEs in Sweden	No
(Jayawarna, Rouse and Kitching, 2013[150])	Reluctant entrepreneur Convenience entrepreneur Economically driven entrepreneur Learning and earning entrepreneur Prestige and control entrepreneur	Analysis and classification of entrepreneurial motivation	Survey among 211 entrepreneurs in the UK	Yes
(Bannier and Zahn, 2014[93])	High growth firms Slow-growth firms	Cross-country comparison of SME growth trajectories	Large dataset of FRA, ITA, UK and US SMEs	Yes
(Nightingale and Coad, 2014[23])	Gazelles Muppets	Address the bias in the use of the category 'entrepreneurial firm'	Literature review, conceptual	No
(BPIFrance, 2014[216])	Hexagonales optimistes Résistantes en sursaut Leaders mondialisés Sérials innovantes Routinieres	Classification of growth trajectories of medium sized firms	Questionnaire to 4000 managers of medium sized firms in France, qualitative analysis	No
(Mills, 2015[94])	Non-employee business Main street Suppliers High-growth firms	Descriptive classification of small businesses	US census bureau data	No
(Jaouen and Lasch, 2015[120])	Four types of owner-manager: success, subsistence, hedonism and paternalism	Classification of views and aspirations of owner-managers	Interviews with 79 micro firms in France	No
(Verhoeven, Span and Prince, 2015[3]) (Span and Wortelboer, 2018[219])	Self-employed Regular SMEs Innovative SMEs Young SMEs	Classification of SMEs according to background and performance	Statistical firm level data in the Netherlands	Yes
(Chen, Chang and Pan,	Creative constructionist	Analyse and classify the behaviour of	Sample 291 creative	Yes

Author(s)	Types	Objective	Data	Tested
2018[160])	Creative opportunist Creative designer Creative producer	creative entrepreneurs and relation with success	entrepreneurs in Taiwan	
(Reboud et al., 2018[219])	Participative SMEs Anti SMEs Entrepreneurial SMEs Established SMEs Ad Hoc SMEs Operationally focused SMEs Reactive SMEs	Development of a taxonomy of the 'ordinary SME' according to observable attributes	Database of 594 SMEs in France	Yes

Table A A.7. Typologies of SMEs and the environment

Author(s)	Types	Objective	Data	Tested
(Walley and Taylor, 2002[103])	Innovative opportunists Visionary champions Ethical mavericks Ad hoc enviropreneurs	Identifying types of attitudes/strategies of SMEs towards greening	Conceptual	In later studies
(Volery, 2002[104])	Environment-conscious entrepreneurs Green entrepreneurs	Classifying green entrepreneurs	Conceptual, 2 case studies	No
(Linnanen, 2002[105])	Types of ecobusiness: nature-oriented enterprises, producers of environmental technology, providers of environmental management services, producers of environmentally friendly products Types of environmental entrepreneurs: non-profit business, successful idealist, self-employer, opportunist	Identifying types of business and entrepreneurs according to their objectives and activities	Conceptual	No
(Schaltegger, 2002[106])	Environmental administrators Environmental managers Alternative activists Bioneers Ecopreneurs	Distinguishes types of environmental management	Conceptual, 7 case studies	No
(Parker, Redmond and Simpson, 2009[102])	Profit driven Advantage driven Environment driven Compliance driven	Analysis of environmental commitment by SMEs	Literature review	No
(Freimann, Marxen and Schick, 2010[107])	Eco-dedicated start-ups Eco-open start-ups Eco-reluctant start-ups	Identifying opportunities for environmental management in types of green start-ups	?	?
(Harbi, Anderson and Ammar, 2010[108])	5 types according to their sustainability orientation and impact of structural influences	Testing the Walley & Taylor typology	Survey 58 Tunisian entrepreneurs, with cluster analysis	Yes
(OECD, 2013[101])	Eco-innovators Eco-entrepreneurs Eco-adopters	Identifying types of green SMEs	Literature review, conceptual	No
(Ghisetti and Rennings, 2014[235])	Energy and Resource Efficiency innovations Externality Reducing Innovations	Testing the profitability impact of types of environmental innovations	Mannheim Innovation Panel	Yes
(Bergset and Fichter, 2015[100])	Alternative start-up Visionary start-up Inventive start-up Ecopreneurial start-up Unintentionally green start-up	Providing a framework for empirical research on financial challenges/opportunities of types of sustainable start-ups	Literature review	No
(Labelle, Spence and Courrent, 2016[109])	Traditionalist SMEs Strategic SMEs Reactive SMEs	Identifying types of sustainable behaviour	Empirical	Tested on 800 SMEs

Author(s)	Types	Objective	Data	Tested
	Militants SMEs			
(Neumeyer and Santos, 2018[110])	Survival ventures Lifestyle ventures Managed growth ventures Aggressive/high growth ventures	Analysis and classification of sustainable business models	90 interviews in two US municipal ecosystems	yes
(Koirala, 2019[111])	Eco-innovators Eco-entrepreneurs Eco-adopters	Identifying types of green SMEs	Literature review, conceptual	No

Table A A.8. Typologies of SMEs and digitalisation

Author(s)	Types	Objective	Data	Tested
(Meckel et al., 2004[144])	e-business strategy leaders old-fashioned SMEs Blind e-business users e-adoption leaders formal strategy leaders	Classification of SME e-business strategies	Questionnaire to sample of SMEs in the UK	no
(Hull et al., 2007[93])	Mild Moderate Extreme	Classify types of digital entrepreneurship according to their update of digital technologies	Conceptual	No
(Robert et al., 2010[94])	Expert Freshman Well-prepared provident Risqué-tout	Classification of entrepreneurs in the ICT sector	Survey amongst 469 ICT firms in France	No
(Vieru et al., 2015[93])	Technical expert Organiser Campaigner	Distinguish different kinds of digital competences within SMEs	Three case studies in Canada, literature review	No
(Cerchione and Esposito, 2017[99])	Guidepost Explorer Exploiter Latecomer	Classification of SME strategies towards knowledge management system use and ICT	Literature review, sample 61 Italian SMEs	No
(Ramón-Jerónimo and Herrero, 2017[100])	Four classes of SMEs	Classification of SMEs according to their response to external shocks (including ICT investment)	Sample of 329 manufacturing SMEs in Spain	Yes
(Calvino et al., 2018[93])	Low Medium-low Medium-high High	Classification of sectors according to their digital intensity	Empirical	Yes
(Holland and Gutiérrez-Leefmans, 2018[150])	Information laggards Basic networking Advanced networking Advanced networking mature Social media markets	Classification of SME e-commerce platforms	Online panel data of 144 websites	No
(OECD, 2019[40])	Digital/physical delivery Capital/labour intensive	Classification of digital platforms	Conceptual	No

Table A A.9. Typologies on SME internationalisation

Author(s)	Types	Objective	Data	Tested
(Huppert, 1981[121])	Sheltered SMEs SMEs exposed to international competition	Analysis of growth strategy of SMEs including classification of international orientation	Sample 3300 firms in France	No
(Baum, Schwens and Kabst, 2011[121])	Export start-up Geographically focused start-up	Classification of new international ventures	Sample of 195 high-tech firms in Germany	No

Author(s)	Types	Objective	Data	Tested
	Multinational trader Global start-up			
(Julien, 2012[123])	Local SMEs Glocal SMEs International SMEs Global SMEs	Analyse heterogeneity in international SME activities	Literature review and descriptive statistics	No
(Swoboda and Olejnik, 2013[118])	Domestic-focused Traditionalists Global Standardisers Multinational Adapters Transnational Entrepreneurs	Analyse and classify the internationalisation of family-owned SMEs	Questionnaire to 3500 SMEs in Germany	Yes
(Baldegger, 2013[247])	Born Global Born again global Born international Born again international Gradual internationalisation	Classification of internationalisation strategies of SMEs	Survey amongst 876 SME decision makers in Switzerland	No

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