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Scale-ups and High-Growth Firms

Theory, Definitions, and
Measurement

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Contents

1	Introduction and Motivation	1
1.1	Introduction	1
1.2	Early Work Focused on Anecdotes and Case Studies	2
1.3	Scope of the Book	3
1.4	Why a Book on Scale-Ups?	3
1.5	Overview of This Book	4
	References	4
2	Firm Growth, and High-Growth Firms	7
2.1	Introduction	7
2.2	Empirical Definition of Firm Size and Firm Growth	7
2.3	High-Growth Firms: The Eurostat-OECD (2007) Definition	8
	References	9
3	Stages of Growth Models	11
3.1	Stages of Growth Models and Their Discontents	11
3.2	Scaling up as a Stage of Growth	12
3.3	Changes in the Structure of Growing Firms	14
3.4	Born Scale-ups?	14
3.5	Can Scale-ups Have More Than One Product?	15
3.6	Blitz-Scaling vs the Lean Startup Perspective on Scaling up	16
	References	17
4	Eight Propositions About Scale-ups	19
4.1	A Scale-up Is a Concept Born of Practitioners, Not Academics	19
4.2	Scale-ups Are Not Just in the IT Sector, But May Be Enabled by IT	20
4.3	A Scale-up Is a Qualitative Concept from a “Stages of Growth” Model	22
4.4	Scaling up Involves Structural Transformation	22
4.5	A Scale-up Does Not Exist Anywhere in a Pure Form	23
4.6	Scale-ups Differ by Degree, Not by Kind	24

- 4.7 Too Many Exceptions 26
- 4.8 There May Never Be a Standardized Empirical Definition
of Scale-up 28
- References 28
- 5 Theoretical Definition of a Scale-up 31**
 - 5.1 Firm Growth or Scaling: Reinventing the Wheel? 31
 - 5.2 Previous Definitions: A Critical Discussion 32
 - 5.3 Five Suggestions for How a Scale-up Should Be Defined 35
 - 5.4 Discussion of Well-Known Cases 38
 - 5.4.1 Is Uber a Scale-up? 38
 - 5.4.2 Is Apple a Scale-up? 38
 - 5.4.3 Was Obama’s 2012 Campaign a Scale-up? 39
 - 5.5 Our Theoretical Definition of a Scale-up 40
 - References 40
- 6 Empirical Definition of a Scale-up 43**
 - 6.1 Scaling up Is More Than Just Growth, or Not? 43
 - 6.2 Four Desirable Properties of an Empirical Definition 44
 - 6.3 Empirical Definition of a Scale-up, in 2 Steps 44
 - 6.3.1 Step 1: Identify the Set of HGFS 44
 - 6.3.2 Step 2: Scale-ups as a Subset of HGFs 45
 - References 51
- 7 In Search of Scale-ups: Empirical Analysis 53**
 - 7.1 Data Description 53
 - 7.2 Results 54
 - 7.2.1 Frequency of HGFs 54
 - 7.2.2 How Many HGFs Satisfy the Conditions for Being
Scale-ups? 54
 - References 57
- 8 Concluding Remarks 59**
 - 8.1 Concluding Remarks 59
 - References 61

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Abbreviations

FSD	Full Self Driving
GPT	General Purpose Technology
HGFs	High Growth Firms
IB	International Business
ICT	Information and Communication Technology
IPO	Initial Public Offering
NACE	“nomenclature statistique des activités économiques dans la Communauté européenne”; i.e. the industry standard classification system used in the European Union
OECD	Organisation for Economic Co-operation and Development
TMT	Top Management Team
USA	United States of America
VC	Venture Capital

Chapter 1

Introduction and Motivation



The book begins with an introduction to research on High-Growth Firms and scale-ups, focusing on the development of the literature, and observing that early work on scale-ups focused on anecdotal evidence and case studies. In contrast, this book seeks to develop a rigorous and general definition of scale-ups that is amenable to being applied to datasets of firm populations from different countries and time periods.

1.1 Introduction

Scale-ups have received an almost mythical status, following on from the rapid growth and phenomenal profits of a handful of extremely successful firms such as Facebook, LinkedIn, Tesla, AirBnB, Uber, and so on. Mystery surrounds these firms, in terms of the secrets of their extraordinary dynamics, as well as their true nature. Indeed, we are not fully aware of how common scale-ups actually are, because there is still no agreed-upon empirical definition that allows us to identify and count scale-ups in the business population.

Scale-ups are an elite few. Most firms do not grow at all, while a small number enjoy very high growth rates. These fast-growing firms have received considerable attention in the entrepreneurship literature (Coad et al., 2014; Demir et al., 2017), and are labeled gazelles, high-growth firms (HGFs), and high-impact firms. Other terms include unicorns (and decacorns), which are private ventures with a valuation of at least \$1 billion (and \$10 billion, respectively) (Kuratko et al., 2020). More recently, an emerging body of work focuses on scale-ups. While scale-ups are argued to be of great economic and theoretical relevance (Autio et al., 2018; Monaghan et al., 2020), there seems to be a lack of a common understanding of what constitutes a scale-up and how it differs from an HGF.

Is it worth adding a new category of rapid growth firms (i.e. scale-ups) to the lexicon? Amid the excitement about scale-ups, there is also much confusion, with

different (and sometimes conflicting) ideas emerging from different sources. A number of recent publications from academic scholars (e.g. DeSantola and Gulati, 2017; Giustiziero et al., 2023) and international organizations (e.g. OECD, 2021; Vandresse et al., 2023) focus on scale-ups as an important new category of dynamic firms, emphasizing that scaling up is something distinct from growth, and that scale-ups are not just high-growth firms, while at the same time containing empirical analysis that defines scale-ups in exactly the same way as one defines high-growth firms (e.g. Belitski et al., 2023; OECD, 2021, p. 42). It seems somewhat incoherent to claim that scale-ups are different from HGFs, while at the same time defining scale-ups in terms of HGFs.

Another problem is that the literature contains various definitions of scale-ups, which is problematic for empirical measurement, knowledge accumulation, comparison across countries and over time; leading to problems in developing a generalizable theory (Lee and Kim, 2023; Vandresse et al., 2023). This book seeks to clarify the confusion in the area, taking the space granted to book-length publications to enter into the required detail to give a deeper and multifaceted understanding of the term scale-up, as well as a practical discussion regarding how scale-ups can be measured in empirical analysis.

1.2 Early Work Focused on Anecdotes and Case Studies

The literature has identified several case studies of successful scale-ups (e.g. Uber [Pfothenauer et al., 2022], PayPal, Facebook, Tesla, and LinkedIn [Hoffman and Yeh, 2018], and many more) that have been useful in introducing the phenomenon, showing that some firms grow by a process of “scaling up” that differs from normal growth. However, it is not clear whether these case studies are outliers or representative of average firms (Tippmann et al., 2023). For example, are all firms that attempt scaling-up successful, or are failure rates higher for scale-ups? Is a dead scale-up a scale-up, in the same sense that a dead lion is a lion?¹ If a scale-up were never profitable, should we still call it a scale-up?²

The questions above suggests that it is necessary to move to the next stage of empirical analysis of the phenomenon of scale-ups, i.e. from case studies and anecdotes to analysis of large sample representative panel datasets through “new large-sample quantitative studies” (DeSantola and Gulati, 2017, p. 656) that can investigate

¹ In our view, a dead scale-up would only be considered to be a scale-up if it satisfied various conditions, including the condition that it grew sufficiently fast over a three-year period to find itself in the set of HGFs. A potential scale-up or a baby scale-up would therefore not be a scale-up. A firm that grows fast but never becomes profitable could be a scale-up, however (as discussed later).

² Growth via scaling up should theoretically be profitable, because revenues grow rapidly while variable costs are low (although fixed costs are high and may increase as production processes invest heavily in intangibles; De Ridder, 2023). However, an unprofitable firm may still be classified as a scale-up as long as it satisfies our empirical definition presented in Chap. 6.

issues such as survivor bias and selection bias, as well as showing population-level proportions and tracking the development of scale-ups over time.

Hence, although the methodology of scale-up research has generally been a discussion of cases (Ries, 2011; Hoffman and Yeh, 2018; Kuratko et al., 2020; Reuber et al., 2021), there is growing interest in investigations of proportions of scale-ups in large samples (OECD, 2021). This book seeks to help the transition from the former to the latter. Now that the term “scale-up” is entering into empirical investigations and policy discussions, it is time for a precise definition. Academics need to move on from the way of thinking that might be caricatured as follows: “on the one hand this firm is a scale-up, and on the other hand it isn’t a scale-up.” Saying that a firm is “somewhat like a scale-up” is not helpful for the emerging body of empirical analysis that needs a binary variable to classify firms into scale-ups vs non-scale-ups. Policy often draws on such empirical analysis to consider questions such as the following: are scale-ups valuable? What are the characteristics of scale-ups? Are they financially constrained? How should policy help them? As such, this book addresses the need for a clear binary definition of what a scale-up is.

1.3 Scope of the Book

There is some debate about whether scaling-up occurs at the level of firms, or whether it can also occur at other levels, such as the levels of initiatives within firms (Tippmann et al., 2023) or at the product-level (e.g. the scaling-up of the iPhone, Hoffman and Yeh, 2018), or at the level of ecosystems that include firms (Tippmann et al., 2023). This book focuses on the firm level. To the extent that scale-up firms are hyper-specialized single-product firms (Giustiziero et al., 2023), the distinction between firm-level and product-level disappears. Our focus is on the firm-level because (as with HGFs) this is the level at which SME and entrepreneurship policy focuses (e.g. OECD, 2021).

1.4 Why a Book on Scale-Ups?

Given the apparent confusion in this area, it seems worth having a book-length (rather than article-length) discussion of the matter. We draw upon various literatures (practitioners, policy literature from countries and international organizations, and of course academics) and various academic disciplines (entrepreneurship, international business, strategic management, economics) and various theoretical concepts (such as stages of growth models, fixed vs marginal costs, intangible capital, network externalities affecting consumer demand) to explain in what ways scale-ups are theoretically different from HGFs. We then discuss how a scale-up definition can be operationalized empirically as the literature matures, moving from anecdotes to large-sample analysis.

It would arguably not be possible to discuss the many facets in a journal article format. Journal articles must be concise, to the point that they must abandon descriptive approaches in the struggle to emphasize their novel contributions. (Furthermore, it is often faster to publish a first draft of a book manuscript than the first draft of a journal article.) Given that considerable confusion remains regarding what a scale-up is, and how scale-ups should be defined (both in terms of theoretical concepts and in terms of defining scale-ups in terms of the variables usually observed in standard datasets), there seems to be a genuine need for this short book.

1.5 Overview of This Book

Chapter 2 contextualizes the literature on scale-ups by discussing the related literature on High-Growth Firms (HGFs). Chapter 3 discusses stages of growth models, a strand of literature that, despite risking oversimplification, gives a theoretical model of the stages through which growth unfolds. Scaling up is presented as a relatively advanced stage in the development of a new venture after it has overcome hurdles related to product design, development, and product-market fit. Chapter 4 contains eight propositions about scale-ups, building up towards the theoretical definition in Chap. 5, and the empirical definition in Chap. 6. Given that many of the concepts and ideas used in the theoretical definition do not correspond closely to the variables found in standard datasets, there is a difference between our theoretical definition (Chap. 5) and our empirical definition (Chap. 6). Chapter 7 contains some preliminary explorations of measuring scale-ups using Swedish data. Finally, Chap. 8 concludes.

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Chapter 2

Firm Growth, and High-Growth Firms



This chapter discusses previous research into firm growth. In particular, Eurostat and the OECD proposed an indicator of High-Growth Firms in 2007 that has helped develop the field of HGF research, because having a standardized HGF definition fostered comparisons of research findings and cumulativeness of knowledge.

2.1 Introduction

Since decades, there has been a keen interest in measuring firm growth. A main reason for this was due to popular interest in job creation. Pioneering work by David Birch (Birch, 1979) investigated the dynamics of employment growth by entrepreneurial firms. An important contribution of David Birch was moving beyond anecdotal cases to focus on large-sample datasets thereby gaining a representative view of job creation by SMEs. In particular, it was his finding that a small number of firms create a disproportionately large number of jobs, that led him to introduce the term “gazelles” to describe high-growth firms. Since Birch (1979), the literature on HGFs has been further developed and standardized such that major statistical offices (e.g. Eurostat and the OECD) collect data on HGF shares in regions and countries over time.

2.2 Empirical Definition of Firm Size and Firm Growth

A first challenge for empirical work on firm growth is to decide upon how to measure growth. This task is not necessarily as simple as it sounds. For example, according to an indicator based on a layman’s understanding of growth rates, when a firm with 100 employees that grows by 50% and then declines by 50% will not actually end up

back where it started (100 employees) but will end up with 75 employees.¹ Tornqvist et al. (1985) discuss the various ways in which growth rates can be measured, and discuss the desirable statistical properties of growth rates indicators, and conclude by recommending that growth rates should be measured in terms of log-differences:

$$GR_{X_{it}} = \log(X_{it}) - \log(X_{i,t-1}) \quad (2.1)$$

For firm i at time t . Firm size is measured in terms of variable X , which usually corresponds for total sales or employment, although other size indicators are sometimes used (such as value added or total assets).²

Research on firm growth has generally measured growth on an annual basis (Coad, 2009). Measuring growth over a period shorter than one year leads to problems due to within-the-year seasonality and is also difficult given that firm-level data are usually reported at annual intervals in most datasets.

Measuring growth over a period longer than one year has the advantage that random fluctuations might become smoothed out, thus reducing the role of statistical noise and boosting the signal-to-noise ratio. However, measuring growth over a longer period results in fewer observations in the dataset, and many firms that do not survive until the end of the growth period are then not observed. Given this tradeoff, the standardized definition of HGFs focuses on growth over a period of three years (Eurostat-OECD, 2007).

2.3 High-Growth Firms: The Eurostat-OECD (2007) Definition

Eurostat-OECD (2007) propose a binary variable for HGFs, which is equal to one for firms that have at least 10 employees in the initial period and a geometric average of at least 20% growth per year over a three-year period.

$$E_{t=0} \geq 10 \quad (2.2)$$

$$\left(\frac{S_{t+3}}{S_t} \right)^{\frac{1}{3}} - 1 \geq 20\% \quad (2.3)$$

where E_t is the number of employees at time t , and S_t is an indicator of firm size (which can be either sales or employees). This HGF indicator has been applied by many researchers in academic and policy publications (Henrekson and Johansson,

¹ The firm that starts with 100 employees has 150 employees after growing 50%, and only 75 employees after declining 50%.

² Daunfeldt et al. (2014) provides an overview of growth indicators used to define HGFs in the literature.

2010; Flachenecker et al., 2020; Grover Goswami et al., 2019; Coad and Srhoj, 2020; Benedetti Fasil et al., 2021), and is generally seen as the standard definition of HGF.

Having a standardized HGF indicator has several benefits. It means that HGF-shares can be compared across countries and industries over different time periods. Econometric results can thus become comparable across studies, leading to a shared understanding between researchers, cumulativeness of knowledge, and meaningful theory-building.

However, the Eurostat-OECD HGF indicator is not without drawbacks, two of which are mentioned here. First, an issue with this HGF indicator is that micro firms (fewer than 10 employees at the start) are excluded from the analysis (Daunfeldt et al., 2015). These firms constitute a lion's share of all jobs created in the economy. This latter concern can be addressed by using a modified HGF indicator that includes micro firms. One way of doing this is as follows. Recall that a firm starting with 10 employees must grow by at least 8 employees to qualify as an HGF; we can apply this same growth amount to consider that any firm with fewer than 10 employees at start must grow by at least 8 employees if it should be counted as an HGF (Coad and Srhoj, 2020). For example, a firm with 2 employees at start can become an HGF if it grows to $2 + 8 = 10$ employees after the three-year period.

Second, requiring that HGFs grow by 20% on average each year can result in a small number of HGFs in the dataset. As such, there has been a recent shift to complement results from a 20% growth threshold with results from a 10% threshold for average annual growth when measuring HGFs (e.g. Flachenecker et al., 2020; OECD, 2021; Benedetti Fasil et al., 2021) to avoid the statistical problems of having too few observations in the $HGF = 1$ category.³ Interestingly, scale-up authors have sometimes taken a different view, arguing that the 20% threshold is too low. Reuber et al. (2021, p. 1033) explain that "it is not unusual for globally scaling firms to exceed a 40% compound annual growth rate." Hoffman and Yeh (2018, p. 46) even state that "[d]ropping below even 40% annual growth is a warning sign for investors."

To conclude, this chapter introduced a quantitative indicator of firm growth, the HGF definition. Note that no attention is given to how a firm achieves its growth. A fuller consideration of the style of growth is the topic of the next chapter, on stages of growth models.

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³ The issue of having too few observations in the focal category is something we keep in mind in our analysis of scale-ups as a subset of HGFs, discussed later on.

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Chapter 3

Stages of Growth Models



Stages of growth models are important for understanding scale-ups. One of the differences between scale-ups and HGFs is that research on HGFs does not take growth stages into account, as long as growth is fast enough. This chapter presents Steve Blank's 4-stage model of firm growth, where scaling up is stage 3. Hence, scaling-up does not occur directly at birth, among the youngest firms, but preparation is needed before scaling up. Differences between scaling up and so-called blitz-scaling are also discussed.

3.1 Stages of Growth Models and Their Discontents

Young firms go through considerable metamorphosis as they grow to become large mature organizations. Researchers have investigated the idea that firm growth unfolds according to a set of pre-determined stages. Prominent in this strand of literature is Greiner (1998; first published in 1972). Greiner's model starts with the case of an entrepreneurial young venture in which employees enjoy frequent and informal communication with the founding entrepreneur(s), known as the creativity stage. Then, after a crisis of leadership, a capable business manager is hired and business processes become more professionalized. Then, after a crisis of autonomy, the firm enjoys a period of growth through delegation, as the organizational structure becomes decentralized, and managers and employees are motivated by greater responsibility and financial incentives. The next stage emphasizes coordination through the use of formal systems such as planning systems and control & review procedures. Finally, the fifth stage prioritizes interpersonal collaboration and team action as a counter-reaction to perceptions of excessive bureaucratic red tape. Besides Greiner's model, other stages of growth models have also been proposed.

Stages of growth models have been investigated in empirical research. When submitted to rigorous analysis, stages of growth models do not give precise guidance

for the real-world growth process because firms may pass through the stages in different orders, or keep facing the same problems many times, or perhaps even entirely skip some stages (Levie and Lichtenstein, 2010). As such, stages of growth models can give a useful rough idea of the types of challenges faced by growing firms, but they should not be taken too literally.

3.2 Scaling up as a Stage of Growth

At a basic level, the idea of two stages in the firm's life course is implied by slogans such as "from startup to scaleup" (Duruflé et al., 2017; Reypens et al., 2020; Vandresse et al., 2023) and "nail it then scale it" (Furr and Ahlstrom, 2011). Subsequent authors went beyond two stages, e.g. Piaskowska et al. (2021, p. 1): "we propose to define scale-ups as high-growth firms at an intermediate stage of organizational development (situated between the start-up and mature firm stage in the organizational life cycle), which pursue strategies that prioritize the attainment of economies of scale."

As such, the timing of scaling up is important (Hoffman and Yeh, 2018; Lee and Kim, 2023). Scaling-up is not something that firms should do from day 1, and scaling up is not something that firms should always be doing. Instead, scaling up is recommended only when "the time is right" (Hoffman and Yeh, 2018, p. 121) and conditions are favorable, i.e. when initial product development and testing stages are finished, when a product-market fit has been found, and the core business idea is sufficiently developed that it can be replicated at scale: "Scale-up is a stage when a company takes a *proven concept* and delivers it to a wider audience, often through market penetration and geographic expansion" (Hellmann and Kavadias, 2016, cited in Coviello, 2019, emphasis ours).

Similar in spirit, Contigiani and Levinthal (2019, p. 554) link scaling-up to the stages of a lean start-up approach:

Specifically, the lean start-up approach explicitly distinguishes between a learning intensive phase, where the venture looks for product market fit, and a scaling phase, following the achievement of product market fit ... the emphasis on self-conscious, dedicated effort on experimentation is specific to the first phase, while the leveraging of the learning obtained is central in the second phase.

In this vein, Sutton and Rao (2016, p. 269) warn against 'premature scaling' which involves adding employees before they are needed. "Hiring too many people too soon burns through cash, creates unnecessary administrative burdens, undermines innovation, and causes companies to focus on landing customers before they have anything worthwhile to sell them."

Figure 3.1 shows the "stages of growth" model put forward by Blank (2013), which helps illustrate the idea of scaling up.

With stages of growth models, it is easy to get an impression of the intuition behind this broad heuristic, although such an impression is vague and becomes difficult to empirically define when one starts to examine the details. This means that being a

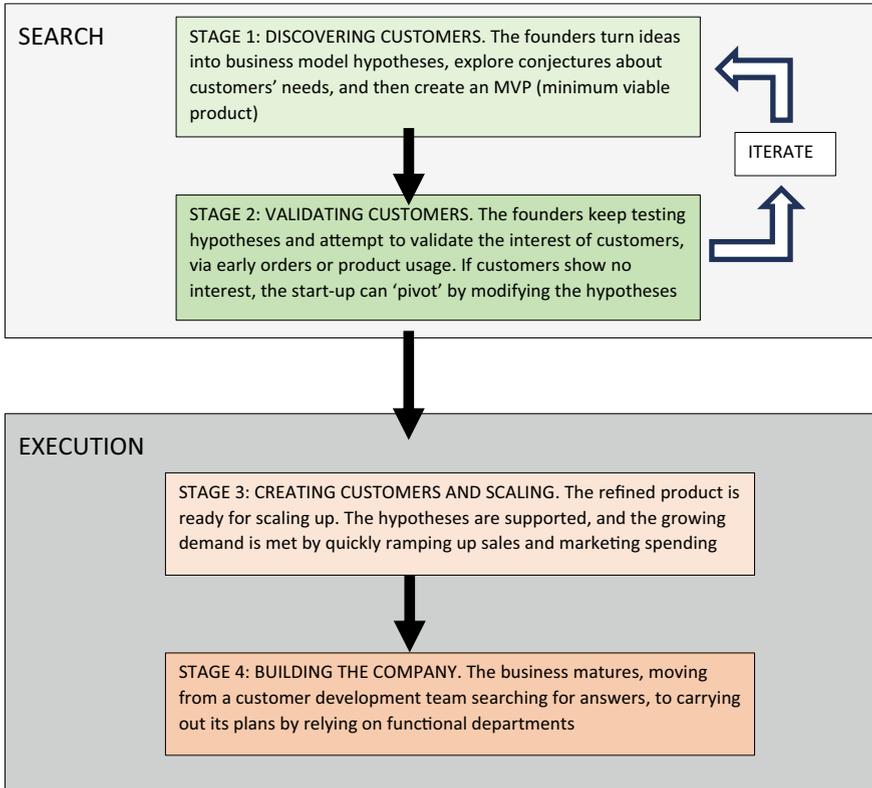


Fig. 3.1 Scale-up as stage 3 in a 4-stage growth model *Source:* our elaboration, inspired by Blank (2013) and Blank and Dorf (2020, Fig. 2.1) (Color online)

scale-up is not a stable trait of a firm, or a stable category of firms, but a short-lived episode. Furthermore, we can expect all the usual problems of “stages of growth” models (Levie and Lichtenstein, 2010), including that stages may not appear in order, firms may enter the various stages more than once, or perhaps in parallel, or perhaps not at all. In particular, many (probably most) firms will never be in a position where scaling up would be appropriate, if for example their core business idea has not achieved remarkable product-market fit that makes it amenable to massive growth in circumstances of near-zero marginal costs of production and distribution (Masters and Thiel, 2014). While stages of growth models may be useful heuristic tools to form an initial rough impression, they become increasingly unhelpful if one takes them too seriously (Coad, 2009; Levie and Lichtenstein, 2010).

3.3 Changes in the Structure of Growing Firms

Firm growth is not a homogenous quantity, there are different ways in which firms can grow. This leads to interest in “how” firms grow, as opposed to just “how much” firms grow (McKelvie and Wiklund, 2010). An analogy from humans would be that we can grow in terms of bone mass, in terms of muscle mass, or in terms of fat, or any combination of these. For an athletics trainer, there is a big difference if a 3 kg weight gain comes from gaining fat, gaining muscle, or becoming pregnant. Scaling up does not correspond to all possible kinds of growth, but a very specific type of growth. This is why we are unconvinced by attempts to define scale-ups exclusively in terms of growth amount (e.g. Belitski et al., 2023; Denney et al., 2023; OECD, 2021). Instead, we think it is important to define scale-ups in terms of how they grow: a key role of up-front costs, intangible assets, marketing investments; a growth that involves near-zero marginal costs, as well as a growth style that corresponds to a shift from iteration and pivoting to a standardized product prototype and business model that is ready to be scaled up.

Scaling up is a supply-side push. Uncertainty surrounding the product offering has been substantially removed because of the emergence of a satisfactory product. The demand conditions for the product are favorable (e.g. if demand is characterized by increasing returns and network externalities, Giustiziero et al., 2023), now that product-market fit has been achieved between what customers seek and what the refined product offers.

3.4 Born Scale-ups?

The literature on entrepreneurship and international business has expressed interest in the phenomenon of ‘born globals’—firms that internationalize from an early age. Is there such a thing as ‘born scale-ups’? Can some firms start scaling right from birth?

In the light of the stages-of-growth perspective, it becomes clear why we consider that scale-ups are young but not too young. Scaling up is not the first stage in a stages-of-growth model, but the third (see Fig. 3.1). Hence, the probability of being a scale-up is not necessarily the highest at birth. While relatively young, scale-ups cannot correspond to the youngest group of firms because of the preparatory stages they need to finish before starting to scale. A “born scaler” probably is just a case where the early stages of pivoting and search have not been recorded properly (e.g. occurring in stealth mode while working for a previous employer) such that the officially registered date of birth is mismeasured.

Given that scaling up is a stage that takes place after birth, rather than at the time of birth, researchers are encouraged to investigate what happens in the stages before scaling up.

More attention is needed to understand what happens during the periods leading up to scaling and accelerated growth – what actions do firms take and what preparatory capabilities do they seek to cultivate to facilitate scaling? (Jansen et al., 2023, p. 15)

Scaling up is the time for applying rather than the time for learning. Learning activity is concentrated in the stages preceding scaling; and the scaling stage is the time for applying the knowledge that has been so far accumulated. Nevertheless, scaling that involves growth into international markets might need some learning and adapting to local markets characteristics (Tippmann et al., 2023; Jansen et al., 2023), even for firms in the scale-up stage. Hence, while saying that most learning/development/adaptation happens before the scale-up stage (Blank, 2013), nevertheless there is still the need for some learning to take place during scaling. Such learning that occurs during scaling could refer to learning about customer needs in new markets, as opposed to learning how to refine the basic features of the product such that the product's performance increases.

3.5 Can Scale-ups Have More Than One Product?

Scale-up is generally considered to be a single-minded focus on delivering an innovative new product or service. The literature has discussed whether multi-product firms can become scale-ups (e.g. Giustiziero et al., 2023; Jansen et al., 2023). The scaling-up of multi-product firms is unlikely because it would draw away resources from other products, even if it does not lead to cannibalization. Practitioners have stated that scaling-up that involves multiple products is particularly complicated.¹ Also, empirical analysis might find it difficult to detect this scaling up if the overall scaling event is “diluted” and hidden when looking at aggregated data (i.e. aggregated across products up to the firm level).

In our definition (shown later), a scale-up must have annual growth of 20% on average at the firm-level (not just at the product level), and multiproduct firms with fast-growing products might struggle to reach this threshold when their growth is considered at the firm-level. Nevertheless, a multi-product firm could be a scale-up: either if one product is growing very fast (e.g. Apple at the time of surging iPhone sales (Hoffman and Yeh, 2018), or in the case where multiple products are being driven by a single scalable technology or capability (c.f. Braguinsky et al., 2021; Srhoj et al., 2022). Therefore, multi-product firms can potentially be scale-ups, as long as they satisfy the empirical requirements. However, as discussed before, our focus is on the firm-level. This means that product-level scaling-up will only be

¹ “I will just say that this idea of running multiple businesses has been among the most complicated parts of scaling” Mariam Naficy, founder and CEO of Minted (Gil, 2018, p. 160).

manifest in our scale-up indicator if the product's growth has sufficient effects at the aggregate firm-level to push the firm into the scale-up category.²

3.6 Blitz-Scaling vs the Lean Startup Perspective on Scaling up

The stages-of-growth model in Fig. 3.1, based on principles of lean startup (Ries, 2011; Blank, 2013) has been criticized by Hoffman and Yeh (2018, p. 75): “we’re huge fans of Eric Ries and his lean start-up methodology. It is an excellent process for systematically tackling risk. But the fact is that most start-ups don’t follow that process.”

Specifically, the Blitz-scaling concept introduced by Hoffman and Yeh (2018) takes an even more extreme view on scaling: firms should start furiously scaling up even if they do not yet have a decent prototype:

Starting a company is like jumping off a cliff and assembling an airplane on the way down. (Hoffman and Yeh, 2018, p. 28)

Instead of waiting to have developed a viable product, the recommendation to startups is to move fast, even to the point that entrepreneurs should “launch a product that embarrasses you” (Hoffman and Yeh, 2018, p. 206). This is because blitz-scaling prioritizes speed over efficiency: no matter how many mistakes are made, the important thing is getting big fast, pre-empting the competition and accelerating the virtuous cycle of positive network externalities for a growing user base (Hoffman and Yeh, 2018, p. 5). A vivid illustration of the urgency of growth, even at the expense of efficiency, comes from a conversation between Reid Hoffman and PayPal co-founder Peter Thiel:

Peter, if you and I were standing on the roof of our office and throwing stacks of hundred-dollar bills off the edge as fast as our arms could go, we still wouldn’t be losing money as quickly as we are right now. (Hoffman and Yeh, 2018, p. 43)³

Fortunately, the blitz-scaling method worked well for Reid Hoffman and his ventures PayPal and LinkedIn.

However, this extreme type of scaling (i.e. blitz-scaling) has been the subject of criticisms. O’Reilly (2019) writes that “blitzscaling is not really a recipe for success but rather survivorship bias masquerading as a strategy.” Lee and Kim (2023) provide evidence that scaling too early is generally more problematic than scaling too late, in their large-sample analysis of scaling up.

² Authors interested in the phenomenon of scaling of products inside multiproduct firms may want to develop their own product-level indicator (such a task is beyond the scope of this book, but a useful starting point could be Baumgartner et al., 2023).

³ The context behind this quote is that, during PayPal’s early days, the company was growing 5% per day, but losing money on transactions, because customers could use the service for free while paying with credit cards. As such, PayPal was absorbing the 3% credit charge processing fee, while charging users nothing.

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Chapter 4

Eight Propositions About Scale-ups



This chapter pushes further in our investigation of the nature of scale-ups by introducing the following eight propositions about scale-ups: (1) a scale up is a concept born of practitioners, not academics; (2) scale-ups are not just in the IT sector, but may be enabled by IT; (3) a scale-up is a qualitative concept from a ‘stages-of-growth’ model; (4) scaling up involves structural transformation; (5) a scale-up does not exist anywhere in a pure form; (6) scale-ups differ by degree, not by kind; (7) many scale-ups are exceptions; and (8) there may never be a standardized empirical definition of scale-up. Each of these eight propositions was either not clear, or was misunderstood, in some previous work.

4.1 A Scale-up Is a Concept Born of Practitioners, Not Academics

Scaling was a ‘hot topic’ in the practitioner literature for a long time, while being conspicuously absent in the academic literature (Shepherd and Patzelt, 2022; Jansen et al., 2023). The concept of scale-up is closely linked to the Silicon Valley venture capital scene. Scaling up concepts have long been analyzed by authors such as Steve Blank (2013), Furr and Ahlstrom (2011), and Eric Ries (2011) from the ‘Lean Startup’ movement, as well as Reid Hoffman, co-founder of PayPal and LinkedIn (Sullivan, 2016; Hoffman and Yeh, 2018; see also Kuratko et al., 2020), and Peter Thiel, co-founder of PayPal and Palantir, and the first outside investor in Facebook (Masters and Thiel, 2014), and also bloggers such as Paul Graham, co-founder of the startup accelerator Y-combinator (e.g. Graham, 2013). These authors went far beyond the confines of their ‘day jobs’ (i.e. investing and supporting startups) to develop concepts, share ideas (while sometimes respectfully disagreeing on some

points),¹ and grow a community of rigorous thinking about the science behind new venture performance. For example, Graham’s 2013 blog post benefitted from interactions with peers including Sam Altman (CEO of OpenAI) and Patrick Collison (co-founder and CEO of Stripe).

Scale-ups have also received attention from policymakers (e.g., OECD, 2021), with a number of policy reports and ‘grey literature’ focusing on the phenomenon of scale-ups (e.g. Coutu, 2014; Hellmann and Kavadias, 2016; Duruflé et al., 2017; Reypens et al., 2020; Vandresse et al., 2023). Meanwhile, it seems that academics are playing catch-up; still trying to determine what exactly a scale-up is and how to define it. Academics started exploring the concept of scaling-up starting with publications such as Sutton and Rao (2016) and DeSantola and Gulati (2017), and some recent journal special issues at the Journal of Management Studies (Jansen et al., 2023), Journal of Business Venturing (Autio et al., 2021) and Journal of World Business.² These early academic publications did not give specific details regarding the definition and identification of scale-ups, however: Sutton and Rao (2016) (as well as follow-up work by Shepherd and Patzelt, 2022) focus their discussion on the important topic of how to scale-up excellent practices throughout a growing organization, although they do not define a scale-up and some of their examples even seem to refer to firms that have not grown in a long time.³ Meanwhile, DeSantola and Gulati (2017) discuss the organizational transformations in growing firms at a relatively abstract theoretical level.

4.2 Scale-ups Are Not Just in the IT Sector, But May Be Enabled by IT

Scale-ups have repeatedly been linked to digitalization and the IT sector (Adner et al., 2019). “Software has a natural affinity with blitzscaling, because the marginal costs of serving any size market are virtually zero” (Sullivan, 2016, p. 46). IT is a GPT (General Purpose Technology) that permeates all sectors and lowers the costs of scaling by reducing the costs of distribution, storage, processing and replication of data for a broad set of tasks in all sectors. Unlike physical assets, digital assets such as databases can be “reused, repackaged, and resold ad infinitum” (Adner et al., 2019, p. 257), such that data continue to provide value for a firm even if it has already been applied in different contexts. This can help firms to overcome the usual limits to growth (i.e. Penrose effects, Piaskowska et al., 2021, p. 5). The development of IT has also enabled the phenomenon of viral marketing, which is enabled by IT and

¹ For example, Hoffmann explains why he does not agree with Lean Startup principles put forward by Blank and Ries (Hoffman and Yeh, 2018, p. 75), and O’Reilly (2019) explains why he disagrees with Hoffman’s vision of Blitzscaling.

² <https://www.sciencedirect.com/journal/journal-of-world-business/special-issue/107WBR49PRK> [last accessed 16th December 2023].

³ For example, the discussion of the Taj Mahal Intercontinental Hotel on page 173.

social media, although the benefits of viral marketing are not confined to IT sectors but can benefit all sectors.

A first implication of digitalization is that distribution costs become close to zero for digital goods and services such as Software-as-a-Service (Adobe), music (Spotify) and video (Netflix) (Hoffman and Yeh, 2018). Distribution of goods via the internet gives a crushing advantage over distribution of physical goods via brick-and-mortar outlets, as evidenced by the disruption of Blockbuster video by Netflix.

A second implication is that products sold to customers over the internet (such as Software-as-a-Service) can be easily tweaked and updated (Nambisan et al., 2019). Software updates can be sent out to users that are implemented over an internet connection. An implication of this is that software products can be sold in an interim and incomplete condition, with the understanding that improvements will regularly be sent out to users to ensure that the security and performance of the software product are up-to-date. Software is clearly easier to update over an internet connection than hardware. This leads us to the 4th rule of blitz-scaling: “launch a product that embarrasses you” (Hoffman and Yeh, 2018, p. 206). Software companies can sell an embarrassingly bad version of their product as long as this can quickly be updated when the improved version is ready. Selling a premature and incomplete product could give software companies the edge they need, if they strive for a fast launch, preempting the competition, and dominating the market as they benefit from a virtuous cycle of positive demand-side network externalities (whereby new users prefer to join a network that already has a large number of established users, resulting in a situation whereby large increases in demand occur without much effort on the part of the producing firm (Mithani, 2023; Huang et al., 2017)).

Launching an embarrassingly bad product has been attempted by producers of physical products, with less success. One example would be Jawbone, a producer of Bluetooth headsets (Kuratko et al., 2020). Jawbone launched an incomplete product with the hope that imperfections could be fixed through software updates, although it transpired that the hardware itself also needed fixing, leading to customer refunds and a spectacular drop from its previous unicorn status valuation. A second example of a scale-up built around a physical product could be Tesla Motors (Hoffman and Yeh, 2018). Tesla sold the promise of Full Self Driving (FSD) mode that, when it became available, could be remotely retro-fitted (like a software update) on pre-existing Tesla vehicles (Niedermeyer, 2019). Such promises have failed to materialize, however, potentially leading to legal and financial liabilities.⁴

Discussions of scaling seem to focus first on prototypical examples of software/IT firms, and then zoom out and concede that scaling-up also occurs in other sectors. While software-as-a-service seems particularly amenable to scaling-up (Nambisan et al., 2019), nevertheless any sector can have its scale-ups as long as it can accommodate firms with low marginal costs of scaling up their revenues (for example, via strategies of setting up their own platforms). Presumably if a scale-up exists in other sectors, it is likely that it is powered by IT capabilities in many cases, e.g. Uber in the taxi industry, Airbnb in the hotels industry, or the case of Copenhagen Seafood A/

⁴ https://www.thedrive.com/tech/29019/___trashed-7 [last accessed 16th December 2023].

S discussed in Nielsen and Lund (2018). It would be surprising indeed if a scale-up did not even have its own website.

4.3 A Scale-up Is a Qualitative Concept from a “Stages of Growth” Model

A scale-up is a qualitative concept that emerged from the “stages of growth” school of thought—as discussed above in Chap. 3.2. Understanding scale-up as a growth stage is important and helps us realize that not all firms are well-positioned to launch into scaling if the background conditions and preparatory work have not been satisfactorily set up in place. Therefore, while scale-ups are younger on average, stages of growth models help us to understand that the very youngest firms are unlikely to become scale-ups because they are probably too young to have passed through the initial stages. A frequent problem among startups seems to be that they scale too early (Lee and Kim, 2023).

4.4 Scaling up Involves Structural Transformation

After a period of scaling up, a firm has a different structure than beforehand (Kimberly, 1976; Flamholtz and Randle, 2015), although such structural transformation is not necessarily required under the definition of HGFs. Growth by scaling up involves rapid increase in revenues but a negligible increase in costs, therefore the share of costs in total revenues is lower at the end than before scaling up. The capital intensity (assets/sales) of a scale-up is presumably very high initially (given the initial fixed costs of setting up the IT infrastructure and platform), although it is lower at the end of the period because the denominator (sales) has increased. Given their focus on platform strategies and ICT-powered business processes, scale-ups are presumably intensive in intangible assets such as software and IT infrastructure (Haskel and Westlake, 2017; De Ridder, 2023). Firms preparing to scale up will invest in the upfront costs of enlarging their corporate infrastructure, such as building bigger and better IT systems, and setting up centralized HRM systems (Von Krogh and Cusumano, 2001). The labor intensity (employees/sales) decreases over the course of the scale-up process because sales increase without requiring the addition of employees.

On the flipside, if a firm has the same structure (cost structure, capital intensity, labor share) after the growth event compared to before, then such a firm would *not* be a scale-up (although it may well satisfy the definitional requirements of an HGF).

Later on in this book, we suggest that an empirical definition of scale-ups (as opposed to regular-growth firms) could draw on the idea that scale-ups have a significantly different structure before and after the growth period.

4.5 A Scale-up Does Not Exist Anywhere in a Pure Form

A ‘pure form’ of scaling up would have the following characteristics. Scaling up is a stage in a startup’s life course whereby learning no longer occurs, because the firm exclusively leverages existing knowledge. Scaling up is a type of growth which incurs zero marginal costs, as firms strive to reduce the marginal costs of growth while frontloading the cost structure with higher fixed costs (De Ridder, 2023). Scale-ups, in pure form, would be entirely composed of scalable resources, and would not contain any non-scalable resources (Levinthal and Wu, 2010). Scaling up involves zero product refinements, because issues surrounding product development were fully addressed in the previous growth stage (c.f. the stages-of-growth model in chap. 3.2). Such a ‘pure form’ of a scale up presumably does not exist anywhere.

Firms can never, for long, increase output without incurring positive marginal costs or modifying their product design. Even digital firms are bundles of resources that include (to some extent) resources that are not fully scalable (Giustiziero et al., 2023; Levinthal and Wu, 2010). The idea of zero marginal costs is an attention-grabbing notion and an over-simplifying metaphor, but upon a moment’s reflection it cannot (for long) correspond to real-world growth.

In the context of internationalizing new ventures, “scaling internationally requires carefully synchronizing functional departments and value chain activities across geographies at a much larger scale. It involves coordination and mutual adjustment across domains of the organization to ensure coordination, foster collaboration, and reduce conflicts” (Jansen et al., 2023, p. 9). Therefore, scaling requires creating new functions, hiring new employees, and focusing attention on new problems.

Investments in fixed costs that might not have been worthwhile with a small customer base might suddenly become worthwhile when the customer base is ten times larger, such as strengthening the internet infrastructure for higher traffic, and streamlining the user experience in subtle almost-indistinguishable ways. Hence, growth of quantity may lead to increases in ‘fixed costs’, and ‘fixed costs’ may not be truly fixed at the start of the growth period.

Scaling is easier for digital firms compared to traditional manufacturing firms (e.g. because of low distribution costs; Kuratko et al., 2020), but even there it is not perfect. Digital firms have resource bundles that include non-digital resources (such as warehouses, inventory, and packing employees in the case of Amazon) and therefore cannot be costlessly scaled up. Giustiziero et al. (2023, p. 1396) continue along these lines:

For example, software and AI platforms need experienced engineers to develop, maintain, and improve them, marketers and salespersons to sell their outputs, customer service professionals to improve service quality, and managers to oversee and direct the enterprise. Often, physical resources such as factories, offices, and warehouses, and even hardware and telecommunication infrastructure to host and deliver digital products, are also required.

Even digital firms with scalable resources must somehow combine these with tangible harder-to-scale resources (Levinthal and Wu, 2010), such as for example allocating managerial attention to learning and the coordination of activities.

4.6 Scale-ups Differ by Degree, Not by Kind

A scale-up is an impossible ideal-type. It is an extreme and never-attained end of a continuum.⁵ Instead of distinguishing between pure scale-ups and non-scale-ups, the task therefore is to distinguish between ‘almost-scale-ups’ and ‘not-so-much scale-ups’, and this latter distinction has a blurred boundary and necessarily leads to some arbitrariness in fixing a threshold between firms labelled as scale-ups and non-scale-ups.

Let us consider the simplistic case whereby a single variable (such as the marginal sales/cost ratio or perhaps a spike in marketing expenditure) can be used to distinguish between scale-up HGFs and non-scale-up-HGFs. As such, it would be theoretically interesting to see the empirical distribution of this, in the set of HGFs. For the conceptual diagrams below (Fig. 4.1), the relevant sample is HGFs only, and we compare scale-up HGFs with non-scale-up-HGFs. Figure 4.1 (left) below has no clear distinction between scale-ups and non-scale-up-HGFs. It is hard to make the case that scale-ups are a different category. In contrast, Fig. 4.1 (right) is a far more interesting case (in the sense of having theoretical clarity), showing a clear separation between scale-ups and non-scale-up-HGFs. In Fig. 4.1 (right), scale-ups appear to be a distinct phenomenon. Ideally, we would find a variable that can distinguish between scale-up HGFs and non-scale-up-HGFs in a way that shows clear bimodality (two peaks).⁶ If such bimodality is not observed, however, then we would be in the case of Fig. 4.1 (left), where the distinction between scale-ups and non-scale-ups seems arbitrary. As we will see, Fig. 4.1 (left) fits the data much better than Fig. 4.1 (right).

Figure 4.2 above analyzes our Swedish data (introduced in detail in Chapter 7). In line with previous research (e.g. Varga et al., 2023; Palmié et al., 2023), scale-ups are defined in Fig. 4.2 as the subset of HGFs that have relatively rapid growth of the sales/cost ratio over a three-year period (high sales growth, but negligible growth of costs).⁷ This is an imperfect empirical definition of scale-ups (as discussed in

⁵ Moreover, it is not clear what would be at the other end of the continuum. Presumably this is because a scale-up is not just based on a continuum along a single dimension, but is the confluence of many simultaneous conditions (reminiscent of a multidimensional matrix: a scale-up is a firm that is growing fast while also having low marginal costs and also aggressively marketing a relatively standardized new product, and so on).

⁶ Statistical tests for establishing the statistical significance of bimodality (e.g. Silverman, 1981) could prove useful.

⁷ In constructing this sales-cost ratio (SC-ratio), we can use the HGF-definition to identify scale-ups, where scale-ups are captured as those firms with increases in sales divided by costs that are greater than 20% annually. In that way, our approach is consistent with the Eurostat-OECD (2007) HGF definition but emphasizes the efficiency and sales increase components that are salient in extant definitions of scaling. However, growth in the SC-ratio could be inflated by cost reductions rather than increased sales. We want to hedge against firms who do not meet the spirit of scaling even if they meet the empirical benchmark brought forward. To account for this, we require scale-ups to have non-negative cost growth. This additional constraint practically implies that firms need to increase sales by at least 73% during a three-year period while keeping costs constant to meet this threshold. With this relatively strict definition, we find that 13% (5659 firms) of HGFs are classified as scale-ups at some point during our 21 years of study.

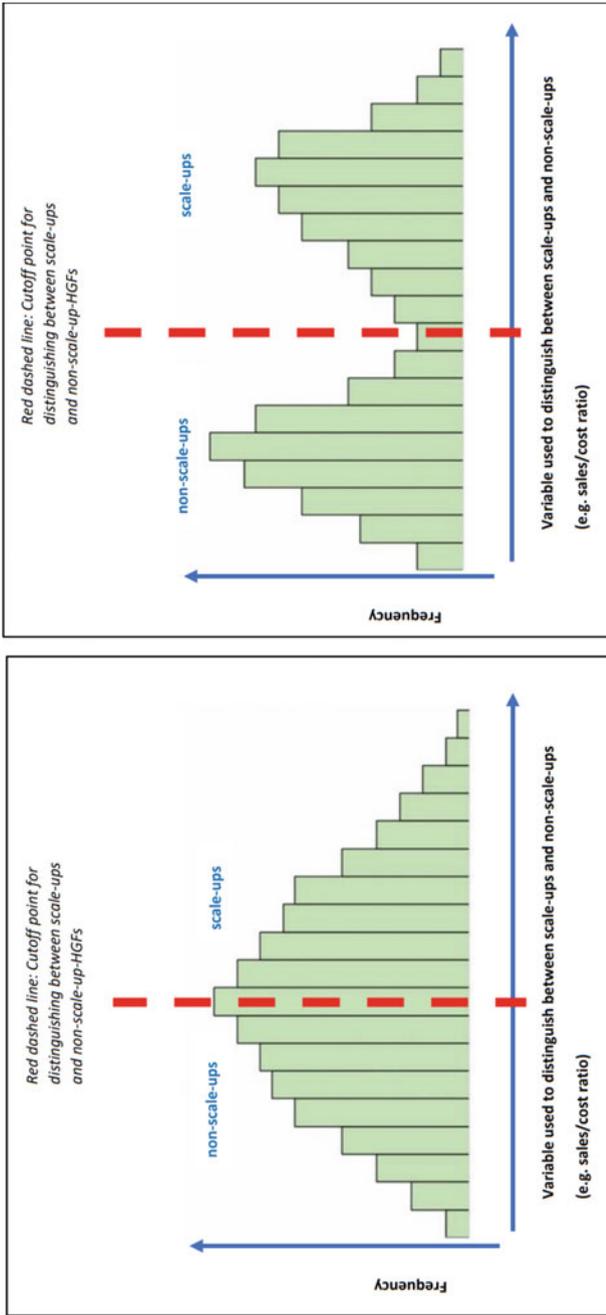


Fig. 4.1 Distinguishing between scale-ups and non-scale-up HGFs. Left: conceptual diagram of a unimodal distribution of sales/cost ratio for the set of HGFs. Right: conceptual diagram of a bimodal distribution of sales/cost ratio for the set of HGFs. [Color online]

Chapter 6), although it is illustrative and sufficient for our current purposes. The main message from Fig. 4.2 is that there is no natural dividing line to distinguish between a species of scale-ups compared to other HGFs. When measured in terms of growth of the sales/cost ratio, scale-ups are not a radically different breed of firm (i.e. not the case of Fig. 4.1 right), but that they are a category that is created by being beyond a somewhat arbitrarily-defined threshold (i.e. the case of Fig. 4.1 left).

4.7 Too Many Exceptions

Scale-ups are, by nature, exceptional firms that find profitable markets by doing things differently. Hence, it is difficult to generalize about scale-ups because they are so unique. Practitioners pioneered the study of scale-ups from an angle of case studies and anecdotes (e.g. Hoffman and Yeh, 2018). If we try to apply a strict definition of a scale-up to large sample data, we might end up misclassifying a few scale-ups when comparing to what popular discourse considers to be “a real scale-up”.

Some authors claim that scale-ups should be profitable. But Uber is often called a scale-up, considered by some to even be a prototypical example of a scale-up (e.g. Pfothner et al., 2022), and yet it was not profitable even up until its IPO in 2019. Kuratko et al. (2020) even go so far as to say that “most” scale-ups are not profitable.

Also, there are too many paradoxes. For example, a popular blogpost in the VC community suggests that scalers need to do things that don’t scale (Graham, 2013; see also Hoffman and Yeh, 2018), referred to as “throwaway work” (Hoffman and Yeh, 2018) that serves a temporary purpose as the firm moves down the long road towards ultimately ending up with highly-scalable business processes. Thus, the best way of production might involve capital-intensive high-fixed-cost intangibles-rich processes that take a long time to set up. But in the scale-up phase, you have to do things that can’t scale, like a CEO putting their personal mobile phone number as the customer complaints helpline (Hoffman and Yeh, 2018, p. 216), or Airbnb founders personally taking photos of the Airbnb rooms to help these rooms look more attractive on the internet (Hoffman and Yeh, 2018), or perhaps the case of Tesla aspiring towards solar power charging capabilities while actually using diesel-powered generators hidden round the back of charging stations to recharge the batteries of its cars (Niedermeyer, 2019).

More generally, Hoffman and Yeh (2018, p. 198) formulate a list of 9 counterintuitive rules⁸ of blitz-scaling, whereby scale-ups do the opposite of what we might expect from a scale-up.

Given that the origins of scale-ups are from anecdotal analysis from non-academics that do not particularly have the mindset of an applied statistician, a troupe of scale-ups will include lots of exceptions. These exceptions will be a headache as

⁸ These nine rules are: Embrace chaos; Hire Ms Right Now, not Ms Right; Tolerate “bad” management; Launch a product that embarrasses you; Let fires burn; Do things that don’t scale (throwaway work); Ignore your customers; Raise too much money; Evolve your culture.

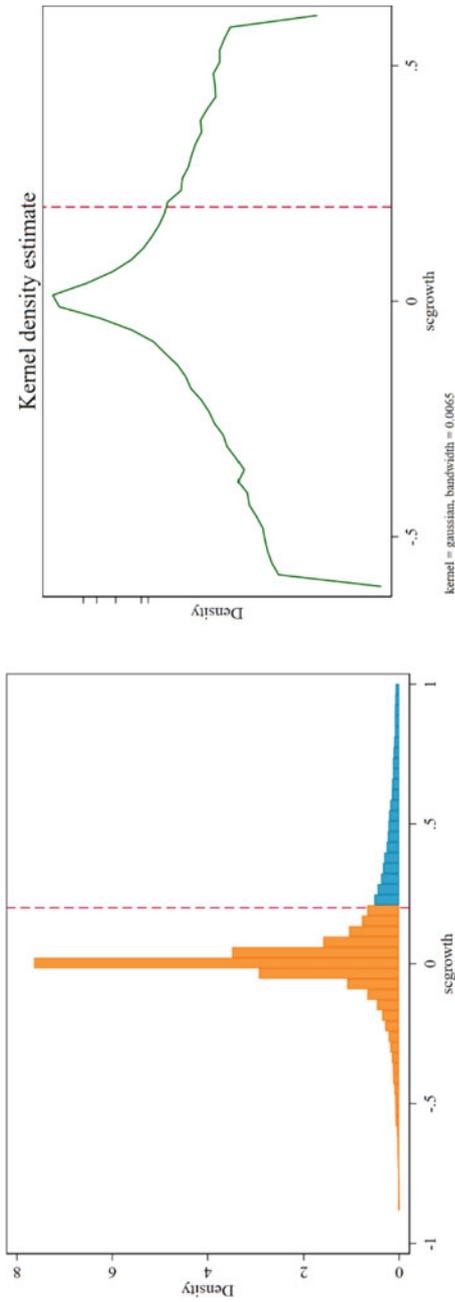


Fig. 4.2 Distribution of growth rates of the sales/cost ratio for Swedish firms. In this figure, sales/cost ratio is measured over a three-year period for the set of HGFs, and scale-ups (blue shading in Fig. 4.2 left) are distinguished from non-scale-up HGFs (orange shading in Fig. 4.2 left). Left: linear y axis. Right: logarithmic y axis. The dashed line corresponds to an arbitrary potential threshold of 0.2 (20%) for defining scale-ups. For a database description, see Chapter 7. [Color online]

we try to formulate a generalizable definition of a scale-up that can be applied at scale to a broad range of datasets.

4.8 There May Never Be a Standardized Empirical Definition of Scale-up

While there is a fairly standardized definition of an HGF (Eurostat-OECD, 2007), a standardized definition of scale-up is more problematic. An empirical definition of a scale-up (which relates to firm growth as well as data on costs, marketing, and organizational structure) draws upon variables that may not always be available in a researcher's dataset. We expect that researchers analyzing different datasets will not have access to the same variables as we have. Furthermore, unlike HGFs, the pure-form of a scale-up may not even exist in the real world (as discussed in Sect. 4.5).

Let us try to be as specific as possible. Scale-ups are a particular type of HGFs. Hence, there is a standardized definition of HGFs. Researchers might generally agree that scale-ups are a subset of HGFs, but they will probably disagree regarding exactly which subset of HGFs. Scale-up studies will probably agree on the first stage (the subset of HGFs), but find it more difficult to have identical operationalizations on the second stage (which subset of HGFs).

Some implications can be discussed. The probable lack of standardization in scale-up definitions makes it important for scholars to be cautious when generalizing across scale-up studies (especially for literature reviews and meta-analyses). Scale-up researchers should make it as clear as possible (e.g. in the abstract) how scale-ups are measured. Scale-up researchers should focus more closely on the previous scale-up papers that have a similar definition. Furthermore, the sensitivity of empirical findings to different scale-up definitions should be explored, where data allows.

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Chapter 5

Theoretical Definition of a Scale-up



This chapter draws on the literature to develop our theoretical definition of a scale-up. A critical discussion of previous literature helps distinguish between aspects that are essential or unnecessary for a definition of a scale-up. We then put forward the following five suggestions for a theoretical definition of a scale-up: (1) Scale-ups are in all sectors, not just IT; (2) Scale-ups have relatively high levels of spending on marketing and sales; (3) Scale-ups have low marginal costs of production; (4) Scale-ups are young, but not too young; (5) In defining scale-ups, we start from the set of HGFs. The chapter ends with our own theoretical definition of a scale-up.

5.1 Firm Growth or Scaling: Reinventing the Wheel?

There seems to be a fashion among scholars to give new names for already-established phenomena. This might be an effort to make their contributions seem more original, while at the same time releasing them from the duty to cite previous related work.¹ For example, “knowledge acquisition” sounds different from ‘learning’ although it would be difficult to explain how these two concepts differ. It seems that many scholars use the word “scaling” when they could simply refer to “growth”. There is already a huge literature on firm growth. However, a 2014 paper on “scale adjustment” in *Strategic Management Journal* starts with these words:

While much is understood about the general pattern of industry dynamics, a critical element underlying these dynamics, the rate of expansion of individual firms, has been largely overlooked.²

¹ The present authors may also be ‘guilty’ of such activity, although we hope that we will avoid this in future.

² Knudsen et al. (2014, p. 1569).

If, however, we call it “firm growth” rather than “the rate of expansion of individual firms” it is much harder to claim that the topic has been overlooked. That is why, four years earlier, McKelvie and Wiklund (2010, p. 261) wrote that “Firm growth constitutes one of the central topics of entrepreneurship research”, and refer to the “massive empirical research” that had already focused on firm growth.

On the one hand, research on scaling might be an attempt at reinventing the wheel, using a new term (scaling) to describe an older familiar concept (HGFs), jettisoning the duty to cite previous work, and avoiding previous inconvenient results (e.g. difficulties in predicting HGFs, lack of persistence in HGFs over time, and the surprising ability of random walk models in providing statistical explanations of firm growth patterns). This motivation of ‘reinventing the wheel’ seems particularly salient when scale-ups are defined precisely according to the HGF definition, which will annoy both HGF researchers (because of reinventing the wheel) and scale-up researchers (because a scale-up is not really the same thing as an HGF).

On the other hand, scaling is not just reinventing the wheel, if scaling is considered a distinct type of growth from just rapid growth. This chapter emphasizes that scaling up is indeed distinct from just ‘plain old growth’.

We seek to provide a clear definition of scaling up, and encourage future scholars to use the word “growth” unless they specifically have in mind scaling. Scaling and growth are not synonyms, and we hope that after this book, the two terms will be used less often as synonyms. Furthermore, a scale-up is not a synonym for an HGF, neither at an empirical level nor at a theoretical level. Instead, the core concept of scaling up refers not to growth in general, but to a unique mode of growth.

While a precise and standardized definition of scale-up has not yet been agreed upon by the broader community, we discuss the core idea of a scale-up, and its essential characteristics, before pragmatically discussing (in the next chapter) how a scale-up could be empirically defined with the available data.

5.2 Previous Definitions: A Critical Discussion

Many definitions of scale-ups can be found in the previous literature, as the study of scale-ups has evolved and gained sophistication. Our goal here is not to “name and shame”, but to highlight the different definitions that have been used, explain their strengths and shortcomings, and to encourage some steps towards a standardization of a definition.

Coutu (2014) defines scale-ups in line with the Eurostat-OECD (2007) definition of a HGF, i.e., with average annualized sales growth greater than 20% over a three-year period, and with ten or more employees at the beginning of the observation period. This definition has been adopted by a number of other scholars as well (e.g., DeSantola and Gulati, 2017; Duruflé et al., 2017; Gulati and DeSantola, 2016; Belitski et al., 2023; Denney et al., 2023). Scale-ups are indistinguishable from HGFs in this definition. Some scholars consider that HGFs and scale-ups are synonyms (e.g.

Zeng et al., 2023).³ However, applying various terms to study a single phenomenon leads to confusion, impedes interdisciplinarity, and retards the development and accumulation of theoretical and empirical insights. On this point, we agree with Coviello (2019, p. 5), who writes with bold in and block capitals: “**Scaling is NOT just about high growth.**”

Other definitions of scale-ups are difficult to measure and evaluate. Coviello (2019, p. 15) argues that scaling is more a reflection of a stage of development where a firm delivers a proven concept to a wider audience and includes standardization/automation for efficiency gains, has a diverse management team, has high absorptive capacity, moves into international markets and is relatively asset-light. We agree with some, but not all, of these suggestions. In our view, a definition of scale-ups does not necessarily require a diverse management team.⁴ While such diversity (i.e. employee diversity, diversity of the top management team (TMT)) may be desirable (Hoffman and Yeh, 2018), it does not seem to be a critical deciding factor that allows us to discriminate between scale-ups and non-scale-ups.

Also, in contrast to Coviello (2019), we consider that scale-ups do not necessarily have to have growth that is international (as opposed to being domestic). There is a lot of interest in scaling from IB (International Business) scholars (e.g. Mihailova, 2023; Mithani, 2023; Monaghan et al., 2020; Reuber et al., 2021; Tippmann et al., 2023). Scaling lends itself to internationalization well (e.g. Table 1 in Reuber et al., 2021). Internationalization is indeed compatible with a scaling approach to growth. However, it is not a strict requirement: there are some firms that can scale up without internationalizing. Indeed, scale-ups may thrive for a long time in countries with large domestic markets such as USA or China.⁵ Stallkamp et al. (2022) investigated a sample of digital firms that achieved an IPO and observed that “among the digital firms in our sample, almost 30% had no foreign sales when they filed for IPO” (p. 103).

A further divergence with Coviello (2019) is that, in our view, it seems unnecessary to refer to absorptive capacity, first because absorptive capacity is difficult to measure, and second because there may be some scale-ups that can grow fast without necessarily having above-average levels of absorptive capacity. These factors (diversity, internationalization, absorptive capacity) may be in place among scaling firms but provide undue characteristics of a definition.

³ See for example these quotes: “HGFs, often referred to as scale-ups, have been studied from a variety of perspectives...” (Zeng et al. 2023 pp. 608–609): “extant HGF studies have almost exclusively viewed scaling as either an ‘input’ or an ‘output’” (Zeng et al. 2023, p. 609).

⁴ Presumably Coviello (2019) is echoing ideas from Sutton and Rao (2014) on the advantages of diverse teams, e.g. “although most people prefer to be around others who are similar to them, new mindsets, skills and practices travel faster and farther when team members have varied backgrounds, skills, and viewpoints.” Sutton and Rao (2014, p. 284).

⁵ China is the land of blitzscaling, according to Hoffman and Yeh (2018, p. 8). They describe how WeChat got its 100 millionth user after 16 months, without pursuing a strategy of noteworthy internationalization.

Similarly, Shepherd and Patzelt (2022) draw upon Sutton and Rao (2016) to conceptualize ‘organizational scaling’ as “spreading excellence within an organization as it grows” (Shepherd and Patzelt, 2022, p. 1). This seems to us to be an inspiring although impractical definition. Spreading excellence is an assumption that is not only unhelpful for empirical work (since excellence is rather vague and unmeasurable), but also unnecessary for theoretical work. A scale-up presumably has excellent routines and practices to have such a rapidly growing user base (otherwise it would not grow), but even if it has only a rapidly growing customer base but not excellent routines (e.g. clumsily exploiting a valuable government monopoly) then it could still be classified as a scale-up, largely on the basis of its realized growth.

There are thus distinct challenges in pinpointing what a scale-up is, and how scale-ups should be operationalized and measured using available data. It is also challenging to argue that the characteristics attributed to scale-ups do not apply to HGFs, furthering the definitional blurred lines between scale-ups and HGFs.

Some authors suggest that scaling can be either fast or slow (e.g. Büge and Ozcan, 2021; Stallkamp et al., 2022). The idea of ‘slow scaling’ could be potentially confusing because in our definition scale-ups are a subset of high-growth firms. Büge and Ozcan (2021) suggest that Facebook’s Libra would have done better to slow down its scaling in the face of high regulatory complexity and risk. In our approach, a firm engaging in ‘slow scaling’ (e.g. reducing its growth rate from 250 to 25% per year) would still be a scale-up if its average annual growth rate is above the growth threshold.

Another recent definition of a scale-up is from Jansen et al. (2023, p. 6): “We define scale-ups as those HGFs up to 10 years old that have grown to at least 50 employees or more by the tenth year of existence or at the year of measurement, whichever is less.”⁶ This differs from the definition that we will later propose. What we like about this definition is that scale-ups are a subset of HGFs. Where we disagree with this definition, however, is that considerations of scaling up as a growth stage (as discussed in Chap. 3.2) are not considered, and that the structural changes due to scaling are not mentioned (e.g. low marginal costs, ramping up of marketing expenditure).

Some definitions of scale-ups mention that eligible firms should be innovative (e.g. Vandresse et al., 2023, pp. 40, 46). While our expectation is that scale-ups are somehow innovative, their innovative nature may not be visible in standard indicators such as R&D investment and patents. Indeed, it is hard to believe that an HGF would not be innovative in one way or another. At a minimum, all HGFs (and a fortiori all scale-ups) are innovative in the sense of having the new-to-the-firm ‘organizational innovations’ (i.e. structural transformations) which are an inevitable outcome of growth.

Further discussion about defining scale-ups can be found in Bohan et al. (2024) in their ‘Journal of Business Venturing’ article entitled “What is scaling?”. They define scaling in terms of sustained exponential growth. This definition seems unhelpful for several reasons. First, exponential growth is actually the baseline understanding of

⁶ A similar definition is used by the Kauffman Foundation (2017), cited in Coviello (2019, p. 4).

growth in the academic and policy literature, and is nothing exceptional. For example, growing 10% in each year will inevitably mean that the growth amount is increasing exponentially, while the growth rate is constant (e.g. Tornqvist et al., 1985). Hence, claiming that scaling is exponential growth is somewhat trivial. Second, there is nothing in this definition about the minimum growth threshold to qualify as a scale-up. Growing 0.5% in each year for a decade should hardly qualify a firm as a scale-up. Third, there are growth setbacks, such that growth may be negative in year 2 but positive overall for years 1–3, hence problematic for fitting an exponential curve. Fourth, there is insufficient consideration of scaling as a growth stage: the ramping up of production after finding product/market fit in the context of a stages-of-growth model.

In sum, the literature is missing a shared understanding of how scale-ups should be defined. The need for a shared understanding and standardized definition of a scale-up was recently expressed by Jansen et al. (2023, p. 7):

Various definitions and key attributes of scaling have emerged during the last couple of years, yet contributions have been developed rather independently. This has led to a scattered collection of narrowly defined studies across different domains with limited synergies in conceptual development.

To clarify this definitional quagmire, we seek a data-friendly definition that is simple, direct and captures the efficiency arguments of scaling in the literature while, at its core, takes into consideration the logic of economies of scale and the potential for having a rapidly expanding business model that has certain characteristics such as high fixed costs, low marginal costs, and efficiency in production and replication.

5.3 Five Suggestions for How a Scale-up Should Be Defined

Scaling-up is a stage in the life-cycle model of firms, and there have always been major practical problems with attempts to empirically operationalize these stages-of-growth models (for reviews, see Coad, 2009; Levie and Lichtenstein, 2010). Furthermore, even if the theoretical constructs in the stages-of-growth depiction of the scale-up construct correspond to real-world phenomena, they might not be measured in databases that are available to most scholars. Ideal data would include variables such as marketing expenditures, and perhaps also hard-to-obtain data such as marginal costs as well as business model reconfiguration (Osterwalder and Pigneur, 2010). Ideally, we would have large-sample representative data, to accurately gauge the proportions of firms that are scale-ups.

That said, clearly not all firms that suddenly ramp up marketing expenditure are scale-ups. For example, a firm producing a stable product that ramps up marketing in time for Christmas (an annual event) or a one-off event (such as the Olympics or FIFA World Cup), might temporarily display the symptoms of scaling-up (i.e. high marketing spend), but would not necessarily correspond to the concept of a scale-up. Hence, not all firms that look like scale-ups are “true” scale-ups. This is not the case

for HGFs though—any firm satisfying the growth requirements would qualify for the HGF label.

Based on these insights we propose five suggestions for the definition of a scale-up:

Suggestion 1 *Scale-ups are in all sectors, not just IT.*

IT intensive sectors are particularly amenable to the scaling up of growing new firms, because of characteristics linked to digitalization. Digital resources such as data, software, and AI are essentially scale free, such that firms' marginal costs remain low for very large production quantities (Adner et al., 2019). As a result, studies of scaling have often focused on the IT sector (e.g. Giustiziero et al., 2023), or the fintech sector (Jansen et al., 2023, page 10).

Giustiziero et al. (2023, p. 1392) motivate their theoretical focus on digital firms:

“We use the term “digital firms” (contrasted with “industrial firms”) to describe firms that participate heavily in the digital economy by either using a significant share of digital resources (e.g., software, algorithms, data) and/or by selling a significant share of digital products and services (e.g., platforms, software, media). We posit that digital firms tend to have more scalable resource bundles due to significant economies of scale in their productive resources and due to markets with low distribution costs and strong network effects”

That said, scale-ups can also be found in other sectors that do not focus specifically on IT, such as the case of Copenhagen Seafood A/S (Nielsen and Lund, 2018) and IKEA in furniture (Jonsson and Foss, 2011).⁷ This is because digitalization and IT have features of a general purpose technology (GPT) that enhances the productivity of operations across many sectors.

It is difficult, and in our view unfruitful, to try to delimit which sectors include bundles of scalable versus non-scalable productive resources. Therefore, we infer whether it is possible for firms in a sector to scale based on whether we observe growth behavior of firms that is indicative of scaling (without attempting to observe particular aspects of the scalability of their resource bases). It is perhaps unlikely that a firm in the ready-mixed concrete industry can scale as rapidly as a firm in the software industry, but we do not rule this out.

Suggestion 2 *Scale-ups have relatively high levels of spending on marketing and sales* (Blank, 2013).

Here we could consider the scale-up stage to commence if there is a sudden step-change in marketing costs (in terms of total amount as well as in terms of the share of total revenues) that happens a few years after entry and that continues for a few years, and that occurs before or at the same time as the firm achieves rapid growth. When looking at the distribution of marketing spend among HGFs, it would be reassuring if there was a peak in the time series, indicating a step change or discontinuity to distinguish between scale-up HGFs and non-scale-up HGFs, such that scale-up HGFs would have a visibly separate cluster of characteristics compared

⁷ Jonsson and Foss (2011) do not actually use terms such as “scaling” or “scale-up”, but it seems relevant to cite them here.

to non-scale-up HGFs. If there were no such bimodality in the HGFs' distribution of marketing spend (i.e. non-scale-up HGFs with low marketing spend, and scale-up HGFs clustered around a second mode corresponding to high marketing spend), such a lack of bimodality would reinforce intuitions that scale-up HGFs are only different from non-scale-up HGFs by degree, and not by kind (see above, Chap. 4.6).

That said, the gang of scale-ups comprises many exceptions. Some scale-ups may grow through viral marketing, which need not be expensive. One example would be Hotmail, which grew fast in terms of its user base thanks to its strategy of automatically attaching a short advertising message at the bottom of emails sent by Hotmail users to others.⁸ Another example would be LinkedIn, which expanded its network at viral speed by introducing an innovative feature that allowed users to import their address book contacts into LinkedIn (Hoffman and Yeh, 2018). Hence, an indicator of scale-ups should not necessarily exclude firms that are not starting to spend more on marketing.

Suggestion 3 Scale-ups have low marginal costs of production.

Low marginal cost of production is a key feature of scaling up (De Ridder, 2023), and it explains why scaling up is strongly linked to profitable growth (Nielsen and Lund, 2018). This idea of low marginal costs of production leads to two major practical problems. First, as competition policy and industrial organization researchers are painfully aware, it is hard⁹ to proxy for “marginal costs of production” with available data. Second, it is too simplistic to distinguish between fixed costs and marginal costs because of feedbacks between them. For example, a minor improvement in a software's functionality might not be worthwhile when there are ten customers but would be worthwhile when there are 10,000 customers. Hence, as the customer base grows, the product improves in a way that corresponds to fixed costs, but these fixed costs only become worthwhile once the firm has crossed a certain size threshold. Before crossing such a size threshold, scale-up firms would be recommended to do “things that don't scale” (Graham, 2013; Hoffman and Yeh, 2018). Hence, they are “fixed costs” (paid one time only for all customers) but they depend on the size of the customer base (if there are enough customers, the fixed cost is worth paying). The total “fixed costs” thus are not so fixed because they vary with the size of the customer base.

Suggestion 4 Scale-ups are young, but not too young.

Scale-ups need to spend time iterating, revising and reconfiguring their business model before they reach the scale-up stage. There is presumably no such thing as a “born scale-up” because this neglects the time spent in the two search stages in Fig. 3.1, unless of course the first two search stages occurred during the ‘gestation’ period before the firm's official birth. The search stage may have occurred in ‘stealth mode’ before the firm was officially registered in a business register, or perhaps while

⁸ https://en.wikipedia.org/wiki/tim_draper [last accessed 16th December 2023].

⁹ It is hard, but not entirely impossible, see e.g. De Loecker et al. (2016).

working for a previous employer. It thus may appear to be a “born scale-up” even if a lot of preparatory work was done before the firm’s first official business day. In other words, the firm-specific preparatory groundwork before scaling-up may be brought to the nascent firm as an initial endowment at the time of birth, drawing on work done during the gestation stage, rather than being categorized as post-entry activity.

Suggestion 5 In defining scale-ups, we start from the set of HGFs.

Scale-ups are assumed to be HGFs, while not all HGFs are scale-ups (Coviello, 2019). Scale-ups are thus a subset of HGFs that satisfy the ideas above, and in particular, Suggestion 2 (ramping up of marketing investment before the high-growth episode) and Suggestion 4 (scale-ups are not newborns but not old either).

5.4 Discussion of Well-Known Cases

5.4.1 *Is Uber a Scale-up?*

Is Uber a scale-up? Uber has been notorious in making losses in the years leading up to its IPO in May 2019 (O’Reilly, 2019), with an EBITDA more negative than -\$2billion in each year from 2016–2021.¹⁰ It would thus not qualify as a scale-up, if scaling up is defined in terms of profitable growth. However, it did rapidly scale up its operations on the basis of a business plan that had been refined and redesigned to be rolled out at scale. So, on that basis, we could consider that, ideally, an indicator of scale-up used in empirical analysis would highlight that Uber is a scale-up. Other authors have considered that Uber is a scale-up (e.g. Hoffman and Yeh, 2018; Pfothenauer et al., 2022). This implies that a profitable final state should not be a necessary part of the definition of scale-up.

A desirable property of an empirical definition of scale-up is that firms that are generally considered to be prototypical “scale-ups” would not be classified by the empirical definition as non-scale-ups. For example, if we restrict the set of scale-ups to profitable firms only, then we would have to exclude Uber which was unprofitable for a long time (even after its IPO). Kuratko et al. (2020, p. 112) actually state that the majority of blitz-scaling companies are NOT profitable.

5.4.2 *Is Apple a Scale-up?*

Sometimes large mature multiproduct firms are described as engaging in scaling. For example, Apple is presented as a serial blitz-scaler, due to scaling waves enabled

¹⁰ Source: <https://www.macrotrends.net/stocks/charts/UBER/uber-technologies/financial-statements> (last accessed 29th December 2023).

by products such as the iPod, iTunes, the iPhone, and the iPad (Hoffman and Yeh, 2018, p. 13). Microsoft has been described as a blitz-scaler on account of its cloud computing service Azure (Kuratko et al., 2020, p. 111).

At the time of the iPhone's success, was Apple a scale-up? Apple was already large and had many products at that stage. Theorizing about scale-ups often considers that it is a unique growth stage that happens shortly after entry (e.g. Hellmann and Thiele, 2022). Some consider that scale-ups are specialized (Giustiziero et al., 2023) rather than multiproduct firms.¹¹ Most would agree that, to the extent that the iPhone operated as a standalone product, then the iPhone could be considered as a scale-up—at the product-level of analysis. At the firm level, it would also be possible that Apple could be classified as a scale-up, if it satisfies (at the firm-level) the empirical requirements presented in the next section, such as 20% annual growth for a three-year period.

5.4.3 Was Obama's 2012 Campaign a Scale-up?

Hoffman and Yeh (2018) consider that Barack Obama's 2012 presidential candidate campaign can be considered to be an instance of blitz-scaling. Obama's campaign grew from zero to 700 employees in a single year, as well as having orders-of-magnitude more volunteers. The campaign leveraged technology to achieve viral growth and powerful distribution through existing networks. Non-profit-oriented social movements such as Obama's campaign can be extremely effective ways of amplifying new ideas and messages to have large scale impacts on society (Chliova and Ringov, 2017; List, 2022). According to our definition, however, Obama's 2012 campaign would not be counted as a scale-up, because it would not satisfy the empirical requirements of being a business firm that survives for at least three years.

¹¹ Giustiziero et al. (2023, p. 25): "When digital firms have scalable resource bundles (arising in part due to demand-side network effects in platforms), our theory suggests that they may be driven toward greater specialization even in the presence of significant transaction costs."

5.5 Our Theoretical Definition of a Scale-up

We conclude this chapter by stating our theoretical definition of a scale-up:

Theoretical Definition of scale-up scale-ups are a subset of high-growth firms that have a specific style of growth that requires ramping up production of a new product (or service). This product has finished the processes of refinement, the business model need not pivot but has become clear, and no further iteration stages are required to find a good fit with the market. All that remains is scaling up. Crucial elements of this definition are that scaling-up is a stage in a stylized life-course model of firm evolution. Scaling-up changes the proportions of a firm (in terms of raising fixed costs, reducing marginal costs, having an above-average capital intensity in terms of tangible capital and intangible capital and also with regards to IT and perhaps also robots and automated systems). Scaling-up connects favorable supply-side conditions (initial product development costs are near their end; low marginal costs of production) to favorable demand conditions (marked perhaps by increasing returns due to network externalities). Scaling-up is often observed alongside a burst of marketing effort to accompany what is essentially a pent-up supply-side push towards a hungry market.

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Chapter 6

Empirical Definition of a Scale-up



This book distinguishes between a theoretical definition and an empirical definition. The theoretical definition seeks to clarify the concept of a scale-up in the minds of readers, using familiar theoretical concepts (such as marginal cost) that may be prohibitively difficult to measure in standard datasets, because the theoretical ideas do not map neatly into empirical variables. An empirical definition is stated in terms of empirically relevant variables and concepts such as growth rates, growth indicators, and other variables that are found in available datasets. This chapter develops the empirical definition. It starts by stating four desirable properties of an empirical definition, and proceeds in 2 steps: Step 1 involves taking the subset of HGFs; and Step 2 involves selecting scale-ups from among non-scale-up HGFs on the basis of seven proposed conditions.

6.1 Scaling up Is More Than Just Growth, or Not?

Some authors use the terms HGFs and scale-ups as synonyms (e.g. Zeng et al., 2023). Other authors define scale-ups in empirical analysis using the HGFs definition (e.g. Belitski et al., 2023). Others emphasize that scale-ups are not the same thing as HGFs, but end up defining scale-ups in terms of the HGF definition.¹

We have previously explained why we think that scaling up is not the same thing as growth, and why scale-ups are different from HGFs. Scaling up is a specific type of growth. The challenge is to set out an empirical definition that distinguishes between the set of HGFs and the subset of scale-ups in available datasets.

¹ OECD (2021, p. 14) states that “scaling up being more than “just” a period of rapid growth”—but then later on (OECD, 2021, Box 1.2) defines HGFs as firms that have 20% average yearly growth over a three-year period, whereas “scalers” are firms who reach the growth threshold of 10% (instead of 20%). The 10% threshold, however, is often taken to measure HGFs (e.g. by the European Commission. Flachenecker et al., 2020).

6.2 Four Desirable Properties of an Empirical Definition

A first desirable statistical property would be that we have a (binary) dummy variable that indicates whether a firm is a scale-up or not, i.e. like a HGF dummy variable. A binary variable would be useful for applying statistical techniques, such as logistic regression and classification trees, for the purposes of investigating and predicting scale-ups.

A second desirable property of an empirical definition of scale-up is that firms that are generally considered to be stereotypical “scale-ups” would not be classified by the definition as non-scale-ups. For example, if we impose the restriction that scale-ups must be profitable, then we would have to exclude Uber which was unprofitable for a long time (even after its IPO), which would be unfortunate because Uber is one of the first companies to come to mind when the word ‘scale-up’ is evoked (Pfothenauer et al., 2022).

A third desirable property is that the indicator is standardized and comparable across time and across countries. Hence, it should ideally be an absolute indicator (leading to different percentages of scale-ups across countries) rather than a relative indicator (e.g. if the top 5% of firms in each subsample are called scale-ups, therefore each country has the same proportion of scale-ups, equal to 5%). The indicator may vary over the business cycle, of course.

A fourth desirable property is that within the set of HGFs, an appropriate share of HGFs are scale-ups. For example, within the set of HGFs, we could calibrate the thresholds such that 20–50% could be scale-ups whereas 50–80% are not. If we are too restrictive, then there will be too few scale-ups for statistical analysis.² Already the set of HGFs is small, and a tiny subset of a small set of HGFs could end up being so small that the application of standard statistical techniques could become problematic, increasing volatility and statistical noise. As discussed earlier, scale-ups differ by degree and not by kind, which means that the distinction between a scale-up and non-scale-up ultimately is due to some arbitrary threshold rather than some innate natural cleavage.

6.3 Empirical Definition of a Scale-up, in 2 Steps

6.3.1 Step 1: Identify the Set of HGFS

Scaling up corresponds to rapid growth, although rapid growth does not necessarily imply scaling up (Coviello, 2019). As such, a firm that is an HGF is potentially a scale-up. Conversely, a firm cannot be a scale-up if it is not growing fast.

² A fairly restrictive definition of rapidly-growing firm was taken by Guzman and Stern (2020), who measure growth in terms of a binary variable, with only 0.07% of their sample being growth = 1 (and the rest as growth = 0). These authors had a large enough sample size of US firms to allow them to do this, however.

That said, which indicator should be taken to measure growth? Consider the case of Instagram, which was “acquired by Facebook for \$1bn, when it had over 100 m users but just 13 employees and no significant revenues” (Hoffman and Yeh, 2018, p. 39). In the case of Instagram, focusing on revenue growth would have missed the action.

Scale-ups such as LinkedIn, Facebook, Dropbox and AirBnB gained attention from investors on the basis of the growth of the user base (Hoffman and Yeh, 2018), even if they had no significant revenues (Moogk, 2012, p. 24). Growth of the user base led to employment growth to keep up with the increased workload, while sales growth came later (e.g. it takes time for users to get ‘hooked’ and pay for premium services), and profits came even later than that. Indeed, the freemium business model, which is often associated with scaling up (Hoffman and Yeh, 2018) can mean that growth of sales and profits occur relatively late in the process. Therefore, measuring scale-ups in terms of profits growth would be inappropriate.

Measuring scale-ups in terms of growth of the user base (registered users, page visits) would be useful in theory, although in practice this would be problematic because this kind of data is not usually available in large-sample datasets. It thus seems better to define scale-ups in terms of employees. This aligns with the advice in Hoffman and Yeh (2018, p. 38): “the most obvious, visible, and impactful change in a scale-up is the number of people it employs ... other measures of scale include the number of users (user scale), the number of customers (customer scale), and total annual revenues (business scale).” For scale-ups, there is so much work to be done that new employees are hired rapidly, leading to the urgent need for capabilities for rapid onboarding of new employees outside of the usual HR procedures (Hoffman and Yeh, 2018), such as hiring anyone with satisfactory education credentials, and hiring immediately upon receiving personal recommendations from other employees (Hoffman and Yeh, 2018).

As in the case of HGFs, therefore, a firm’s identity as a scale-up refers to a specific episode rather than being a life-long trait (Grover Goswami et al., 2019). Scaling up in the past is no guarantee that scaling up will continue in the future.

6.3.2 Step 2: Scale-ups as a Subset of HGFs

CONDITION 1: Scale-ups spend more on marketing.

Scaling up is a stage in the firm’s life course associated with a step change in marketing activity surrounding the launch of a viable product (Reuber et al., 2021). At the very least, we can thus remove firms from the sample of potential scale-ups if they have a DECREASE in marketing spend during the rapid growth period. One way of operationalizing the focus on marketing spend would be to suggest that scale-ups spend more on marketing than they did before. There may be a step-change in marketing spend.

A possible caveat is that sometimes viral marketing need not be very expensive, such that marketing spend is not a good indicator. Facebook achieved incredible virality by deciding to “deliberately delay launching at a college campus until over 50% of the students had requested it so that local critical mass was reached almost immediately” (Hoffman and Yeh, 2018, p. 115). Dropbox enjoyed ‘organic virality’ because of how users share files with non-users, as described in Hoffman and Yeh (2018). Cisco had a conspicuous lack of marketing expenses (no professional sales staff, and no standard marketing campaign, at the time of their IPO) because it harnessed the power of organic virality afforded by intimately understanding customer pain points and turning customers into partners (Furr and Ahlstrom, 2011, p. 135). Another caveat, of course, is that information on marketing expenditure may not be available in the data at hand.

Lee and Kim (2023) investigate the timing of scaling-up in a large sample of firms, defining the start of a scaling episode in terms of the hiring of a firm’s first sales personnel (reflecting outward-oriented aspects of growth) as well as the hiring of a firm’s first manager (reflecting the challenges of growth in terms of internal organization). This is done using detailed data on job postings. The idea of identifying scale-ups using the firm’s first job posting for a sales position is a clever and meaningful indicator in our view, although we do not pursue it here because such information does not appear in standard datasets, and not many researchers (including ourselves) will have such rich data at their disposal.

CONDITION 2: Scale-ups are relatively young.

This could be operationalized by saying that scale-ups have below-median age in the sample of HGFs.

As discussed in Chap. 3.2 on stages of growth models, scale-ups are relatively young, although scaling up is not something that happens immediately at birth. Young firms are more likely to scale up, because they have organizational flexibility, dynamism, and are free from concerns of cannibalizing existing products. A caveat, though, is that sometimes relatively mature firms can successfully navigate the torturous path of scaling up, for example when Apple had significant firm-level growth derived from scaling up the iPhone (Hoffman and Yeh, 2018).

CONDITION 3: Scale-ups strive to reorganize in order to have large fixed costs and low variable costs.

Scale-ups seek to restructure their costs, substituting towards intangible inputs, such that there are high fixed costs but marginal costs that are low, as close to zero as possible (De Ridder, 2023). This makes sense in theory, although in practice it is notoriously hard to obtain firm-level data on fixed costs and marginal costs. Also, as discussed earlier (e.g. in Sect. 4.4), scale-ups have been encouraged to “do things that don’t scale up” (Graham, 2013; Hoffman and Yeh, 2018) to survive challenges in the short-term, which means that many scale-ups may temporarily be exceptions to this general tendency to tilt the cost function towards having large fixed costs and low variable costs. It has even been suggested that, until the winning business model has

been ‘nailed’, ambitious startups should seek to turn fixed costs into variable costs to reduce their burn rate, and have the flexibility to pivot and adjust before reaching the end of their financial ‘runway’ (Furr and Ahlstrom, 2011, p. 164).

This condition could be operationalized by keeping only those HGFs whose spending on IT and/or software (and perhaps other intangibles) has had an above-median growth over the HGF period (in line with De Ridder, 2023). At a very minimum, spending on IT/software (and other intangibles) should be higher at the end of the growth period than at the start.

Low marginal costs need not imply that a firm is a scale-up, however. Firms can be considered as bundles of lumpy indivisible resources (Penrose, 1959; Coad et al., 2021). In some cases, growth can feed off organizational slack and unused capacity such that the marginal costs of increasing production are low. In other cases, firms in a state of full capacity utilization cannot increase production without engaging in broad-based investments that would correspond to high marginal costs. Growth is a lumpy phenomenon and marginal costs fluctuate considerably over time, depending upon a firm’s degree of capacity utilization (Coad et al., 2021).

CONDITION 4: Scale-ups have non-negative growth of inventory.

The reasoning here is that, before scale-up, inventory starts at zero, because the prototype has been discovered but not yet produced at scale. Then, scale-ups move from a learning stage (product development) to the stage of furious expansion of production capacity. This condition could potentially be useful if it highlights the change in production activity. In line with this logic, Coad and Srhoj (2020) observe that low inventories are associated with higher chances of subsequently becoming an HGF.

However, this condition also has some potential caveats. It could be that the inventory is ‘sold out’ during scaling, for example in the case of Tesla Motors, which has been identified as a scale-up (Hoffman and Yeh, 2018) although it has long struggled to produce enough cars to satisfy its order books (Niedermeyer, 2019). Another potential caveat could be that struggling scale-ups may have (at least in accounting terms) a large inventory of imperfect models at the start of the scale-up period. Furthermore, the concept of inventory is more relevant for physical products than it is for software-as-a-service firms and digital products that can be instantly replicated and duplicated at near-zero cost. Indeed, it would be wrong to put digital firms in a disadvantaged position for the title of scale-up (see also our next condition on this point).

As such, this condition relating to stocks of inventory could be useful to identify which firms might be scale-ups, although firms that do not satisfy this condition should not be excluded from the set of potential scale-ups.

CONDITION 5: Scale-ups are in the digital/ICT sectors.

The prototypical scale-up is a digital firm (Giustiziero et al., 2023) because the ICT (Information and Communication Technology) sector has a natural affinity with scaling up (Hoffman and Yeh, 2018), given that it is possible for software products

and digital goods and services to be replicated and distributed at near-zero cost, allowing digital firms to expand globally without having any significant physical presence. In addition, the value of digital platforms and goods/services often benefits from network externalities, that lead to increasing returns to scale for users, thereby propelling successful digital firms onto a trajectory of rapid scaling. Authors are quick to concede, perhaps as an after-thought, that firms from traditional sectors (such as retail, hospitality, and transportation) can also be scale-ups (e.g. Hoffman and Yeh, 2018), such that firms should not be excluded from the category of scale-up simply because they are not primarily in the ICT sector.

CONDITION 6: Scale-ups are the subset of HGFs with the highest growth of sales/employee and sales/costs.

A basic premise behind scaling is that firms leverage economies of scale, with low marginal costs of production, to grow revenues faster than costs (Coviello, 2019, p. 5). In this vein, Palmié et al. (2023, p. 2) describe scaling as “increase in the size of a focal subject that is accompanied by a larger-than-proportional increase in the performance resulting from the said subject, with “subject” referring to what is being scaled (e.g., number of products sold, number of customers, or number of markets served).” The intuition behind these claims seems well-founded.

Scale-ups grow rapidly according to all dimensions, such as user base, employees, sales, and profits. A relatively lenient condition could be that, for scale-ups, growth of sales is relatively faster than growth of employees or the growth of costs (compared to other HGFs). Hence, even if sales are low at the start of the scaling period, sales growth may appear large if it started from a low base.

It may be that fee-paying customers only arrive in large number after a certain lag. This is especially likely given that many scale-ups operate on a freemium model, where they accept initial losses by most users in the hope that these will eventually be cross-subsidized by a minority of fee-paying customers (Hoffman and Yeh, 2018). Hence, a caveat of this condition is that there may be exceptions that some fast-growing scale-ups have not yet reached the expected explosive growth of revenues.

A corollary to the changing proportions of sales per employee is that scale-ups enjoy labor productivity growth (defined as sales/employee or value-added/employee). In the period before scale-up, productivity is low, because sales are low. As scaling unfolds, however, sales grows faster than the employee input, leading to labor productivity growth.

Another possible indicator, besides labor productivity, could be market value. Market value is a forward-looking measure that potentially considers future business prospects based on today’s knowledge and capabilities, although a problem with focusing on market value is that this variable is difficult to measure for small private firms.

CONDITION 7: Scale-ups have high gross margins.

While not all scalers achieve profitable outcomes, nevertheless profitability is a main goal of scaling: “Scalability is about achieving profitable growth” (Nielsen and Lund, 2018, p. 65).

Gross margins refer to product revenue minus product cost (Furr and Ahlstrom, 2011, p. 164). HGFs with gross margins at a very high level, for example above 30% or 40%, at the end of the growth period would be scale-ups (in line with Hoffman and Yeh, 2018). This is because such very high gross margins are a signal that the firm has tilted its cost structure towards having high fixed costs and low marginal costs, which is ideal for scaling up (De Ridder, 2023). Firms with such high gross margins will likely have achieved a monopoly position by growing a new submarket around their innovative product, in a situation that is often associated with IT services sectors and digital platforms, where scale-ups seem to be more common (Hoffman and Yeh, 2018).

Hoffman and Yeh (2018, p. 63 and 243) give some numbers for the values of gross margins reached by some superstar scalers: 61% for Google; 87% for Facebook; 86% for LinkedIn; and 35% for Amazon; as well as 57% for Zara, and 55% for H&M. These firms successfully scaled up to reach these enviable market positions. Similarly, Furr and Ahlstrom (2011, p. 165) refer to a target of gross margins of around 50% or more.

Flexibility in the Second Step

Table 6.1 summarizes the advantages and drawbacks of the 7 conditions taken individually.

All potential scale-ups must satisfy the first step, but not necessarily satisfy all conditions at the second step. While there is a theoretical basis behind the conditions at the second step, there are also various caveats with these conditions because scale-ups are such a heterogeneous troupe. Given the principle of ‘too many exceptions’ (as mentioned above in Subsection 4.7) we might want to allow for the case where failing one condition might not be fatal. Therefore, we tentatively suggest that firms can still become scale-ups if they satisfy a minimum number of conditions (e.g. 4 or 5 out of 7 conditions).

Table 6.1 Advantages and drawbacks of these seven empirical conditions for being classified as a scale-up, taken individually

	Advantages	Drawbacks
CONDITION 1: Scale-ups spend more on marketing	Scaling up is the stage when a firm has a market-ready product	Marketing need not cost much to be effective, e.g. viral marketing
CONDITION 2: Scale-ups are relatively young	Scaling up usually occurs when young single-product firms launch into growing their first product	It is rare, but not impossible, for mature multiproduct firms to scale up
CONDITION 3: Scale-ups strive to reorganize in order to have large fixed costs and low variable costs	A defining feature of scale-ups is that marginal costs of production are low, spurring on dramatic increases in scale	Marginal costs can be hard to measure. Also, 'fixed costs' may grow as firms become larger
CONDITION 4: Scale-ups have non-negative growth of inventory	Scaling up is a stage of rapidly increasing production to accompany the product launch	Inventory is not a useful concept in some sectors (e.g. Software as a Service) Demand might outstrip supply for some scale-ups, such that inventory is not positive
CONDITION 5: Scale-ups are in the digital/ICT sectors	The prototypical scale-up is a digital firm, because digital strategies have near-zero marginal costs of production, low-cost distribution, and network effects	ICT is a general purpose technology (GPT) that can be applied in all sectors Broad agreement that scale-ups can be found in all sectors, not just ICT
CONDITION 6: Scale-ups are the subset of HGFs with the highest growth of sales/employee and sales/costs	If marginal costs are low, total revenues grow faster than the growth of inputs	Due to the freemium business model, and the focus on growing the user base while delaying value capture, scale-ups may remain in a position of relatively slow sales growth
CONDITION 7: Scale-ups have high gross margins	The prototypical scale-up is a tech firm in an emerging market that strives for a monopoly position in order to obtain high margins	Some scale-ups are not profitable, even after completing their IPO, such as Uber

Box 2 summarizes these ideas to present our empirical definition of a scale-up. The next chapter seeks to apply some of these ideas to Swedish data.

Empirical Definition of Scale-up a dummy variable takes the value of 1 if a firm satisfies the requirements of a scale-up. There are two steps in identifying scale-ups. In the first step, we select the set of High Growth Firms (HGFs), where growth is measured in terms of employment. In the second step, we select the subset of scale-ups from among the set of HGFs by referring to seven conditions: (1) Scale-ups have a non-negative change in marketing; (2) the age of scale-ups is below the median for the set of HGFs; (3) Scale-ups have a non-negative change in intangible assets; (4) scale-ups have a non-negative growth of inventory; (5) scale-ups are in the digital/ICT sector; (6) for scale-ups, growth of sales is faster than growth of employees; (7) scale-ups have high margins (e.g. operating margins above 30%).

In the second step, firms do not need to satisfy all seven of these conditions to qualify as scale-ups, because this would be unnecessarily restrictive and it would select only a tiny number of firms. Instead, firms that satisfy 4 or 5 out of 7 conditions in the second step can qualify as scale-ups.

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Chapter 7

In Search of Scale-ups: Empirical Analysis



This chapter takes our empirical definition of scale-up to the data: Swedish register data on over 700,000 firms for the period 1997–2021. 1.28% of firms meet the HGF criteria. Among these HGFs, it is rare for a firm to satisfy all 7 scale-up conditions (in line with the idea of ‘too many exceptions’). 25.89% of HGFs satisfy 5 or more of the 7 conditions for scale-ups, while 60.75% of HGFs satisfy 4 out of 7 conditions. Our analysis highlighted how missing values can cause problems when investigating which HGFs are scale-ups.

7.1 Data Description

We use a Swedish register database that includes all limited liability firms active at some point for the years from 1997 to 2021 ($n = 8,294,726$ firm-year observations).¹ This reduces our dataset to 6,888,528 firm-year observations, covering 739,094 firms. The database contains audited annual report information, such as yearly revenues, as well as costs for machinery, buildings, employees and salaries, and intellectual property, among other variables. It also includes information on firm age, financial strength, location, industry classification, and much more.

This database has been widely used to study, for example, the effects of employment protection (Bornhäll et al., 2017), barriers to firm growth (Bornhäll et al., 2016), firm growth paths (Coad et al., 2018, 2022) and high-growth firms (Daunfeldt et al., 2014; Daunfeldt and Halvarsson, 2015).

¹ In 1997 the database went from covering a sample of Swedish firms to covering the full population of them. Unfortunately, this reduced the quality of the data for the year 1997. The last year, 2021, is used to identify firm exits making it unsuitable to include in the analysis. The main analysis of the Swedish scale-ups is based on three-year periods, meaning that we only include data from 2000 to 2020 to obtain seven fully covered three-year periods.

Table 7.1 Frequency of high-growth firms

Periods of high growth	Number of firms	% of all firms (%)
0	729,646	98.72
1	8,291	1.12
2	1,041	0.14
3	107	0.01
4	7	0.00
5	2	0.00
Total number of firms	739,094	100

HGFs are defined as firms with an average annualized employment growth greater than 20% over three years and with ten or more employees at the beginning of the observation period. We divide our data into seven three-year periods: 2000–2002, 2003–2005, 2006–2008, 2009–2011, 2012–2014, 2015–2017, and 2018–2020. During these seven three-year periods, we identify 9,448 firms (1.28 %) that meet the HGF criteria, of which 12% (1,157 firms) meet the criteria during more than one period.

7.2 Results

7.2.1 Frequency of HGFs

Table 7.1 shows that HGF events are rare and that only 1.28% of all Swedish firms ever experience a high-growth period. Also, previous work on Swedish data has shown that HGFs are ‘one-hit wonders’ (Daunfeldt and Halvarsson, 2015) and unlikely to repeat their HGF episode. These findings are supported by our results, showing that only 0.16% (1,157) of the firms manage to meet the HGF criteria for more than one period.² If HGFs are rare and lack persistence, we can expect this from scale-ups too. Scaling is likely to be a short-lived episode that is more akin to a ‘stage of growth’ (Blank, 2013) than a durable firm-specific trait.

7.2.2 How Many HGFs Satisfy the Conditions for Being Scale-ups?

Table 7.2 shows many interesting findings. Regarding Condition 1 (non-negative change in marketing): we had severe problems of missing values for this case. We

² This would be an even lower number if we require them to have two or more subsequent HGF periods.

could only calculate the growth in “cost of sales” for 598 of the high-growth events. 543 (90.80%) of those had a non-negative growth in cost of sales during their high-growth period. This also highlights the difficulties in getting data to test this condition properly.

Regarding the age distribution of HGFs, some key percentiles are as follows: 25th percentile: 6 years; 50th percentile: 11 years; 75th percentile: 18 years. Therefore, it might be appropriate to take age 10 as a cut-off point (following previous work e.g. Coad et al., 2016; Vandresse et al., 2023). Firms older than 10 years would probably not correspond to a common understanding of what is a scale-up. However, we must stress that our methodology allows for exceptions too. Restricting in this way means we still have about half of high growth events (5,296 out of 10,732) remaining in the category of potential scale-ups.

Condition 3 focuses on a non-negative change in intangible assets. Intangible assets are our best-available proxy for software, which is crucial for scale-ups (De

Table 7.2 Decomposing the sample of HGFs to see how many HGFs satisfy the conditions for scale-ups

	Number of firms with non-missing values	Percentage of the sample of high-growth events
All firms	739,094	
Number of high-growth events	10,732	100.00
Number and % of the sample of HGFs that satisfy these conditions taken individually:		
CONDITION 1: non-negative change in marketing	543 out of 598	90.80
CONDITION 2: firm age is up to (and including) 10 years	5296 out of 10,732	49.35
CONDITION 3: non-negative change in intangible assets	7987 out of 9,369	85.25
CONDITION 4: non-negative growth of inventory	8292 out of 9,367	88.52
CONDITION 5: digital/ICT sector	492 out of 8,680	5.67
CONDITION 6: growth of sales is faster than growth of employees	4193 out of 9,344	44.87
CONDITION 7a: HGFs that have gross margins above 40%	190 out of 925	20.54
CONDITION 7b: HGFs that have gross margins above 30%	267 out of 925	28.86
CONDITION 7c: HGFs that have operating margins above 40%	7919 out of 10,673	74.20
CONDITION 7: HGFs that have operating margins above 30%	7979 out of 10,673	74.76

Ridder, 2023). Data for intangible assets show that 7,987 (85.25%) firms had a non-negative growth of intangible assets during the HGF period compared to 1,382 (12.88%) firms that had a decline in intangible assets.

Condition 4 relates to non-negative growth of inventory. 8,292 (88.52%) out of 9,367 high-growth events were associated with a non-negative growth of inventory. 1,075 (11.48%) of the high-growth periods had a decline in inventory.

Condition 5 focuses on the industry classification of the HGFs, in particular whether they are in the digital/ICT sector. This is operationalized using the NACE codes in the classification scheme in OECD (2011). 492 (5.67%) out of 8,680 HGFs are active in the ICT sector. 8,188 (94.33%) are active in some other sector. This shows that scale-ups appear in a variety of industry sectors as opposed to solely in Information Technology. In that way, they are similar to HGFs that appear across all types of industries (Daunfeldt et al., 2015).

What is notable about this finding, however, is that much of the scaling is in great part thanks to general purpose technology that these scaling firms leverage to increase their efficiencies over time. Further examining the details of industry-based differences and how scaling is possible may offer greater conceptual insights. Studying the limited number of firms that can scale, despite what seems to be a challenging environment to scale, may also open up new avenues for understanding what entrepreneurs can accomplish within what may appear to be externally objective challenges, but where subjective perceptions of opportunity may vary greatly (McKelvie et al., 2018). These deeper examinations may also promulgate genius ways in which entrepreneurs leverage technology or investments to scale.

Condition 6 stipulates that growth of sales is faster than growth of employees. In our data, 4,193 (44.87%) of HGFs experienced higher growth in sales than in employment during their high-growth phase. 5,151 (55.13%) experienced the opposite. No HGFs had equal growth in sales and employment.

Condition 7 requires that HGFs have gross margins that are high, above 40% (or alternatively above 30%). We consider two indicators of financial performance: gross margins (which suffers from problems of missing values) and operating margins (where there are far fewer missing values). Our preferred indicator (that will be used in Table 7.3) is the number of HGFs with an operating margin above 30%.

Table 7.3 shows the number and percentage of the sample of HGFs with non-missing values for the 7 conditions. There are 502 HGFs with non-missing values for all of the 7 conditions. From the set of 502 HGFs, there is only one that satisfies zero conditions. Clearly, this would not be a scale-up. In contrast, only 2 HGFs satisfy all 7 conditions. The most common case is for HGFs to satisfy 4 out of 7 conditions (34.86% of HGFs). There are 25.89% of HGFs ($= 21.71 + 3.78 + 0.40$) that satisfy 5 or more of the 7 conditions for scale-ups, while 60.75% of HGFs satisfy at least 4 out of 7 conditions.

Table 7.3 Number and percentage of the sample of HGFs with non-missing values for the 7 conditions

number and % of the sample of HGFs that satisfy:	Number	%	Cumulative %
All 7 conditions	2	0.40	0.40
6 conditions	19	3.78	4.18
5 conditions	109	21.71	25.89
4 conditions	175	34.86	60.75
3 conditions	151	30.08	90.83
2 conditions	39	7.77	98.60
1 condition	6	1.20	99.80
0 conditions	1	0.20	100.00
All HGFs in this sample	502	100.00	

Notes: The numbers in this table are constrained by the low level of observations for “marketing” (Condition 1)

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Chapter 8

Concluding Remarks



This chapter closes the book with a brief summary of the book’s purpose, and a brief statement of the theoretical and empirical definitions of scale-ups. While we argue that our book is timely, we also acknowledge the limitations of our book, chief among which is the data limitation of missing values affecting our empirical analysis.

8.1 Concluding Remarks

There is growing interest in scale-ups and high-growth firms from various stakeholders: entrepreneurs, academics, policymakers, investors, and the business press. However, growing research efforts in this area have led to a potentially confusing variety of definitions of scale-ups. This book to the opportunity for a detailed discussion of the concept of scale-up. It began by discussing the literature on high-growth firms (HGFs), noting that this research area has benefitted from having a standardized definition of a High-Growth Firm (Eurostat-OECD, 2007). Within the set of HGFs, scale-ups are HGFs that are at a specific stage in their life course, leading us to discuss scaling as a stage of growth. We present eight propositions about scale-ups in Chapter 4, before presenting a theoretical definition (Chapter 5) and also translating this into an empirical definition (Chapter 6) that allows researchers to identify scale-ups using the (potentially restrictive) set of variables available in standard datasets.

Scale-ups are a subset of high-growth firms that launch into rapid growth after having achieved product-market fit. Scaling-up is a stage in a stylized life-course model of firm evolution. Scaling-up changes the proportions of a firm (e.g. in terms of raising fixed costs and reducing marginal costs). Scaling-up connects favorable supply-side conditions (such as low marginal costs of production) to favorable demand conditions (such as increasing returns due to network externalities). Scaling-up is often observed alongside a burst of marketing effort to accompany what is

essentially a pent-up supply-side push towards a hungry market. In our empirical definition, scale-ups are identified using a dummy variable that takes the value of 1 if a firm satisfies the requirements of a scale-up. There are two steps in identifying scale-ups. In the first step, we select the set of High Growth Firms (HGFs), where growth is measured in terms of employment. In the second step, we select the subset of scale-ups from among the set of HGFs by referring to seven conditions that are particularly relevant for the style of growth associated with scaling up (referring to variables such as marketing expenditure, young age, and high gross margins).

Our book seems timely. At present, policymakers are interested in gathering representative data on the number of scale-ups in regions and countries (e.g. OECD, 2021), although there is a confusing range of (sometimes conflicting) definitions in the literature. A number of recent special issues in journals have focused on scale-ups, although we feel that they have not resolved the confusion surrounding how to define a scale-up. It is worth repeating that scaling up is not just firm growth: it is more nuanced. This book draws on theory and case discussions, with the goal of providing general rules for empirical researchers to identify scale-ups in their datasets. We hope to have contributed to a step forward in understanding, such that firm growth and scaling up are no longer considered as synonyms.

Some recommendations emerge from our work. Researchers should not talk about scale-ups if they have in mind HGFs. Previous analysis has defined scale-ups in terms of HGFs, ignoring the differences between these two. Regarding economic policy, it would be a pity if policy interventions targeted towards scale-ups end up being gobbled up by HGFs. A practical recommendation for scale-up research recognizes that scale-ups have a nuanced definition and lack the definitional clarity of HGFs, although they can be considered to be a subset of HGFs. Therefore, studies that report the number of scale-ups should also (for comparison and for context) report the number of HGFs.

Future work could involve a deeper treatment of marginal costs of production as firms scale. Scale-ups are argued to have low marginal costs to allow for scaling. However, marginal costs are highly volatile and vary greatly over time, even for firms that have smoothly-increasing demand conditions (Coad et al., 2021).

As with all studies, ours is not without limitations. A major impediment was that our data analysis was affected by missing values. This was a problem even in our relatively rich Swedish data, hence a fortiori the problem of missing values can be expected to arise for other researchers working on databases from other countries. Hence, data limitations may restrict the ingenuity of researchers in identifying the peculiar characteristics of scale-ups. Data limitations may also prevent subsequent researchers from applying our definition to their data in full, although we hope at least that our definition can be applied in near-complete form. Another limitation, as ever, is that our reliance upon Swedish panel data might be affected by the unique Swedish cultural and regulatory contexts, and furthermore a reliance on financial statement-based measures rather than other variables that might be more salient from a theoretical angle. Further, we have not yet delved deeper into the comparative heterogeneity of scale-ups to understand their variety at a more detailed level, such as whether the scaling took place by entering foreign markets, by expanding into

other local or domestic markets, or other market-based mechanisms through which scale-ups ‘take a proven concept and deliver it to a wider audience’ (Hellmann and Kavadias, 2016; Piaskowska et al., 2021).

Despite the limitations discussed above, we believe that our empirical work is a potentially valuable foray into pinpointing the distinctiveness of scale-up firms. To that end, we believe that our empirical definition and findings offer preliminary but useful avenues for future work that help bring to the fore a unique and operationalizable definition that furthers the study of scale-ups in the future. Our analysis relies upon access to rich data, beyond what many may be able to access, and where the variety of scale-ups precludes there from pinpointing one ‘pure form’. Yet, we also recognize that this attempt is insufficient in leading to a standardized scale-up definition for all to emulate (standardization which was arguably achieved in the case of Eurostat-OECD (2007)’s widely-adopted HGF definition).

Overall, in this study, we identify some core differences between scale-ups and HGFs. By providing an objective definition of scale-ups that is based on accessible firm-level data, we hope that the scholarly community can continue its pursuit of identifying, dissecting and theorizing about the emerging yet fabled category of firms known as scale-ups.

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