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## Introduction

The tech industry thinks in terms of scale. Growing, expanding the user base, and developing smaller hardware to cram more processing power into smaller spaces are rarely questioned drivers of digital innovation. Companies with revenue larger than most countries seek planetary monopolies. Mainstream narratives associate *big* data with *useful* or *good* data. But is *big* always *good*? Global commercial platforms, such as Airbnb and Uber, are regarded as examples of successful digital technologies by virtue of their global take-up, despite their negative impact on local contexts and communities.

This way of measuring progress purely by size and numbers ignores culture and flattens local contexts into sameness: Scoping technical development through metaphors of growth makes technology design inattentive toward locally relevant ecological relations and eco-social goals. It also misses the possibility that using metaphors of size repeatedly shapes design strategies that are not helpful as societies wrestle with the fallout of environmental change and the need to rethink cultures of production and consumption. Views of technology that consider growing and expanding to be the only processes that matter leave little room for more-sustainable lives and alternative and fairer economies.

## Insights

- The tech world is dominated by metaphors of scale and growth that reflect and reinforce capitalist value systems.
- We question scale as a metaphor and scaling as a process in addressing the sociotechnical.
- We, as practitioners, must reshape our vocabulary if we are serious about prioritizing social and ecological values like sustainability and equity.

When scale in the form of "bigness" dominates, the entanglements and relationships between smaller parts of large-scale entities are neglected, sometimes to the point of becoming invisible. As with any modeling, the models provided by the bigness metaphor are incomplete, yet they are uncritically reproduced in visions of technological innovation and of universal expansion across times and places. This poses an interesting set of challenges for research on social

computing, and for understanding the social consequences of computational technologies more broadly.

When metaphors become as entrenched in our language as the tech world's current notions of growth and scalability have become, we don't notice how they govern our thoughts and actions [1]. They are therefore rarely questioned, even by those who are not in it for exponential profit. It's time to change this. Drawing on metaphors other than size and numbers makes visible the questions that are neglected by prioritizing the ever-expanding use of digital platforms. There are practical implications to how we frame processes of development and the resulting relationships. This, we believe, points to two ethically loaded questions:

- *What are the consequences of thinking of scale and scaling in terms of size and growth?*
- *What alternative language might help us as we rethink ecological relations and try to foster fairer and more diverse ways of transforming, spreading, and developing technology?*

We say upfront that *big* is not necessarily appropriate, and refer the reader to E.F. Schumacher's *Small Is Beautiful* [2]. But, as illustrated through work we have conducted over the past few years [3,4], it pays to question scale as an expression of progress, and growth as something that can be universally welcomed with no consequences [5].

[image]

**Scaling is so entrenched as a metaphor that the consequences of thinking in terms of scale tend to be overlooked.**

[image]

**The proliferation metaphor draws attention to how ideas find their way to new contexts and develop locally.**

## **Reframing and Rescoping Design Narratives Beyond Growth**

Within HCI and computer-supported cooperative work, a focus on large-scale projects and collaborations easily evokes the idea of *lots of people*, but it could just as well mean a comprehensive set of tasks spanning different time zones and trajectories, the use of diverse digital artifacts, or the adoption of similar forms of participation across contexts and initiatives.

The taken-for-granted relationship between success and size suggests that *making more* is what counts. But what about *making change, making meaning, or making sense*? If we think more broadly than *making more*, we can dispute the idea that

scaling *up* is necessarily always better. Sometimes it makes more sense to scale *down* [4,6,7], unmake, or invite degrowth.

Businesses commonly frame their focus as *generating* value. What if, instead, we were to purposefully leave space for what people already value? What if we were to talk not about *innovating* and *generating* but rather about *sustaining*, *maintaining*, *nurturing*, or *improving*? What would that do for our metaphors? Sustainability has to do with longevity, relationships to place and land, and resilience across time. Thinking several generations ahead is a different kind of scaling than growth in size or numbers; it introduces complexities that simply cloning digital technology does not address. Attending to future generations and living in place reveals the impossibility of regarding relations as universal and easily transferable.

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It can, of course, be beneficial to replicate (or extend) a system across many sites. Networked software is particularly well-suited to this task, being scalable without much additional local effort. However, while the resulting homogeneity may provide some value, it often lacks relevance to local circumstances. Less-conventional sites of technological development, such as collaborative economies, not-for-profits, and volunteer movements, illustrate alternative views of impact that do not focus on growth but rather on creating relational assets [3] and fostering social stability. These initiatives are more diverse in their ambitions regarding size, longevity, and how their ideas and practices transfer from one setting to another. As they're not primarily driven by monetary values, their central goals may instead be to tackle particular circumstances and/or simply sustain themselves. Consequently, they engage in diverse non-scaling approaches to seek impact, connecting with other actors, promoting and sustaining cooperation, activating related initiatives, or even resisting escalation if staying small is instrumental to coping with the challenges of mobilizing resources and organizing. For them, growing through mainstream digital platforms might come at the cost of overriding local ties, key values, and caring relationships [3,4].

**[Image] The metaphor of scalar trajectories brings focus to the touchpoints that shape the evolution of design.**

As this illustrates, scaling and value have a complex relationship more complex than mainstream rhetoric tends to reveal. While we acknowledge that businesses

are put under pressure to either grow or perish, the Global North will be hard-pressed to address the increasingly urgent need for more-sustainable development if those shaping the world of technology do not start to question the business case for growth. We can also question whether the desire for growth should outweigh other values, such as asking why we give preeminence to business. And if we find that it should not, we should then explore what alternative metaphors could drive development and innovation. As researchers and designers of technology, we have an obligation to reorient the narratives that frame and scope technology design, to avoid neglecting both the detail of the context and the impact of language.

### **Suggesting an Alternative Language**

This is not merely an ethical position. Having a nuanced vocabulary and set of metaphors for thinking about the processes and evolutions of the structures around us (to which we contribute as designers and developers) might reveal new possibilities, and thus serve both creativity and productivity. More important, it would enable us to scrutinize what we mean when we talk about scaling, and whether that conceptualization actually works toward the intended aims.

Growth is not natural or intrinsic to sociotechnical development; it reflects cultural priorities and the value systems in play. Furthermore, it is a formulation in language [1]; and because it is a formulation, it can be changed. And there are, as noted, reasons to interrogate the language we use to speak about development, especially if this language unwittingly narrows our options and makes uncritical growth outcomes more likely. Conscious of the relationship between the metaphors embedded in our language and what we think and do (see, e.g., [1]), we close our reflection with suggestions for an alternative vocabulary for articulating the intersection between human organizing and technology. By our reckoning, if we embrace new metaphors for understanding and thinking beyond scale, size, and numbers, we also welcome new politics and new designs—ones that can better serve the futures we want and need. Changing practices goes hand in hand with changing the way we think.

To this end, we finish with a description of the practices we would like to see promoted and some terms to help usher those practices into being. By suggesting a vocabulary, rather than prescribing what actions to take, we wish to inspire conscious, deliberate framings of making and impact. By no means do we provide a comprehensive map to follow, and we encourage readers to look for yet other metaphors that can challenge narratives of material growth.

[Image] **Meshing as a metaphor expresses how new initiatives tie in with local resources and capabilities so that they jointly become more than the sum of their parts.**

***Proliferation.*** If we consider the domain of collaborative economies and community-led initiatives, *proliferation* emerges as a useful framing. The concept of proliferation helps us consider how local initiatives develop, morph, and/or multiply over time; how ideas find their way to new contexts; and how digital networks might support growth through learning (see [3,4]). While the notions of scaling and scalability are often used to emphasize the ability of digitally networked projects to expand and grow without changing inherent components, thus ignoring local diversity and the heterogeneity of the world, the concept of proliferation encompasses diverse ways of transforming and spreading that acknowledge the importance of context and place. When we think in terms of proliferation, instead of focusing on how an individual initiative evolves, we are nudged to consider how different initiatives may connect, collaborate, and learn from one another over time. The proliferation metaphor draws attention to how ideas *travel* [8], rather than centering on strategies and opportunities to *make more*. The metaphor thus reorients design narratives toward a view of impact that centers on the relational values of social computing interventions and thus the cooperation of different initiatives in contending with shared concerns [9]. It entails a framing of value as the extent to which these initiatives can become resources, triggers, or inspiration for the activation and mobilization of other projects.

***Scalar trajectories.*** Without fully rejecting the notion of scaling, dynamic scalar trajectories suggest a useful alternative to scale as size and growth when we look at initiatives that combine everyday design engagements [10], exemplified through the making of DIY face masks during the Covid-19 pandemic [11]. Scalar trajectories emphasize the movement between different touchpoints where individuals and collectives interact with existing knowledge, situations, and artifacts (e.g., objects, patterns, platforms, and rules) and frame these touchpoints as ways of moving forward. By describing DIY mask-making in terms of scalar trajectories, Saad-Sulonen et al. [11] direct focus to the way a sewing pattern and its uses travel from a Danish hobbyist seamstress across her local Facebook group on mask-making and existing local communities in other places, while encountering touchpoints with Facebook's terms of use, as well as local and global health policies and guidelines. Scalar trajectories frame designs as traveling across different locations and contexts, as well as along two main axes of engagements in design (individual/collective and use/innovation). In doing so, scalar trajectories highlight the richness of practices at play in and around design that include creative sharing and collective doing in times of crisis.

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*Considering scaling as flowing across trajectories rather than as growth allows local instances to come into view, even when a technology or design has spread globally.*

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**Meshing.** Studying the way that community initiatives are learned and shared in London neighborhoods, Ann Light and Clodagh Miskelly [3] talk of relational assets: how new sharing activities build on the experience and mood of an area (as well as on previously successful activities), which provides an easier path to viability and, in turn, supports further creative community activity. Observing this, they explore how initiatives become enmeshed, suggesting that meshing to make a *platform of platforms* provides intangible assets for the place and people living in it. Focusing on place, first and foremost, they illustrate how digital and other platforms that scaffold resources and capabilities in a neighborhood accumulate to be more than the sum of the parts (i.e., a further platform of relational assets), offering a different focus, as well as a metaphor with which to understand how sociotechnical systems can evolve and mature. Meshing builds in place, locally, and cannot be taken out of the relationships that constitute it. If platforms such as timebanks or sharing services start to spread, they create new hubs from which to operate to maintain relevance through proximity [3].

### **Challenging Bigness**

These three framings—proliferation, scalar trajectories, and meshing—contrast with the metaphors of scale that dominate descriptions of technological and financial growth. The growth metaphor focuses on a single entity, the technology and/or the corporation, growing outward, covering as much of the world as possible and smoothing out (or glossing over) differences in the process. The result is that we overlook when there is a need to allow solutions to adapt and be adapted to local conditions, or to enable local communities to reject or radically reform solutions.

Whereas growth principally benefits those at the center (e.g., founders and shareholders), proliferation offers knowledge through patterns of learning that respect the subtleties of place and eschew monocultures for structural and conceptual diversity. Technological dispersal, then, becomes about learning, adopting, and adapting. Likewise, considering scaling as flowing across trajectories rather than as growth allows local instances to come into view, even when a technology or design has spread globally, helping us focus on its local development. Meshing allows us to see the ways in which such local development, innovation, and shaping can enrich a place, like plant roots combining to stabilize and nurture a stretch of soil and make it stronger, enabling a focus on what the tech can do for the local rather than what the local can do for the tech.

Unlike growth, these alternative metaphors also help us notice connections across initiatives and places, as well as between technology, land, and local circumstances and infrastructures. In noticing these connections, we may also notice and follow the ripples coming from what we're putting into the world, to understand what

consequences they will have in places other than the immediate locale or for people other than those we had in mind; and hence we may also anticipate potentially negative consequences [12]. And as we talk of rippling, we recognize that there are many more metaphors to use for these processes of evolution, each one providing a different angle on the relationship between people, tools, place, and values. This will be central to visions of computing that are oriented toward a long-term perspective in which eco-social change is to be continuously sustained, nurtured, reinvigorated, and possibly (re)negotiated.

We therefore call upon our fellow researchers, practitioners, and educators to challenge the bigness metaphor in both thought and action: to reframe progress by being deliberate in the vocabulary we use to describe our goals, and to explore alternative metaphors and their generative outcomes in both the short and the long term. By turning our focus to the consequences, good and bad, that technology can have on people and the social and physical environments they inhabit, the metaphors proposed question the very notion of digital innovation as a goal to universally strive for. Until our working language enables us to foster higher goals, such as sustainability and equity, we cannot expect to imbue these essential elements into the things we create. We invite everyone, from individual designers and small nonprofits to large corporations, to show that this reframing can be effective in their settings. It's time to prioritize viability over scalability in social computing and beyond.

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