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— Developing theories and tools in the service of action

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By Henrik Berglund

Entrepreneurs design products and businesses under tremendous uncertainty. However, most entrepreneurship research has very little to say about how to do this effectively. Grounded in work with over 100 Swedish startups we conceptualize entrepreneurship as a form of artifact-centered design, propose two design approaches that further clarify what this means in practice, and discuss implications for organizations that support startups.

Next time you meet an ambitious entrepreneur, or intrapreneur for that matter, ask what keeps them awake at night and busy by day. They will probably tell you about run rates and fundraising needs, how hard it is to find really good developers and salespeople, and the painful experience of (not) letting people go. If they are honest, they may also describe the agony of having to project confidence to the team while privately acknowledging tremendous uncertainties.

If you drill down and ask how they deal with these business-related uncertainties, the conversation tends to become quite concrete and tangible. You will likely hear about the latest prototypes and "minimum viable products" used to test new products or features. About A/B tests used to experiment with landing pages, ads, and channels to attract more customers of the right kind. About how they have changed their pitch decks to better resonate with investors and customers. And about an exciting new project with an innovative partner that they hope will give them access to entirely new markets. Stated a bit more abstractly, when asked what they do entrepreneurs will often describe a gradual process of business design where more or less concrete artifacts such as pitch decks, prototypes, and online ads are central.

Conceptualizing entrepreneurship as design

Despite these pressing and practical concerns, very little research seeks to help entrepreneurs better deal with them. Emulating the natural sciences, most scholars instead aim to *describe the world and explain its mechanisms*. Examples include how human and social capital relate to firm growth, how holding patents may increase the odds of raising VC funding, or how self-efficacy influences the number of opportunities entrepreneurs identify. This can be contrasted with design-oriented disciplines such as engineering, architecture, or medicine. While often building on descriptive and explanatory knowledge, these disciplines aim to help *design what does not yet exist*. This means that products, IP strategies, business models, organizations etc. are not treated as *naturally existing things* but as *artifacts intentionally designed* in light of relevant environmental constraints and affordances.

The contrast between descriptive and design science was famously laid out in Herbert Simon's *The Sciences of the Artificial* (1996). Simon argued that all design is structurally similar in that it deals with artifacts designed at *interfaces* between *inner* and *outer* systems. To design then entails the gradual development of artifacts made to fit with and thereby connect such systems. To illustrate, a knife designer must consider both the materials of the blade and the things it will cut. Importantly, the knife designer will also use a range of intermediate artifacts such as sketches, CAD designs, and physical prototypes to gradually develop the final design.

It makes a lot of sense to also conceptualize entrepreneurship as form of design. Together with colleagues and PhD students at Chalmers, I have therefore spent a good part of the last ten years running two national startup accelerator programs. Doubling as very hand-on research programs, *Born Global* and *Scale Global* have let us test and develop theories and tools of entrepreneurial design together with the founding teams of some of Sweden's most promising startups as well as experienced venture capitalists and serial-entrepreneurs serving as coaches. Combining this rich empirical material with existing entrepreneurship research—as well as insights from design, information systems, and practice theory—we are currently developing theories of and tools for entrepreneurship as design (cf. Berglund et al. 2018, Berglund et al. 2020, Berglund and Glaser 2001, Berglund 2021).

Below, we summarize these ideas using two broad ideal types that describe how entrepreneurial design can differ greatly in terms of: the organized individuals inside the venture, the external environment and how it is engaged, and not least how design artifacts and design principles can be used to relate the two. We conclude with implications for entrepreneurs and advice for organizations tasked with supporting them.

Experimentation and Transformation

Being abstract ideal types, experimentation and transformation do not correctly describe any particular case. Instead, they are meant to capture and analytically clarify essential aspects of entrepreneurship as a form of artifact-centered design. To summarize, experimentation describes how a visionary founder leads subordinates, who use distinct and unambiguous

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Table 1. Summary of Experimentation and Transformation (adapted from Berglund et al., 2020).

		Experimentation	Transformation
Outer System	Environments	The world has independent existence.	The world is created through human action and interaction.
Interface	Design Artifacts	Artifacts are distinct focusing devices that enable the efficient execution of experiments.	Artifacts are mutable boundary objects that facilitate as well as transform in interaction.
	Design Principles	Adaptation is key. Uncertainty is overcome by gathering information about the world.	Negotiation is key. Uncertainty is overcome by transforming the world together with others.
Inner System	Individuals	Founder leads sub-ordinated employees who help test his or her vision.	Stakeholders with different goals and visions organically co-ordinate.

artifacts to test explicit hypotheses, in order to learn about—and gradually adapt the business to—the external environment. The popular Lean Startup methodology largely falls within this category. In contrast, transformation describes how groups of individuals, each with their own goals and ambitions, engage in creative negotiations centered around mutable artifacts, thereby gradually co-creating both venture and environment. Readers may be familiar with Sarasvathy's theory of effectuation, which in many ways fits this description.

Being mindful of how experimentation and transformation differ has proven valuable both for descriptive and prescriptive purposes. This becomes especially clear when looking at the details of how entrepreneurs work with physical, digital, and narrative artifacts.

In terms of *physical* artifacts, consider the common suggestion to seek early feedback on product ideas by talking to potential customers.

"Next time you are looking for a date, try asking 'What would it take for you to go out with me?'. It is not hard to imagine doors opening that would have remained firmly closed had you stuck to the traditional 'Will you go out with me?'"

A well-known example is Palm Pilot cofounder Jeff Hawkins' use of a wood and paper mockup to test and get reactions to its planned form factor, features, and overall value proposition. In contrast, a transformational approach might entail sketching out the product specs on a whiteboard and then handing the pen over with an invitation to jointly suggest and work out improvements.

With *digital* artifacts, entrepreneurs can experimentally test the attractiveness of a planned value proposition by describing it on a landing page and measuring who and how many want to buy. I was personally thrilled, and slightly disappointed, to see Husqvarna employ this tactic last summer when I tried to subscribe to "Mowed lawn as a service" ("Klippt gräs som abbonemang") on www.klipptgräs.se. Only after I had clicked to buy did I realize it was a so called "smoke test"! A more transformational use of digital artifacts would be to share an intentionally incomplete product with a community of users and encourage them to develop it further. This was famously what Linus Torvalds did when open sourcing his embryonic operating system (aptly named "Linux 0.01") and sites like Wikipedia and Reddit are almost entirely user generated. However, using mutable digital artifacts to harness collective creative potential is not limited to software and open source. Companies ranging from Burberry and Nike to Lego and Coca Cola have long worked strategically with digital toolkits for development and design in order to enable individual and collective development of products and offerings.

Finally, *narrative* artifacts, such as pitches used to engage business angels, also take on different characteristics when part of experimental and transformational processes. An experimentation minded entrepreneur will pitch their business plan as clearly and convincingly as possible, including any caveats and uncertainties, hoping for funding and support. A more transformation minded entrepreneur may instead describe their plan followed by an invitation to engage by asking "What would it take to get you involved?". This opens up for a much broader and more creative discussion compared the Yes/No response one likely gets after a hard pitch. Such open-ended questions can of course be used for all kinds of purposes. Next time you are looking for a date, try asking "What would it take for you to go out with me?". It is not hard to imagine doors opening that would have remained firmly closed had you stuck to the traditional "Will you go out with me?".

Theories and tools in the service of action

Some 50 odd years ago, Herbert Simon encouraged schools of engineering, business, and other professions to develop knowledge about "how to make artifacts that have desired properties and how to design" (Simon, 1996: 111). To achieve this, Simon urged scholars to combine deep theoretical knowledge with appreciation of professional practice. However, he also issued a stark warning that "organizing a professional school or an R&D department is very much like mixing oil with water: it is easy to describe the intended product, less easy to produce it" (Simon 1967: 16). In particular, the scholar who ignores practice by seeking goals, values, and approval only among academic peers, risks becoming irrelevant. On the other hand, the scholar ignorant of theory risks becoming "a slightly out-of-date purveyor of almost-current business practice" (Ibid: 12). Following Simon's advice, we have combined theory and practice to develop design-oriented theories and tools in the service of action. So far, this has led to publications in top-ranked journals as well as direct impact via work with entrepreneurs as well as organizations tasked with supporting them.

While an area where we plan more work, the concrete implications for practice are quite straightforward, as illustrated by the experimental and transformational use of artifacts. Less obvious, but potentially more impactful, are the implications for support and funding organizations, including public (e.g. Vinnova, Almi, the Swedish Energy Agency, University Incubators) as well as private (e.g. VCs and large firms with intrapreneurship programs) actors. Many such organizations unfortunately try to pick winners up front, despite the inescapable uncertainty faced by innovative entrepreneurs.

To illustrate, consider a hypothetical but quite realistic example. This organization regularly invites applications in the form of detailed business plans, complemented with analyses of: IP strategies and technology trends; market segments and trends; customer needs and price sensitivity; current and emerging competitors' strengths and weaknesses; switching costs including price sensitivity and brand strength; substitutes including relative strengths, weaknesses, and switching costs; and relations to stakeholders such as owners, employees, and regulators. Applications are then evaluated by internal staff, supported by external experts. A limited number are given substantial support.

Contrast this with another hypothetical example. This organization invites applications in the form of brief descriptions of the current business idea, complemented with: a backward-looking account of where they started out and what they have done, built, and learned to date; and a forward-looking list of things to do and build to overcome remaining uncertainties. Applications are then evaluated based on both idea and especially team quality, as indicated by past and planned actions. A substantial number are given limited support. This process is then repeated once or twice to gradually identify teams of fast builders and learners.

The first approach has several negative consequences. First, the best entrepreneurs likely avoid applying for fear of wasting their time. Second, those that do are incentivized to work on their applications rather than their businesses. Third, when asked for analyses regardless of information, applicants are indirectly encouraged to bullshit*. Fourth, the whole process signals that comprehensive analyses and plans are key to managing entrepreneurial uncertainty.

By developing sound theories and useful tools for entrepreneurial design, I hope more organizations will be encouraged to embrace the second approach.

* Bullshit, as a technical term, means saying things to persuade without regard for truth (Frankfurt, 2009). It is a growing area of management research.

FURTHER READING

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Funded by Vinnova, Almi, and the 100 participating companies, *Born Global* and *Scale Global* were combined accelerator and research programs that operated from 2010-2020. The programs were hosted by IMIT and organized by a Chalmers team including Henrik Berglund, Sören Sjölander, Joakim Björkdahl, Martin Wallin, and Johan Sköld. Participating startups include Bokio, Detectify, Elastisys, Greenbyte, Parakey, Volumental, and WeMatter. Coaches include Johan Crona, Mengmeng Du, Liselotte Engstam, Miriam Grut Norrby, Anders Hallin, Stefan Lindeberg, and Alfred Ruth.

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