VI. Innovation-Making
The Construction of Value

In August 2021, a significant scandal disrupted the Californian start-up landscape. Renowned media outlets across the United States, the United Kingdom, and Germany published headlines such as 'Rise and Fall of Theranos Founder Now on Trial' (Business Insider, 31 August 2021), 'Selling a Promise: what Silicon Valley learned from the fall of Theranos' (The Guardian, 30 August 2021), and 'Fallen Founder' (Die Zeit, 31 August 2021), raising public interest in the event. The centre of this upheaval was Theranos, a medical technology company once considered a pioneering entity within the illustrious Silicon Valley. Founded in 2003 by Elizabeth Holmes, who was likened to Steve Jobs and lauded as a young, self-made female billionaire, Theranos reached a valuation of one billion US dollars. Its signature invention, the 'Edison' machine, promised to revolutionise medical diagnostics by detecting multiple diseases from a single drop of blood—an unattainable advancement in medicine.

However, the lustre of Theranos began to tarnish as it encountered sustained challenges to its credibility leading up to the scandal. 2015, the Journal of the American Medical Association (JAMA) admonished Theranos for failing to disseminate research findings through peer-reviewed journals. Subsequently, The Wall Street Journal published a series of exposés alleging that Theranos relied on commercially available technology from other large companies rather than its own for blood testing. This revelation sparked further scrutiny, and in 2016, the Centers for Medicare & Medicaid Services (CMS) rescinded the operational and licensure privileges of Theranos' blood testing laboratory in California for two years. This action prompted the United States Securities and Exchange Commission and the California Attorney General's Office to investigate the company's practices.

Although this report alone cannot represent innovation development or a Western innovation culture, it has a particular advantage over a real success story because the series, podcasts, and coverage of this unprecedented swindle deconstructs the founding myth of a company. Such stories are usually 'superior' as how innovation is written about or presented leads to the impression that technical development has followed a straight, rational path from the past to the present (Bauer, 2017: 9). De-

constructing innovation myths is generally challenging. This difficulty intensifies in cases involving successful end products, frequently portrayed as having a straightforward development process. However, this is rarely the case. Technology development is a complex process subject to many circumstances and has a great deal of compromise character.

Theranos is one famous example of failure, which will be a visual example in the following subchapter. Firstly, however, it is necessary to look at the various structures of innovation as spaces for possibilities and how those possibilities are narrated and perceived. Therefore, Chapter IV discusses the environments, proclaimed culture concepts, and opacity of innovation. Further, it goes into detail in examining innovation narratives and performances. Third, it examines the construction of values and the influence of evaluation practices on innovation.

4.1 Structures of Innovation I: Spaces for Possibilities

Introductory Vocabulary on Innovation and its Definitions

Before proceeding with the subject, this section will outline the vocabulary commonly associated with innovation culture and the start-up scene. I will interpret these terms as follows:
Business Angel = Private investors who invest their own money, time, or professional skills and networks in young companies (start-ups) in the hope of financial gain and thus participate in the risks and opportunities of the company's development.
Incubator = The term incubator originated in medicine, referring to preterm infants' receptacles. In the entrepreneurial milieu, it refers to the services and institutions available to entrepreneurs while establishing their businesses. Such incubator facilities are frequently public entities, such as technology centres, with ties to venture capital firms or business angels. Through an incubator, founders can access expert counsel, training, or coaching; they typically receive assistance with the required infrastructure, including office space, hardware and software. Furthermore, the incubator helps founders to access a supportive network. In return, the incubator gets shares in the company if it succeeds.
Iteration = A procedure for the step-by-step solution of a given problem, meaning a non-finished prototype. With the help of a first approximate solution, i.e. further development, additional approximate solutions are developed. These sequences or approximations are called loops and resolve the problem through succession.
Makerspace; Innovation lab; Prototyping Space/Lab = Institutions that rent out workplaces to teams who want to realise an idea. These spaces are usually the first port of call for entrepreneurs, founders, or inventors if they still need to be engaged with an incubator. In ad-

dition to the workstations, these 'labs' often also provide equipment such as laser cutters, 3D printers, workbenches, and associated workshops, as well as other areas that enable the first distribution of products. These prototyping or innovation labs are often networking places for young founders who can exchange ideas.
Living Lab (sometimes also called real-world laboratory, depending on the goal and definition) = These 'labs' are more extensive than an innovation lab and often refer to a whole region, city, or quarter. Usually, the region holds several projects with a particular mutual goal, e.g. sustainable mobility. Living Labs can function as industrial areas that host testbeds for schemes prior to their broader public testing.
Milestone Plan = A plan that regularly checks the completion of an activity at a specific point in time or event within a project's framework.
All extensive projects, especially those involving software, start-ups, or incubators, generally use milestones to ensure they meet the schedule, cost, and quality requirements specified in the project plan.
Prototype = From the Greek 'protos' meaning 'first' and 'typos' meaning 'archetype, model, form', a prototype is a model designed in science and business to show the essential elements or functions of an imagined and desired component or product. Users employ prototypes to check ideas, test reactions, and find sponsors, aiming to demonstrate the principal feasibility of a concept. Prototypes hold a significant role in technology and computer science.

In 1972, the *Club of Rome* published its State of the World report entitled 'The Limits to Growth. A Report for the Club of Rome's Project on the Predicament of Mankind' (Meadows et al., 1972). Despite already being somewhat dated, the report points to current problems. It serves as the counter-project to the economic liberal attitude, which states that all that is needed is the right innovations to continue to create constant economic growth. Sometimes, these are the only existing opinions on economic growth: its limits, success, and failure. There exists no intermediary stance. Notwithstanding confirming the Club of Rome's view in recent studies and data, buzzword innovation holds its own. This term benefits from a positive, forward-looking narrative and serves as the keyword for economic and infrastructure success with assumptions that their development functions linearly (Reinhart, 2016).

In addition, magazines and newspapers have promoted the 'innovation' section for years. Business and investment websites that only deal with the latest technologies to know when it is the right time to invest 'in the future' are no longer only for brokers but are made available to the general public. Additionally, not only the economic liberal parties are open to promoting investment in new technologies since, due to new societal challenges, the focus on innovation is also shifting. Hence, investment in the same becomes mandatory.

Despite the favourable connotations associated with the term' innovation', replete with its narratives and myths, and its role as a facilitator for securing both

private and public funding, the definition of innovation remains nebulous. In literature and official pronouncements, finding a concrete definition that everyone can relate to is difficult. Ultimately, it is precisely the diffuse and confounding nature of the term that makes it so attractive. For some, it provides access to funding and networks. However, it is impenetrable and difficult to grasp for those unfamiliar with the term. All experience the same ultimate difficulty and fascination: it carries many expectations, lacks uniform description, and ultimately necessitates fulfilling promises. Despite all the ambiguity, one understanding remains untouched, namely that innovation is new or at least novel. At best, it is disruptive and does not involve imitation (Godin, 2017), although the latter aspect is not unconditionally necessary. Here, too, the definitions are not unanimous. The best-known descriptions of what is 'innovative' are those of the Austrian economist Joseph Schumpeter (1883–1950), whose work has been experiencing a renaissance since the 1990s. He defines 'new combinations' as a different way of conveying a product as innovative (Schumpeter et al., 2006).

Even though Schumpeter's definition has influenced many others, I draw on a different clarification, which is helpful precisely because of its precision and brevity; it keeps diffusion in check, and, in this conciseness, it does justice to the term to facilitate working with it. Hence, I refer to a German perspective by Reinhold Bauer from his book 'Gescheiterte Innovation' (Failed Innovation), which reads as follows:

> An innovation is [...] the first economic exploitation of a new problem solution. Essentially, it is irrelevant what kind of solution it is: It can be an organisational change, for example, within a company (organisational innovation), a change in the way a product is produced (process innovation) and/or a change in the manufactured product itself or the completely new introduction of a product (product innovation). [...] The product or process does not have to be new in a fundamentally global sense ("objective innovation"); it is sufficient if the exploitation is a first for the innovating subject or subjects ("subjective innovation") (Bauer, 2017: 11 f., my translation from German).

Bauer presents the three common types of innovation in this definition: 'organisational innovation', 'process organisation', and 'product innovation', describing the standard categories into which innovations are usually classified and thus serve to explain their character.

Ultimately, the concluding remark merits attention, articulating that 'subjective innovation' suffices for an entity to be deemed innovative. Thus, the primary determinant of innovation is the perception of novelty, irrespective of its actual originality. This point may allude to the need for a universally accepted definition of innovation. Moreover, it underscores the notion that innovation does not inherently entail novelty; instead, it represents the timely integration of an idea or product into a so-

ciety prepared to embrace it (e.g. Akrich, 1992; Bijker et al., 2012; Hoffman & Marz, 1996; Urry, 2016). This observation builds on the close connection between society and the economy, especially concerning innovation (Reinhart, 2012).

Even if structures, processes, and products can be categorised, this only says something about their development, success, aberrations, hurdles, and frequent failures unless their daily conditions are exposed. Subjective innovation is ultimately the term that opens the door to further examination at this point because, as mentioned, it refers to the nature of compromise in a certain way. Since products and processes are guided precisely by these compromises and circumstances in economic, social, political, and cultural terms, it is a permanent negotiation process among different actors (see subchapter 3.4), taking place in iterative loops in designated places. Therefore, the innovation structure leads to the abovementioned circumstances and compromises by actors within the same categories that evaluate existing ideas that might lead to innovation. The structures are manifold. I will, therefore, begin by describing the spatial configurations, which, through the mode, are arranged to guide processes in specific directions. This description already tells us how innovation is currently understood and what sociopolitical interest forms the basis of the type of innovation. This understanding gives rise to a culture that becomes emotionalised and functionalised. Looking at the first external conditions, such as spatial structures, the emergence of culture and the opacity that comes with it, provides a preliminary understanding of how innovation as a mode of practice constitutes a mode of feeling.

4.1.1 Creating a Creative Environment

In contemporary discourse, a tendency exists to overlook societies characterised by innovation. They epitomise evolutionary development at the societal and economic levels. In the last few years, one could increasingly observe how 'Creative City Quarters' (Florida, 2004), 'Living Labs' (Ballon et al., 2015; Bulkeley et al., 2018; Picard, 2017) and 'Sustainable Futures Initiatives' (Dixon et al., 2018; Frantzeskaki et al., 2018) in regions and cities were developing. The number and diversity of these creative places are evident. Is this because of the once gloomy picture painted of Europe's innovative capacity in the early 2000s (see: Nowotny, 2010) and/or the entrepreneurial understanding of science, which has entered into a pact with the economy as an innovation driver (Reinhart, 2012)?

Regarding the myriad structural changes, Europe exhibited a significant demand to enhance its economic spheres, manifesting across various contexts and entailing a broad imperative for creativity. Primarily, one must always consider the relevance of socially significant discussions. These topics often refer to digitalisation, demographic changes, climate, or war. All of them reorder multi-lateral

relations and provoke new conducts and demands. The revelation of innovation *dispositifs* demonstrates that creativity and its execution space are boundless.

Furthermore, various forms of innovation also accompany the places of creativity, and the term 'innovation' has been universally discussed from past years to the present (e.g. Färber et al., 2008). Hardly any country, company, or university can do without it. The association of attributes such as *openness*, *social relevance*, and *sustainability* has emerged in recent years. The economic concept of innovation is gradually dissolving, and for over two decades, a much broader, more open vision of innovation has emerged (e.g. Meissner et al., 2017). These open visions remain key interests, not in the sense of less production-increasing measures or measurable success on the markets, but in the sense that creativity finds its space in various sectors that have not intentionally established a connection to market interests, e.g. makerspaces.

These conditions are no coincidence but are demanded and desired through public calls from the European Commission (EC) (see the *Innovation Union* initiative from 2010 onwards), regions, or cities. In recent years, the imperatives of innovation have gained significant prominence, compelling not only governments to respond in exceptionally modern and innovative manners (Farias & Wilkie, 2016; Hutter, 2016; Pfotenhauer, 2017) but also challenging and necessitating societies at large to do the same:

> The Innovation Union will focus Europe's efforts – and co-operation with third countries – on challenges like climate change, energy and food security, health and an ageing population. It will use public sector intervention to stimulate the private sector and to remove bottlenecks which stop ideas [from] reaching the market (Press Release by European European Commission, 2010).

With this quote, the view on so-called *Grand Challenges*, such as climate or demographic change, is shifting. The transformation in focus mentioned in this quote and the resulting values and practices, i.e. adaptions in behaviour, can be understood as a cultural change. Therefore, different forms of dealing with innovation, specifically innovation cultures – whether nationally generated or institutionally cultivated, as in companies – can be identified. From this, it becomes apparent that it is not reasonable to disconnect macro-, meso-, and micro-levels on an analytical level as they are intertwined. Therefore, they should be referred to as one another (as seen, for example, in the study by Akrich, 1992).

In this context, it naturally follows that the new steering mechanisms, both within the scope of this work's empirical research and more broadly, are designed to nurture particular forms of creativity and set up an initial framework. These mechanisms should establish closer links between the economy and current so-

cial debates to test solutions in real-world environments within an experimental framework.

First, regions often fund politically intended *Living Labs* with the hope of uncovering sustainable solutions to region-specific problems through unconventional methods (Bulkeley et al., 2018; Keyson et al., 2016; Wissenschaftlicher Dienst des Deutschen Bundestages, 2018). This means focusing on transfer processes, which in these cases are often identified as so-called 'citizen science' (Irwin, 1995). These citizen scientists use their generally diverse lay knowledge to participate in research projects through observations, raising questions, or active engagement in data analysis (e.g., Bächtiger et al., 2018; Bryan & Tobin, 2019). Ultimately, the closer connection should not only verify societal and/or economic needs, but at the same time, it should also ensure societal and economic success. For example, the former German Ministry for Economic Affairs and Energy (Bundesministerium für Energie und Wirtschaft; BMWi) argues that:

> The coalition agreement sets out the goal of promoting living labs [Ger. *Reallabore*] and experimental spaces in a wide variety of thematic areas. Against this background, the German Federal Ministry for Economic Affairs and Energy intends to strengthen living labs as a cross-cutting instrument of innovation policy. In December 2018, a comprehensive living labs strategy was presented for this purpose, which is based on three pillars (Bundesministerium für Wirtschaft und Energie, 2018: 14, my translation from German).

The three mentioned pillars refer to 'innovation-open regulation', 'networking and information', and 'initiating and accompanying living labs' (Bundesministerium für Wirtschaft und Energie, 2018: 14). As the first pillar suggests, this is about creating flexible innovation spaces that are not subject to legal regulation and yet find a legally secure framework. The second pillar builds on business, science, and administration networking, whereby the main focus is again on legal safeguarding liability and competition issues. The third pillar ultimately refers to anchoring practice and implementing possible innovations outside their testbeds.

Further, these new structures are also echoed at universities, colleges, privately in cities, or by profitable companies that can afford to set up a 'playground' they call a *makerspace* or *innovation lab* (e.g. Davies, 2017). These can be described as shown in the following exemplary extracts (selection):

At the Technical University Berlin:

> The DAI-Labor and chair in "Agententechnologien in betrieblichen Anwendungen und der Telekommunikation" [Agent technologies in operational applications and telecommunications] managed by Prof. Dr. Sahin Albayrak at the Technical

> University of Berlin, explores and develops technologies realizing a new generation of systems and solutions – "Smart Services and Smart Systems". The DAI-Labor's goal is to test its custom solutions in a real-world environment and get users in contact with it (DAI-Labor, 2021).

At a private makerspace:

> With over 2,000 members in Berlin, Salzburg, and Vienna, we are the largest maker community in Europe. For you, this means concentrated know-how and the opportunity to exchange ideas with makers from a wide range of disciplines. In our regular tours, training sessions and workshops, we pass on our know-how about digital production! (Happy Lab N.A., 2021b, my translation from German).

At a company's makerspace:

> The Bosch IoT [Internet of Things] Campus is one of our locations worldwide. More than 300 associates work at the campus in Berlin-Tempelhof – mainly on projects related to the Internet of Things and digital transformation. Our experts advise and support customers in the development and implementation of projects for connected solutions.
> The Bosch IoT Campus is more than just a normal office: it brings together the entire IoT ecosystem in one place. The strong team spirit contributes to the unique atmosphere of the campus. In addition to external customers and partners who use the campus to work on projects, various Bosch divisions are also based here. You can also book many of our premises for your events (Bosch IoT N.A., 2021a).

In all these spaces, the provision of infrastructure minimally imposes rules while simultaneously striving to cultivate an optimal environment for the emergence of innovation. In the spirit of 'Constructive Technology Assessment' (CTA) (Rip et al., 1995), the experimental space should be isolated but implemented in networks to establish an exchange with the outside world. It represents the fine line between privacy and the necessary disclosure in favour of innovation and its possible application areas. Despite advocating for openness, labs and spaces must safeguard their privacy. Given the fragile nature of innovation, it necessitates protected environments: like everything that develops, it finds itself in uncertain spheres.

4.1.2 'Culture(s)' in Innovation-Making

These protected spaces, be they named start-ups, incubators, or makerspaces, often talk of 'culture', meaning 'their' culture and corporate culture. The inflationary use and occasional misuse of this term, along with the emergence of hyphenated cultures and neologisms, merely contribute to another aspect of a broadly defined

cultural concept that risks becoming indistinct and often loses its expressiveness as a consequence. And yet, in the context of an economic liberal understanding in which progress and innovation are supposed to be the engines, a culture is born and reflected in the modern entrepreneurial scene. Thus, it is necessary to grasp this culture in its form. Its emotional forces to get to know its moral economy (Daston, 1995: 24) because '[…] moral economies are historically created, modified, and destroyed; enforced by culture rather than nature and therefore both mutable and violable; and integral to scientific ways of knowing (Daston, 1995: 7).' This is why I will examine the cultures around the concept of innovation and their characteristics to approach a culture that conveys something about such ways of knowing.

By way of example, I picked out two descriptions of a 'successful corporate culture' to examine them more closely. Suppose one asks Brian Chesky, CEO of the company *Airbnb*, rather than a cultural scientist, what culture is. The answer sounds quite simple: 'Culture is simply a shared way of doing something with *passion*' (Chesky, 2018: 76). This description becomes even more passionate when reading the brief contribution of the company's head in *The Guru Book*, a guidebook and a collection of experiences of various CEOs of Western countries:

> The thing that will endure for 100 years, the way it has for most 100-year companies, is the culture. The culture is what creates the foundation for all future innovations. If you break the culture, you break the machine that creates your products (Chesky, 2018: 76).

These 100 years do not refer to a biblical revelation, nor do they claim to change, which most cultures entail alongside continuities. Yet, it becomes clear how highly the concept of culture is valued, and its context is associated with innovation and values. More generally, by culture, Chesky refers to what social scientists understand by the term 'habitus' and what Durkheim would attribute to a 'conscious collective'. Through the habitus, socialisation and the understanding of norms become evident. Following the CEO, this becomes apparent in hiring people, writing an e-mail, and walking along the corridor (Chesky, 2018: 76). What exactly he means by this remains vague, and yet there is a hint of some fluid knowledge (Star, 1992) that is supposed to refer to a culture: small process structures and micromanagement reduce the potential for autonomy and, thus, *trust*, he writes. In addition to values that are to be shared, trust is to be created and maintained.

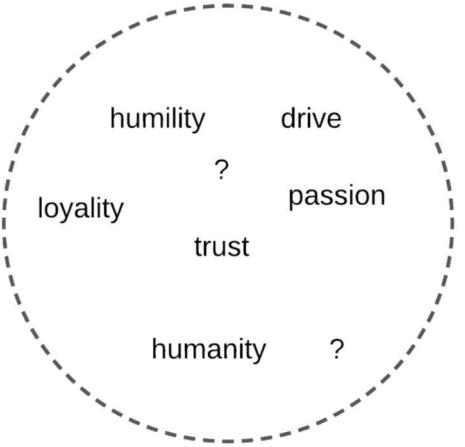
Trust, it is noticeable, is a frequently used term in this context, especially when CEOs describe their company's atmosphere, which is why it particularly attracts my attention. Studies in anthropology suggest that trust is the balancing factor for uncertainty where solid knowledge is lacking (e.g. Strathern, 2005). Tim Ingold, for example, describes its essence as '[…] a peculiar combination of autonomy and dependency […]. Trust […] always involves an element of risk – the risk that the other

on whose actions I depend, but which I cannot in any way control, may act contrary to my expectations' (Ingold, 2000: 69–70). And yet, at the same time, trust here seems to be one of the best arguments to respond to secrecy, uncertainty, and risk (Corsín Jiménez, 2011: 192). Chesky's text says that only where there is little trust would many rules be needed to compensate for the same (Chesky, 2018: 77). And apparently, this argument promotes the use of trust as a (new) organisational category (Corsín Jiménez, 2011: 178). However, as we encounter it in Chesky's text, the concept of trust does not mean an emotive category but a cognitive one. 'We have accounts of trust as […] a dynamic of "encapsulated interests", where trust emerges as a mutual co-implication of interests on all transacting parties (Corsín Jiménez, 2011: 178).' The alleged trust is supposed to reveal a relationship, reflecting transparency. Everything around the visible thus creates a counterbalance to obligations of secrecy, discretion, and risk. Although accountability is present, the suggested radical visibility blurs it. Therefore, trust only exists in a system that has demonstrated trustworthiness, founded on the flow of information and a solid understanding of the system. This understanding, however, completely contradicts trust as an emotive and creates misunderstandings. Because '[any] attempt to impose a response, to lay down conditions or obligations that the other is bound to follow, would represent a betrayal of trust and a negation of the relationship' (Ingold, 2000: 70). In addition, other emotive illustrations aim equally to bolster the image of trust.

Another CEO, Tine Thygesen of *Mesh*, a start-up network, refers to *loyalty* associated with trust that builds a company's culture (Thygesen, 2018). She also emphasises empowering and challenging employees to get the most out of them. Thygesen repeatedly refers to *humility* and *humanity*, which are necessary to run a company. *Drive* and *passion*, she also notes, are indispensable for a culture that everyone supports. In this respect, it is also important that employees feel this drive and passion for changing things. She writes: 'The start-ups that manage to articulate this clearly can create an almost cult-like atmosphere where the company becomes a major part of the employees' and founders' self-image' (Thygesen, 2018: 79). Quite apart from the fact that here again, the fetishisation of labour, of the product and the self, come into play, the company, in this instance, clearly deals with emotive nouns although it might imply otherwise. According to the statements, culture – here alone, emotional-individual characteristics are included – based on trust, loyalty, humility, humanity, drive, and passion. Depending on which CEO one would ask, there might be one or two more descriptions, albeit equally charged.

The definitions of culture refer to an expanded concept of culture, which combines an open and closed understanding of the concept. It is open due to its flexibility, dynamics, and cohesion (e.g. Bolten, 2007; Hofstede & Hofstede, 2001). At the same time, these cultures try to distinguish themselves from other companies, develop an identity, and 'have' a culture, which in turn points to a closed understanding.

Figure 3: The Emotive Corporate Culture



This general understanding of culture was transferred from anthropology to organisational theory (Smircich, 1983) and developed in the early 1980s. Following the critique of the concept of culture, from then on, a new cultural concept of corporate culture is also subject to a vague, broad understanding that is interpreted and treated differently by its users (Smircich, 1983). However, one can determine the term's emotional connotation, interpretation, and use. Even more, it can be said that the concept of corporate culture is quite deliberately emotionalised. The nouns listed are emotive resonators that users can interpret differently. Regardless of the interpretation, they convey a feeling of collective belonging and family, which can be enhanced even further when this (corporate) family becomes a private sphere for the individual and is thus interchangeable with what could actually stand in its place. However, this happens for corporate purposes (e.g. Corsín Jiménez, 2011; Illouz, 2007). After all, what happens when my trust, humility, or humanity comes to nothing? What if trust becomes entirely elusive because a company inherently operates on its own logic, prioritising market interests over the collective's need to interpret and establish a social reference independently? The emphasised terms gain a shared meaning through collective interpretation within a group and are not subject to dictation by a higher authority. It is something learned and handed down and only persists through common culturalisation based on general acceptance and not on being dictated to or postulated by the CEO—terms imposed from the outside degenerate into empty phrases.

Still, the concept of culture is applied because a company, an organisation without rules, does not exist in practice. Although not openly communicated, the concept of culture substitutes what others term rules and a group possessing an evolved culture exhibit typical interaction forms and cultivates diverse practices and rituals.

In this respect, the CEOs' previous statements appear arbitrary, thus promoting certain emotions while tempering others. A corporate culture communicates what is considered adequate and inadequate. In general, culture always refers to the 'how' (Bright & Parkin, 1997: 13). However, how does it occur that—whatever understanding we come across—the legitimisation of the content of culture emerges?

At this point, I refer to the empirical part concerning creativity dispositifs and calls for more innovation, which also results in *a* 'culture' in terms of the ways of dealing with the phenomenon of innovation. Understanding the values and practices a lab or a start-up represents requires knowledge of how it is embedded and financed and the networks it utilises. Equally, it concerns the following questions: How does a company justify its work and product? Under what circumstances was it developed? Who evaluates the product, and who is responsible for it? Chapters V, VI and VII will address these questions, which will undoubtedly provide further research scope.

Observing these aspects, such as (1) the group or actors that are involved, (2) their policies and politics, and finally, (3) their values, tells us a lot about the innovation culture. Therefore, we learn about a group's or society's emotional position and understanding of values. This classification helps determine trends and qualitative indicators of success or failure in innovation-making. These relations find their place on a micro-level (culture). However, they intertwine with national structures and their intermediaries, thus connecting the meso-level and the macro level, such as the European Commission's call for a Union for Innovation. This given structure means that it is observable how nations deal with a global postulate of progress imperatives and if and how this finds expression in economic efforts.

Being primarily an open-ended process, valuing the qualitative exploration of these developments proves significant because, unlike in economics papers, the qualitative inquiry does not presuppose quantifiability in advance. Instead, as in this case, it examines the process's openness, which cannot be planned (Briken, 2006).[1]

1 In this context, it has become clear that empirical attempts to predict success based on quantitative models, such as 'Linear Structural Relations' (LISREL) or similar models, are not particularly meaningful. In this respect, moving away from an R^2 factor is advisable (e.g. Curnow & Moring, 1968; Panne et al., 2003; Roure & Keeley, 1990).

It needs legitimacy for a concept like innovation to become a dispositif and universal recipe for success[2]. Not only does the notion need broad recognition, but equally, what emerges from it, i.e. its ideas, inventions and, ultimately, products. Without its emerging profitable products, the concept would remain empty and fail. Consequently, the concept – especially as its success is not always immediately apparent – needs strong belief (Deutschmann, 2020; see also James 1909; Latour, 1996; Latour, 2010). Therefore, the label and concept offer a frame and support a secure environment for testbeds in the form of 'labs' (see subchapter 4.1.1 and later 5.1). These are quasi-sacred spaces that, similar to religious contexts, offer separate protection for the practice of doing, in this case, innovating. Other texts on innovation spaces also reach for similar outcomes. In the text 'Innovation Spaces' by Moultrie et al. (2007), the authors conclude that more creativity results from the space created and identify various factors that are (supposed to be) promoted by the space.

On the one hand, Moultrie and his colleagues define *competitiveness* as a strategic goal for companies, aiming to reduce costs and enhance employee productivity. Moreover, they seek to enhance the quality and quantity of ideas while promoting teamwork through improved communication structures and closer collaboration within the lab. Furthermore, the quality and quantity of ideas should be improved. Promoting the ability to work in a team should involve improving communication structures and enabling closer collaboration within the lab. In addition, the option of 'customer input' plays a role, i.e. the opportunity to receive ideas from outside and, in general, implement specific skills should be provided by installing the creative lab.

On the other hand, the authors also acknowledge the *symbolic power* of the lab, which I believe is manifested in all the mentioned factors. It is not only about the strategy and cultural incorporation of the company but also about the corporate values conveyed by the facility (see: Moultrie et al., 2007: 57). Therefore, while new structures emerge as described above through the creative space, a new working culture simultaneously arises, which is inscribed and communicated. Ultimately, legitimacy stems from establishing these labs' from above,' thereby ensuring their favourable reception under the mediation of modern and open structures. Different forms of dealing with innovation, specifically innovation cultures – whether nationally generated or institutionally cultivated, as in companies – can be identified. A description may read as follows:

2 From Latin 'lēgitimus'/ 'lēx' meaning law: in this context, it means a set-up through a 'law' or rule, rather than a dispositif; a dispositif that describes what is expected or right to do and act in society.

> Reaching innovation is a key challenge for any business in a competitive market. However, often the best source of innovation is actually within the company itself – the employees. The most successful companies are the ones who [sic] capitalize on this asset and create a culture of innovation, using employee suggestion software to transform ideas into results (Qmarkets, 2021).

Furthermore, the ability to innovate is becoming a hallmark of these very societies that are beginning to legitimise their work through the postulates, demands, and credos just mentioned, which, in part, remain unquestioned (e.g. John, 2012; Latour, 1996: 287). It is neo-liberal and forthcoming structures, as in organised innovation-making such as 'labs' that lead to an understanding of 'a generalised perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions' (Aghamanoukjan, 2012; Suchman, 1995: 574). On the one hand, the inflationary use of the word may create an inherent logic of legitimacy, but on the other hand, on closer inspection, it behaves just as insubstantially. The fact that a term now replaces many others, such as 'novelty', 'discovery', or 'improvement', does not generally imply a better understanding or method for how this content comes about. The arbitrariness that pervades this triumph ultimately points to the non-verifiability of the concept since it does not have any standard criteria of legitimacy and quality.

4.1.3 Expectations as Iterations in a Black-Boxed System

Theoretical solutions to problems are, by their nature, promising. Until implementation, they do not need to prove their functionality, but in the process, they serve as a canvas for all hopes and unmet expectations. In this respect, in theory, they provide a space for all actors and their expectations. As mentioned in the previous chapter, the future is only the servant of a failed past in the present. The promises represent solutions in the future to problems from the past that emerge in the present. Therefore, the future as a period is not independent, but through its temporality, it is always dependent on what has gone before. Thus, the expectations, whose origins are previously identified, also rely on this temporal sequence. In the process, a remarkable degree of promise arises precisely through creativity. The diversity of ideas leads to the will to experience the *eureka* moment. However, the nodes of the iteration loops are significant, i.e. those points where a repetition loop, a renewal of the idea, a 'new start', and suchlike commences. They are where either new actors join, new proposals are made, and/or previous ideas are rejected and represent the 'grinding points' of an idea toward the final product.

Figure 4: Iteration Loops of Expectations During the Development Process

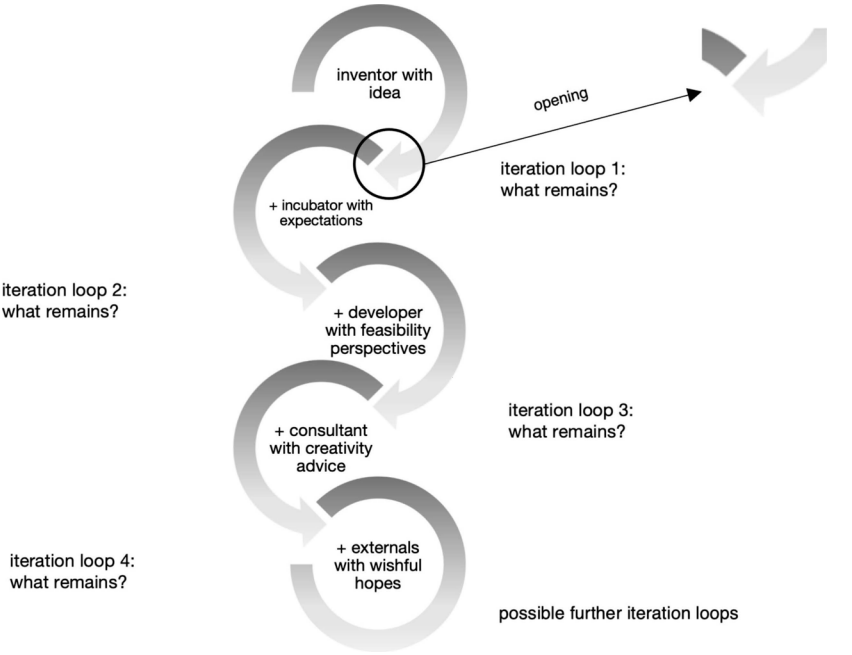


Figure 4 illustrates the iterative nature of the development process of a prototype, often referred to as iteration loops. Moments of *opening* and *closing* of the prototype characterise these loops (Corsín Jiménez, 2014; Dickel, 2019; Guggenheim, 2010, 2014). Opening signifies the opportunity to incorporate new ideas and make changes, followed by a moment of closure. These phases alternate, highlighting the continuous adaption aspect of the prototyping process. Moments of opening appear, as indicated here, by opening a new circle (see enlargement in Figure 4), for example, when new actors join a team, after team meetings and consultations, or because the milestone plan requires it. This open space indicates utopia in its original sense – a 'non-place' (from ancient Greek οὐ ou 'not' and τόπος tópos 'place'). The idea space 'topos uranios' is the heavenly place where the idea dwells (Bloch, 1980: 43). It is not a geographical 'place' but a space – perhaps even just an 'aching gap' (subchapter 3.4.1) as we see here – that represents the open portal to new creations: *innovation*.

As the term implies, moments of closure entail the conclusion of opening processes, wherein participating actors decide following the presentation of proposals or improvements. A decision (temporarily) closes the respective opening process, and the two processes alternate until completing the final product. These moments of openings and closings thus correspond with changing and defining the design

of a prototype. The prototype, due to its experimental character, indeed allows for failures. However, it also enables a democratic and open form of technology development, at least in theory or with concepts such as CTA (Bowman et al., 2017; Rip et al., 1995). This approach not only involves the participating actors, as in the case of Susan Leigh Star's and James Griesemer's 'Boundary Object', which is fed or interpreted by information from the outside but retains the identity-forming part that becomes the 'core of the thing' (Star & Griesemer, 1989). It also creates a user-oriented design, which is often called 'open innovation' (Corsín Jiménez, 2014: 382). Therefore, the prototype is the materialisation of many expectations and the result of an experimental process in which decisions or consensus are reached in a communicative-collaborative – at best democratic – manner. Inscribed in them, we find with each narrative an expectation, a hope, an attitude and stance, an opinion, and ultimately emotions. As long as the technological artefact is a prototype, this is inevitable; it is a product of cultural discourses, an object of socialities and relations (Law & Mol, 1995).

However, even if the appearance of prototyping seems to be a democratic process, the overall opportunity for technology development remains a black box (Collins & Pinch, 2014; Latour, 1987). In moments of technology and innovation development, the information does not circulate unhindered as it does not recur to materiality and expected effectiveness. However, it is much more socially or communicatively conceived (Reinhart, 2016: 166). Adding to the complication, technical developments, although portrayed as such, cannot be convincingly interpreted as technical innovations developed in response to a problem (Reinhart, 2016: 166). Thus, the development of a technological artefact intended as an innovation presents a paradox. Although different actors with different backgrounds come together in so-called incubators to work on a project and try to reach an understanding and agreement in the process of working together, they are obliged by the fragility and uncertainty of the development process to maintain silence. This way of collaboration seems typical among incubators and makerspaces, ensuring that there is neither idea theft nor too much (or unintended) leaked information. The incubator must serve as a sheltered space, meticulously crafting an optimal environment for teams to innovate (albeit artificial and constructed). Within this context, stakeholders must ensure that knowledge dissemination is prevented until it is deemed reliable and secure, as demonstrated in the empirical findings (see Chapter VII).

These incubators bear a resemblance to laboratories, which '[are] the result of a procedure that separates between an outside, an environment that is considered negligible for some epistemic claim or technological invention, and an inside, a (partly) controlled environment that is considered relevant for this claim or invention' (Guggenheim, 2012: 101). They exist in a state of partial seclusion and isolation, endeavouring to address a commonplace issue that is incongruous with their daily

existence within the incubator. The inventors transpose a problem from a 'real world' context – potentially their own – to be examined under microcosmic conditions. Their sociality with each other within the emerging team and with the object (Knorr-Cetina, 1997), as well as the settings and prerequisites, are constructed. It is imperative to extricate the problem from its initial context to facilitate a thorough examination and derive a viable resolution. The problem at hand, and ideally the resolution as well, necessitates the attainment of control.

Moreover, one can introduce alterations, encompassing potential future scenarios that influence the utilisation or conduct of the subject matter. Ultimately, one can modify the laboratory environment to restructure it distinctively and conduct experiments. The capacity to isolate, regulate, and manipulate epitomises the essence of the laboratory condition. Nonetheless, while isolation and controllability are indispensable for innovation studies, they also possess adverse facets.

While these makerspaces, incubators, and living labs rely on their confidentiality clauses and their keyword *innovation*, which guarantees a cloak of silence, the problem arises that knowledge generation generally remains in a black box. Developers and incubators do not disseminate this knowledge; they do not practice openness, and, ultimately, they seem to deliberately delay the publication of findings on innovation research and development (R&D) despite technological advancements in the field (Cristea et al., 2019; Ioannidis, 2015). In this way, innovation spaces operate secretly and create a space that offers the necessary isolation to innovate competitively. However, due to the constant unity, there is the danger of verifiably being contrary to constructive technological development. Eventually, verifiability does not only mean an alternative form of technology construction that develops in the interest of society, as the CTA proposes. In addition, verifiability refers to the legitimate interest in innovators' capabilities and whether they can ultimately keep their promises. If the sense of responsibility for technology development and the resulting ex-ante promises were to be lost, this would not only be questionable for moral reasons, but innovation development would consequently become obsolete and abolish itself.

4.2 Structures of Innovation II: Narratives, Myths, and Beliefs

Telling stories within groups and societies is considered original and natural. It is an informal and necessary function of being human. Storytelling is the verbal expression of the imagination of images, our consciousness, and what we actively perceive (see: Comer & Taggart, 2020: 25). Stories stir something in us; they speak to and touch us emotionally. We convey and control what we want to say (and how) with words and use stories as an instrument to reveal what is on the inside and persuade the other party. Therefore, for entrepreneurs and innovation teams, much depends

on the narrative surrounding a prototype, its company, or the team members – for example, their legitimacy, financing, or the team's productivity.

Although the field of storytelling, narratives, and communication systems is well-researched in the humanities and social sciences (e.g. Bausinger, 1958, 2016; Comanducci & Wilkinson, 2019; Friedl, 2013; Ricœur, 1988, 1995), as well as psychology (e.g. Comer & Taggart, 2020; King, 2000; Smorti, 2020), there is a relatively large research gap for the field of entrepreneurs and the start-up scene in general (Borghoff, 2018). However, this field is particularly revealing when investigating motives, strategies, and the so-called 'gut feeling' for a 'good' investment (Villanueva, 2012: i.a. 38).

As in the example of *Theranos* summarised at the beginning of this chapter, the narratives of innovation are the easiest to analyse over time and from their end as they expose their adaptations. The narrative or founding story has many functions and is usually highly emotionally charged. As described under the aspect of legitimacy to innovation, too much depends on imagination, belief, and interpretation. Since these are communication mechanisms in the constructed system of innovation, Luhmann's concept of a social system is correct at this point (Luhmann et al., 2013; Müller, 2013). '[…] Stories that are told about the system outside of it, in its environment, and that is, so to speak, processed, modified, adapted or rejected in the system as an intervention, are meaningful for the identity of a social system' (Müller, 2013: 139). This chapter, therefore, analyses how narratives evolve, how they are emotionally constructed, and why they may change over time.

The narrative functions represent identity-forming elements for a group or, generally, for the people outside of it. Further, the 'good story' related to innovation, together with imaginatively linked images, creates a general acceptance in society and gains access to financial resources and networks. Finally, it is a roadmap for the developed prototype, and through what it conveys, it connects the past with the present and future. Furthermore, this story is also reflected in the materialisation of the prototype and, later, the final product.

4.2.1 The Evolving Narrative on Innovation

For innovations, or what is called innovations, it is often factual that a problem precedes the original idea (see Chapter III). As Chapter II described, a conscious experience is often a clue to what confounds, challenges, disturbs, and displeases. This problematic starting point ultimately enables one to imagine an improved state. The potentially improved but still imagined state is thus the starting point for innovation and is frequently described in a revolutionary and emotional fashion as outlined below:

> I grew up in a family that was very focused on the belief that we are all here for a reason and try to make this world a better place. And that we have a purpose. And I thought I was going to do what my dad did, which was work in disaster relief. Because I grew up in a house where I was surrounded by pictures of him helping people when really bad things happened. And over time, I started to see business as [a] vehicle for making a change in the world because you have total control over what you decide to do and how you decide to do it. [...] When I spent time thinking about what was the most valuable thing that I could do with my life, to me, there is nothing more valuable than being able to change the reality in our world, which is that all too often, people we love are lost because you find out too late in the disease progression process to be able to do anything about it. And the fact that making laboratory testing more accessible is a way to help change that. And that is part of getting rid of that big bad needle (Computer History Museum, 2014: Interview with Elizabeth Holmes, CEO of Theranos, at December 9th 2014 led by Michael Krasny).

Often, a detected *problem* or a *sense of injustice* precedes the revolution narrative. In the example here, it is not just the 'big bad needle' that was, and as Elisabeth Holmes mentions in the interview, still is, terrifying for her. She also feels the urge to make a difference or bring about change because she grew up surrounded by people who exemplified the importance of making a difference in the world and for one's life to be meaningful. Often, individuals mention that the initial desire to effect a change has either been present for a considerable duration or has suddenly emerged due to an enlightening everyday situation. Therefore, narratives that change the world require a foundation that sets the stage for their actions and motives. Society often highly values and thus utilises meaningfulness and significance (Graeber, 2018). Hence, employing these terms justifies one's actions or the desire for societal and personal change. One often equates meaningfulness with the value of one's work and self. In addition, the idea and the company are valued extraordinarily highly through social recognition and what is considered morally acceptable actions. The (linear) narratives often follow the pattern:

Figure 5: The (Linear) Narration Pattern

The problem refers to a social disadvantage or even harm; the latter mainly counts for health innovations. The solution has a societal impact in the sense that it benefits everyone. If this is the case, the innovation is morally accepted and recognised. In sum, innovation is likely to be a success. According to this, problem-

based creativity applies in most innovation narratives, as shown later again (see Chapters V and VI). Thus, a *creativity dispositif* (Reckwitz, 2017) based on discovering the problem returns to the way of innovating. In this respect, it becomes a race among those who want to be creative to discover a problem that a solution can follow.
Hence, Reckwitz's thesis remains partially valid:

> The regime of novelty produced by the creativity dispositif in all its parts is founded on novelty as a stimulus. What counts for it is the production and reception of constantly new stimulus events, which should be as intense as possible, and the interest of which lies in their immediate presence. The aim is not to be better but to be different (Reckwitz, 2017: 666).

Importantly, in this context, novelty does not necessarily provide stimulation. Instead, *the discovery of the problem* acts as the catalyst for the emergence of new things. While creativity certainly maintains its *dispositif*, its origin shifts. It is not about creating novelty at all costs but about the crucial process of problem discovery. This process, where modern humans stay true to two of their abilities: the conscious act of creativity and the awareness of the problem that makes them discoverers, is what truly engages us in the discussion of creativity.

4.2.2 Mythmaking, Belief, and Performance

Myths are part of every society. As narratives, they are political instruments of identity formation that can promote a sense of belonging. They structure the past (Münkler, 2009) and serve as moral guidance in the present and future. This subchapter shows how mythmaking becomes relevant to innovation as it is more than mere founding motives shared at congresses and funding platforms since myths equally convey the team's emotional values that are (supposed to be) shared. They are the glue of the confessional community and serve to convince the outside world. 'Myth is depoliticized speech' (Barthes & Lavers, 1972: 142) as an achieved effect through language and rules that resembles a message. The myth has a system in its form of communication, and because it is so easy to integrate into everyday life, everything can be (and become) a myth. The condition is suggestive, states Barthes, and he is correct in this view (Barthes & Lavers, 1972: 142), for indeed, the mere description of an idea's form, of what it is supposed to do, does not apply to its publicity. It is not the descriptions that adorn it. An idea, a potential innovation, lives from itself, its projection, and the stories about it. It is not the mere words that give it a character, but what an individual associates with it that is emotionally charged. It lives from society's consumption, which needs to be developed and satisfied, and from images filled with meaning; it lives from semiotics. Nonetheless, it can also perish when so-

ciety exposes the images as deceptive, when they no longer meet societal needs, and when they fail to evoke any emotion whatsoever.

In this context, people often perceive the creation and transmission of myths as something prehistoric or pre-modern. They associate it with a time before the Enlightenment; thus, it no longer aligns with the logic of modern rationalities. Yet, these myths are inherent elements of society that we cannot eliminate. They bear witness to our emotional interpretation and assimilation of our experiences and socialisation. They represent the very essence of our culture. We constantly interact with the myth; we apply it to our face when we look in the mirror, we drive it, and we type our messages on it. Furthermore, just as with products from advertising, every innovation comes equipped with it. Therefore, every innovation that presents itself as a 'superlative object' has, in some way, 'fallen from the sky'(Barthes & Lavers, 1972: 88).

> We must not forget that an object is the best messenger of a world above that of nature: one can easily see in an object at once a perfection and an absence of origin, a closure and a brilliance, a transformation of life into matter (matter is much more magical than life), and in a word a silence which belongs to the realm of fairy-tales. [...] [Those are] objects from another universe which have supplied fuel for the neomania of the eighteenth century and that of our own science-fiction (Barthes & Lavers, 1972: 88).

Whether it is the new Citroen, as Roland Barthes suggests, or any other novel phenomenon that claims indispensability, the narratives at play are interchangeable, flexible, and potent. They do not just refer to our desires but can create them, setting the stage for their own satisfaction. Consider a random example from the *Kick-Starter* platform to understand the role of narratives and myths in crowdfunding. Here, *Indiegogo* or *Kick-Starter* Projects present their ideas and prototypes, aiming to collect funds from potentially interested individuals. The founders then invest the raised money to transition the prototypes into production. They offer early customers various donation variants, each with its own set of perks. A small donation is equivalent to a 'handshake' (sic!), but a larger investment could secure a first version of the series product upon its earliest release. In this way, the 'packages' available for purchase expand in value with the donation size.

The following example is a variant of a toothbrush – a start-up idea from Austria dating back to 2016. The company started their funding period on Indiegogo and Kick-Starter in the summer of 2017. The idea was a fully automated toothbrush that cleaned your teeth within a few seconds. It looks like a pacifier from the outside with

a protrusion for the teeth. This new type of toothbrush does not require a hand to hold it while it scrubs; it is a device placed on the teeth, which then cleans them.[3]

> Amabrush – The 10-Second Toothbrush (Kick-Starter-Project)
> Do you like brushing your teeth? Especially at night when you get ready for bed? Amabrush is the first toothbrush, that cleans all your teeth at once in just 10 seconds! You never have to brush your teeth again!
> Amabrush is the world's first, fully automatic toothbrush. This patent-pending device brushes all your teeth at once, [is] fully automatic, and finishes in just ten seconds. All you have to do is press a single button, wait ten seconds, and you'll have perfectly clean teeth!
> And further: Let's face it: brushing your teeth is not exactly the sexiest thing on Earth. You have to squeeze, scrub, gargle, spit, rinse and floss every morning and evening, every day of your life. Many of us hate brushing our teeth so much that we avoid doing so whenever possible—even though we know we shouldn't… Brushing our teeth at least twice a day maintains good dental health. This is why we invented Amabrush—a device three years in the making with a single goal: to make toothbrushing quicker, automatic, and more efficient so you have more time for the relevant things in your life (Amabrush, 2019).

The product represents the facilitation of everyday life, a healthier version of what we know, but in a more convenient and user-friendly format. The advertising texts often agree on this, and they, too, become interchangeable.

We find words such as *just, at once, never, fully automatic, all you have to do, a single button, and perfectly clean*. The second part continues with the negative aspects: *not the sexiest, every day of your life, hate, avoid*. And again, the single goal: *quicker, automatic, efficient – to have time for the relevant things in your life.*

At this juncture, the intended achievement of language becomes clear. Initially, certain words aim to communicate a specific ease. A unique excitement seeks to present a modern approach to one of the most routine daily activities: brushing one's teeth. The revolution of even the simplest things carries a sense of 'extraordinary simplicity'. The suggestion projects an image of a simpler, better life devoid of effort and expense, even though it pertains to a cause of such importance as the company declares. Despite the apparent neglect of the practice of brushing your teeth, it remains essential for health. This ambiguity often arises; it is the interplay between

3 The start-up 'Amabrush' met its demise in 2019. Despite a successful prototype, the Austrian company failed to deliver its promise of a toothbrush that could produce clean teeth. This failure led to several fraud allegations and left several thousand customers fuming. In a disappointing turn of events, the fraud case against the manufacturer was dropped in 2020, leaving the deceived customers without compensation. A staggering seven million euros had been collected via crowdfunding platforms, making the failure all the more significant.

relief and necessity, whether for one's own body while driving or in the household. In all innovation sites, one can find pairs of opposites and antitheses, which become compatible and harmonised through the expanded possibilities of innovation.

These myths, prevalent in 'hot' or 'heated' societies or cultures (Assmann, 2011; Levi-Strauss, 2021), embody a unique complexity. They are the products of flexible societies that, while desiring change and evolutionary progress, remain rooted in the narrative form of mythmaking. Suppose we start from Levi-Strauss's and Jan Assmann's thesis of hot cultures, societies and cultures driven by progress and expand on Ulrich Beck's thesis that this very society is transitioning from the contours of industrial society to the 'risk society' (Beck, 1986) where a sense of threat is pervasive, albeit sometimes subtle (Beck, 1986: e.g. 59) or, at times, unconscious.

At this point, we must question the extent to which the drive for renewal, improvement, and innovation stems from the uncertainty inherent in these hot risk societies. Could it be that these *societies*, feeling insecure, seek to compensate through adaptation and change, namely technological progress? Following this line of thought, a state of uncertainty likely always precedes the status quo within a society and the status of its technical development. This state is perpetual, as the present, being uncertain, finds its resolution in the future. However, the future is merely a reflection of the present and is, therefore, also uncertain.

And yet, the same applies to the innovators themselves, who want to enter the incubator and grow in it. Entre- or intrapreneur (Parker, 2011), inventor, and innovator are their names, and they establish their own creeds. They exude a profound self-belief in themselves, their idea, the product, and the team; they believe in the consumers who will (should) discover the product's intrinsic value. This unwavering belief is the foundation of their trust-building process. And vice versa: the others, e.g. the investors and customers, are inspired to believe in them, the idea, the product, and the team (Villanueva, 2012: 136 f.). The investors and customers need to think that the money is well spent, that the idea can succeed, that the right people are working on it and that suitable suppliers have been chosen.

Religious analogies are not unusual, particularly when discussing meaningfulness, faith, and impact. A 'cult-like' atmosphere, as alluded to in subchapter 4.1.2, suits the insecurity and exposes even more in this regard, as we can read in Georg Simmel's 'A Contribution to the Sociology of Religion':

> All religion contains a peculiar admixture of unselfish surrender and fervent desire, of humility and exaltation, of sensual concreteness and spiritual abstraction, which occasion a certain degree of emotional tension, a specific ardor and certainty of the subjective conditions, an inclusion of the subject experiencing them in a higher order – an order which is at the same time felt to be something subjective and personal (Simmel, 1905: 362).

In the preceding descriptions, religious acts are paralleled to compensate for the uncertainty and lack of order and knowledge, and this order is subsequently found in teams, the incubator, and in this 'trust from above', which is supposed to provide support. In this regard, the existence of certainty underscores the crucial role of trust in forming knowledge. This trust enables inventors to perform with belief and conviction (Seidenschnur, 2019). They perform on demo days; they shine, and they are convinced. They perform at TED (short for: Technology, Entertainment, Design) Talks and earn applause. They are performers because they must convince others.

With failed companies, such as *Theranos* or *Amabrush*, the investors' shock suddenly becomes the unmasked naivety that they 'want[ed] to believe' (Yahoo Finance, 2021 Documentary: 57'). The interviewees talk about 'how much they wanted it' – how much they wanted to see the idea succeed, upon which the experts join in and recite the motto: 'Fake it, 'til you make it'. The myth is an aid to one's own faith relationship with oneself (Latour, 2010). It drives the performance of the self-confident founder who knows how to convince the people around him.

4.2.3 How Narratives Adapt

Narratives may also adapt during prototype development. First of all, there is the discrepancy whereby a single person, the creator, initially has an entirely different idea of the possible development of a product in mind. Hence, as already discussed under the aspect of experience and the moral economy (subchapter 3.4), an initial concrete idea is associated and conveyed with an experience and a problem, both of which result in a narrative. As more team members join the initiative, these ideas and associated images add up or are reduced, similar to the iteration loops of a prototype: they overlap, reinforce, or partially exclude each other, weaken, and renew. Like the prototype, its founding narrative is also subject to a grinding process, i.e. various adjustment processes that are decided on at different moments alone or together in the team. However, it remains an ambivalent process that can be connected to several insecurities, as Caroline Bartel and Raghu Garud pointed out:

> [B]ringing people with disparate perspectives and capabilities together during the innovation process can, in turn, create other difficulties. For example, ideas that come from different parts of the organization may remain underused to the extent that people are unable to see their relevance to their own work. Also, dysfunctional confrontation can arise as people with diverse backgrounds and expertise interact, thereby undermining innovation. Such unproductive social interactions can exacerbate the uncertainties inherent in innovation processes and increase the chances of generating suboptimal outcomes (Bartel & Garud, 2009: 107).

In this respect, a shared corporate culture can help develop shared values, norms, and beliefs that allow a common ground for social action during the innovation process (Bartel & Garud, 2009; Jelinek & Schoonhoven, 1990). On the other hand, these cultural structures can also severely affect employees, leading to contrary developments. According to Bartel and Garud, negative stress can arise due to different working methods, leading to tension (Bartel & Garud, 2009: 108). At this point, the innovation narrative can assist and become the mechanism that enables both coherence within the team and flexibility for the people involved. Hence, the interconnections between narrative and corporate culture become evident.

Consequently, for tactical reasons, a narrative is often reduced in some respects and enriched later, for example, by a plot. This strategy typically involves a conscious process where a decision is made to disclose (or withhold) information deliberately. This decision hinges on whether sharing some information might be beneficial or if the situation is too delicate to divulge. This decision always relies on the estimation of potential future success.

Equally, unconscious moments occur; at times, one might inadvertently omit something, or a certain aspect might take precedence over another due to its current relevance. Nonetheless, it is essential to note that the narrative continues to exert control. Further, one can find guidance websites for entrepreneurs and teams on the importance of storytelling and how it can create a certain legitimacy (e.g. Day & Shea, 2018: "Grow Faster by Changing your Innovation Narrative"). Among other things, there are references to economic aspects that promise to grow faster through a better narrative. The MIT-Sloan Website states that:

> An innovation narrative is an oft-overlooked facet of organizational culture that encapsulates employees' beliefs about a company's ability to innovate. It serves as a powerful motivator of action or inaction. We find innovation narratives in two basic flavors: growth-affirming and growth-denying, or some combination thereof (Day & Shea, 2018).

In addition to widely touted success concepts such as Innovation Boot Camps or Design Thinking, the magazine article concludes that the narrative is an often-underestimated factor. As previously mentioned, the narrative can serve as the cornerstone of the development and success strategy, acting as a mechanism in challenging situations where translation is necessary to establish legitimacy, even within an organisation (Bartel & Garud, 2009). Translation involves tailoring the narrative to the audience and adapting it to the various actors involved in the process of innovation communication (Latour, 1994). At this stage, the narrative must change solely within a team or company to generate and maintain its internal legitimacy and motivation to avoid tension or stress. In addition, this circumstance is equally valid for external parties. Thus, this is not a mechanism to ensure coherence and flexibility but to

maintain external conviction, legitimacy, and acceptance. Once the team stabilises its identity, it can communicate content externally, where the narratives are adapted and translated. In conveying innovation, another identity moment that promotes acceptance and social capability must be constructed. It becomes clear that the emotionalisation of the narrative plays a recurring role for reasons of identity and empathy, both within and outside the team (Villanueva, 2012).

Consequently, there are connections between narrative and growth, emotionalisation and legitimisation, and further ethical aspects are linked. There are plenty of websites providing advice and service to founders to point out that certain target groups are more likely to be addressed by exact 'wording' and that a business should also convey a specific message through the word, whereby, above all, social norms and values should be considered (e.g. N.A., 2022; Williams, 2022). The 'wording' and the set of values vary depending on the product and the target group addressed. One should consider the overall communication method through text design, which equally involves colour, image, and content. This approach creates a resonance space that engages the emotional level.

Interestingly, in this context, one can observe how business narratives are also changing, especially concerning the shifting norms on climate change, sustainability, and social responsibility (Hinkel et al., 2020; Kuenkel, 2018; Mackintosh, 2021). There is a noticeable shift towards new business strategies in the media, literature, and political campaigns. These strategies do not primarily focus on profitable 'how to make money' approaches but rather on sustainable business practices. This shift aligns with the Green Deal initiated by the European Commission in 2019.

Hence, the advice for companies and innovators does not necessarily recommend a rethinking but primarily a retelling. With reference to economics, ethics, monetary incentives, and globalisation, companies are encouraged to revise their approaches as a society or group's value system and emotional attitude continue to steer its economic intentions and, thus, its innovation ventures.

4.3 Values and Evaluation

In the previous two subchapters, 'Structures of Innovation I and II', I discussed the structures of innovation practices, which involved the spatial allocation of practices subsumed under innovation-making, such as makerspaces and innovation labs. Additionally, the emphasis is on culture, specifically, the structures manifested in daily practices and customs and how individuals narrate them. This focus is particularly relevant in terms of the practices and narratives conveyed, that is, the relationship between what people do in their everyday lives and how they discuss it. Concerning how practices form and constitute, our identity determines the value we ascribe to

the activity (Krüger & Reinhart, 2017), how we view and value innovation and, ultimately, how we feel about the degree of innovation of an artefact.

The fields of 'valuation' and 'evaluation' have been emerging and developing in sociology for several years by dealing with different phenomena that fall under it (Krüger & Reinhart, 2016; Krüger & Reinhart, 2018). It is either the field of investigation of the attribution of monetary or non-material value to material and immaterial goods in the realm of nature or human life or rankings and ratings as formalised valuation practices (Krüger & Reinhart, 2018: 2). Additionally, the sociology of evaluation contributes to normative value orders as orders of justification (Krüger & Reinhart, 2016: 487).

Generally, visible and invisible evaluation processes can differ in their logic, although they do not necessarily do so. For example, in relation to innovation, there is always the question of whether it is marketable (Reinhart et al., 2019), and hence, market logic comes into play. As shown later in 6.2 or 6.4, for the field of medical technologies, it can be questioned to what extent patient interests differ from these market logics or whether a processual convergence of capitalist market logic and patient interests becomes relevant here.

4.3.1 Constructing Value Consensus

As demonstrated in the preceding chapters, the innovation and prototyping process involves a continuous re-evaluation. The thesis posits that just as expectations and prototypes evolve over time and undergo refining processes, a parallel evaluation of the same occurs. Depending on the observer and the actor, different evaluation logics come into play during the evaluation process, which the prototype must satisfy as a product by the end of its development. The evaluation logic hinges on the individual's position and discipline: their professional background and emotional perspective. Therefore, in the moral economy, not just the expectations, perspectives, and claims converge but also the associated evaluation logic.

Consequently, the prototype depends on these circumstances and all those who negotiate them. Typical questions in this process include: Who gains the upper hand? How do these negotiation processes shape the prototype? Moreover, does the prototype foster a confident expectation through its further potential for possibilities, for instance, with the incubator and the business angel?

Figure 6: Evaluation Interactions Between the Prototype and the Individual

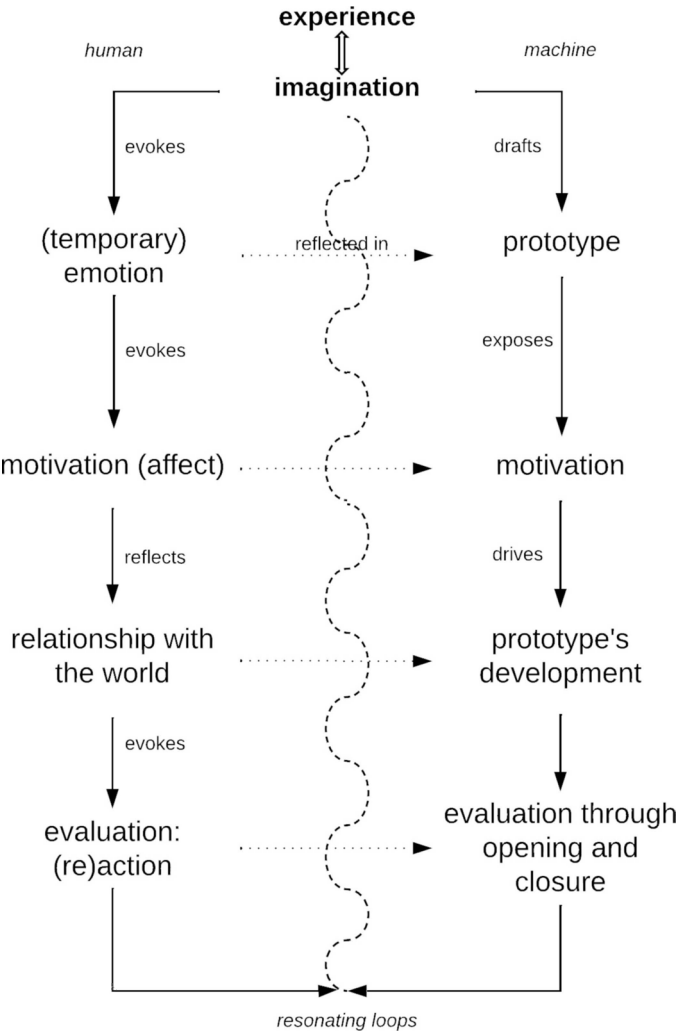


Figure 6 is a further elaboration of the above sketches, especially that of Figure 2, albeit it means a simplification and does not refer to later ruptures that occur in this process. It shows the parallel course of individual human emotion and evaluation processes and the development of the prototype. Both processes start with the result of the interrelation of experience and imagination, evoking distinct emotions based on previous expectations and accompanying imagination (left). Likewise, one's background, i.e. *a* previous experience, evokes a particular idea of a model that is supposed to address everyday issues (right). Both lead to a specific moti-

vation. The left side illustrates how a specific emotion prompts action, creating a need to alter the problem. On the right side, the associated rationale for developing a specific prototype is displayed. Hence, it is a purposeful motivation justified by a particular problem. The left demonstrates motivation, specifically how emotions guide individuals in their relationship with the world. The behaviour triggered by emotions thus provides insight into how an individual relates to their environment. On the right, this relationship to the world, i.e. the motivation to want to solve a certain problem, provides information on how the prototype develops. This, in turn, reveals the background, motivation, and a particular relationship of trust or acceptance between innovation and society.

Finally, both processes lead to an evaluation process. On the left is the reaction to the prototype, leading to a judgement. On the right is the evaluation process, which affects the prototype's further development. The individual steps resonate with each other and interweave; they behave in an oscillating, and partly circular way, whereby circular in this context means that processes can start from the beginning. The (non-)completion of a product is, in turn, reflected as a new experience in our evaluation patterns in a new development process.

Generally, the processes involved in the constitution of knowledge grapple with the assertion of science's supposed objectivity (see subchapter 3.4). The expectation is that evaluation schemes follow 'objective criteria' and are rationally generated to ensure some level of security (Reinhart et al., 2019). Yet, sociology has demonstrated how these can be deconstructed. Consequently, evaluators apply different forms of evaluation schemes to assess innovation. Quasi-objectified or seemingly objectified evaluations determine whether an idea merits funding, development, marketability, and societal value. These assessments also encompass understanding how we value innovation, i.e. whether society is more likely to accept one idea over another. They also provide insights into the conditions and circumstances under which we develop something and how transparent the development process should be.

Following this, we will explore how society brings specific inventions to life and the crucial elements for an artefact's implementation. We can question whether it is possible to establish criteria to judge the potential success of something. We will examine how we assess the success or failure of an idea and its development and whether we can pinpoint specific reasons for a lack of success. In this context, the question of how we evaluate the innovation processes themselves emerges. We will explore how we confirm an invention's innovative potential. Given the Theranos case and the absence of verifiability, we must critically scrutinise and question the success and transparency of such a process.

In the subsequent discussion, we will consider how we develop specific inventions and the essential factors for an artefact's implementation. We will ponder whether it is possible to establish criteria that we can use to judge whether something will be successful. We will investigate how we evaluate the success or failure of

an idea and its development and whether we can explicitly state why something was unsuccessful. Furthermore, the question of how we assess innovation processes themselves arises in this context. We will examine how we verify the innovative potential of an invention. Based on the case of Theranos and the lack of verifiability, we must critically examine and question the success and transparency of such a process.

4.3.2 Serendipity or a Matter of Perspective?

Louis Pasteur once remarked that '[Chance favours the prepared mind]' (Vallery-Radot, 1926: 76). In his inaugural address as newly appointed professor and dean at the new Faculté des Sciences in Lille, France, on 7 December 1854, he questioned the mere coincidence of inventions and discoveries. He thus refers to the urgency of foreknowledge, or an open mind, to come across anything that one might later call chance; a quiet hunch, an open eye for what is happening around one, to see a problem. This assumption is correct insofar as previously described. One cannot comprehend a problem without being alert to one's environment. In the annals of scientific history, the term 'serendipity' frequently appears in these contexts. It denotes accidental discoveries, such as penicillin, X-rays, sticky notes, and the 12 moons of Jupiter discovered in 2018. These discoveries represent findings that ideally would have resulted from deliberate planning or searching. Although the term serendipity first appeared at the end of the 18th century and originally came from a Persian fairy tale, Robert K. Merton introduced it to the social sciences in 1958 with his book 'The Travels and Adventures of Serendipity'. Researching and searching are part of everyday life in science and describe its modern character. Irrespective of whether one considers coincidences, chance discoveries, or luck, one simultaneously walks the fine line between knowing and not knowing one's field or the phenomena taking place in it (Rheinberger, 2014). Hence, by its very nature, research is an activity full of surprises, as knowledge cannot always be located and thus remains unpredictable and, to some extent, constantly an experiment (Rheinberger, 2014). The descriptions by Robert K. Merton and Hans-Jörg Rheinberger refer to science. However, one must note that these construction processes of science, as they occur here, are equally applicable to the knowledge production processes surrounding innovations and technology. In both cases, one deals with the accumulation processes of knowledge and both areas can have an equal impact on society, both positively and negatively:

> [A] number of ideas that today we consider false actually changed the world (sometimes for the better, sometimes for the worse) and [...], in the best instances, false beliefs and discoveries totally without credibility could then lead to the discovery of something true (or at least something we consider true today) (Eco et al., 1998:VII).

Thus, the question concerns not only the circumstances of an idea and its originality but also its assertiveness, which can vary greatly depending on the presenter (Merton, 1968). It is also interesting to look at the narrative of the concept in the context of innovations in their environment, e.g. how innovators and their surroundings operate with the term, as it has some predominant role for some time when searching websites or investors magazines. Observing serendipity in the innovation process can be disconcerting, especially when considering subsequent success, as it becomes challenging when success appears to be a matter of chance. However, investors and entrepreneurs insist on employing the 'principle of chance' to generate innovations.

This perspective progressively alters the demand for problem identification. If a potential inventor is not open to the chance events that can occur at any time, accusations of exclusivity may arise. The art of innovation, and indeed its demand, lies in maintaining openness despite the pursuit of problems. It is not necessarily the diversity of the solution to a problem that matters, but rather the *diversity of problems* to be discovered. In the initial stages, the solution takes a backseat.

This is where the race and pressure for the longed-for *eureka* moment begin. On the one hand, it is the search for the problems when they are not yet known or the race for a solution if at least one problem is already known and recognised. Alternatively, it comprises the drive to become known if one is the inventor of a problem and/or the potential solution. It is not uncommon for a solution to a problem to go unrecognised. As a result, society often overlooks its relevance (cf. invention of the electric car by Gustave Trouvé in the 1880s). In other cases, one can consider the solution to a recognised problem for which the original idea provider remains unrecognised, and someone with a better network takes the credit (Yaqub, 2018). Social structures such as networks, gender, money and the resulting competitiveness and resilience profoundly impact an idea's success, not only because they are the stabilising factors but because they can control the perspective on acceptance and benefit. No matter how good their ideas are, individuals categorically disadvantaged by the aforementioned structures often remain unseen. Thus, whether one can speak of chance discoveries—given the factors outlined above—remains open.

Serendipity is a phenomenon that has been sufficiently described in innovation research (e.g. Kingdon, 2013). What is interesting here, however, based on the theory described in Chapter III, is the following focus: if the emphasis is on discovering problems – partly because financing structures, like incubators, inadvertently necessitate this – then, as mentioned, the innovator finds the solution in the experimental space.

Furthermore, during the development of an idea, creativity might operate within a restrictive framework, specifically one that is problem-based (see subchapter 3.2.1.). For chance or the possibility of discovery in the sense of serendipity, this can mean restricting imaginative powers that cannot operate despite the required transparency in the problem-and-solution-finding process. Especially for

innovation, the lack of openness can become a problem due to the simultaneously enforced closedness as, after all, innovation requires an open mind, united forces, and stimulation through the exchange of fruitful ideas. Furthermore, the joint decision-making process generates something like luck, which results in potential success (Elias et al., 2012).

However, assessing success and failure is independent of luck, even if it is considered a factor. In this respect, the question arises to what extent it is really a matter of chance or much more a matter of the plannability of something that some call chance. Inquirers must create real-world conditions, plannability, and experimentation in spaces that offer everything. Thus, random generators and algorithms provide a remedy for not relying on the randomness of chance. Predictability is more popular than pure serendipity when investing money and ultimately justifies the structures created around innovation. Nothing can be left to chance when too much depends on social factors. In this respect, serendipity is sometimes nothing more than a motive, perhaps a myth. The actual results of an evaluation are ultimately a mixture of chance factors, which, however, depend on the problem situation and not on chance as such, and probabilistic factors that try to make a statement concerning the future.

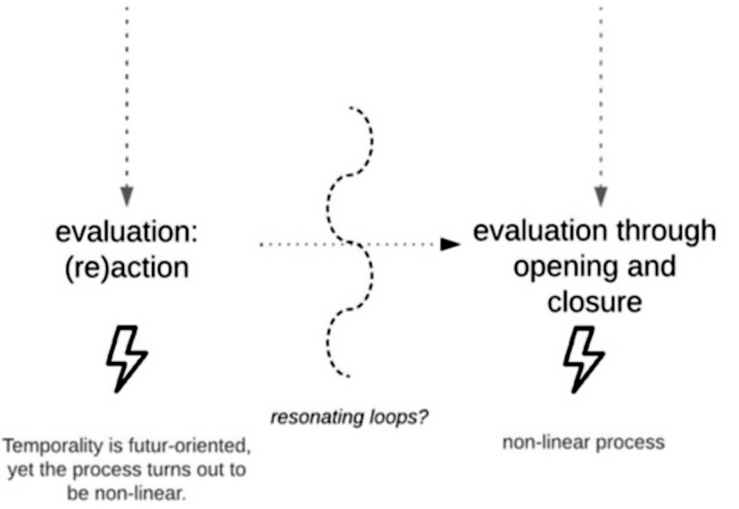
4.3.3 The Problematic Verifiability of Innovation

Despite all the constraints involved, serendipity and failure assessment practices seem to be highly prevalent in innovation-making. What is striking about these terms is the unpredictability that resonates in these construction processes, whereby the uncertainty provokes the temptation to give phenomena such as serendipity a special status. Similarly, there is an undeniably positive attitude towards failure. There is even talk that 'Innovation needs failure!' as in the *Museum of Failure* (MOX) slogan, which started its travelling exhibition about failed inventions from around the world in 2017. The exhibitors introduce their visitors to *The DeLorean* (1989–1990), *Logbar Ring* (2014–2015), and the *Boeing 737 Max* (2017–2019) – all of which are failed innovations. The MOX is not alone in its opinion concerning a productive view of failure (e.g. Wills, 2019), and it is common in innovator circles to approach work with precisely this attitude. How is this call to be understood? Beyond all doubt, there is a certain irony in this postulated acceptance of failure as, while it is accepted or even openly stated that there can be no success without failure, no innovator wants to fail. Failure does not lead to successful innovation, thus justifying the reinterpretation of failure as an act of mindfulness. What is necessary is not simply ignoring one's potential failure but rather adopting a 'mindful (approach) to failure' (e.g. Mielke, 2021: i.a. 26, 33), which must be preceded by an act of consciousness. Following this train of thought, it is said that that mere failure is insufficient for reflective handling of failure, as it does not allow one

to recognise what they have failed at. The general reference here is how failure is managed, possibly through a corporate culture that permits failure and makes it tolerable. Consequently, the reflexive power of 'mindful failure' comes into play, which involves retracing the path and uncovering the sources of error – a formula for success based on previous failure.

The connection between innovation success or failure and emotional association occurs at different levels. For example, team dynamics and social structures, as described above, impact successful product completion. If the team structures are unstable, driven by conflicts or non-consensual goals, the idea can quickly be abandoned (process innovation). Furthermore, an innovation might fail if the assessment of user needs is inadequate or if the invention lacks general interest and thus does not have a market that could make the innovation appealing (product innovation). The further development of the previous figure illustrates these potential failures, which it had already suggested.

Figure 7: The Non-Linear Evaluation Interactions



All these aspects can also be subsumed under the term problem-solving strategy to give the container concept of innovation some meaning. Exciting phenomena come to light in this context because one makes a virtue out of necessity. In recent years, in addition to so-called sprint sessions and *makeathons*, i.e. brief but inten-

sive prototyping workshops that sometimes last a whole weekend, so-called *Fuckup Nights* have been established.

Interestingly, these Fuckup Nights are just as popular as *TED Talks*. Well-known innovators, investors, and (neo-liberal) politicians give speeches about the virtues involved in failure, the value of failure, and destigmatising failure. These events seem like an attempt to provide transparency to a complex black box system where there should be none, and they feature loose, generally positioned advice shared among entrepreneurs. The fact that an entrepreneur is willing to share their experience about their (prototypical) innovation with a random, broad audience does not seem surprising, as an invention in its infancy or an already failed project does not allow for any statement to be made about the development and, due to its vague formulation, ultimately also does not mean offence for the person giving the talk.

In addition to the positive portrayal of what no one wants to take away from the bitter note, the question remains whether other emotional aspects play a role alongside this to excite the failure. Is it a resilience technique or the old principle of 'trial and error'? These are coping strategies of the innovator scene and an optimising society that is stuck in its belief in progress and cannot put an end to a failed project. Failure cannot simply remain a failure and hence must follow a certain market logic of 'it was worth it' to potentially embed it into another linear storyline. Money that was invested but has not generated any added value in the sense of success is not justifiable and must, therefore, not appear in any narrative. Otherwise, as described before, no myth would be able to emerge.

Moreover, the irony is to be avoided after all, and one would prefer not to use a justification strategy. In that case, the difficulty remains concerning how to tell a good idea from a bad one (or, at least, a feasible idea from a non-feasible one). It is never foreseeable whether an innovation or what is called an innovation, will be successful. However, despite this, the question arises of whether it is possible to predict innovation success, as presented in many economic papers, by examining, for example, the error culture of a company. Are scenarios like the *Theranos* example mentioned at the beginning of this chapter avoidable? However, cases such as *Theranos* or *Amabrush* provide new evidence to open the discourse on the possible predictability of (mis)success (Ioannidis, 2015). As the innovation sections of magazines and newspapers have shown, they themselves are not reliable since they rely on assessments that are not objective or scientifically verifiable. Even so-called 'experts' cannot predict success and failure, which is solely due to the lack of transparency. 'Fake it, 'til you make it' is a solid motto that can keep an entrepreneur afloat for a prolonged period, even in very challenging phases. In part, this is an essential option for those who must overcome problematic development phases and hurdles without preceding their business partners' support. On the other hand, however, there is always the possibility of feigning success where there is none.

As Cristea, Cahan, and Ioannidis (Cristea et al., 2019) have already pointed out in their paper, the community must generally question to what extent the start-up scene conducts 'stealth research' because, as correctly indicated, fraud becomes public at a certain point, whereas unscientific work is not necessarily exposed. However, there is a well-founded desire within the sciences and society to share the scientific findings surrounding innovation. Other ethical measures apply mainly in the medical field. While it is not necessarily of collective interest whether the next 'smart device' will be successful, entrepreneurs become accountable (at the latest) when they claim 'social impact' for themselves and their product(s). This impact arises when technological inventions are disruptive to such an extent that they influence legal, ethical, and social issues and can potentially cause harm, which is the case with Theranos or potentially with automated technologies such as smart cars. This question boils down to what criteria societies use to evaluate an idea and, consequently, a prototype and to what extent these criteria are linked to the abovementioned expectations or to what extent they are emotional, i.e. subjective. A simple example of this encapsulates the question concerning to what extent the desire for a solution is more dominant than its actual reliability.

Chapters V, VI and VII present and discuss the case studies and, in doing so, refer to the theory presented in III and IV. In the current examples, we examine the genesis of an idea in its initial state, addressing both the emotional connotation and the subsequent modifications that the notion and its related players undergo as they evolve. The notion prompts the evolution of the moral economy.

The investigation begins with the envisioned concept serving as a projection surface for dreams and futures in response to one's difficulties. It scrutinises the challenges and obstacles to growth and the techniques for surmounting them. In conclusion, we examine the assessment throughout the concept's development, its materialisation in the prototype, and its outreach and (re)claiming.