6 OBSERVATIONS – MATERIAL SEMANTICS OF REALIZING CREATIVITY

The following chapter complements the diachronic analysis of the creativity narrative in IT and focuses on the present. Building on the analysis of the historically constituted creativity narrative in IT, this chapter outlines how the meaning of this narrative and its immanent logics perform and present themselves today.

For this, I first examine *how* and by what means creativity is *expressed*. For this, I compare the propagated representation of creativity with the actual events and effects of this narrative before I continue to analyse the underlying organisation of the narrative's performative portrayal.

6.1 HABITAT AND HABITUS: EXPLICIT AND IMPLICIT CODES, METHODS AND PATTERNS OF EXPRESSION

I would like to proceed by exploring the idea of a performative portrayal of IT (in the form of its various human and nonhuman actors). It focuses on the representation of working methods with creativity as a characteristic and special feature. It is thus about a specific translation and representation of creativity inherent and intrinsic to the tech world. This *how* implies both habitus and habitat of this creative realisation. Here, an autoethnographic addition enhances the existing material with my *situated knowledge*[1], i.e., my observations, glimpses and sentiments originating from a particular site of the tech world for the purpose of revealing specific micro-sociological practices and idiosyncrasies. To contextualise, I briefly outline the factual and quantifiable

1 The use of the pair of terms "situated knowledge" is adapted from the American postmodernist and scholar in the field of technology and science Donna Haraway (1988).

framework of the enterprise, its research division and particular place where I have been present in order to then supplement autoethnographic additions.

6.1.1 AUTOETHNOGRAPHIC ACCOUNT

For this analysis, I draw on my accumulated experience gained by working in a think tank of IBM's largest European research centre for about four and a half years. I use these to broaden the scope of this thesis by adding an internal perspective. As the diachronic analysis has shown, IBM is not a typical representative of Silicon Valley. Rather, for a certain time, the company seemed to play the role of an anachronism, on which the young, up-and-coming companies could grind and set themselves apart, making IBM a constitutive element in shaping the Silicon Valley's meaning of creativity.

During my research on the creativity narrative in IT, I was regularly on site at the IBM research lab, and in some cases I even continued my own theoretical studies directly from there. The influence I was exposed to as a result is something I want to take into account here. It became increasingly obvious that although I was working in a long-established IT company that had played a decisive role in shaping the fate of technological development in the last century, I now increasingly had to see this very company in the role of the underdog, despite its heritage and experience, and that other IT companies had overtaken its rank in terms of name recognition and influence. This resulting ambivalent situation in my work environment, this mixture of having to prove oneself and being challenged at the same time has caused numerous irritations on my part, enhanced my sensibility for a need of differentiating IT's concepts of creativity and, not least, has had a constitutive influence on the research question of this thesis.

For a better understanding, a brief context overview of my working environment and my scope of work in the research laboratory will be provided first. Being "one of the most prolific research companies in existence",[2] IBM Research is the research and development division of the large-scale technology corporation IBM. With over 3000 researchers and engineers working in

2 Arne Holst, "IBM's expenditure on research, development and engineering from 2005 to 2018 (in billion U.S. dollars)", *statista*, last modified 9th August, 2019, https://www.statista.com/statistics/274821/ibms-expenditure-on-research-and-development-since-2005/.

twelve research laboratories in ten countries, it is the largest IT research organisation in the world. The budget in 2018 amounted to $5.38 billion.[3] IBM has been the top recipient of U.S. patents for 26 consecutive years. For 2018 this means a record of 9100 patent applications – followed by Samsung with a large gap and 5850 grants (in comparison, Apple, Google and Amazon as representatives of the comparatively young companies in Silicon Valley have all filed around 2000 patents).[4] A third of the more than 9000 IBM patents were filed in the areas of AI, cloud and quantum computing – thus areas that are currently identified by IT as the industry's main trends.[5]

Established in 1956, IBM Research – Zurich is the oldest IBM Research laboratory in Europe as well as the largest and most diverse one with scientists originally coming from over 45 different countries.[6] The institute's work led to ground-breaking inventions. Among the awards that scientists have received for their discoveries, developments and achievements at the Zurich laboratory over the years, the two Nobel Prizes in Physics for a total of four researchers are particularly noteworthy: in 1986, Heinrich Rohrer and Gerd K. Binnig received the Nobel Prize for the invention of the *scanning tunnelling microscope*; Karl Alexander Müller and Georg Bednorz received the Prize for the discovery of *high-temperature superconductivity* the following year.[7] In order to do justice to the importance of the location, the European Physical Society awarded the research centre the title "EPS Historic Site", making it one of 41 locations in Europe to date, including the Geneva CERN or the Paris Curie Institute to name but a few.[8]

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3 Ibid.

4 Ifi Claims Patent Services, "2018 Top 50 US Patent Assignees", *Ifi Claims Patent Services*, last modified 2nd January, 2018, https://www.ificlaims.com/rankings-top-50-2018.htm . Apple takes 9th place, Google 11th and Amazon 12th. However, it should be recalled that these companies do not attach the same importance to patents than IBM due to their own logic, which is determined by the creativity narrative, as was shown in the introduction to chapter 6.

5 Arvind Krishna, "IBM Marks More Than a Quarter Century of Patent Leadership with Record Year" *IBM Research Center*, last modified 8th January, 2019, https://www.ibm.com/blogs/research/2019/01/2018-patent/.

6 IBM, "IBM Research – Zurich. Fact Sheet", *IBM*, [accessed 8th August, 2019], https://www.zurich.ibm.com/pdf/employment/ZRL_FactSheet.pdf.

7 Ibid.

8 Luisa Cifarelli, "The EPS Historic Sites", *EPS*, [accessed 8th August, 2019], http://epn.eps.org/historicsites-booklet#p=37.

In terms of mere and tangible figures, IBM Research – Zurich can therefore be perceived as a highly innovative place. To further exploit and build on this, the so-called THINKLab exists, which acts as an intermediate think tank between local research on the one hand and industry as well as society on the other hand. Being an intersection in between these two poles, it negotiates between them, researches and strives for synergy effects. In its own official words:

> "The THINKLab at IBM Research – Zurich is a unique place in Europe to gain insights from IBM researchers, industry and trend experts in order to meet today's and tomorrow's challenges. This think-tank […] gives companies, academia and governments the opportunity to learn how IBM's R&D assets, trend research, advanced technologies and solutions can enhance their success. It is also the place where clients can get first-hand experience with innovative prototype solutions."[9]

In this environment I took on an intermediate role, with most of my colleagues having a scientific or technical background and are therefore closer related to the laboratory's scientific heritage. My own background in humanities initially made me both an insider (due to the corporate attempt of empowering the ambiguity tolerance and interdisciplinary orientation, my academic *deviation* was welcomed immediately) and an outsider (still, my background remained a distinction, albeit expressed in colleagues by enduring curiosity which in turn opened up a constant stream of fascinating discussions regarding different views on a certain issue). The latter changed noticeably within the first few months and after about a year I had the feeling that I started to understand the complex structure of this widely intertwined company and its specific nature. Especially in terms of outward appearance, I quickly adapted to the given status quo which advocates that clothing is of less importance and is not in favour of formal attire. Joining the lab, I first continued to wear a suit and tie, but abandoned this idea after a few days, as it seemed increasingly silly to myself. What I had intended as a small and harmless jibe against the *uniformity of the displayed non-uniformity* was not recognised as such in everyday life anyway, so that I received slightly irritated but also discreetly pitying looks when I walked down the corridors and in passing met work colleagues (still) unknown to me. Of course, there were people in classic business outfits,

9 IBM. "IBM Client Center THINKLab", *IBM*, [accessed 8th August, 2019], https://www.ibm.com/ibm/clientcenter/zurich/research/.

even those working for IBM Research; but somehow these people managed to camouflage themselves more effectively and remain more inconspicuous, blending in with the rest of the people. Quickly I disliked to be noticed this way and I changed my style of dressing. Nevertheless, the scientists' relation to clothing was generally determined by a lack of interest. If at all, clothing is simply not important enough to worry about, thus it may not have been my formal attire per se that irritated others but the fact that I consequently had to waste thoughts on it – for reasons unknown and incomprehensible to some of my colleagues and only to strive for an ideal that has no validity within the lab anyway. Of course, my assumption certainly does not apply to all employees, possibly not even to the majority. Clothing simply did not play a major role. Not only do I mention this as my initial practical joke failed so quickly, but also because both the impression of IBM's stiff business attitudes – which I had gained in advance through research – no longer existed, as well as no imminently visible new stylistic codes substituted for them. I had anticipated the usual clichés associated with the tech sector – i.e., intentionally casual clothing in form of hooded sweaters.

It was precisely this cliché of hoodie-wearing techies that I then encountered at an IT conference hosted by a major bank in Zurich. Two high-ranking Google managers were announced as speakers. One came from the recently built research centre in Zurich, another arrived from the USA where he held worldwide responsibility for Google's research on virtual reality. It was easy to recognize the two keynote speakers: both wore the iconic hoodies (in contrast to the vast majority of other participants and guests from the tech scene). More remarkable, however, was the fact that they smiled more or less constantly and without a break, demonstrating a permanent good mood and optimism during their presentations and beyond. Simultaneously, they struck me as strangely detached, very professional but not necessarily personal. As with few people, I was aware that I could not know anything about the private person behind the management role; nothing was disclosed by their outward appearance. Without being able to assign them to a company at first (we had no name tags or other identifying marks on us), both of them appeared to me as being smooth and especially concerned with standing out personally, knowing that they had the best to offer, letting people come to them without themselves taking too much interest in other participants or conversations. Like no other speakers that day they referred to their company, Google, numerous times, stressing out collective efforts and success, speaking about the "we" and "we, the Zooglers" (as Google employees in Zurich call themselves);

all at the expense of an "I". Also, I was surprised by their level of self-confidence. After all, both Google employees gave scientific lectures in front of a mostly skilled audience. I was used to IBM scientists having doubts and self-criticism, proactively pointing out possible research flaws or gaps. On several occasions, I watched and listened high-ranking IBM scientists being indulged in conversations about limits and overestimations of their own research with guests from other political, scientific or economic institutions, intrinsically concerned about others' opinion and evaluation on the respective topic in question. There was none of this in the Google talks. Admittedly, it was a very large audience – but even the next speaker, a philosopher of technology, came across as very self-doubting and far from being at peace with himself and his research compared to the two Google employees.

For local IBMers, as IBM employees tend to call themselves, it is especially true with regard to the rivalry with Google that competition does not only take place in the digital sphere, but also right on the spot in the very area. Just like IBM, Google's main European research lab is situated in Zurich as well, with only a few kilometres between both sites. When a "Google Streetview" car drove slowly past the IBM campus one day, it first slowed down and then stopped in front of the IBM compound for an extended period of time, provoking a confrontation with in-house security (when I saw the Google car slowly rolling by, I couldn't help but reminisce about an incident in the so-called "Little Italy" part of New York's Manhattan district, when a black limousine packed with grim-faced men rolled by in front of a local restaurant, who the bystanders assumed must have come from neighbouring Chinatown). In Zurich, what appears to be a show of force among hostile clans may have served the purpose of gathering as much data as possible from the research lab with the antennas and data collectors mounted on the car, as was quickly suspected). Although the little "incident" amused me and many colleagues for a short time, it did not leave a lasting impression that would have been discussed for a considerable time.

Whenever Google was mentioned in conversations, snippets of dialogue or brief interjections during our lunch together, for example, there was no pronounced feeling of *us versus them*. The location of Google Research in the immediate global neighbourhood was rather expressed in a certain uneasiness; a respectful caution towards the changed new, which the established place stag is now confronted with and, above all, the unpredictability, which Google brought with it through its geographical presence, so close to one's own place of research. At the same time, there was a certain feeling of appre-

ciation of not having to work in an environment with constant hyper-competitiveness but here, on the *island* which is IBM Research's Zurich lab, as some put it figuratively. However, there is by no means any fear of comparison, but rather a sometimes-defiant conviction that one's own approach (which even includes the concept of a private life detached from IBM Research) is more effective, socially acceptable, and will prevail in the long run. As a tangible practice this opinion manifests itself in occasional and, if possible, extended lunch breaks in teams or in pairs, in order to exchange and evaluate both subject-related and non-subject-related news and topics. Time and again, I was impressed by the interdisciplinary curiosity and intrinsic breadth of interests that were evident in such discussions. Thus, when IBM launched an AI application able to create unique recipes, a heated discussion between the main course and coffee could ensue about the pros and cons of cooking; with advocates of cooking as an aesthetic practice on the one hand, and advocates of the interpretation of cooking designed for pragmatic food consumption in the sense of minimizing time waste on the other (the latter was represented by engineers in particular). A glance at the neighbouring tables in the spacious cafeteria told me that we were by no means the only ones who were engrossed in conversation as lunch drew to a close – and many a time we continued the discussions on the way back to the office without one party emerging as the winner of the playful dispute. By no means was this curiosity limited to singular snapshots or individual employees. On my way to the open-air cafeteria at lunchtime, I once recognised a group of perhaps a dozen colleagues standing together by the side of a path, gazing at a spot on the ground, seemingly discussing it. Only when I joined them with interest did I notice a caterpillar on the grass next to the gravel path that seemed to attract the common interest of all the bystanders. Passing by and listening with one ear, I overheard a solitary researcher, apparently well versed in the local flora and fauna, lecturing on this particular caterpillar specimen, remarking how rare and strange it was for this species, of all things, to be found in this place at this time. Without having even the slightest knowledge about caterpillars, it was easy for me to guess that the colleague in question had a profound knowledge about this subject – which was appreciated by the surrounding colleagues with further curious and interested questions. The gathering to admire this obviously peculiar caterpillar specimen was by no means short-lived or trivial but had the character of a practical seminar on the example of a living object in the wild when looking at it from the outside.

At first, I underestimated the sheer size of the company behind the research lab – meaning not only tangible figures such as IBM's headcount or turnover, but also its historicity and the resulting institutionalized sense of long-lasting existence beyond one's own career or life span. The place itself – and by this I indeed refer to the physical existence of the things present – emanated an effect of *relevance* and *significance* on me: for example, when I walked past the office of a Nobel Prize winner or found myself standing in a room prepared with enormous effort and expertise for highly sensitive nanometer-scale studies, which is almost completely silent, thus considered one of the quietest places in the world, and in which highly sensitive sensors could detect my presence long after I had left the room again so that experiments could be carried out only hours after a human being had acoustically contaminated the room. I catch myself in no small part crediting the fascination of this space to my inability of scientifically comprehending such processes. My technical incompetence fuelled the intensity of my perception, since it was not distracted or diluted by any rational logical understanding of how such silence is technologically feasible. In fact, this is precisely what happened again and again in this specific chamber: regardless of their academic background and potential subject matter knowledge, visitors were less fascinated by the very experiments and results than by the context of possibilities inherent in the infrastructural framework. The idea of being here in one of, or perhaps even the most tranquil place in the world aroused astonishment and created a sense of humility and exceptionality in many people – including myself (it is hardly surprising that this has been one of the highlights of every guided tour). Both examples – the office of a Nobel laureate and the quietest laboratory in the world – always were in a passive state when I have been there. The office because something relevant once happened there that still resonates today, the lab because something relevant will only happen when I, myself (or someone else) is not present in the immediate vicinity. The site itself, then, augurs a sense of opportunity, all through these shimmering narratives of accomplished past and potential future creative endeavours. The place bears history and strives to create more stories through cutting-edge techniques and developments. The work setting is based on this and, depending on the age of the building and wing, emphasises either what has already happened or what is still to come. The atmosphere, determined by laboratories, individual offices and small to medium-sized meeting rooms seems to me to be very much aligned with practicality and feasibility. The THINKLab in particular is characterised by an architecture rich in daylight and space and an inte-

rior that corresponds to the purpose of the THINKLab and is therefore also designed for representational purposes. This includes a demo area in which IBM's latest developments are exhibited for guests, or various types of versatile meeting rooms in which one side of the room is usually completely covered by whiteboards, while in one particular room an entire wall is covered with flat screens that enable interactive access to an IBM Research collaboration tool using complex gesture control, which was intended to ensure the global networking and showcasing of all research projects from all over the world. In practice, however, it quickly became apparent that the implementation did not always live up to its promise in one place or another. Accordingly, the system did not enjoy the greatest popularity, which in turn was made no secret of. Researchers were irritated by something that claimed to be greater than it really turned out to be – though the tool was far from being non-functional or a mere gimmick. It may, however, be representative of a fundamental unease in the research community about any form of pomposity or what is perceived by them as excessive marketing. To me, this felt completely different compared to e.g. the loudish, colourful, playful extroversion of a Google centre, or the monochrome, cool, tidy and to me almost clinical looking interior as demonstrated by Apple. The working environment at IBM did not seem to be one thing or the other. Similar to clothing, the environment first and foremost serves a purpose that is not, at its core, aimed at the external effect. The façade remained a façade and was not part of the content but rather negligible.

Nevertheless, or perhaps precisely because of this, many media and companies seemed to be clearly more oriented towards companies whose façade gleamed. Interestingly, my impression was that this was particularly due to taking recourse to the concepts of creativity and innovation, even though I also found these concepts applied here at IBM Research – the sheer number of patents cited at the beginning of this paragraph underlined my subjective perception (which was of course highly irrationally charged by my presence at IBM) in a rational, tangible way. This provided a major driving force for my further endeavour: how could it be that, for all the differences between Apple, Google, Facebook and co., they all nevertheless rely on the concept of creativity, which, on top of that, was used by them in rare unanimity in a similar style?

It was all the more irritating for me to move from one newer building to the next that happen to be there for decades. It felt like I was travelling back in time to another place. In particular, the older part of the building ensemble was characterised by an academic, inward-looking seriousness that to me did

not fit in at all with the bright and extroverted THINKLab or the comparatively new Nanotech Centre. The campus is a tense simultaneity of what IBM used to be and what IBM is today. Both perceptions of this enterprise are merged on this site and alternate, building by building.

However, in both areas – the old and the new – there is an absence of overly hip lounge areas or leisure facilities. If anything, it is the old section that still houses a room dedicated to leisure (called the *Blue Lagoon*) featuring a piano, some older games consoles and the like. If you did not know about this place, you would not get there too quickly, as it does not seem to be a regular meeting place, nor to have been frequented too often (at least that was my perception, which is very limited, however, as I have only been there very rarely myself – but then never encountered anyone). Metaphorically speaking, I felt as though the *Blue Lagoon* was one of those hidden spaces that one stumbles upon by chance during an extended exploration into the uninhabited and unmapped areas of an old estate.

People from different age groups now work in this specific setting. Quite a few employees built decades-long careers in this one place, or at least within the IBM microcosm. These people experienced IBM at the beginning and, depending on their age, probably in the first third of their career as an immensely well-known, less volatile company; as a brand with economic supremacy and great influence also on culture and politics (here, the example of IBM's contribution to the moon landing as discussed in chapter 5.1.4 is just one more recollection).

Hence, for quite a few of my colleagues the research centre in Zurich is a place to stay – not a professional stopover or a steppingstone to a career outside IBM. Among some of the employees I was talking to and as quickly mentioned above, the IBM Research facility in Zurich is paraphrased and compared to the image of an island – in several respects: within the multi-layered corporate structures of its parent company IBM, the research division stands for a comparatively more tranquil economy, oriented less toward short-term success and more toward long-term sustainability. The lab and its employees appear to radiate a rather unagitated but keen mode of operation – of which its employees seem to be very well aware of.

6.1.2 NONVERBAL ASPECTS OF A DISCOURSE ON CREATIVITY

With the autoethnographic remarks on the spatial organisation of creativity at IBM in mind, I would like to contrast and analyse the localization of creativity in the IT world outside IBM.

For current research, places represent unique spaces[10] in which material objects are arranged and charged with meaning in such a way that they are experienced with a particularly composed spatial density.[11] These places have their own logic.[12] IT's atmospherically dense office landscapes are pioneers of this logic and, as is well known, export hits: on closer examination, it becomes evident that the specific creativity narrative of IT can be located particularly in the imitations of this logic, as it is exemplary to see on the concept of coworking spaces.

In fact, there are almost always references to a howsoever creative way of working in the description of coworking spaces. This not only happens emblematically in relation to the overall presentation, but also in a striking and literal sense, as the following example shows: the online magazine "Coworking Mag" lists twelve "awesome yet affordable coworking spaces in Palo Alto".[13] These are either "spots for people who require a creative space" (Sacred Space), workspaces "with energetic professionals who understand the importance of creative collaborations" (Enerspace) or straightforward "a creative coworking space" (BootUP Ventures), "housing a community of creative professionals and entrepreneurs" (Sandbox Suites).[14] While plenty of descriptions are literally referring to creativity, other coworking spaces presented by Coworking Mag are perfect for an "innovator who likes to experiment with new things" (Hana-Haus), or generally for "innovative professionals who harbor big dreams and

10 Here, the concept of space is based on Martina Löw's concept of the constitution of space. The constitution of space is determined by goods and people. In addition, not only individual goods or people can be linked to form spaces, but also entire ensembles of buildings or single room units. Seen in this light, the individual employee in an office at Google is just as much *space* as the gigantic headquarters of Apple, the Infinity Loop. Cf. Martina Löw, *Raumsoziologie* (Frankfurt am Main: Suhrkamp, 2000), p. 157.

11 Reckwitz, *Die Gesellschaft der Singularitäten*, p, 60.

12 Ibid., p. 61.

13 Asma Hafiz, "12 Awesome Yet Affordable Coworking Spaces in Palo Alto (2019)", *Coworking Mag*, [accessed 8th August, 2019], https://coworkingmag.com/united-states/coworking-space-palo-alto/.

14 Hafiz, "12 Awesome Yet Affordable Coworking Spaces in Palo Alto (2019)".

aspirations just like you!" (Nordic Innovation House), supporting "the community of innovators" (OnePiece Work).[15] Others are perfect to "chance upon a new idea" (Pacific Workplaces) or, if that *Heureka!* moment already happened, a workspace "that will transform your dreams into reality!" (Alley Coworking). In its conclusion, Coworking Mag stresses out that the workspaces presented above "will give you a great coworking experience wherein you will learn the importance of creative collaboration […]."[16]

While many coworking spaces – true to their name – rely on collaboration among each other and hope to stimulate *creative work*, some of them nevertheless offer quiet single cabins or small, isolated rooms. This alone would not be noticeable, but the firms also refer to the role model of creativity in IT in advertising these non-collaborative rooms.

HanaHaus, a coworking firm with workspaces in Newport Beach and Silicon Valley's Palo Alto has a "maker room" named "Silicon Valley" in their latter branch. Although quite small and almost constricting but "private", its description starts with the sentence: "This room can be as creative as you are".[17] In addition to a fancy ceiling lamp, this creativity seems to be expressed in bright wooden furniture, white chairs, at least one glass wall, a television, a mixer and / or a coffee machine as well as some pens for a whiteboard. This *Maker Room* is intended for up to eight people.

In this context (that happens to be in the tech-scene's epicentre, Palo Alto), the idea of Silicon Valley functions as an advertising medium on a small scale that is inherent in a culture of empowerment, which in turn emerged and is expressed through creativity.

However, this logic also operates on a grand scale, as can be seen not least from the phenomenon of creative cities.[18] Nowadays, an immense develop-

15 Ibid.

16 Ibid.

17 HanaHaus, "Workspace in Palo Alto", *HanaHaus*, [accessed 9th August, 2019], https://www.hanahaus.com/workspace-palo-alto#pal-private-seating. The Coworking space HanaHaus archetypically stands for the connection between collaborative work and creativity.

18 The term *creative city* is coined by Charles Landry, who researched urban creativity through his studies in Britain and Germany in 1990 and 1994. According to Landry, the notion has been preconfigured in a 1988 agenda by the former Australian Minister of Planning and Environment in Victoria, David Yencken, who suggested that a city "should be emotionally satisfying and stimulate creativity amongst its citizens". Moreover, "creative planning is based on the idea of cultural resources and

ment in the context of the spread and number of *creative cities* is observable that Charles Landry called a "rash" and a "mantra of our age"[19] already in 2005. As of 2019, the UNESCO (United Nations Educational, Scientific and Cultural Organization) homepage lists 180 creative cities from 72 countries as members of their UNESCO Creative Cities Network. One of the most impressive examples of the creativity narrative in IT's exportability with regard to the constitution of space is the so-called *Samsung Digital City* that resembles many aspects of the Silicon Valley space.[20]

The inherent logic of space in the sense of the creativity narrative in IT can be identified at various levels. While the above listed export examples were aimed at the big picture, the narrative can also be traced at an individual and personal level. Chapter 5.1.x change in work clothing towards a new but rather subtle uniformity, which is still valid today. Hence, the impression that formal clothing stands for restraint and narrowness is still present in IT today. When Steven Levy came to interview Mark Zuckerberg in Palo Alto for an afterword to a new edition of his influential book *Hackers: Heroes of the Computer Revolution*, he noticed:

> "Surprisingly, the CEO, best known for wearing North Face fleece, is sporting a tie. He explains that he is nearing the end of a year in which he promised his team that he would show up for work in neckwear every day. […] 'Maybe it's a charm,' he says, of the attire. 'But I think it mostly just chokes me.'"[21]

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the holistic notion that every problem is merely an opportunity in disguise; every weakness has a potential strength", thus showing many traces of the geosocial logic of the Silicon Valley, as it was examined in chapter 5.1. Cf. Charles Landry, "Lineages of the Creative City", *Creativity and the City Netherlands Architecture Institute (2005)*, http://charleslandry.com/panel/wp-content/uploads/downloads/2013/03/Lineages-of-the-Creative-City.pdf#page=11&zoom=auto,-82,259.

19 Cf. Ibid., p. 1.

20 The Samsung Digital City inhabits around 35000 Samsung employees. They work in four *landmark office towers* and 131 smaller buildings. On their homepage, Samsung advertises its digital city with pictures of leisure aspects such as massage tables, swimming pools, or a 30 feet high rock-climbing wall, referred to as *wall of innovation*. In addition, Samsung mentions incentives such as free food, free healthcare, teachers for the 900 children of employees and a *work smart* concept that allows employees to choose their time of work. Cf. Samsung newsroom, "20 Things You Didn't Know about Samsung's Headquarters in Suwon", *Samsung Newsroom*, last modified 29th September, 2014, https://news.samsung.com/global/purposely-leaked-20-things-about-samsungs-digital-city. Since 1987, Samsung has a branch in Silicon Valley as well. Cf. Ibid.

21 Levy, *Hackers*, p. 475.

In contrast to earlier times, when IBMers in black suits and ties symbolized exactly this alleged narrowness, it is now natural in this IT company of the first hour to appear in informal clothing (at least this seems to apply to the microcosm of the IBM research laboratory; in other business divisions, a formal attire is still somewhat commonplace). Formal clothing is seen as atypical, something that does not fit into this world. The subtle, yet existing pressure not to correspond to a stereotype of uniformity ultimately results in the same thing: a uniform, albeit with opposite signs.

As it was my impression presented in the previous chapter regarding my autoethnographic account, the Google employees' (the *Zooglers*') habitus mirrored this kind of uniformity in the sense of their physical expressions of both their clothing and acting. I could not tell anything about their personalities despite them being Google employees.

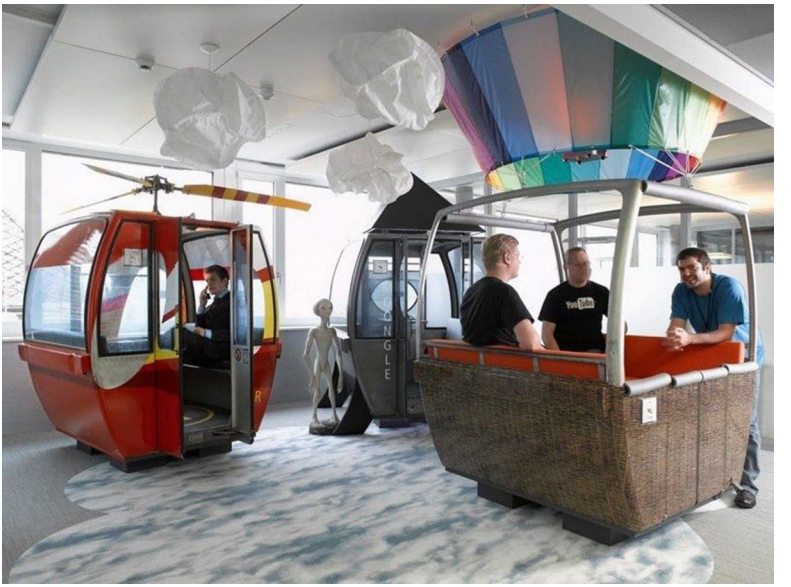
The special constitution of space, as produced by IT as an expression of the narrative of creativity, is also reflected in the arrangement of an office atmosphere. It is a mixture of objects, architecture and people, which should convey a harmonious overall picture. With Italian sociologist Maurizio Lazzaratto in mind, this arrangement is immaterial work in a broader sense for Reckwitz. For although it deals with materials, it is still about the overall impression conveyed on the basis of narrative and aesthetic references.[22] How this arrangement can translate into physical existence is exemplified by two pictures showing office scenes at Google Research in Zurich.

Google's offices have a reputation for being special and enjoy great popularity on relevant specific websites.[23] Their distinctiveness becomes apparent with the examination of the two following pictures:

22 Reckwitz, *Die Gesellschaft der Singularitäten*, p. 69.

23 Cf. Tom Boredpanda staff. "The Best Place to Work: Google and their Office in Zurich", *Boredpanda*, [accessed 22nd August, 2019], https://www.boredpanda.com/the-best-place-to-work-google-and-their-office-in-zurich.

*Fig. 4: Evolution Design: Pendant, People, Phone / Study Booth from Office snapshots 2012.**



* Office Snapshots, "Awesome Previously Unpublished Photos of Google Zurich, *Office Snapshots*, [accessed 22nd August, 2019], https://officesnapshots.com/photos/8449/.

The photograph displays a bright room flooded by daylight with three different types of gondolas. The floor in the room is grey, with an almost room-filling cloud-shaped carpet with printed dots of clouds on it. The ceiling of the room consists of white panels with lampshades consisting of cloud-like structures. The back of the room is bordered by a window front. The right wall seems to be semi-transparent. Other exterior walls are not visible.

The three gondolas are placed next to each other with the middle of the gondolas being in the background. The most prominent gondola at the right side of the photograph consists of a basket of a hot-air balloon including a grey carrying frame, coloured balloon stripes and parts of something attending to be a burner. There are two men in the basket wearing black t-shirts, one shirt sporting the *YouTube* brand logo.

Another man is leaning against the scaffold from the outside, relaxed and smiling with his elbows placed on the railing of the basket. The second gondola on the left side of the picture appears to look like a cable car cabin, painted in red and yellow. Small rotor blades are on its roof, the doors are open. A man dressed in a suit is sitting inside, talking on the phone, holding a white note in his hand. The third gondola, placed in the background, is again a different type and appears to be empty. Yet, its doors are open. A plastic figure, which should represent an alien creature, is placed next to the grey gondola. In opposite to the other cabins, this one sports a pyramid-like roof. The scene appears to be staged, with all furniture and people being carefully arranged: despite the unusual furnishing, the picture conveys a working atmosphere, with the three men at the right cabin seem to be involved in a conversation while the businessman sitting in the left cabin works undisturbed for himself. Both groups appear to not noticing each other. They give the impression of being able to concentrate on their work – whether alone or in a group. The third gondola in the background is unoccupied, conveying the impression that this *office* is not working to full capacity.

Despite sitting in various types of gondolas surrounded by tinkered clouds, nobody gives the impression of being in a strange environment. The photo serves a stereotype of Switzerland by converting the means of transport known for this country into workplaces. Furthermore, according to Google, they "play the 'Heidi' song at 5 pm every Friday, where [they] have beer, snacks and fun themes".[24] The second selected picture, which will be briefly presented here, refers even more directly to the legacy of the creativity narrative in IT:

24 Google careers, "5 Surprises about Google Zurich", *Google careers*, [accessed 24th August, 2019], https://careers.google.com/stories/5-surprises-about-google-zurich/.

*Fig. 5: Brainstorm Room, People, Whiteboard from Office snapshots 2008.**

* Office Snapshots, "Google Zurich Offices, *Office Snapshots*, [accessed 22nd May, 2019], https://officesnapshots.com/photos/11833/.

This picture shows a narrow, elongated room. At the back of the area is a large window that lets daylight fall into the room. The right side is bordered by a glass front. A whiteboard on the left sidewall occupies half of this wall. The whiteboard is covered with formulas in red letters. In front of it stands a man, writing something on the whiteboard while apparently explaining something about it. Two other people in the room listen and watch to what he has to say and show. One of them, a man, sits on a beanbag in a sidetipped paddleboat, made of blue and white painted wood. Wearing a flower-dotted shirt, the man has an Apple laptop on his knees and looks interested towards the whiteboard. There's another, albeit unoccupied beanbag in the boat that could hold another person. A rope tied to the bow of the boat lies loosely on the ground. The other person, who is probably a woman (on account of her physique) is situated in the front left corner of the picture. She sits on another blue-coloured beanbag with her legs turned over. A blue and white striped carpet is on the ground

between the boat and whiteboard. In the background, a pimple plant in a yellow-orange vase in front of a slightly different yellow-orange wall can be seen. A ceiling lamp and a small transparent table on the carpet complete the scenery.

The choice of colour has a very coordinated effect. The tilted boat, the sand-coloured bottom and the marine colours are reminiscent of a beach scene. In addition, people are not sitting on office chairs, but on loose, comfortable beanbags, also in matching colours. Again, the scene seems very posed. I chose the second picture because it is reminiscent of the working situation at Xerox PARC as it is shown in figure 3: From beanbags to whiteboards there are many identical details. The Google variant takes up the idea of casual, relaxed working and exaggerates it to the extreme. Nevertheless, it shows the evolution of the spatially expressed part of the creativity narrative in IT in a simple yet obvious way.

Both pictures emanate a pretended lightness, supposed to convey something playful and entertaining. Everything seems deliberately harmless, innocent and at the same time unagitated. In particular, the materials used in the first picture are reminiscent of a scene from kindergarten or primary school – exaggeratedly depicted. The very superficial and clichéd dealing with the subject of Switzerland serves this impression. The same is true for the second picture, where the marine scenery is depicted in an exaggerated way.

Apple, on the other hand, is known for its tidy, clean and rather monochrome workplaces[25], but at the same time is much more concerned with security. There are many myths surrounding the new "Apple Park" headquarters in Cupertino, California, with various websites taken on the task of (pseudo) investigatively compiling conjectures, facts and, above all, actual pictures.[26] But in fact, even after an extensive search, no current picture can be found that shows an interior area of the mega-building ensemble that is

25 Cf. Robin Parrish, "Inside Apple HQ", *AppleGazette*, last modified 5th April, 2012, https://www.applegazette.com/feature/inside-apple-hq/.

26 When the new Apple Campus was under construction, one website reads: "It's the chocolate factory for nerds. Search the web for 'Apple HQ,' and most of the results you get will be pictures of Apple's Cupertino headquarters – from the outside. […] But what we really want to see is what's inside the ultra-top-secret place where all our favorite gizmos are dreamed up." Cf. Amy Senger and Steven Mandzik, "Photos from inside Apple Headquarters", *1x57*, last modified 11th April, 2012, http://1x57.com/b/photos-from-inside-apple-headquarters/.

only open to employees. As Apple officials say, the goal of the new headquarter is to "achieve the security and privacy required for the invention of new products by eliminating any public access through the site, and protecting the perimeters against trespassers".[27] The Los Angeles Times reports that this is taking some drastic measures: "[…] an Apple executive haggled over the location of a single tree. 'Also if we move the tree an additional five feet in, the tree becomes a security issue for us,' Apple executive Meg Thomas wrote. 'People will be able to potentially climb the tree and hop the fence'".[28]

6.1.3 THE FINE LINE BETWEEN INTERNAL AND EXTERNAL FAILURES

IT – and especially Silicon Valley – claims not only to tolerate mistakes, but to even *love* them and to regard them as a fundamentally important part of its self-image: "In the world of tech startups, messing up is practically a religion"[29] is the title of a Guardian article in this regard. However, the logic of the creativity narrative in IT propagates a very special kind of failure, which is strongly determined by social practices. It is clearly defined what such a *messing up* is for IT, what kind of failure to love and what kind to ignore and abandon. In an interview for German television, a Yahoo employee deals with the dissolution between leisure time and job. While guiding the television team around the Yahoo campus and showing them packed refrigerators and numerous recreational facilities, he mentions that a separation between work and life does not exist for him. There is no work-life balance in this sense here because it is all one. Everyone enjoys what they do, which is why they no longer want to distinguish between working and living.[30] Free drinks, snacks, meal, medical doctors and dentists, a gym, drugstore, and even a laundry service

27 Amy Moore, "Complete guide to Apple Park", *Macworld*, last modified 20th February, 2018, https://www.macworld.co.uk/feature/complete-guide-apple-park-3489704/#toc-3489704-4

28 Chris O'Brien, "At Apple Campus 2, security will be a priority", *Los Angeles Times*, last modified 1st October, 2013, https://www.latimes.com/business/la-xpm-2013-oct-01-la-fi-tn-security-will-be-priority-at-apple-campus-2-20130927-story.html.

29 Adrian Daub, "The undertakers of Silicon Valley: how failure became big business", *The Guardian*, last modified 21st August, 2018, https://www.theguardian.com/technology/2018/aug/21/the-undertakers-of-silicon-valley-how-failure-became-big-business.

30 Cf. Bayerischer Rundfunk, Silicon Valley | Faszination Wissen | Doku | BR, YouTube, w.d., 30th September, 2016, accessed 8th June, 2019, https://www.youtube.com/watch?v=mF8JkyQZUKU. In his native language, German, he states originally: „Eine Separation zwischen Arbeit und Leben gibt es nicht. WorkLife Balance in dem Sinne gibt es

– everything on site at the company's premises. According to the Yahoo employee it is okay if other employees play soccer for an hour at noon because they'll stay an hour longer.[31] For him it is basically no problem to stay longer, he is always there anyway, the employee continues. In any case, however, people are always available outside the office as well. Once again, it should be noted that he does not seem to regret this circumstance at all. He does not count whether he is in the office for 40 or 60 hours. He doesn't feel like Monday morning on a Monday morning because he's always in the flow anyway. He doesn't feel like he has to switch himself on. He is always on. After all, work is what he enjoys most.[32] Without exaggerating the employee's position, he seems to sketch a perfect working world – precisely because it no longer seems like a working world. Just like Google (see chapter 6.1), this Yahoo example shows an environment that cares about its employees and their well-being. One is not left alone, even with medical problems.

A few hundred kilometres further south, an ostensibly even more satisfying way of working is currently developing: at Silicon Beach in southern California, business is being done on the beach. People get to know each other while surfing and invest a large amount of money in the start-up of the surfer next to them.[33] At the same time, more than one in three schoolchildren in the Silicon Valley area was homeless at the end of 2016,[34] to provide only one example of the ongoing housing crisis in this area. This figure presents a strong gradient and an invisible wall between those *inside* and *outside* IT. But also, for those that participate in the social structures of IT it is not easy to keep

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hier nicht, weil es ist alles eins. Wir haben alle Spaß dran was wir machen, wir wollen das gar nicht unterscheiden."

31 Ibid. In German, he states: „Wenn sie hier mittags 'ne Stunde Fußballspielen ist das okay, weil sie dann ne Stunde länger bleiben".

32 Ibid. In German, he states: "Es ist so, dass die Leute im aber auch außerhalb des Büros immer verfügbar sind. Ich zähle nicht ob ich jetzt hier 40, 50, 60 Stunden ransetze und ich fühl mich auch nicht montagmorgens oder Sonntagabend, dass ich irgendwie muss ich wieder auf Arbeit, sondern ich bin ja sowieso immer in dem Flow. Ich fühl mich nicht, als müsste ich anschalten. Ich bin immer an. Es ist ja auch das, was mir Spaß macht".

33 Cf. Jürgen Schmieder, "Unter der Sonne", *Sueddeutsche Zeitung*, last modified 25th June, 2019, https://www.sueddeutsche.de/wirtschaft/silicon-beach-unter-der-sonne-1.4498321.

34 Cf. Alastair Gee, "More than one-third of schoolchildren are homeless in shadow of Silicon Valley", *The Guardian*, last modified 28th December, 2016, https://www.theguardian.com/society/2016/dec/28/silicon-valley-homeless-east-palo-alto-california-schools.

pace. On the *Quora.com* website, which aims to be able to provide precise answers to questions and is known to repeatedly attract well-known IT actors such as Bill Gates for this purpose, the question was asked as to what a typical day in Silicon Valley would look like.[35] The respondents were not hesitant to point out the difference between presumed and experienced reality in a rather cynical way: a businesswoman living in the area since 1995 provides a detailed account of her day, which consists mainly of routine tasks (awakening children, walking dogs, etc.). Beforehand she sarcastically presents an ideal-typical day on which she gets up at 4.30 a.m. and drives to the chic and fancy gym, discussing world politics and investment ideas.[36] Other accounts are equally sarcastic in its basic tenor. With their sarcastic remarks they sketch the external expectations and the general impression of Silicon Valley's tech world that they believe there is.

Hence, people from within IT seem to be aware of the dichotomy between inside and outside, but not of the fact that it is possible to fail in a way that is unforgivable to the logic of IT. So, the following quote seems like proof of a double bottom. Because for Aaron Sittig, the inventor of Facebook's *like* button,[37] the Silicon Valley is everything but competitive**:**

> "The best way to think about Silicon Valley is as one large company, and what we think of as companies are actually just divisions. Sometimes divisions get shut down, but everyone who is capable gets put elsewhere in the company: Maybe at a new start-up, maybe at an existing division that's successful like Google, but everyone always just circulates. So you don't worry so much about failure. No one takes it personally, you just move on to something else. So that's the best way to think about the Valley. It's really engineered to absorb failure really naturally, make sure everyone is taken care of, and go on to something productive next. And there's no stigma around it."[38]

Nevertheless, there are unwritten laws and informal rules that must be obeyed. If one does not, no second chance is given, but one is consistently

35 Cf. Jessica Treat, "What is a typical day like in Silicon Valley?"*Quora* (blog), [accessed 22nd May, 2019], https://www.quora.com/What-is-a-typical-day-like-in-Silicon-Valley#MoreAnswers. [401] Cf. Ibid.

36 Cf. Ibid.

37 Cf. Fisher, "Cast of Character" section, para. 1.

38 Fisher, "Silicon Valley, explained" section, para. 2.

excluded. This can even be fatal, as the following example from the *Paris Innovation Review* shows: Glenn Mueller was a venture capitalist[39] who, contrary to the general rules, did not let the entrepreneur hold 30% of his start-up in shares, but only 2%. When the entrepreneur found out about this exploitation, he warned his network and coined the notion *vulture* capital.[40] Now, everybody knew about the disrespect of the *informal social norm*. Unpleasant consequences quickly followed for Glenn Mueller: "the deal flow stopped. Entrepreneurs stopped sending him their projects. […] no one spoke to him when he went to fetch his children at school, he was no longer invited to weekend barbecues, nor to any other socializing activities. He was gradually excluded from all community networks".[41] When the cheated entrepreneur founded Netscape, he refused to do business with Glenn Mueller's company and chose another investor. "On that day, Glenn Mueller committed suicide. He was a multi-millionaire and nothing he had done was illegal. But he had violated an informal standard of Silicon Valley and was expelled from the network of his community".[42]

This anecdote shows the including and excluding logic, which ended here in an extreme conclusion. It also draws a deterministic-normative picture of the creativity narrative in IT, which offers freedom of movement only within its own limits. It also shows that IT hardly has an eye for the exterior, which is not inherent in its own logic.

6.2 THE SOCIAL ORGANISATION OF A PRODUCTIVE PRACTICE

6.2.1 INTRINSIC BASIC RESEARCH VS. APPLIED RESEARCH

IBM and companies such as Google, Yahoo, Apple or Amazon are active in two rather different business areas and are permeated by different logics, although these overlap on some occasions. As an example, and as described in Chapter 5.1, IBM as an alleged antagonist played an almost constitutive

39 More on the notion of venture capitalism and its connection to the creativity narrative in IT in chapter 6.2.2.

40 Michel Ferrey, "Silicon Valley: a cluster of venture capitalists?" Paris Innovation Review, last modified 21st September, 2017, http://parisinnovationreview.com/articles-en/silicon-valley-a-cluster-of-venture-capitalists.

41 Ibid.

42 Ibid.

role in the development of the concept of creativity in IT in the 1970s and 1980s. Today, however, many of the old signs have reversed. Whereas a few decades ago IBM was known to almost everyone, today it is the above-mentioned companies whose reputation and brand value are at the top of the list. To a not inconsiderable extent, this is due to the fact that IBM has increasingly concentrated on business customers in recent decades and offers neither services nor products to private end customers. Only recently has this changed again with the AI called IBM Watson, the development of cloud software and, in particular, the publicity-driven open access to prototype quantum processors that can be (restrictedly) used via a cloud based website.[43] The influence of Google[44] on the creativity narrative in IT is correspondingly high, which is why it also influences the practice at IBM.[45] Nevertheless, there are still fundamental differences, as the disparate significance of patent filings exemplifies. The way in which the intrinsic differences (with IBM on the one side and Google on the other side) and the creativity narrative interact can be well demonstrated by the different views on research and development. For IBM's senior vice president Arvind Krishna, the number of patents filed also has to do with endurance and, as he puts it, with research for the sake of research that does not relate to practical areas of application:

> "Our work in these areas, and others, began long before there were practical enterprise uses for the technology, and that spirit of research for the sake

43 This access to quantum computing is called *IBM Q Experience*. Cf. IBM, "IBM Q Experience is quantum on the cloud", *IBM Q*, [accessed 2nd August, YEAR], https://www.research.ibm.com/ibm-q/technology/experience/. The concept of a quantum computer has a certain mystic overlay: *The visual representation of the* quantum experience *is not particularly exciting in itself. Calculations can be made, which are graphically represented without much sensationalism. Nevertheless, this tool was often used by visitors to give them a foretaste of the computers of tomorrow. Interestingly enough, the statement indicating that these were actually calculations made by a quantum computer triggered great astonishment, curiosity and sometimes even a certain reverence for the incomprehensible technical innovation. The quantum computer spoke for itself and didn't have to (and couldn't) convince anyone otherwise.* Cf. Autoethnographic account.

44 …and other companies mentioned above – for the sake of simplicity, only Google is mentioned hereafter, although the above-stated companies are meant here as well.

45 As outlined in chapter 6.1.

> of discovery is what has propelled us to lead the field in patent grants for more than a quarter of a century."[46]

With this statement Krishna advocates basic research. [47] Consequently, this type of research is also very much present in the Zurich research laboratory.

Large parts of the IT cosmos function according to a completely different logic. For companies like Google, it is common practice to not necessarily acquire and develop knowledge (e.g. new technologies) themselves, but to purchase this knowledge and to therefore close a gap to competitors or to build a competitive edge. Google, as an example, did not invent but acquire the technology for their mobile backbone structure *Android* by purchasing the eponymous start-up for an estimated $50 million in 2005, ensuring "the company's safe and profitable transition into the mobile era."[48] To lead the emerging race for supremacy in artificial intelligence research, Google bought the London-based start-up called *DeepMind* for an estimated $600 million in 2014.[49] DeepMind was only founded in 2010, made possible by the investment of venture capital. The AI developed by the company quickly made a name for itself so that not only Google but other companies such as Facebook showed interest in the young company as well.[50]

Overall, it has become part of the reporting that success of the *race for AI domination* – as it is called metaphorically-martially and with reference to the

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46 Arvind Krishna, "IBM Marks More Than a Quarter Century of Patent Leadership with Record Year", *IBM Research Blog*, last modified 8th January, 2019, https://www.ibm.com/blogs/research/2019/01/2018-patent/.

47 Remarkably, it was Vannevar Bush who popularised the concept of basic research in the USA when he replied to a letter from President Roosevelt on the future of science after war, in which Bush emphasised the importance of basic research for the fundamental further evolution of research. Cf. Vannevar Bush, "Science: The Endless Frontier", *Transactions of the Kansas Academy of Science (1903-)* 48, no. 3 (1945).

48 Nitasha Tiku, "Three years of misery inside Google, the happiest company in tech", *Wired*, last modified 13th August, 2019, https://www.wired.com/story/inside-google-three-years-misery-happiest-company-tech/.

49 Sam Shead, "Google's 400 million acquisition of London AI startup DeepMind just got very interesting", *Business Insider*, https://www.businessinsider.de/googles-400-million-acquisition-of-deepmind-is-looking-good-2016-7?r=US&IR=T.

50 Cf. Amir Efrati, "Google Beat Facebook for DeepMind, Creates Ethics Board", *The Information*, last modified 26th January, 2014, https://www.theinformation.com/articles/Google-beat-Facebook-For-DeepMind-Creates-Ethics-Board. Apparently, DeepMind made it a condition of the acquisition to set up an ethics council so that the technology could not be abused under Google's aegis.

Space Race of the 1950s – is not primarily evaluated by a company's own research results, but by the acquisition of AI start-ups having the appropriate expertise. For example, a data journalist on the Statista website finds Google in the lead with eleven acquisitions between 2012 and March 2017, followed by Apple with seven and Facebook and Microsoft with five acquisitions of start-ups each.[51] Even though a title like *Google Leads the Race for AI Domination* might sound more appealing to potential readers than a rather direct statement that Google has taken over most AI start-ups, it is interesting to note that in the short accompanying text neither the quality of the takeovers nor the amount invested in the own AI research is being mentioned. Instead of R&D – research and development – the term A&D – acquisition and development – is more appropriate for companies like Google.

6.2.2 ITERATION AND CONTINGENCY – VENTURE CAPITAL IN FULL FORCE

When analysing the development of the creativity narrative in IT, it has already been argued that the logic of that narrative is strongly influenced by a state of contingency.[52] The following will demonstrate that organizing the financing of new ideas (which enables them to exist beyond their mere theoretical existence) has perfected the exploitation of the contingent state and is an essential driver of the logic of the creativity narrative.

In chapter 5.1.5 it was shown that all important actors needed to set up a new company are located within the Silicon Valley – from donors of ideas to financiers. Christopher Stone, co-founder of Twitter, describes the situation as follows: "The infrastructure is here: the real estate people, the legal people, the you-name-it people. They get start-ups, so it's easier: 'Oh, okay, you're a start-up. So, here you go.' It's just easier to do start-up stuff, because everyone in the whole ecosystem knows about start-ups".[53] Those who do know best about start-ups are the ones that finance them as *pre-businesses*, hence business plans that are hardly more than an idea: venture capital (VC) firms and so-called *angel* investors.[54] In fact, VC is the financial heart and accord-

51 Cf. Felix Richter, "Google Leads the Race for AI Domination", *statista*, last modified 17th May, 2017, https://www.statista.com/chart/9443/ai-acquisitions/.

52 Cf. chapter 5.1.5.

53 Fisher, *Valley of Genius*, "Silicon Valley, Explained" section, para. 2.

54 The difference between venture capital and an angel investor is that an angel is an individual while VCs are companies and funds. Accordingly, venture capital firms usually have more money to invest, but they are also more selective. Cf. Becca, "Startup

ingly the drive of IT's narrative of creativity; not only because it often provides the financial basis for start-ups in the first place, but also literally as many of the most important venture capital firms are located on a single street that passes Stanford University just a few hundred meters away and which has since become the most expensive in the world: Sand Hill Road.[55] The agglomeration of money willing to invest not far from one of the great incubators of the tech world has brought the street to some fame. Similar to Silicon Valley for tech giants, Sand Hill stands as a metonym for venture capital ("Sand Hill Road rules Silicon Valley")[56] – and is thus a network[57] within another, broader network, which further underscores its significance.

For the companies located there in particular as well as for venture capital in general, a special focus is on emerging high-technology companies with an insecure future that would otherwise not have been financed.[58] This includes research on AI, as "around 42% of the AI companies acquired since 2013 [until 2018] have had VC backing".[59] As already mentioned in Section 6.2.1, it is in particular the large tech companies that act as VC firms when it comes to acquire AI start-ups. The logic of VC is therefore not limited to classic venture capitalist firms, but describes the predominant type of financing in the outlined world of IT.

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investment: What is a VC?" *twine* (blog), last modified 17th April, 2017, https://www.twine.fm/blog/vc-startup-investment/. For the sake of simplicity, however, the following only refers to venture capital, though this implies the investments of business angels, unless otherwise stated.

55 With $111 per square meter, renting office space in the USA is nowhere more expensive than here; even the famous Fifth Avenue in Manhattan is cheaper by $9 per square meter in direct comparison. These figures are from 2014. Cf. Bloomberg, "Venture Capital: Sand Hill Road Rules the Valley", *Bloomberg*, last modified 4th December, 2014, https://www.bloomberg.com/news/articles/2014-12-04/venture-capital-sandhill-road-rules-silicon-valley. 422 Ibid.

56 Ibid.

57 The use of the terms *actor* and *network* refer to the understanding related to the actor-network theory as described in chapter 5.1.x

58 Paul Gompers and Josh Lerner, "The Venture Capital Revolution",*Journal of Economic Perspectives* 15, no. 2 (2001): 145-168. doi: 10.1257/jep.15.2.145.

59 CBInsights, "The Race for AI", https://www.cbinsights.com/research/top-acquirers-ai-startups-ma-timeline/.

Besides money, an investment can contain strategic advice in order to increase the chance of a successful (financial) investment.[60] In return for their investments, VC firms receive shares or equity of a company and hence earn the (partial) ownership as well as the hope to be able to multiply their investment by a later sale of the then hopefully successful new company.[61] As stated in chapter 5 already, contingency implies the necessity to take risks and with that the potential of disappointment – after all, there are good reasons why start-ups take money from VC although they lose shares and therefore influence in their emerging company: the too high risk for *normal* banks is one of them (although not the only one, as will be shown later). The risk for VC can be minimized by risk diversification. This means that a VC company does not only rely on one potential start-up, but on many at the same time. If one is successful, it not only recoups the investments made in this business, but also subsidises the failures[62] of other company ideas that have failed.[63]

This is of great significance for the creativity narrative in IT if the underlying process is examined more closely and associated with the concept of *iteration* in a slightly, yet crucial modified form. This is due to the following. The term *iteration* originates from mathematics but is nowadays frequently used in various fields with similar, yet slightly iridescent meanings.[64] What

60 Stuart Logan, "What is a venture capitalist?" *Quora*, last modified 7th June, 2017, https://www.quora.com/What-is-a-venture-capitalist.

61 Becca, "Startup investment: What is a VC?", https://www.twine.fm/blog/vc-startup-investment/.

62 The notion of failure is related to the concept outlined in chapter 6.1.2.

63 Depending on the source, the failure rate of start-ups in the US is roughly between 50 and 90 percent within the first five years of their existence. However, the longer a company survives, the more it is likely to continue to exist. Cf. Failory, "The Ultimate Startup Failure RatevReport", *Failory*, last modified 2019, https://www.failory.com/blog/startup-failure-rate.

64 In philosophy, for example, Edmund Husserl uses the concept of iteration to describe the alteration of a conceptual meaning that is modified each time the concept is used. Each use of a concept irrevocably changes its meaning. Accordingly, there is no original, correct definition of a concept to which one could refer, but rather modifications which in turn refer to modifications and further develop a concept. Cf. Martin Heidegger, ed., *Edmund Husserls Vorlesungen zur Phänomenologie des inneren Zeitbewußtseins* (Halle: Max Niemeyer Verlag, 1928), p. 450ff. Within this thesis, however, the concept of iteration is not understood in Husserl's way, especially not with regard to the development of the concept of creativity in IT.

all understandings have in common, however, is the assumption that iteration describes a repetition that takes place step by step or repetitively, with the aim of approaching or achieving a certain objective or purpose. Translated into the logic of venture capital, this means that a repetition stands for an investment in a single new company with the goal being the successful growth of that company. Now, as many repetitions are made until a company is successful. The difference to a regular understanding of iteration (with all area-specific variations) lies in the meaning of repetition and in the correlation with contingency. Here, repetition does not mean a repetition over time, but a broad diversification in the awareness of the high probability of failure. Thus, the idea of investment is repeated by funding different start-ups simultaneously instead of chronologically. Instead of repetition, duplication appears to be a more suitable term.

The reference to contingency here is not only intriguing because of the iterative process' ability to reduce the prevailing risk in the face of the permanent uncertainty through duplication (formerly repetition). Usually, contingency is exposed by various approaches to the attempt to be overcome.[65] The iterative logic of venture capital[66] determines that many individual risks must be taken in order to minimize the overall risk. Despite a hard selection and preselection (so-called pitches), the failure rate shows that it is primarily about quantity instead of quality without exception. Not only does the logic of VC welcome contingency, it also needs it for its iterative process – a process in which there is no reduction but an increase in complexity.

In a certain contrast to the dotcom bubble period of the late 1990s,[67] potential start-ups are nonetheless dependent on presenting their ideas in a convincing way. Despite the logic of a contingent-iterative risk diversification, VC companies carefully select their protégés. In addition, from a start-up perspective it is not only relevant how much money one could raise for an

65 Niklas Luhmann, for example, attempts to overcome contingency through communication. The aim is to transfer the basic openness of human attitudes and actions through communication into a holistic, emergent order, which then leads to a reduction in complexity and a decrease in unpredictability. Luhmann refers to this emergent order as social systems. Cf. Niklas Luhmann, *Soziale Systeme. Grundriß einer allgemeinen Theorie* (Frankfurt am Main: Suhrkamp, 1987).

66 With reference to the significance of VC for the IT narrative of creativity this refers to the logic of IT as well.

67 Cf. chapter 5.1.5.

idea, but also who provided this money. Venerable VCs who can pride themselves on having already invested in companies such as Facebook and Google or Twitter and Skype and now reside on Sandhill Road[68] are considered by industry experts to be the *holy grail* of investment.[69] Receiving an investment from such companies – even if it is a significantly smaller fund than an alternative offered by a lesser-known venture capitalist – sends a signal to the entire ecosystem. As a result, there is a shift in defining *success* that in turn affects the creativity narrative.

For the financial backers, it is a matter of recognising potentials, thus following the tradition of IT's creativity narrative as it is outlined in the previous chapters. To be creative means to envision creativity. VC firms are successful if they are able to recognise and realise a presented potential (by funding it, not by producing or developing it). For prospective founders, the moment of success also shifts: success does not only occur when a service or a product can actually assert itself on the market, but already in advance, with the successful presentation of the non-existent service or product yet to exist. This can be summed up in the words of former Google product manager and founder of an early social network service Orkut Büyükkökten.[70] For him, the distinctive feature is not the amount of new ideas, but the ability to implement it, turning it from abstract to reality.[71]

First and foremost, however, it is a question of pretending. Often the narrative of known successes is adopted and reused without necessarily having the same great potential – as it was for example with Apple and other companies developing the personal computer. Thus, proposals for investments are often bursting with megalomaniac approaches. Everyone sets out to change the world following in the footsteps of digital models.[72] Even within IT, this tendency has not remained without criticism. On the contrary, many see the

68 The examples meant here are Kleiner Perkins Caufield & Byers and Andreesen Horowitz. Cf. Bloomberg, "Venture Capital: Sand Hill Road Rules the Valley", *Bloomberg*, last modified 4th December, 2014, https://www.bloomberg.com/news/articles/2014-12-04/venture-capital-sand-hill-road-rules-silicon-valley.

69 This has been told to me in a personal conversation by a tech manager and *angel investor* in 2015.

70 Cf. Jesse Lichtenstein, "The Real", *The New Yorker*, last modified 21st March, 2004, https://www.newyorker.com/magazine/2004/03/29/the-real.

71 Cf. Fisher, *Valley of Genius*, "Silicon Valley, Explained" section, para. 2.

72 In a more specific example, a teenager received a $100,000 scholarship from the Peter Thiel Foundation to mine asteroids for the idea of extracting all the rare minerals

motivation of the tech scene only in the accumulation of money. For some, this even sounds like a farewell to the *old days*. For Sean Parker, co-founder of Napster and former Facebook consultant, the logic of VC marks the entry into the "post-social media era",[73] in which it is not about the idea or the project, but quite simply about money:

> "It's all the people who would have become investment bankers who want to go start internet companies, and it's a purely commercial, purely transactional world. It's just become this transactional thing, and it's attracted the wrong type of people. It's become a very toxic environment. A lot of people have shown up believing, maybe correctly, that they can cash in. But that's Silicon Valley the ATM machine, not Silicon Valley the font of creativity and realization of your dreams".[74]

Creativity is (still) in demand. But the narrative has shifted and is now home to the hypothetical, speculative, purely virtual. The logic of venture capital promotes a general climate of opportunity and change, encouraging optimism and innovation – but also the constant danger of being *outsmarted* by someone who is faster, more innovative but most importantly the better persuader and pretender. As a consequence, the organisation of creativity has become hypercompetitive,[75], comparable (by means of its financial value) and can therefore be ranked and evaluated. This, too, is strongly criticized by members of the IT sector, as a further quote from Biz Stone demonstrates, who almost cynically describes what he considers to be the existing exaggerations of the VC logic presented here:

> "Only in Silicon Valley can you be like, 'Yeah, we would like $10 million and we'll sell you a percentage of our theoretical company that may one day have lots of profits and if we lose all the money we don't have to give it

found on them. After receiving the scholarship, however, his interest focused on other projects. Cf. Alexandra Wolfe, *Valley of the Gods* (New York: Simon & Schuster, 2017).

73 Fisher, *Valley of Genius*, "Silicon Valley, Explained" section, para. 2.

74 Ibid.

75 The concept of hypercompetitiveness is derived from Reckwitz, who states that markets live on attention and cultural valorisation. In addition, he concludes that there is a pronounced, unpredictable competition for attention and appreciation of uniqueness. Cf. Reckwitz, *Die Gesellschaft der Singularitäten*, p. 114. However, Reckwitz neither refers the unpredictability directly to the concept of contingency, nor does he describe venture capital as a decisive development or even as a usurper for this development.

> back to you. And maybe we'll start something else.' In what crazy world does something like that exist? […] I mean it's just crazy. […] Here's what some people do. They say, 'We need $25 million, but you know, just so we can stay focused my cofounder and I each need $3 million of that money in our bank accounts. Then we don't have to worry about bills so we can really focus. Okay?' And then they blow the money and they say, 'Oh, well, that didn't work out, but we're still keeping the $3 million each, so now we're rich.' What the hell? That is crazy. So, it's a crazy world. This is like some kind of nutty place where you can do that kind of stuff".[76]

At the same time, the narrative refers to all the past tales that have shaped the understanding of Silicon Valley (and that were examined in the previous subchapters for their influence on the creativity narrative in IT). The old stories retain their influence on the narrative, which of course does not completely reinvent itself. However, human actors are now very aware of the creative heritage of Silicon Valley and its specific *otherness*, which they use to promote one's own creative ability (and *otherness*) – hence, the creativity narrative in IT became a self-referential tool, used to keep the contingent iterative process running by means of an autopoietic manner.

6.2.3 ON THE ONTOLOGICAL NATURE OF COMPUTATIONAL CREATIVITY

Since its inception in 1956, AI as a scientific field of research[77] is considered to be an interdisciplinary subject, whereby IT has been and continues to be a decisive factor in questions of technical feasibility from a developmental point of view. For this, it is of paramount importance that large IT companies such as Google, Facebook and IBM have massively entered the race for the development of artificial intelligence in recent years or have at least increased their commitment.[78] This also includes the postulate to develop artificial intelligence systems with the ability to be somewhat creative. The discourse about artificial creativity complements the creativity narrative of IT with an independent and quasi-inverted logic: the fundamental difference lies in the fact that so far, the creativity narrative in IT claims to enable innovative *things* (by means of products, services and ideas) to emerge through creativity. In contrast, artificial creativity is about using these innovative things to *create*

76 Fisher, *Valley of Genius*, "Silicon Valley, Explained" section, para. 2.

77 …whose development in relation to creativity in IT is presented in chapter 5.3.

78 Cf. chapter 6.2.2.

creativity itself. Therefore, it is the same people who *buy* or *sell* creativity – and thus add a quantifiable value – who also have the power of interpretation over artificial creativity. On the basis of the developments presented in Chapter 5.3, the following section will therefore outline and analyse how IT's view of the scientific field of research on artificial creativity is both influencing and influenced by the creativity narrative in IT.[79]

Despite its constitutive anchoring in the field of AI research, the study of artificial creativity "is a recent but burgeoning area of creativity research that brings together academics and practitioners from diverse disciplines, genres and modalities, to explore the potential of our machines to be creative in their own right".[80] In the course of this, parts of IT have come to realise that an understanding of artificial creativity can only be created through a comparative approach to natural creativity, namely human creativity.

Those IT enterprises who have already implemented the mindset to consider the concept of natural creativity are now not only confronted with a terminological understanding of the notion on creativity and questions regarding development and implementation, but also with ontological issues regarding the potential of an artificial consciousness and the resulting exploration of differentiating factors between humans and machines. Through the linkage to creativity research, the scientific part of research is of equal interest for artificial as well as natural creativity.[81] IT, on the other hand, takes a developmental engineering approach: as an engineering endeavour, it is claimed

79 By way of limitation, it may be noted that this subchapter certainly cannot claim to reflect all the major currents, actors, and developments in research into artificial creativity. This would not be possible in the context of this work from quantitative standpoints alone, since this young but broadly based area of research already has numerous and rather heterogeneous discursive strands from a broad range of special discourses.

80 Tony Veale, F. Amílcar Cardoso and Rafael Pérez y Pérez, "Systematizing Creativity: A Computational View", in *Computational Creativity. Computational Synthesis and Creative Systems*", eds. Tony Veale and F. Amílcar Cardoso (Cham: Springer, 2019), doi: https://doi.org/10.1007/978-3-319-43610-4_1, pp. 1-19. The recently published volume of editors from which this introductory quote is taken provides a comprehensive and broad overview of the subject area and related fields of interest and includes contributions from the leading experts in the field.

81 Ibid. However, and although the title of the article from which this quote derives from is *Computational Creativity. The Philosophy and Engineering of Autonomous Creative Systems*, the authors, who preface this as an introduction to a profoundly edited compendium on computational creativity, do not consider the *philosophy* to be an integral part of research on natural creativity, but rather scientific disciplines such as: "machine learning,

possible to construct autonomous systems that produce novel and useful outputs that deserve the label *to be creative*.[82] Here, too, the difficulty of defining creativity poses a challenge to the actors of this special discourse. In particular, institutions and associations that address the phenomenon of artificial creativity directly through research and development are trying to achieve a somewhat better understanding of the term. In this context, the former definition of artificial creativity provided by the Association for Computational Creativity [83] is of interest. Until 2013, this association suggested that "Computational Creativity is the study and simulation, by computational means, of behaviour, natural and artificial, which would, if observed in humans, be deemed creative".[84]

By adding the last few words, which reads *be deemed creative*, the above proposal for defining the creativity of AI systems points to the fact that creativity and *to be creative* are interpretative and evaluative ascriptions that require an evaluative capacity of interpretation that can differ – even if the conditions are objectively the same. It therefore takes human beings to evaluate and acknowledge and appreciate artificial creativity as such. Consequently, the updated definition approach adds the fact that it is the task of artificial creativity research to learn more about the phenomenon of human creativity and to develop systems that enhance human creativity – without necessarily having to be creative themselves.[85] Thus, the question of what it means to be creative seems to be equally valid for both artificial and human creativity research, notes the PROSECCO (Promoting the Scientific Exploration of Computational Creativity) research network.[86] In addition, these proposals

artificial intelligence, engineering, design, and experimental psychology". Cf. Ibid., p. ii.

82 Ibid.

83 The Association for Computational Creativity is an association on the subject of artificial creativity, which strives both for further development and the authority to interpret this field. Cf. Anna Jordanous, "What is Computational Creativity?" *The Creative Post*, last modified 10th April, 2014, http://www.creativitypost.com/science/what_is_computational_creativity/.

84 Anna Jordanous, "A Standardised Procedure for Evaluating Creative Systems: Computational Creativity Evaluation Based on What it is to be Creative", *Cognitive Computation* 4, no. 3 (2012): 246-279, p. 248.

85 Association for Computational Creativity, http://computationalcreativity.net/home/.

86 PROSECCO, "Introduction to Computational Creativity", *Promoting the Scientific Exploration of Computational Creativity*, [accessed 21st August, 2018], http://prosecco-network.eu/introduction-computational-creativity/.

for definition show evidence that there is a discourse strand, which considers the question of what artificial creativity is as ultimately not being effective. This led to diametrically opposed approaches in how to deal with the concept of creativity. The first approach does not give an assessment of creativity, as the following quote shows:

> "So creativity in the domain of sports […] is clearly different from creativity in the arts domain […], yet there are enough similarities for exemplary outcomes in each domain to be deserving of the same label, 'creative'. This heterogeneity makes creativity a notoriously difficult concept to pin down in formal terms, and definitions that favor one area of human activity (such as art) [sic!] are unlikely to do justice to other areas (such as science, engineering, or cooking) [sic!]."[87]

What is essentially expressed in this quote is: art is one domain of many. Initially, art has the same value for creativity as sport or cooking: all of them – according to the prevailing opinion here – are purposeful human activities, i.e., active processes leading to tangible results that can be described as creative in one way or another. Art is neither an exception here, nor is it seen as a possible origin of creativity or as an existential part of it. This approach towards artificial creativity is based on the concept of an expert system, as it has existed since the 1980s in particular.[88]

The second approach is more concerned with a fundamental understanding of creativity and considers complementary, ontological questions such as the possibility of an artificial consciousness: the author Pamela McCorduck, renowned primarily for her texts on the significance and history on artificial intelligence, summarizes the arguments "as to why machines […] cannot be said to think"[89] in four categories. Next to emotional or ethical reservations there are "Arguments of insuperable differences"[90]. For McCorduck, this *insuperableness* lies in the very essence of creativity:

> "The reasoning says that machines can't be said to think because intelligence requires creativity and originality, and no machine has been or can

87 Veale et al., "Systematizing Creativity: A Computational View", p. 2.

88 Cf. chapter 5.1.4.

89 McCorduck, *Machines Who Think. A Personal Inquiry into the History and Prospects of Artificial Intelligence*, p. 199.

90 Ibid.

> be creative and original. […] Intelligence, this argument runs, requires autonomy, and no machine can ever be autonomous. […] the only so-called intelligent tasks machines can accomplish are one of a kind; […] it won't be able to transfer that savvy […]. Intelligence means coping with a variety of tasks successfully and with originality. Even if a machine could do these things, it would not be conscious of having done so, and consciousness is a significant part of intelligent behavior".[91]

Even though opinions within the discourse differ widely, there seems to be an essential understanding that creativity does not equal creativity. There is hence a concluding tendency to draw a distinction. For example, journalist Geoff Colvin (2015) acknowledges the ability of computers to be creative in principle but reserves the *high-value creativity* for humans.[92]

One applied example is AARON, a computer program which has been developed and continuously improved since the 1970s by the British artist Harold Cohen. The system is capable of producing abstract images that have made it to the Tate Gallery. Yet, Cohen himself does not consider the program to be creative, partly because it cannot independently learn or discover new styles.[93] Rather, new styles must be written by humans in appropriate code form. Nevertheless, Cohen provokes people's exclusive claim to be creative by asking what it is then, what AARON produces, and how this can be distinguished from the real thing, the artwork produced by humans.[94]

A possible answer to this is provided by cognitive scientist Margaret Boden, who proposed a hierarchical classification of the concept of creativity into three levels, which differ significantly in their degree of unconventionality and complexity.[95] The basal level is called *combinatorial* creativity. Within known and familiar ideas, unfamiliar combinations are created, and analogies are made. This allows, for example, future scenarios and appropriate behaviour patterns can be developed. What has already been learned can be applied to unknown situations, since, according to Boden, analogies create similarities to familiar situations. The second level is known as the ground

91 Ibid.

92 Geoff Colvin, *Humans are Underrated. What High Achievers Know That Brilliant Machines Never Will* (New York: Penguin, 2015).

93 Harold Cohen, "The Further Exploits of AARON, Painter", *Stanford Humanities Review* 4, no. 2 (1995): 141–158.

94 Ibid.

95 Boden, *The Creative Mind: Myths and Mechanisms.*

explorative level. For Boden, this is the ability to create new, surprising ideas within the existing field. The value of explorative creativity lies in the demonstration of new possibilities within an existing framework that no one previously suspected or knew of.[96] Boden describes the third form of creative work as *transformative* creativity. According to Boden, transformative creativity strives to replace the old with something new, whereby it automatically becomes a danger to the established, but can hardly encounter a general understanding.[97]

From a discursive point of view, it seems reasonable to speak of (artificial) creative approaches rather than (artificial) creative abilities. Ultimately, technical feasibility is of secondary importance for discourse. More interesting is the power of the discursive truth, which propagates the existence of artificial creativity. As part of the creativity narrative of IT, the phenomenon of artificial creativity is also subject to the assumption that the question of how this phenomenon expresses itself is more relevant than the question of *what* artificial creativity is. Discursively speaking, something is creative if it appears to be creative – just as the interpretive approach above expressed it with the words *to be deemed creative*.[98]

Accordingly, the creativity narrative in IT is of importance, since its dominant position in the creativity discourse (which includes the special discourse of artificial creativity research) determines what can be perceived as (artificially) creative.

96 Ibid.

97 Ibid.

98 One aspect of the Chinese Room thought experiment may function here as an analogy: the simulative character of (apparent) intelligence does not allow an observer to distinguish it from supposedly "real" intelligence. A *pretending as if* is sufficient. Again, the question of *how* and *by whom* is perhaps more relevant than *what*. In terms of creativity, the situation may be similar: if IT simulates artificial creativity to an extent that can produce the same effects as human creativity from an external point of view, this seems to be a variant of creativity that has become a discursive truth. Cf. John. R. Searle, "Minds, brains, and programs", *Behavioral and Brain Sciences* 3, no. 3 (1980): 417-45.