

HACKING AS ADAPTATION: A New Agenda for Planning through the Lens of Copenhagen's Sharing Economy

Columbia University

Graduate School of Architecture,
Preservation, and Planning

THESIS BY ISHA PATEL



Mark Pelling, a co-author on the IPCC Fifth Assessment report has also been a prominent voice on the theoretical frameworks of transformative adaptation. Positioning it relative to resilient and transitional adaptations, he identifies transformation as the most dramatic and fundamental form of adaptation. While transformation is not inherently a top-down process, political regime changes are frequently noted as examples.

Pelling highlights social learning and self-organization as two key ingredients to adaptation. In order for an adaptation to be transformative, significant tension between dominant and alternative schools of thought needs to exist in conjunction with critical reasoning, a willingness to take risks, and active civic engagement (Pelling, 2011). In the presence of the aforementioned elements, a catalyst – such as a social, economic, or environmental shock, or a pull factor that incentivizes action – can activate the adaptive capacity of a system such that new organizations form and social learning occurs. Similarly, Revi (2014) points to a dissatisfaction with the status quo and an ability to tap into or generate a resource base as the drivers of adaptation. The importance of some sort of activation energy to both initiate and sustain the adaptive capacity is also noted by Kates (2012), who highlights a supportive social context as a key internal driver and a multitude of pressure points, combined with adequate local leadership, as external drivers.

At its core, transformative adaptation challenges social priorities, norms, values, and functions (Pelling, 2011). The changes induced are “non-linear” (Revi, 2014) in that they go beyond incremental adjustments in policy and social action. Rather, they can be viewed as exponential. Transformative adaptation targets the root causes of vulnerability (Pelling, 2011) in a manner that bypasses traditional checkpoints of generating change.

Predictably, there are often significant barriers to adaptation becoming transformative. While Pelling (2011) generally cites vested interests and fear of change as among these barriers, Kates (2012) specifies “legal, social, and institutional conceptions of rights, longstanding resource allocation policies, customary protection and entitlements, and behavioral norms.” In other words, Kates (2012) is describing power structures. There is little argument that robust institutional frameworks can decelerate the decision-making process,

but methods of foregoing the linear trajectory of a decision-making processes vary contextually. Many researchers point to urban governments as the heart of successful transformations. This is particularly true for climate change. As consolidated geographical entities, cities can obtain a thorough understanding of their ecological footprints and utilize that knowledge to develop effective adaptation and mitigation policies (Revi, 2012). Besides contextual differences, the tangibility of transformative adaptation is contested in the literature. While some posit that transformation needs to be reflected in practical action, others assert that transformation can and should address invisible vulnerabilities such as imbalances in social power (Lonsdale, 2015).

PELLING'S RESILIENCE-> TRANSITION-> TRANSFORMATION FRAMEWORK

Mark Pelling places adaptation on a spectrum from resilience to transformation. Each point on the spectrum is a function of self-organization and social learning, with greater social learning associated with greater proximity to transformation. Social learning is the process of normalizing new societal values, ideas, and practices. It comes about as a result of tension between dominant and alternative views. An organization refers to any “space of engagement” where learning and adaptive capacity can grow. The development of both social learning and self-organizations is typically fueled by adaptive capacity, which itself is triggered by some environmental catalyst.

Pelling's concept of resilience hinges on “functional persistence” (Pelling, 2011). Other views on resilience equate it to a system transformation (Fainstein, 2015), but Pelling's definition is such that resilient solutions actively avoid disruption in favor of working within system bounds. Surprisingly, adaptation as resilience does include changes in social organization. Resilient adaptation can alter priorities and power structures, as long as long as the system architecture remains standing. Freive (2015) notes that resilient solutions are designed for the purpose of gaining an advantage. However, although resilient solutions do not directly challenge the system architecture, there is potential for upscaling individual cases to a point when adaptation becomes transitional or transformative.

Transition is one step beyond resilience in that it affects actual rules or regulations within a system, rather than just reorganizing existing processes. In turn, there is incremental change. Transitional solutions actively seek to innovate while still maintaining the existing system architecture. Whereas resilient solutions may seek to tame the influence of certain actors, transitional solutions seek government reform. Self-organization and social learning are still the key ingredients, but social learning that leads to for transitional and transformative changes necessarily calls for high levels of trust, willingness to take risks, transparency to test and challenge embedded values, active engagement, and citizen participation (Pelling, 2011).

Finally, in addition to demonstrating the five aforementioned characteristics of social learning, transformative change requires social learning to occur at an individual specificity, where alternate frames of thinking become the cultural norm. This type of transformation is often a result of conscious targeted “reform.” In other words, transformation is conscious disruption. Often triggered by disasters or other strong “push” factors, transformation is sometimes identified by regime change. As it stands, it would appear that the type of transformation necessary to combat climate change primarily involves the overthrow of malicious vested interests. As the previous section highlights, exact definitions on transformative adaptation are many and varied. This paper recognizes these distinctions but maintains that transformation entails a substantial disruption of the status quo.

As Susan Fainstein reminded the profession, urban planning is equally concerned with outcome as it is with process (Fainstein, 2005). While fair and democratic mechanisms are crucial to her vision of a just city, these frameworks do not guarantee a democratic outcome, as reality does not necessarily conform to plan. In the discourse on the scope and precise role of planning, a just and sustainable outcome aspect is often lost – a trend that is reflected in the influence of the market on neighborhood character and land use. Transformation, on the other hand, is precisely an outcome-drive approach. Thus, in planning for transformation, costs and benefits must be rigorously considered – particularly considering the scope of impact of transformational adaptation.

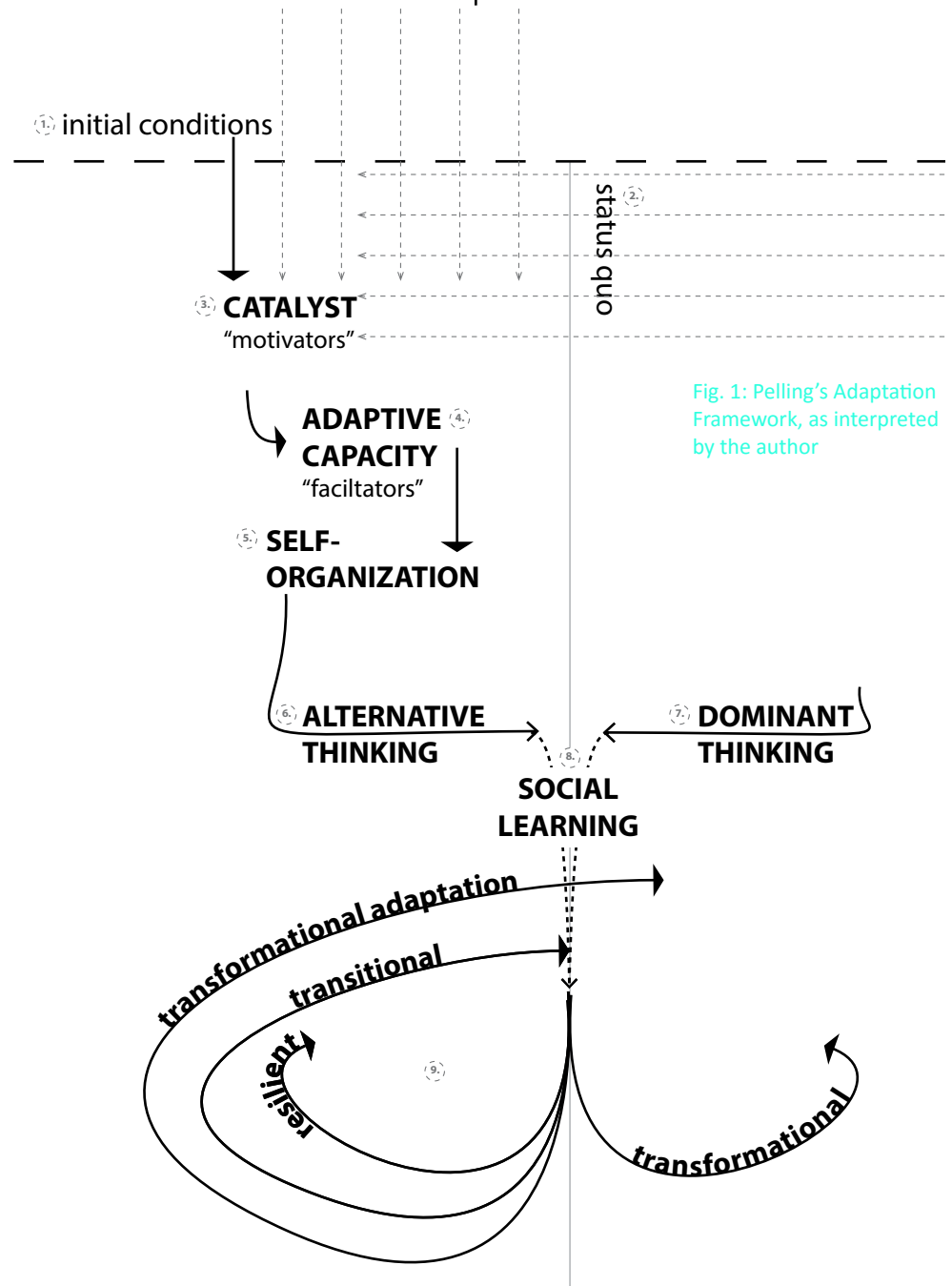


Fig. 1: Pelling's Adaptation Framework, as interpreted by the author

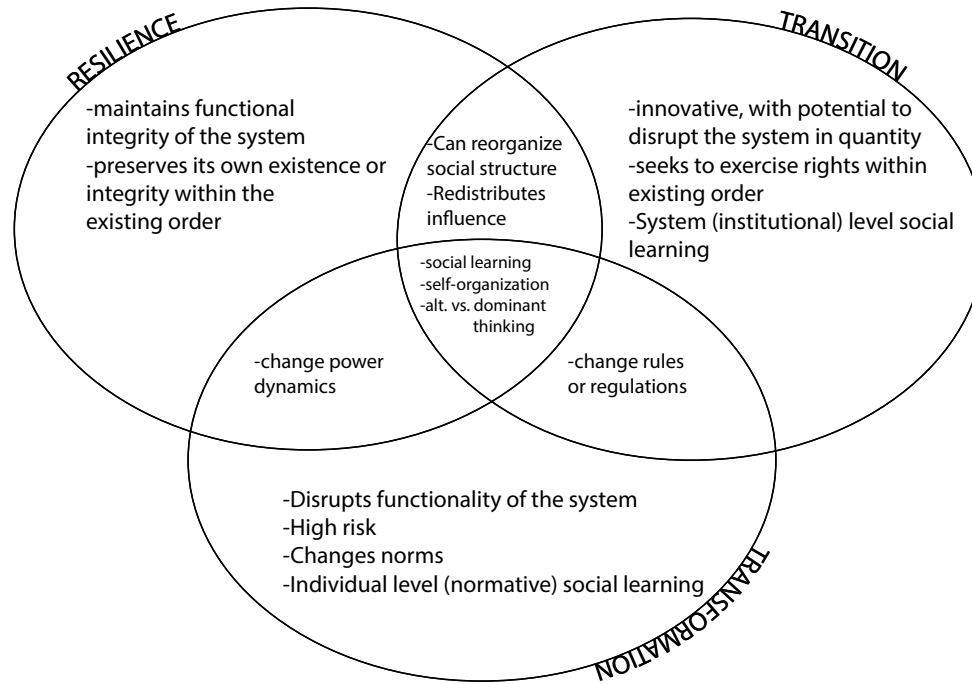


Fig. 2: Distinctions in types of adaptation, as interpreted by the author

“Hacking” is not common word in urban planning scholarship. With origins in the science and tech community, it has come to have many and varied connotations – many of which were relevant to this research. The following definition of hacking is a synthesis of feedback from formal and informal conversations from field research, personal experience with the hacker community, and a consideration of popular and scholarly literature reviewed below.

Hacking: *a process undertaken by an actor outside of an established system to rudimentarily derive an outcome, in a way that does not alter basic system architecture, but tends to undermine or shift existing power dynamics.*

hack: *an outcome of the hacking process*

By definition, hacking bears close resemblance to the process of achieving resilient adaptation. However, I hypothesized that the cultural appeal of hacking can serve a role in bringing about transformation.

ORIGINS OF HACKING

The first known use of the word “hack” beyond its denoted meaning to “cut with heavy blows” (Oxford English Dictionary) was at M.I.T. in 1955. Students used it to refer to elaborate pranks that they regularly devised. However, the people credited with really coining the term, “hacker,” are often the students of MIT’s Model Tech Railroad Club of 1958. The club was made up of students who focused on building and designing the physical train models, as well as those on the Signal and Power Committee (Levy, 2010). The latter group of students spent their time obsessing over how every part of the system functioned, and coming up with ways to tweak it or make it better. These projects – “undertaken...or built not solely to fulfill some constructive goal, but with some wild pleasure taken in mere involvement” – were called hacks (Levy, 2010). While hackers today are commonly equated with programmers, the hackers of the TRMC – obviously lacking the computers and software we have today – hacked electrical systems and tinkered with hardware. Although this “tinkering” sounds like something dismissible as crude or irrelevant, it’s understood that a true “hack” must be something innovative and imbued with some “technical virtuosity” (Levy, 2010).

This marked the advent of a hacker culture that, over the next decades, would grow to new levels and spread beyond anything the original hackers could ever imagine. But first, it was a founding principal of MIT’s famed AI Lab and generally facilitated an environment at MIT that attracted what Levy (2010) calls “the strays – science-mad people whose curiosity burned like a hunger, who...would be exploring the uncharted maze of laboratories at MIT” and spending their nights hacking to optimize the world’s first general-purpose programmable computer built with transistors (the TX-0). This hacking was driven by sheer intellectual curiosity.

The next major phase of hacker-dom was the 1980s when a group of Milwaukee teenagers were arrested for 60 computer break-ins from Memorial Sloan Kettering to a Nuclear Defense facility in Los Alamos. In line with the hacker ethic, these break-ins were primarily a product of intellectual curiosity (CNN). Though there was no real damage was done, the story gained enough

Introduction

media attention to give “hackers” a negative connotation as criminals with malicious intent. 16 new pieces of cybersecurity legislation were passed, and remain in place today (CNN). While the hacker ethic was still doctrine in tech communities, the mainstream population’s negative perception of hackers was upheld by numerous computer crimes, particularly in the 1990s, breaking into, and tampering with, systems including those of the First National Bank of Chicago, NASA, the Korean Atomic Research Institute, and US federal websites (Trigaux, sptimes.com). They were considered malicious forces against whom we needed to be protected. Hacking had security risks including divulging personal information or corruption of information. Hacking had security risks including divulging personal information or corruption of information. Coleman found resentment among computer hackers and programmers upon calling these people hackers, however (Coleman, 2012). They instead referred to them as “crackers,” as they cracked important security systems (“The Jargon File”).

TODAY’S HACKERS

Today, the negative perception still exists in terms of cybersecurity. However, with the rise of the global tech sector, hacking has become a much friendlier term. Like the early hackers, this generation is also led by the youth. The modern day “hackathon”- originating in 2006 with Yahoo’s first Hack Day – tends to happen at universities and tech offices as a means to spark creativity, quickly develop ideas, and often just have a good time. These hackers are people who “program enthusiastically and who believe that computing and information sharing is a positive good,” and that it is their ethical duty to facilitate access. In many ways, these hackers have begun to spread the “hacker ethic” to a wider population (Zapico, 2013).

The projects produced at hackathons tend to be software or encoded hardware. However, as the concept of hacking has become more popular, the term has been adopted outside the computer tech community. Now, the word is used to describe a wide variety of things on a wide variety of scales. Civic Hacking, for instance, is generally defined as a citizen-driven process for coming up with solutions to problems faced in cities, usually through technology (Levitas, codeforamerica.org). While civic hackers often use

Etymology of a Word

the same technology as computer hackers, the requisite civic engagement component of their projects is telling of how hacking has evolved. Here we see altruistic motivation for real social impact, as opposed to a pure dedication to technological innovation and intellectual curiosity.

However, the iteration that is most illustrative of how “hacking” has evolved is the “life hack.” Defined by Wikipedia as “any trick, shortcut, skill, or novelty method that increases productivity and efficiency” (Wikipedia, 2016), life hacks range from DIY tweaks to furniture to tips for more efficiently chopping vegetables to a method for projecting your smart phone screen without any additional technology. These everyday tips and tricks may not always reflect the unadulterated hacker ethic, but it demonstrates that “hacking” has become something positive – a show of cleverness, without the previous backlash for rule-breaking. In many ways, the rise of open information and open-source code has facilitated this movement. As more people could tweak existing code, develop apps, and build whatever they wanted to build – the tech community became much more visible, and the popularity of their jargon grew the same way.

In all of its iterations, the idea of “hacking” is based in systems thinking. A hack – regardless of form or intent – seeks to beat the system. The original computer hackers made their way into secure computer networks, disrupting (intentionally or not) the systems designed by computer scientists and engineers and, in the process, gave themselves power over system functions. Yet, there is nuance to this. The popularization of the word “hack” has led to connotations that contradict the real essence of hacking. The synonymization of a hack with any sort of innovation is often bothersome for programmers and developers who use the word to describe a “quick and dirty solution” (Dorph, Personal Interview) – something of a bandage. The glorification of hacking can thus potentially both dilute the meaning of “hack” and minimize achievements that are more than just makeshift solutions. This is something that became apparent in this research process.

HACKING



Fig. 3: Hacking in everyday life

Existing literature contains numerous concepts that are either similar to, or encompass, the concept of “hacking” presented in this paper. These include grassroots movements, entrepreneurship, urban innovation, informality, etc. While many of these definitions overlap, one term that is often misused synonymously with “hacking” is “disruptive innovation” (Christensen, 2015). These two concepts imply the similar impacts on systemic power dynamics, yet are fundamentally different in both their intent and approach. While disruption actively seeks to cause radical change at a system level, the purpose of hacking is to derive an outcome without reconfiguration the system architecture. Zapico notes a resurgence in the use of the word “hack” for non-computer related things like personal development, furniture design, and various other everyday activities (Zapico, 2013). Considering the etymology of the term discussed in the previous section, this reflects a certain identification with of the concept of makeshift, individual actions that appeals to today’s youth such that they have adopted it into almost every facet of everyday life. A casual scroll through Facebook or Twitter feeds featuring lifestyle blogs, tech websites, news sources, and friend-to-friend interactions often reveals several usages of the word. This was reinforced by the Twitter analysis as part of this research.

As Zapico’s dissertation is among the first academic papers to discuss this topic at length, the literature has yet to delve into the implications of the popularization and diversification of the hacker ethic. Zapico speaks theoretically of the “hacker ethic.” He identifies (1) practical skills and results, (2) passion, (3) openness of information, (4) creativity, and (5) work-leisure balance as its key components– and then watched many of these qualities play out in a 2011 Green Hackathon organized in Stockholm as part of his research. Specifically, he noted the following effects of being within a hacking environment:

1. There was an ad-hoc organization of groups and projects
2. A community was formed around hackathon theme of internet and open data for sustainability
3. There was a focus on getting things done and showing results
4. The element of competition drove the quality of projects forward
5. There was still a somewhat playful, friendly environment in which competition is not taken excessively seriously
6. The experimental style of the event helped cross-pollinate ideas and test concepts that may mature in the future
7. It showed examples of ways to collaborate in a hands-on way

Table 1: Various uses of hacking

UserName	TweetDate	TweetText
@JacobJJJohnsen	12/6/2013	@nikesoverheels you can use the smith machine to do hack squats. Really targets your quads
@ThorStevnss	9/18/2014	#expertnight New businesses are hacking the system
@llllalalalala	8/26/2014	The fact that I've learned how to hack the Kim K game has ruined my life and gotten me even more addicted.
@HPOHUE	8/21/2013	#Local #Hack - fruit explaining EA feral information systems #EASS13
@TatiLeea	5/5/2014	What the hell did somebody hack my twitter?
@joyobject	4/9/2015	Hacking paper crane to origami smartphone stand #origami #paperproducts
@thomdahl	2/24/2016	Video: Neil Patel on Growth Hacking with some great tips - http://bit.ly/1U0AzLm

Coleman offers a more theoretical analysis of hacking, noting how it advances liberal ideals including (1) protection of property and civil liberties, (2) promotion of individual autonomy and tolerance, (3) a free press, (4) ruling through limited government and universal law, and (5) preservation of commitment to equal opportunity and meritocracy. The key exception, however, is “productive freedom” (Coleman, 2012). Centered around a belief that source code should be open and available to edit and improve, productive freedom stands in stark contrast with intellectual property regulations of liberal and neoliberal frameworks. Harvey discusses neoliberalism as a theory advanced by “liberating entrepreneurial freedoms and skills within an institutional framework characterized by strong property rights, free markets, and free trade” (qtd in Coleman 4). Appearing to be a minor difference, productive freedom removes the power associated with ownership. It instead advocates a collectivism in which everyone benefits equally from technical progress. Yet, an unconstrained dedication to skills, results, and technical virtuosity can lead to progress that is actually detrimental to the commons or undermines hacker values. Accordingly, the ethos has evolved to include a moral sensitivity that considers the implications of hacking. Coleman observes that hackers have come to stray from the dominant notion of “liberal personhood,” i.e. the self-interested consumer and rational economic seeker (Coleman, 2012).

Looking collectively at these two works, the hacker ethic rejects any notions of privilege or unwarranted power. It embodies a light-heartedness that undermines egos to create a community of true collaboration and productivity.

So why even bother with hacking? The world has already witnessed hacks transforming certain industries. Uber and Airbnb are examples of globally pervasive, multibillion dollar companies that have inelastically changed the transportation and hospitality industries, respectively. Since I have not interviewed the brains behind either company, I cannot objectively call them hackers. Yet, the services they provide act as hacks on systems they entered. In an industry where formal transport services were either publically controlled or reserved for special purposes, Uber made private car service accessible by enlisting existing resources – the time and vehicles of regular drivers – in turn, minimizing operating cost to the company and, in turn, the riders. Uber has arguably been most disruptive to the taxi industry, yet it did not systemically alter any part of it. Instead, it repurposed an excess of labor to bandage the demand for cheaper car service. Similarly, Airbnb avoids the root causes of hospitality demands. Instead of utilizing an existing stock of cars and labor, Airbnb commissions existing living space and repurposes it to serve the function of a hotel.

Power gives one the ability to decide – directly or indirectly. Whereas hotels and taxis previously determined how much a consumer would pay for their respective services, Uber and Airbnb removed the exclusivity of that power. Airbnb puts that power in the hands of individuals, creating a decentralizing network of stakeholders. Although Uber fails to democratize decision-making power, it does shift the power structure. When discussing defined systems, this power manifests as limiting factors, or limiting reagents in the case of chemical reactions. Limiting factors cap attainable output. Thus, hacks may not overthrow the existing power structure, but they do alter power dynamics by either stripping or lessening the role of existing limiting factors.

Zapico's Green Hackathon was a microcosm of real life startup culture in many respects. Von Hippel's (1986) and Tuomi's (2002) theories indirectly relate startups to the hacker ethic, saying that open-source, user innovation, and crowd-sourcing are alternatives to investor-backed companies and bring new forms of goods and service delivery to the market. In contrast, Wadhvani essentially equates entrepreneurship with disruption of the capitalist economy and instead "puts the imagination and will at the center of a dynamic and disruptive view of capitalism as a system" (Wadhvani, 2012). Baumol and Schumpeter agree, writing about the idea of an entrepreneur "a potential source of equilibrium destruction" (1968, 1911). While the capitalist system should theoretically encourage competition and small business growth, that entrepreneurship disrupts the actual dynamics of capitalism speaks to the power of big business that skews that intention. The distinctions in these works identify a nuance in which hacking and operating under the hacker ethic are not mutually exclusive. Startup culture has adopted the ethos of a hacker, but is not confined to projects that are hacks.

But what is a startup? There is no agreed upon definition or industry delineation that determines whether a company is a startup. Robehmed asserts that "[t]o be a startup is to claim a freshness that suggests a finger on the pulse of the future. The label may even help companies to cash in on a 'cool' factor when hiring, allowing them to snap up qualified staff on the cheap who are attracted by the promise of innovation and a ping-pong table" (Robehmed, 2013). That description is slightly unfair because startups often pay their employees very well. While not confirmed with hard evidence and rather a trend noticed from personal observation, this is in line with the belief that happy workers are productive workers. Though it might make sense for startups to use cheap labor considering their limited budgets and a generally high supply of potential employees, the hacker ethic puts great value on human capital, and considers happiness and leisure to be key factors of a productive environment. The symbolism of startup culture - hoodies, stickers, laptops, ping-pong, beer – is representative of this. These symbols are often about perception as much as identity. Startup culture is also associated with innovation, ideation, and long hours of coding. But it's the prior list that makes these things "cool."

Still, there is more to being a startup than just exuding coolness. General rules or guidelines include:

1. Up to 5 years old (the number is arguable, and some dispute the idea that there is an age limit at all)
2. Should be independent, i.e. not yet bought out
3. Has the ability to grow at a quick rate.

This is a key point that most people agree on. This is also why people have come to equate startups with tech companies. Technology and the Internet facilitate rapid growth. More necessarily –

4. Startups must “focus on growth unconstrained by geography which differentiates startups from small businesses” (Robehmed,2013)

Startups have significance beyond that of entrepreneurial activities.

Vaidyanathan writes about the growing conflict between freedom and control as a result of globalization and information freedom. The explosion of the startup scene is a consequence of “global, electronic, unmediated communication” (Vaidyanathan, 2014), which has facilitated a shift in social and economic hierarchies such that they can now be led and driven by “nonelites.” In business terms, elites are analogous to corporations. Without geographic or technological bounds on communication, startups now hold the same communicative powers as more established system actors. With the stark clash of regulated, oligarchical frameworks and distributed, anarchical ones that are perpetrating the global economy, Vaidyanathan asserts that tension is inducing a reaction from the elites (2014). While he argues that a third type of framework is needed in order to uphold democracy and stability – this tension between dominant and alternative is exactly what Pelling (2011) argues is prerequisite for an adaptive society.

Some may feel that planners have no dominion in the startup ecosystem, and in the sense that startups are fundamentally independent of geography would make them right. If hacking was only relevant to matters of technology or even strictly business, this would not be an urban planning thesis. However hacks, hacking, and hackers – three things that should encompass the same actions and actors, but do not, per se - have direct consequences on the geography of power in a society. The hacker ethic hinges on open communication and information, the meaning of which has been revolutionized by the Internet and other global networks. Vaidyanathan says global communication has “collapsed time and space” (2014). I would agree and argue further that hacker networks compose their own geographies, connected by different networks and governed by different rules or norms.

“Sharing” is an altruistic concept. It implies a selfless giving. One can share possessions, information, ideas, opinions, and something that of late has merited its own distinction – digital content.

Botsman and Rogers write about the sharing economy as a foil to hyperconsumption – a potential antidote to the societal value placed on ownership, self-centrism, and superficial notions of identity. Botsman and Rogers (2010) define hyperconsumption as the “endless consumption of more stuff” such that it blurs the line between necessity and convenience and creates a tendency to define our lives by what we own. Similarly, Degli (2014) talks about hyperconsumption being characterized by a continuous stimulation of demand. While capitalism typically views this phenomenon as an economic benefit, hyperconsumption has been shown to decrease average psychological satisfaction. Moreover, hyperconsumption commoditizes the city in such a way that it retracts “the right to the city” from anyone who does not have the means to participate as consumers. Moreover still, hyperconsumption perpetuates climate change by encouraging an irresponsible use of resources and obstructs adaptation and mitigation efforts by glorifying the value of ownership and appearance.

This can be connected to four key drivers of hyperconsumption (Botsman & Rogers, 2010). The first is The Power of Persuasion, or appealing to the person a consumer wants to be by tapping into their desire to “feel good, powerful, and sexy.” The second is the Buy Now, Pay Later Culture, which seeks to detach the act of purchasing something from the actual purchase – in turn making people consider it more acceptable to buy unnecessary things. The third is The Law of Life Cycles, which creates both perceived and planned obsolescence in products. In other words, producers make consumers feel that their products are out of date, and in addition to actually shortening product life spans, in order to sell more “stuff.” The waste that results is obvious. The final driver is The “Just One More” Factor, which combines a consumer desire to have one of everything available with increasing choices as yet another reason to buy more (Botsman & Rogers, 2012). Thus, hyperconsumption is a psychological phenomenon created and manipulated by businesses and advertisers to create a manufactured need in consumers. Though this was a very US-centric analysis, the normalization of the collective psyche in favor

of hyperconsumption, appears to call for a transformational adaptation. An economic model that eliminates ownership value in favor of accessibility value and whose nomenclature reiterates altruistic values would appear to counter the dominant consumerist model – making the sharing economy a hack on the “linear economy” (Skytte, 2015) that fostered hyperconsumption. As such, this project was designed to examine how this hack contributed to a societal transformation toward a culture of sharing.

However, upon deeper consideration, the sharing economy’s role as an alternate model is not that simple. In fact, it has been argued that the sharing economy is merely a rebranding of neoliberalism with new, glitzier tools – namely the Internet and social media. Ideally, the sharing economy attempts to minimize resource consumption through greater efficiency and reuse. Yet, a critical consideration of popular sharing economy companies reveals different dynamics. TaskRabbit, Spotify, Airbnb, and Etsy represent four different “sharing” business models. TaskRabbit facilitates “collaboration” between peers such that one party fulfills the other’s need for labor with his/her time. Spotify facilitates access to creative content from artists to consumers without the expense of ownership, in exchange for either advertisement space or a fee. Airbnb represents a peer-to-peer model intended equally serve both the room provider and the room renter by offering the former income on otherwise idle capital and the latter an inexpensive place to stay with potential for greater social fulfillment. Etsy is also a peer-to-peer platform, but mimics traditional producer-consumer patterns – simply introducing a new population of producers. While it is most apparent in Etsy and TaskRabbit, each of these companies replicate traditional consumption models, where a consumer exchanges money for either a good or service. They simply introduce new providers or producers. These new actors can circumvent industry regulations and in turn shift power dynamics.

In reality, the new providers or producers are consumers themselves. TaskRabbit, Spotify, Airbnb, and Etsy offer platforms, services essentially, that allow people to forge traditional economic relationships without the bounds of traditional market limitations.

Uber is another classic example. The drivers act as service providers while riders act as service consumers. This is certainly the case in the lens of the rider. Uber offers mechanisms that attempt to balance this imbalance in

role – namely the ability of drivers to review rider and/or reject riders. This is an important divergence from the taxi industry it has hacked (and in this case, also disrupted). Although not the case in San Francisco, NYC taxis are required to pick up any customer who hails a cab and drive them to any destination in the five boroughs (Yellow Taxi Complaint, NYC311). By including this ability into their service, Uber theoretically altered the power dynamics between driver and rider, in favor of the driver. Whether this plays out in actuality would require a rigorous analysis that is outside the scope of this thesis. Still, Uber is a business. A self-described logistics company, Uber’s service is actually consumed by both the driver and the rider (Belbari, 2014). Interestingly, the relationship between Uber and the driving consumer is an inverse of the traditional service-provider to customer relationship. Instead of giving money in exchange for the service, drivers offer a service, or labor, in exchange for money.

Thus, companies that are lumped under the term “sharing economy” do not share a business model. Nor do they share a motive, an outcome, or altruistic ideals. At times, it can even further stress divides within a city by giving off an image of inclusiveness while masking barriers to access for already marginalized groups. Yet, they each act as hacks on their respective industries by introducing new actors and methods of distribution. In a city like Copenhagen, which has a history of both transformation and sustainability, what role do these hacks have in collectively transforming societal norms toward sharing? Looking at the sharing economy, which is largely situated within the startup scene, simultaneously offers a look at hackers, i.e. those who identify with the hacker ethic, in addition to just the hacks themselves.

Popular perception of Copenhagen is one of a green, just, and progressive city. It is reputed for being a bicycling capital of the world, as well as for being situated in the World's Happiest Country (Forbes, 2016) Copenhagen's reputation for sustainable living was furthered in Copenhagen 2025 Climate Plan, which pledged and detailed a carbon neutral Copenhagen by the year 2025. It is this plan that leads the IPCC to consider Copenhagen one of the first cities to undergo a transformative adaptation to climate change. The plan continued city-wide climate efforts, which had resulted in a 21% CO2 reduction between 2005 and 2011 (City of Copenhagen, 2012). While CPH 2025 is, by all means, a government-produced plan, it emphasizes the city's intention to induce a complete societal transformation regarding greenhouse gases. It calls, firstly, on Copenhagengers to fully engage in this mission. In their opening letter, The Lord Mayor and Mayor of Technical and Environmental Administration urge:

A carbon neutral city requires everyone to take a long look at their habits. When we move about the city, a bike and public transport must be our preferred means of transport. Increased waste separation will mean new ways of arranging our kitchens and backyards. We must be willing to invest in having our homes energy retrofitted. Last but not least, we must accept that our city, from time to time, will resemble a building site when we will be installing pipes for remote cooling systems, extending metro lines or constructing new cycle lanes.

With heavy emphasis on transport and an initiative called "City of Cyclists," which aims to have 50% of all trips to work or school be made by bike, the city is playing to its strengths. A look into the history of cycling in Copenhagen demonstrates both a structural and cultural adoption of the bicycle. The 1960s saw Denmark on the brink of succumbing to domination by the automobile, and the congestion, accidents, and pollution that accompanied it. However, the decades to follow brought about socioeconomic triggers that put Denmark en route to being one of the world's bicycle and sustainability capitals. The environmental damage that cars were causing in the cities, in addition to the economic challenges from a global oil crisis, led Denmark's government to move to revive historic affinity to the bicycle through massive marketing, branding, and policies including complete shutdowns of streets to automobile

traffic (Denmark.dk). The social integration that resulted from this movement was one of the main catalysts of Denmark's co-housing – an early example of sharing (Agyeman, 2013).

Equally important is the emphasis placed on the necessity of business and university proactivism in "spearheading the development of green solutions generating employment and green growth" (City of Copenhagen). They pledge to financially back companies that demonstrate their contribution to the green agenda – an initiative that primarily serves to cultivate the startup ecosystem. However, this is one aspect of a larger mission to accumulate and share knowledge about sustainable tools and solutions. To holistically collaborate in a way they illustrate in Figure 1, the city compiled a "catalogue of inspiration" for developers and strove to form relevant partnerships with knowledge institutions and businesses.

The "Smart City" portion of the plan is interestingly, but not surprisingly, all about improved energy technology. The outlined initiatives contribute to minimizing energy consumption of buildings and vehicles, maximize use of renewable sources by integrating them into public energy systems and ensuring its exclusive use for government functions, and improving systems for monitoring and evaluation. The interesting part is the equation of "smart" to energy efficient. While it is outside the scope of this thesis to define the "Smart City," the causes and effects of climate change go well beyond energy technologies and the rising of temperature. Copenhagen's scientists and policy-makers likely are aware of this fact. However, devising a climate change plan that focuses solely on direct carbon reductions and trying to pass it off as a "Smart City" is not convincing. The plan lacks the incorporation of economic strategies to reduce carbon.

The City of Copenhagen also recognizes that much of the legislative framework of the green transition is shaped on a national level. As such, they seek to leverage their position as a capital to share knowledge and assert a constructive influence. Internationally, they aim to both set an example for other cities, as well as offer practical technologies that other cities can adapt in pursuit of sustainable goals.

There is an oft-repeated story in Denmark about ancient farmers inflicted with a dire storm that makes fields unharvestable, who came together to take collective ownership and help each other plant trees to revitalize the fields. While this is a feel-good story, MacLaren and Agyeman (2015) attest that Denmark did not always have a culture of sharing, but have embraced it over time. They cite the governmental initiatives that encourage shareable spaces, and a larger initiative called Sharing Copenhagen, which aimed to share the city's sustainable solutions with the world. They also discuss the popularization of co-housing – a far cry from the original colonizers' teachings that communal living was a sin – and an underlying philosophy of cycling culture (that cycling spreads positive karma by freeing up streets so they can be used by everyone) as examples of cultural adoptions of sharing ideals. The 2050 Climate Plan demonstrated the Copenhagen has the capacity to undergo a transformative adaptation. Although residents and outsiders alike hail Copenhagen for have a culture of sharing, the validity of this will be examined through the lens of the sharing economy, and examine if and how hacks contained within the “sharing economy” have contributed to a transformation toward sharing as a core societal tenet.

Copenhagen's startup community – recently coalesced into a grassroots movement called #CPHFTW – is an important sub-geography to focus on in study. In the same way the squatter settlement Christiania took hold of a portion of Copenhagen's physical landscape, and forced the city to make accommodations for them to stay, the startup ecosystem is taking hold of the market landscape. Due to the forces of hyperconsumption and globalization, market forces have become increasingly influential to the makeup of a city.

The sharing economy in Copenhagen is not constrained by the startup geography. Of the companies interviewed, Resecond and KBHFF do not identify as startups (or former startups), and operate as independent services to the community. Resecond, due to its unique model, is technically listed as a fitness center for dresses. A swap shop for dresses seems to be an intuitive application of sharing economy ideals, and there have been several companies in Copenhagen that have tried to do something similar (to varying degrees of success).

The methodology for this study was fourfold. The primary method was a series of interviews with “hackers” based in Copenhagen. The interviewees were largely startup founders whose businesses fell under the sharing economy umbrella. Some did not fall exactly within the sharing economy, but participated in sharing in a different way. Interviewees were initially contacted through email outreach, and subsequent referrals from new contacts. A site visit was made from 12/16/2015 to 12/23/2015, during which the first round of interviews was conducted. These were face to face interviews taking place at office spaces or cafés in Copenhagen. These interviews provided further references that were contacted after the site visit and interviewed over videochat in the month following. Description of the interviewees can be found in Table 2.

Table 2: Summary of Interviewees

Company	Description	Interviewee	Interviewee Title
GoMore	Ride-sharing service	Soren Riis	Co-founder
Resecond	Swap Shop for dresses	Claus & Stine Skytte	Founders
SUND Innovation Hub	Startup Incubator	Marten Justesen	Founder
NEST	Co-living space for startup people	Analisa Winther (& Kristopher Dorph)	PR & Communication Officer (and co-founder)
KBHFF	Organic food co-op	Sarah Christiansen	Board Member
Low-Fi	Peer to peer platform for living room concerts	Anne Dvinge	Founder
Joli	Jewelry rent/share platform	Stine Sloth Gosvig	Co-founder
Be My Eyes	Peer to Peer app connecting blind people to volunteers who help them with everyday tasks	Hans Jorgen Wiberg	Founder

This study intended to assess buy-in to the idea of sharing by surveying customers of companies included in the interviews. Distribution was discussed with interviewees at the end of each interview. Most agreed to help distribute through official channels, though some declined. Surveys were then designed and digitized on an Internet platform, and sent to companies who passed it to their customers via Facebook or email. However, obtaining substantial responses proved difficult. Only one set of survey responses was substantial enough to analyze.

The interviewees were asked questions related to their motivations for starting the company, the evolution of their mission and service, crucial facilitators and obstacles, etc. A full list of questions can be found in the Appendix. The interviews were semi-structured, with relevant follow-up questions asked between the pre-determined. The sample includes companies at various stages of development, with varying geographical reach.

Search_Words	SearchLocation	SearchStartDate	EndDate
#cphftw OR cphftw	CPH + 40 mi	1/1/2006	2/28/2016
hack OR hacker OR hacking	CPH + 40 mi	1/1/2006	2/28/2016
sharing economy OR collaborative consumption or peer-to-peer OR circular economy	CPH + 40 mi	1/1/2006	2/28/2016

Table 3: Twitter Search Criteria

Table 4: Twitter database sample

Search_Words	hack OR hacker OR hacking	#cphftw OR cphftw
SearchLocation	CPH + 40 mi	CPH + 40 mi
SearchStartDate	1/3/2015	1/4/2015
EndDate	30-04-2015	30-04-2015
UserName	@SquirrelEvictor	@d2t21
TweetDate	04/07/15	04/09/15
Followers	1081	116
Retweets	1	2
Favorites	1	4
TweetLocation	Kobenhavn	Kobenhavn
TweetText	@simeon_oneill *whispers* look at all the growth hacking favs you just reeled in	Amazing product from @BeMyEyes! Cant wait to try out myself #bemyeyes ~ Lend your eyes to the Blind #cphftw #startup
Media		https://pbs.twimg.com/media/CCKwghFWYAAANLNU.jpg
Media2		
PositiveorNegative	P	
Tech	N	
Mention_user		@BeMyEyes
InReplyTo	@simeon_oneill	
Followers_	684	6579
TweetDate2	4/7/2015	
Retweets	0	
Favorites	14	
TweetLocation2		
TweetText2	@SquirrelEvictor His book ha. He's the kind of guy who uses the term "growth-hacking" without rolling his eyes.	

As an alternative, a social media analysis was conducted to assess the conversation around sharing. A database was manually compiled of tweets meeting the search criteria outlined in Table 3. It should be noted that about 12% of all Twitter users have private accounts, and only 10.3% of users allow geolocation (Bosker, Huff Post). Private users and the 90% with geolocation switched off would not appear in search results. Searches were done incrementally, as the Twitter search interface limits the number of search returns. Tweets were recorded in a database with the fields listed in Table 4.

Due to time limitations, an in-depth analysis of #CPHFTW was not conducted. To obtain a better understanding of the composition and function of the ecosystem, the following things were done:

1. Attended #CPHFTW sponsored events while visiting Copenhagen,
2. Documented startups listed as part of the network, and categorized on the basis of sharing function (see Appendix)
3. Review of Town Halls activities, engagement, and reaction
 - Twitter database, Facebook events archive, #CPHFTW website, and websites of affiliated Nordic startup-centered organization were used to do a qualitative overview
4. A limited version of #CPHFTW email newsletter archive was obtained and reviewed. Future study should analyze the history of #CPHFTW sponsored events, the type of news items that are shared, key words used in job descriptions or generally in startup-centric conversations, and perhaps use the newsletter as a tool to create a chronicle of major achievements within the #CPHFTW community.

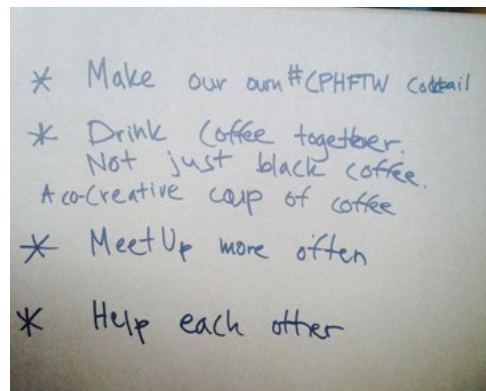


Fig. 4: Inside a #CPHFTW Town Hall

Fig. 5: To Do List created at a #CPHFTW Town Hall



Transformative Adaptation Frameworks

FRAMEWORK

The case studies will be analyzed through the framework of Pelling's spectrum of adaptation. Pelling first suggests determining the following components of a system:

1. Unit of Assessment
3. Intention
4. Action
5. Outcome

Thereafter, the analogous parts of each case to the process depicted in Figure 8 will be identified. Each hack will be designated resilient, transitional, or transformational adaptation to the system in question, according to criteria derived from literature and depicted in Figure 6. Finally, motivators and facilitators for hacking will be categorized into groups according to observed trends in results. The categories are shown in Figure 7.

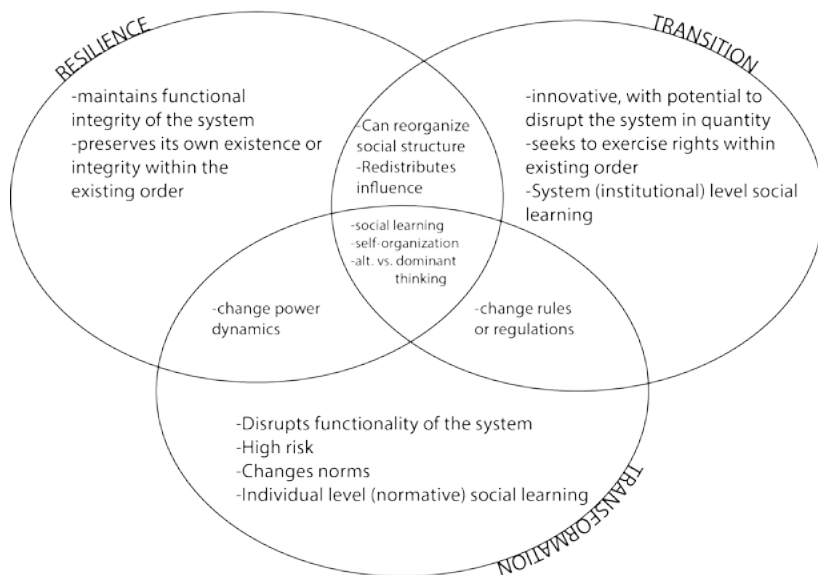
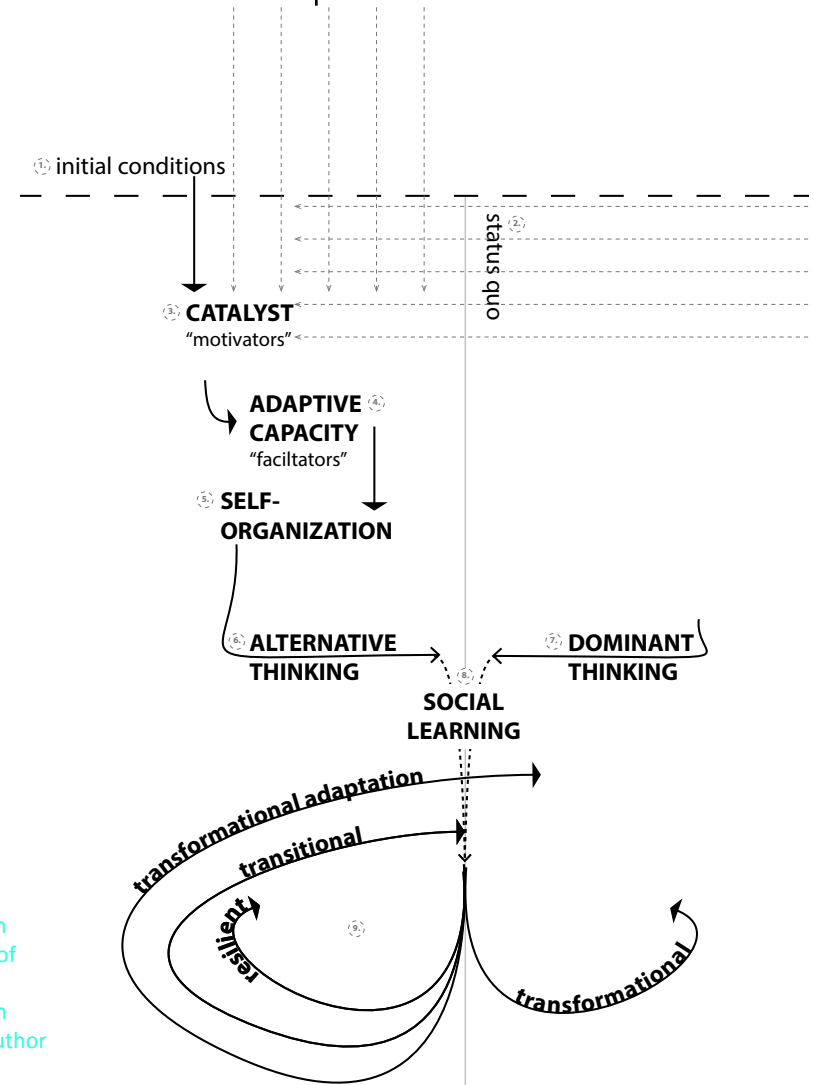


Fig. 6 : (left) Types of Adaptation
 Fig 7: (bottom) Categorizations of motivators and facilitators
 Fig 8: (right) Pelling's Adaptation framework, as interpreted by author



- | | |
|--|----------------------------|
| ● INDUSTRY-SPECIFIC PASSION OR MISSION | ● EXISTING DEMAND |
| ● SUSTAINABILITY | ● GOVERNMENT SUPPORT |
| ● DESIRE TO SHARE | ● PRIVATE FUNDING/SUPPORT |
| ● ATTRACTION TOWARD A SMART IDEA | ● PERSONAL RELATIONSHIPS |
| ● ECONOMIC PULL FACTORS | ● MEDIA COVERAGE |
| ● INTERNATIONAL INFLUENCE | ● INTERNATIONAL INFLUENCE |
| ● ECONOMIC PUSH FACTORS | ● TECHNOLOGY |
| ● DESIRE TO DO SOMETHING USEFUL | ● EXPOSURE TO UNIQUE IDEAS |

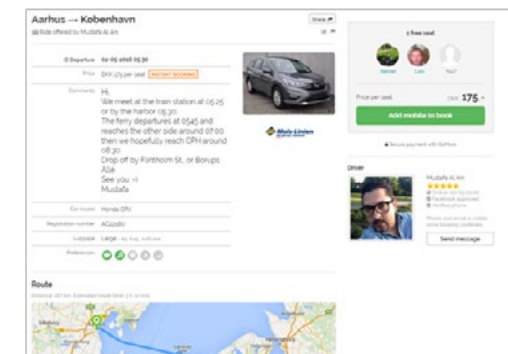
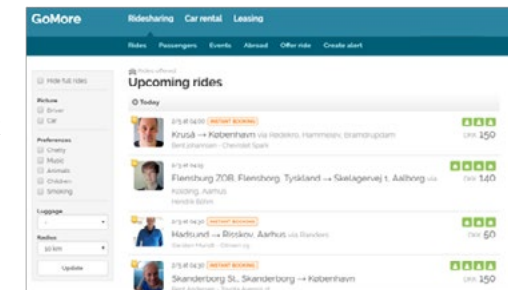
GoMore is an online platform that allows people in need of a ride to find and join drivers with open seats en route to similar destinations. The platform allows passengers seeking a ride to post their desired origins and destinations, the date, and time that a ride is needed. Drivers can then review the profiles of these riders, and invite them passengers to accompany them on a ride.

Drivers and also post rides and request certain criteria. In addition to specifying their origin, destination, and time of trip, they specify their price, the number of seats available, the radius within which the rider's destination should be of their own, whether the rider can have luggage, and other preferences as depicted in Figure 9. It should be noted that trips on GoMore tend to be long-distance trips between cities or countries, and often do not parallel public transit routes.

Existing transportation options gave discretion to one party – either the rider or the ride provider. GoMore, consistent with dynamics of other peer-to-peer or sharing economy companies, essentially have two sets of consumers, one of which acts as a service-provider. While the service-provider has a greater ability to specify preferences, the consumer (or rider) also has some power due to their ability to choose amongst various drivers. The power of the consumer is enhanced when a greater number of drivers offer their services, particularly if rides are offered in greater abundance than are requested and the fees charged become increasingly competitive. Other “ride-sharing” services such as Uber and Lyft have faced opposition due to the exploitation of labor that has come out of a highly demanding base of riders that overpower drivers who often depend on an unsecured source

of income in order to survive. There has also been criticism for these services that rail against privatizing public services [ref]. At first glance, the GoMore platform appears to reflect the intention of the “hackers” by offering a viable, smart transportation option that utilizes the idle capacity of existing vehicles. However, upon closer inspection, the option for drivers to create new rides for posted ride requests suggests the potential for the platform to evolve into a source of primary income. Instead of simply matching existing rides with existing riders, the option to create new rides can perpetuate several problems. First, instead of reducing the number of cars on the road, it's possible that the number increases due to the profit potential that comes of it. To determine if this is indeed a considerable risk, it would be necessary to analyze the values and motives of GoMore users, as well as how well available transportation options fit those values, which is outside the scope of this study.

Table 5 summarizes the intentions and outcomes of starting GoMore. Founded by two Danes in 2005, GoMore was inspired by a German



Figures 9 & 10: GoMore online interface

car-sharing company that co-founders Soren and Matias had seen and extensively used while studying abroad in Germany. They considered it a very smart idea, but saw much room for improvement. This is a good identifier of a hack. The cleverness and sensibility of the idea was more of a driver than the business motivations. Although founded in 2005, it was not until 2010/2011 that the company was able to become a full-time project for Soren and Matias. Around this time, private investment began pouring in. In 2012, GoMore received a grant from the government that was a significant facilitator in the success of GoMore. Additionally, it should be noted that although GoMore was founded in 2005, neither smart phones nor social media were near the level of prominence in society as they are now. Smart phones and apps like Google Maps have altered the perception of cities [ref], adding a new layer to the urban mobility. Thus, the system within which GoMore operated changed significantly between 2005 and 2012.

SYSTEM HACKED

As identified in Table 5, the system that GoMore hacks is the transportation sector.

GoMore is the case of two people uninvolved with decision-making in the transportation industry – they were not transit planners, nor did they work in the car industry, nor did they work for the government – who influenced the use of transportation without altering the functionality of the original system. They did not pass regulation giving incentive to carpooling. GoMore responds to issues of economic

Table 5: GoMore Overview

Unit of Assessment: Transportation sector
Viewpoint of the Observer
Foreign, non-user?
Action
<ul style="list-style-type: none"> – Created an online platform to help people in need of a ride find existing drivers/rides being made in the desired direction – Later created “GoMore stops” analogous to bus stops at multimodal transit hubs – Hello. It’s me.
Intention
<ul style="list-style-type: none"> – Create a good transportation option – Bring a smart idea to Denmark – Create social experiences – Offer a lower fare option for students – Optimize a car’s idle 23 hours in interest of being “green” -“make sure nobody...had to buy a car if they didn’t drive all the time or everyday...green vision...”
Outcome
<ul style="list-style-type: none"> – Lessened dependence/incentive to buy a car or second car – User base expanded from mostly students to a diverse range, primarily within the 20-40 year old demographic – Metropolitan area usage expanded across Europe – Prevalently used for long-distance trips, in contrast to Uber and other car-sharing options – Connections with other transit modes; addresses the “last mile” dilemma for transit users – Connected strangers on a personal level – had people that would not normally have a conversation talking for the duration of a long-distance car-trip – Breaks down stereotypes and typical social barriers – Unexpected uses (divorced couple, elderly mother) – Potentially decreases incentive to walk (smaller extra fee for door to door service) or bike – BMW and Mercedes have their own sharing cars in Madrid, Berlin, and Copenhagen for inner city transport – Insurance companies came up with a way to make insuring cars for these services easier

cost and environmental cost of transportation, while offering benefits cross-municipal mobility, and a flexibility that was previously only offered by ownership of personal vehicles. They managed to provide citizens greater mobility, yet they did not (initially) create new infrastructure or reorganize public bus routes. Of course, these new benefits may not reach those citizens whose disposable income is on the lowest end of the spectrum. To determine this, a rigorous demographic analysis should be conducted which is, again, outside the scope of this study.

Catalyst Motivation (Push/Pull)	Immerision in German culture of carpool and efficiency
	-Grant from the government in 2012 -Advent of Facebook and smartphones (weren't that prominent when GoMore first started) -Financial crisis of 2008 -Friendship of Matias and Soren -Investment that started in 2010/2011 --> allowed it to be a full time project -Influence of New York Times article praising the sharing economy as the future (helpful in receiving an important grant)
Adaptive Capacity Facilitator/Initial Conditions	-Created an online platform to help people in need of a ride find existing drivers/rides being made in the desired direction -Later created "GoMore stops" analogous to bus stops at multimodal transit hubs
Self-Organization Action/Strategy	
Alternative Thinking What's different?	Focus on idle capacity - not two passengers, but 3 empty seats;
Dominant Thinking What's normal?	Cars are private vehicles, convenient, on-demand form of transportation for the owner
Social Learning Outcome	-Fewer people feel compelled to purchase cars -Car companies begin to understand the power of sharing cars
Challenges/Deterrants	Determining how to insure shared rides

Table 7: GoMore Analysis, per Pelling's framework

Table 8: GoMore Examples of Adaptation

LEVEL OF ADAPTATION

To assess where GoMore falls on the spectrum of adaptation, the outcomes listed in Table 6 were considered. The intent of GoMore founders was to innovate and change the transportation habits of the citizens in Copenhagen. They were successful in creating a viable transportation option that lessened the need for people to purchase their own vehicles. In addition, GoMore successfully changed the rules by working with insurance companies to create

a brand new policy specifically for shared drivers. Since existing transportation options remain in place and viable, this can be considered transitional adaptation.

Examples of resilient, transitional, and transformational outcomes for this particular system can be found in Table 8.

System	Transportation
Status Quo	Automobiles are sold from private companies to private owners, or used as taxis for primarily intra-city travel, or rentable for longer durations
Resilient Change (hypothetically)	Imposing a tax single-rider car trips
Transitional Change (hypothetically)	Allowing multiple people to have title over a single car
Transformational Change	Banning the private ownership of cars

KBHFF is a food co-op with 10 locations throughout Copenhagen, and 8 more under development. Started in 2007 upon inspiration from the Park Slope Food Coop in Brooklyn, KBHFF gives people a place to grow fresh, organic vegetables at a time when organic food was not available in mainstream supermarkets. The co-op has grown from a group of 30 committed individuals to having about 1800 members today, in the process pushing supermarkets and mainstream food distributors into expanding their stock to include organic produce. Upon receiving produce from local farmers, members of KBHFF pack and distribute weekly vegetable bags. To be able to purchase of these bags (for 100kr, or about \$15), one must also be a member, which entails committing to work at the co-op at least 3 hours every month. In exchange, they also “co-workers and co-owners” and are included in the decision-making process.

SYSTEM HACKED

People in cities primarily get their food from supermarkets or other places where food is available for purchase. KBHFF and other food co-ops hack this system by circumventing traditional middlemen to bring food directly from the farmers to consumers. It bears similarities to “peer-to-peer” platforms, however certain requirements that KBHFF has for its members allows it to avoid common trends that undermine the validity of that categorization. For instance, KBHFF does not allow non-members, i.e. people who do not put in 3 hours of work per month, to purchase the produce. Thus, KBHFF is not a “platform” or a middleman. Rather, because the people who receive and package the produce are the same people who take it home, the produce is exchanged directly from the producer to the consumer.



Figures 11 & 12: Inside KBHFF

LEVEL OF ADAPTATION

Food co-ops are not a new phenomenon. As mentioned previously, KBHFF was inspired by a co-op in Brooklyn, New York. Moreover, there is a rich tradition of food co-ops within Denmark (ref), each of which have hacked the food distribution system for people who have been otherwise unable to access organic produce. While it cannot be attributed solely to KBHFF, perhaps the most significant accomplishment of the food co-op movement has been pushing supermarkets into selling organic produce. What began with resilient intentions gained enough traction and following to have a larger impact. KBHFF did not set out trying to change the status quo of food distribution. Rather, their intentions reflected a desire to preserve their own welfare, and that of the farmers they sourced from. However, the fact that organic produce has enough demand for this to happen is indicative of system-level social learning. While the growth of KBHFF may have introduced new people to idea of organic produce, it was institutions – the supermarkets – that actually adapted. Faced between the dominant option of mainstream supermarket produce and the fresh, organic alternative that food co-ops provided, enough people chose the latter to induce a transitional change. While several reorganizations of the system have occurred, it has not been disrupted or fundamentally altered.

Unit of Assessment: Organic Produce
Action
<ul style="list-style-type: none"> – Set up a co-op to bring local, organic produce to urban communities – Created 10 branches in various Copenhagen neighborhoods, to date
Intention
<ul style="list-style-type: none"> – To be a source of fresh, local produce – To pay farmers a fair price – Create a community around fresh produce
Outcome
<ul style="list-style-type: none"> – Significant growth in membership – 1800 current members – Supermarkets stocking organic produce – Need to adjust to market and find new ways of staying relevant – Thinking about creating a division where KBHFF acts as a distributor for companies – Tend to attract students and people over 60 years old, but have members of all ages – Income distribution of members likely skews on lower side (not formally measured)

Table 9: KBHFF Overview

SYSTEM HACKED

People in cities primarily get their food from supermarkets or other places where food is available for purchase. KBHFF and other food co-ops hack this system by circumventing traditional middlemen to bring food directly from the farmers to consumers. It bears similarities to “peer-to-peer” platforms, however certain requirements that KBHFF has for its members allows it to avoid common trends that undermine the validity of that categorization. For instance, KBHFF does not allow non-members, i.e. people who do not

put in 3 hours of work per month, to purchase the produce. Thus, KBHFF is not a “platform” or a middleman. Rather, because the people who receive and package the produce are the same people who take it home, the produce is exchanged directly from the producer to the consumer.

LEVEL OF ADAPTATION

Food co-ops are not a new phenomenon. As mentioned previously, KBHFF was inspired by a co-op in Brooklyn, New York. Moreover, there is a rich tradition of food co-ops within Denmark (ref), each of which have hacked the food distribution system for people who have been otherwise unable to access organic produce. While it cannot be attributed solely to KBHFF, perhaps the most significant accomplishment of the food co-op movement has been pushing supermarkets into selling organic produce. What began with resilient intentions gained enough traction and following to have a larger impact. KBHFF did not set out trying to change the status quo of food distribution. Rather, their intentions reflected a desire to preserve their own welfare, and that of the farmers they sourced from. However, the fact that organic produce has enough demand for this to happen is indicative of system-level

social learning. While the growth of KBHFF may have introduced new people to idea of organic produce, it was institutions – the supermarkets – that actually adapted. Faced between the dominant option of mainstream supermarket produce and the fresh, organic alternative that food co-ops provided, enough people chose the latter to induce a transitional change. While several reorganizations of the system have occurred, it has not been disrupted or fundamentally altered.

	KBHFF
Catalyst Motivation (Push/Pull)	Desire for and unavailability of fresh, local produce in the city
Adaptive Capacity Facilitator/Initial Conditions	-Large group of interested people -Inspiration from Park Slope food co-op
Self-Organization Action/Strategy	-Started a food co-op where produce comes straight from local farmers -Members must commit to working in the co-op at least 3 hours every month -Produce is only available to members who commit the monthly hours
Alternative Thinking What's different?	-Obtain produce straight from the farmers -Give members ownership of their food source
Dominant Thinking What's normal?	-Obtain produce from the supermarket -No sense of community around their food source
Social Learning Outcome	-Supermarkets began selling organic vegetables -Composition of 10 branches reflect the composition of their neighborhoods
Challenges/Deterrants	-Need to adjust to changes in the market

System Issue	Food Distribution Organic Produce
Status Quo (Current System Organization)	Farmers sell produce to supermarkets, often in lieu of fair compensation to preserve lower prices for consumer; produce is not guaranteed to be fresh
Resilient Change (hypothetically)	Some individuals start their own home gardens
Transitional Change (hypothetically)	Small groups source produce directly from farms
Transformational Change	Food quality standards become stricter, forcing supermarkets and other major food distributors source food directly from farms

Table 10: KBHFF Analysis, per Pelling’s framework

Table 11: KBHFF Examples of Adaptation

Resecond is a swap shop for dresses. In fact, it is the world's first physical shop of its kind [ref Stine's Ted Talk] Although they do have a newly launched app, it primarily operates out of a physical store. Interestingly, the Danish property registry has Resecond technically listed as a fitness center. This is because the shop does not conduct any sort of monetary exchanges, not even keeping any money or a cash register inside the shop. Members pay a monthly fee online to join Resecond, and then they have unlimited access to dresses. A dress needs to be brought in for a member to take one back, and one of the only other rule is that the story of how and when the dress was worn is written on a tag to be shared with future dress-wearers. It is the only company of those examined here that actively set out to spread sharing economy ideals, creating a community "walk-in closet."

Located on a small street in the Norrebro neighborhood of Copenhagen, the idea for Resecond was developed by Claus and Stine Skytte in the summer of 2011 upon reading what some now consider the sharing economy bible – Rachael Botsman and Roo Rogers' book entitled *What Mine is Yours*. Claus and Stine believe the sharing economy, when done properly, is a key solution to saving this planet. As such, they set out to get involved in this movement. Specifically, Resecond was (and is) an experiment to try to get people to give more than they can take and overturn our current model of consumption. Despite this, a monthly fee validates members vs. non-members. While this fee was described as "small" in interviews, it equates to approximately \$20/month [ref Resecond website], or the cost of buying a dress every 2-3 months [ref dk dept store].

Claus and Stine Skytte set out to change the world. Their goal was not to create a thriving business, nor to offer a useful service. Rather, their mission struck directly at social norms and perhaps could be fulfilled by nothing short of a social movement.



Figures 13-15: Inside Resecond



SYSTEM HACKED

Resecond operates within the fashion retail sphere, which predominantly includes department stores, boutiques, high street stores likes H&M and Moss Copenhagen, high-end designers, and thrift shops. That list is not comprehensive, as it only includes formal sources of purchasing clothing. It is possible that clothing is also exchanged between individuals. Additionally, online shopping allows webshops outside of Denmark to be part of the Danish fashion retail system. This system exists entirely within the capitalist economy, without government regulation. Overlaying this system is consumerism - a preoccupation with and an inclination toward the buying of consumer goods” [ref merriam-webster]. Historically, this has been induced through clever marketing that fabricates a need for certain items by appealing to human desires to “feel good, powerful, and sexy” (Botsman & Rogers, 2010). In turn, the dynamics of consumerism promote unnecessary accumulation of material goods and value for quantity over quality (Botsman & Rogers, 2010). Resecond cannot be categorized as anything established part of the system. Its distinctive feature are that (1) money is not exchanged directly for clothing and (2) a dress taken by a customer does not leave the system, but rather gets recycled within in. These dynamics are illustrated in Figure [__].

However, Resecond is the first physical shop where clothing does not have a monetary price.

Unit of Assessment: Consumer culture
Action
<ul style="list-style-type: none"> - Created a swap shop for dresses where members pay a small fee each month and have an unlimited number of dresses available when they have one to exchange. Each dress is also accompanied by stories from everyone who wore the dress previously so the stories don't die when the dress gets passed along - Don't keep a cash register in the store - Teach women about quality of clothing - Created an app (several iterations have passed) - Choose the dresses that the girls bring to the store in order to maintain quality teach members that it's better to buy expensive dresses that will last, and how to take care of
Intention
<ul style="list-style-type: none"> - To experiment and see if they can make people think as givers, before takers - Be part of the sharing economy and bring it to Denmark - Reduce the waste associated with buying and throwing away dresses, or buying wearing once, and leaving it hung in a closet
Outcome
<ul style="list-style-type: none"> - Filled a shop that started completely empty with dresses - Attracted press interest - New swap shops have popped up around Copenhagen (not all are actually successful) - Invited by TedX - Included on Copenhagen Fashion Week's "Green Fashion" route - Attract 20-30 year old women - Some members consistently try to trade up instead of trading at equal value (need to combat the Tragedy of the Commons) - Haven't expanded much (outside of the app; usage is not known) - Dresses are swapped and used 40 times at Resecond

Table 12: Resecond Overview

LEVEL OF ADAPTATION

Resecond seeks to undermine the consumerism overlaying the system. It succeeds to the extent that community and stories are given greater value than ownership of the actual dresses. However, while Resecond tries to be above it, the influence of consumerism diffuses into Resecond's community. While dresses brought in by members are checked for quality before they are accepted, there is no other built in mechanism that ensures that members don't consistently trade up for a more valuable dress than the one they originally brought in. The community aspect pushes against this dynamic in a way that preserves its own integrity. Although consumerist influences have trickled in, Resecond has also influenced the system to an extent. Resecond has been recognized by Copenhagen Fashion Week, TedX, and news outlets across Denmark. While this does not indicate that Resecond has caused systemic adaptation, it has certainly introduced alternative thinking. Furthermore, Resecond's survival and success within a competitive fashion industry suggests that it has reached the point of resilient adaptation. Faced with the threats of consumerism, Resecond railed against the status quo that promoted the disposal or disuse of dresses once purchased and worn.

Catalyst Motivation (Push/Pull)	Inspiration from the book, <i>What's Mine is YOurs</i> , and a desire to contribute to the sharing economy 'movement'
Adaptive Capacity Facilitator/Initial Conditions	-Massive press interest -Dedicated and genuine members
Self-Organization Action/Strategy	-Started with an empty shop and had people bring in dresses to swap -Have people share the stories of wear dresses have been worn on tags to ensure the story doesn't get forgotten -Teach members about the importance of good quality and caretaking
Alternative Thinking What's different?	-Have a communal closet instead of buying a dress and wearing it once
Dominant Thinking What's normal?	-It is better to own something than to share it
Social Learning Outcome	-Inspired other swap shops to start up -Have a core community in place
Challenges/Deterrants	-Combatting the Tragedy of the Commons -Combatting people constantly want to trade up -Finding the right space

System Issue	Fashion/Retail Clothing Waste
Status Quo (Current System Organization)	Clothing is produced or purchased by sellers who, in turn, sell it to customers in exchange for money
Resilient Change (hypothetically)	An app is developed that tracks clothing purchased and the amount of times it gets worn, and predicts how often future purchases will get worn
Transitional Change (hypothetically)	Department stores offer rebates for recycling used clothing
Transformational Change	High Street brands are boycotted and go out of business

Table 13: Resecond Analysis, per Pelling's framework

Table 14: Resecond Examples of Adaptation

Low-Fi is another example of a “peer-to-peer” platform. Anne Dvinge, a former academic with research on jazz and American culture, came up with the idea for Low-Fi in response to what she perceives as a devaluation of music, in terms of both human and monetary value. She cites the importance of intimacy and attentiveness in a musical setting, and the way that the modern music scene, for instance in the form of festivals with “200 people just walking by”, often detracts from such things. Low-Fi seeks to counteract this by providing a platform where people (hosts) book bands or musicians to play in homes or other private spaces. Sometimes referred to as “living room concerts,” the event can be situated in the host’s location of choice. The bands that are part of the Low-Fi network tend to be “non-superstar” bands of various genres. Figure 16 is a screenshot of Low-Fi’s website. Listing types include band profiles, host profiles, concert tickets, renting out, and “pass the hat” concerts. There are not currently any listings that fall under the latter two categories. As shown in Figure 16, bands specify their location, fee, genre, and the “mood” of their music. Band profiles typically offer detailed descriptions, with links to their music and a space for reviews from people who have previously heard them play. Moreover, the band profile shows a rating based on reviews.

Low-Fi is still a new startup. Anne participated in the Thinkubator accelerator program in 2015, during which she built the Low-Fi platform, despite having a background in humanities. Thinkubator is a 10 week accelerator conducted in partnership with Singularity University – a Silicon Valley-based startup accelerator with locations across the globe. Thinkubator chooses startup ideas or early-stage startups and provide mentorship, office space at the Dare2Mansion co-working space in Copenhagen, one-on-one coaching, keynotes from world class speakers, and the opportunity to work closely with established startups (ref). Low-Fi was a beneficiary of the resources

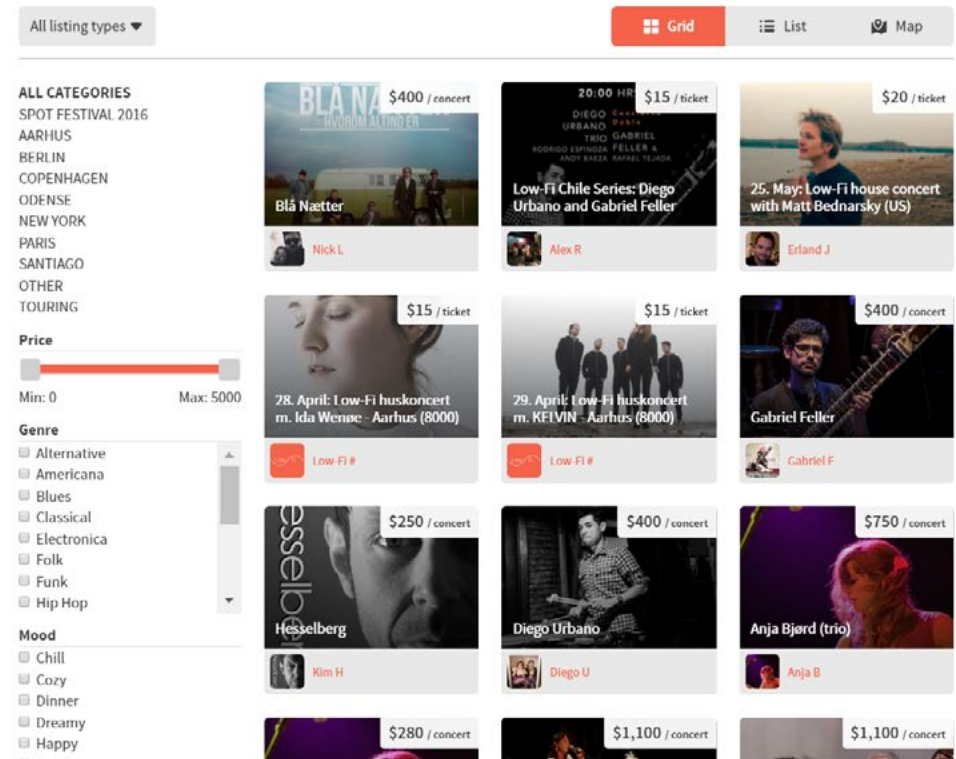


Fig. 16: Low-Fi Interface

and connections of Thinkubator and is now considered one of its original success stories. In addition to, and as part of, the Thinkubator program, Anne participated in a crash course on exponential technologies called Danish Ideas. Danish Ideas brought together budding entrepreneurs affiliated with several organizations within Copenhagen's startup ecosystem. It was here that she met her future business partner – a testament to the importance of the connectivity in the startup ecosystem.

SYSTEM HACKED

Low-Fi is a hack on the music industry. The founders felt that music was becoming impersonal due to its increasing availability due to online streaming platforms, for instance. By increasing the access to music, it was becoming less valuable, both monetarily and experientially. This particularly impacts new and lesser-known artists whose income primarily comes from record sales and live shows. With record sales dropping due to online streaming and a perception of decreasing appreciation for live music, Low-Fi attempts to tackle both the monetary and experiential challenges of smaller musicians.

Unit of Assessment: Music Industry
Action
<ul style="list-style-type: none"> – Created a platform to allow people to book bands or musicians for “living room concerts” in homes or other private spaces – Participated in Thinkubator
Intention
<ul style="list-style-type: none"> – Make people stop and listen to music again – Counteract the overflowing music market and the devaluation of music – Help struggling musicians make a living – Create a different way of understanding the value of music – Make it a personal experience by facilitating real human interactions between musicians and listeners; put music in non-music spaces; “open-source music scene”
Outcome
<ul style="list-style-type: none"> – Used by early or middle-stage, “non-superstar” bands – Used by people 30+ who want to add coolness to their private events – Used by millennials – Majority of people that attend a concert come back – Listeners interact with musicians in a way that makes them want to actually buy their music – Musician in Santiago brought Low-Fi to Chile, where it's now thriving.

Table 12: Low-Fi Overview

LEVEL OF ADAPTATION

Low-Fi has not yet come to impact the mainstream music scene and the existing system continues to function as usual. While the bands on Low-Fi are part of the larger pool of artists trying to find success within the music industry in general, Low-Fi offers those that have not reached superstardom an opportunity to make a living by carving out a space in the system specifically for them. Mainstream artists generally would not have incentive to be part of Low-Fi because they could easily sell out larger venues and make more money. If superstar bands are eventually attracted to Low-Fi, it would be because of the intimacy that Low-Fi provides, which would indicate a transformational change in the values of the music industry.

Catalyst Motivation (Push/Pull)	-Lecture about peer-to-peer -Interest in putting music in non-music spaces -Frustration with the university system's capacity to have an impact - quit job
Adaptive Capacity Facilitators	-priveleged situation: supportive life partner (morally and financially) -previous savings -Support system of friends to validate ideas and offer confidence -Availability of startup accelerators -Collaborative nature of CPH Startup Environment
Self-Organization Action/Strategy	-Created a platform to allows people to book bands or musicians for "living room concerts" in homes or other private spaces -Chose the "lean" methodology of being in perpetual beta -Attempts to create a "different way of understanding the value of music" instead of trying to fix the music industry -Community building between musicians and listeners
Alternative Thinking What's different?	Musicians are in demand Music is an intimate experience
Dominant Thinking What's normal?	Most musicians struggle to make a living Music is highly accessible and there is no need to "stop" and listen to music
Social Learning Outcome	People that attend concerts almost unfailingly come back Platform is being used in several different cities, including Santiago Chile
Challenges/Deterrants	-Small size of CPH Startup environment

System Issue	Music Industry
Status Quo (Current System Organization)	Unestablished artists have trouble making money, distributors keep much of the revenue, which is not large to begin with for unestablished artists, increasing accessibility and competition for listenership is diluting the experience of listening to music and detracting from the intimacy of live music
Resilient Change (hypothetically)	Upcoming artists begin to play at unconventional venues
Transitional Change (hypothetically)	Artists begin to take their music off online streaming services
Transformational Change	Mainstream artists begin to use Low-Fi

Table 16: Low-Fi Analysis, per Pelling's framework

Table 17: Low-Fi Examples of Adaptation

Be My Eyes is an iPhone app that connects blind people with volunteers to help them do tasks such as reading mail or helping them navigate a new space. The app, which is another product of the inaugural Thinkubator class, connects the two people via videochat. The service is free and founder Hans Jorgen Wiberg intends to keep it free. In fact, the company began as a non-profit service for blind people who need assistance doing everyday tasks. Met with financial difficulty after using up the initial \$300,000 that they raised, Be My Eyes became a for-profit company and moved headquarters to Silicon Valley. This was partly in conjunction with their acceptance into Singularity University, which happened through Thinkubator. The for-profit switch allowed the company to first raise seed funding and become financially sustainable.

Although Hans intends to keep the service free for blind people, he has been considering other forms of generating revenue such as offering up the platform to the elderly or to kids who need tutoring.

SYSTEM HACKED

Be My Eyes is essentially a life hack for the blind community. It has softened the severe constraints imposed by a lack of, or extremely limited, eyesight. The interview with Hans revealed that in addition to the countless physical bounds that the blind community faces, there are also potential psychological ones. For instance, the guilt of being a burden may often prevent someone for asking for the help he or she needs. By eliminating the possibility of resentment on the part of the volunteer, this psychological bound is removed.

Be My Eyes is unique from most of the other platforms examined in this study because it is entirely eliminates the exchange of money. Volunteers selflessly give their time to help someone in need, and are perhaps repaid by good karma or a feeling of self-fulfillment. The existence of Be My Eyes, and its use in over 100 different countries, can be viewed as an indication of how cities have failed to accommodate the needs of this community. A counter argument would be that

Unit of Assessment: Life for blind people	
Action	
–	Connects blind people with volunteers through videochat
–	Ensured that volunteers that answered the call would be willing to help by simply allowing volunteers without time to ignore the call, thus eliminating potential guilt or feeling of imposing burden
–	Connects to random people, eliminating the guilt of bothering a volunteer multiple times a day
–	Moved headquarters from Copenhagen to Silicon Valley
–	Changed business model from non-profit to for-profit in order to sustain itself
Intention	
–	To help blind people live more independent lives and overcome certain obstacles
–	To work <i>with</i> other apps for blind people, not competitively
–	To connect blind people with each other and offer support to blind people in places where there is little institutional support
Outcome	
–	Within a year, Be My Eyes has created the largest network of blind people in the world
–	25000 blind members within a year
–	Massive press coverage
–	Picked up by major US tech sites including Mashable, Daily Dot, Tech Crunch, and Huffington Post
–	Covered by CNN, NPR, Fox News, ABC, and CBS in US; also by France, German, Turkish, Thai, and Russian networks
–	Majority of users are in US, England, Australia, and Canada
–	Significant userbase in Turkey, Germany, Norway, Sweden, and Denmark
–	App has been downloaded in 140 different countries
–	Approached by telecommunications companies about possible collaboration (unfruitful so far)

Table 15: Be My Eyes Overview

LEVEL OF ADAPTATION

To fundamentally address difficulties of the blind community, they should be able to perform everyday activities without any outside assistance. Because the system does not allow for that, Be My Eyes is a self-preserving initiative that reorganizes the power balance of the system by bolstering the power of the blind. While Be My Eyes does not completely eliminate their challenges, it increases their adaptive capacity such that resilient adaptation is engendered. Considered the criteria outlined by Pelling, Be My Eyes does not at all impact the lives of those not on the platform. But while the first priority is self-help and self-preservation, if Be My Eyes expands to connect blind people with one another, it would begin to reach a level of transitional adaptation, as these new connections and ways of learning can be seen as innovative ways to exercise rights within the existing order.

Catalyst Motivation (Push/Pull)	Personal struggles of the founder, as a blind person
Adaptive Capacity Facilitators	-A real need in the community -Seed investment -Existence of startup accelerators -International connections via startup ecosystem -Substantial government grant (received when still non-profit)
Self-Organization Action/Strategy	-Connect blind people with volunteers through videochat -Keep it a free service -Allow volunteers to pass on calls if short on time -Switch to for-profit model -Move HQ to Silicon Valley
Alternative Thinking What's different?	-Blind people need to be accounted for and offered assistance
Dominant Thinking What's normal?	-Blind people are often forgotten in logistical decision-making
Social Learning Outcome	-Largest network of blind people in the world -App downloaded in 140 countries -Used mostly in Western countries -Garnered attention from both mainstream and tech media -Approached by telecommunications companies about possible collaboration
Challenges/Deterrants	-Could not sustain a non-profit model -Difficult to reach blind people

System Issue	Everyday life for the blind
Status Quo (Current System Organization)	Blind people need to request help for everyday tasks when supportive infrastructure is not built in
Resilient Change (hypothetically)	Build an app to make it easier for blind people to request help
Transitional Change (hypothetically)	Allow guide dogs to enter facilities typically restricted to animals
Transformational Change	Require all public and commercial facilities to have assistants on hand to aid blind people

Table 16: Be My Eyes Analysis, per Pelling's framework

Table 17: Be My Eyes Examples of Adaptation

NEST is the first co-living space of its kind. Housing 21 entrepreneurs in four adjacent apartments, NEST was the brainchild of three people who wondered what it would be like to eat, breathe, and live “startup.” It has attracted residents from the around world, who were selected by the founders through an application process. In the two years since NEST has opened its doors, While NEST has been a hub for events hosted by the startup community, including hosting a Low-fi concert, the dynamic in the apartments ended up being much more homely than work-like. Thus, the fact that NEST exists is a testament to the energy and enthusiasm of the startup community, but also the human need for personal relationships and the world/life balance – a cornerstone of the hacker ethic.

SYSTEM HACKED

NEST is the only case in the study that does not fall under the sharing economy. The founders had no intention of optimizing space or merging resources. Rather, they simply wanted to bring entrepreneurially-minded people together in a new setting and for creative benefit. Although the realities of life have created a different dynamic than was originally envisioned, the learning and personal development has been more nuanced than the learning that goes on in a co-working space. In a sense, NEST has hacked the way these 21 people have developed as people and as entrepreneurs. While NEST itself was not a “quick and dirty solution,” it did utilize the existing housing processes to experiment and convene a new type of living situation.

LEVEL OF ADAPTATION

NEST exhibits traits of transitional adaptation.



Fig. 17: NEST Mission



Fig. 18: Inside NEST

Catalyst Motivation (Push/Pull)	Lack of support and communication within Copenhagen's startup community (prior to #CPHFTW)
Adaptive Capacity Facilitators	-The friendship and network of the co-founders
Self-Organization Action/Strategy	-Developed a "co-living" space for people involved in startups -Initially recruited through personal networks -Allowed the living situation to evolve organically, rather than pushing the original vision for the space
Alternative Thinking What's different?	People passionate about startups can interact at home
Dominant Thinking What's normal?	People passionate about startups can interact in coworking spaces
Social Learning Outcome	-Attract people from different parts of the world -Engenders enormous personal growth in residents even though startups are not the constant topic of conversation, as originally envisioned
Challenges/Deterrants	-Finding a space in Copenhagen to fit 12 people -Cost of rent is more than usual

Table 18: Be My Eyes Analysis, per Pelling's framework

Joli is the newest company in this study. Another product of Thinkubator, Joli officially launching in March of 2016. It started as a university project for Stine and her co-founder. The project – an online platform for people to rent jewelry – was well-received by peer and professors, and was therefore pursued as a startup. The jewelry is rented out for either four or 12 days, but can be purchased if a customer likes it enough. Unlike Low-Fi, Be My Eyes, and GoMore, Joli insources all jewelry before renting it out to customers. This is a measure of quality control, so although Joli is placed under the sharing economy umbrella, it cannot be considered a peer-to-peer platform. While it was ideated in response to the frequency of women buying jewelry that they end up not wearing, it soon became apparent that Joli also, and perhaps more importantly, offered a significant benefit for small designers. Similar to the struggles that unestablished musicians on Low-Fi face in their industries, small designers struggle to make money and are frequently ripped off by high street fashion brands like H&M and Moss Copenhagen. The platform functions like a typical webstore. The interface (translated by Google into English) is shown in Figures 19 and 20.

SYSTEM HACKED

Asked whether she considered herself a hacker, Stine responded uncertainly. While she intuitively relates hacking to the Internet, and accepts the idea of hacking being anything that “break[s] a system,” she does not definitively call herself a hacker due to her idealistic attitude. She contrasts idealism with entrepreneurship – a distinction that is not definitively made in this paper’s discussion of the hacker ethic. However, the idea of hacking as a quick fix that does not fundamentally fix the flaws of a system contradicts the “ideal” that would be a system that functions to everyone’s benefit. Hence, while Joli can be considered a hack on the fashion industry in that it

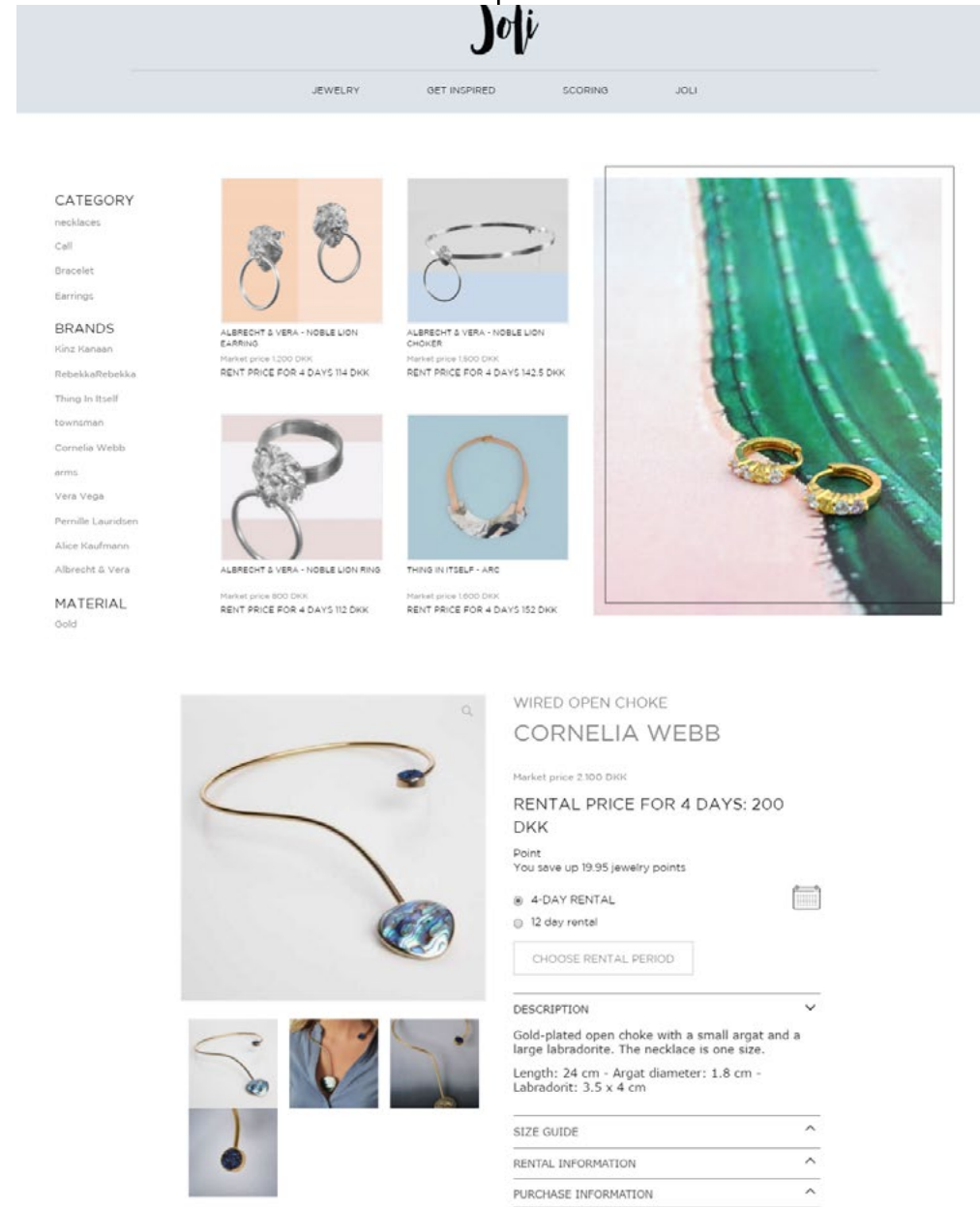


Fig. 19-20: Joli Interface

circumvents the obstacles typically faced by small designers and gives consumers more power to participate in fashion, it was not necessarily supported by a hacker ethic.

LEVEL OF ADAPTATION

The adaptive impact of Joli differs for the various groups that utilize the platform. However, at this early stage, Joli has not had much time to leave a mark on the fashion industry and it is therefore difficult to definitively say what type of impact it will have in the future. In the perspective of the designer, Joli appears to offer a form of resilience against more powerful actors that can currently get away with ripping off designs and selling low-quality merchandise. If Joli actively advocated for their cause and was able to draw enough interest to the matter, a transitional change where companies who steal designs are actively punished is possible. For consumers, the jewelry renters, it is pitched as a platform that gives students and lower-income individuals the opportunity to wear jewelry they otherwise would not have been able to. However, if Joli becomes

Unit of Assessment: Fashion/Jewelry Industry	
Action	<ul style="list-style-type: none"> – Created an online platform for people to rent jewelry from “established and upcoming brands” – Customer rents for either 4 or 12 days – Insource all jewelry, i.e. act as middlemen between designer and customer in order to quality control – Allow customer to buy jewelry if they’ve rented it and like it enough to keep it
Intention	<ul style="list-style-type: none"> – To continue a school project that received high praise/interest – To allow people to continually fresh up their wardrobes – To bring original designs to customers who wouldn’t otherwise be able to buy them – To prevent small designers from being ripped off – To minimize waste of clothing (extend the lifespan of items)
Outcome	<ul style="list-style-type: none"> – Received funding from government for being a “green” project – Have garnered interest from women between 18 and 35, who say they know the struggle of not using things that buy

Table 19: Joli Overview

successful for a mainstream userbase, it is likely to attract people who utilize the service for sheer convenience. While this is not inherently a negative, it does undermine the “green” element of Joli. Although ecofriendliness of a service that is constantly shipping materials back and forth is questionable, popularization of the service could undermine it even more by encouraging the production of more jewelry.

Catalyst Motivation (Push/Pull)	-School project -Prevent unnecessary waste of money and resources buying jewelry that ultimately goes unused
Adaptive Capacity Facilitator/Initial Conditions	-Living in a big city, where Uber and Airbnb are a thing (exposure to sharing concepts) -Emphasis of sustainability in CPH -Fund of Entrepreneurship (kr50,000)
Self-Organization Action/Strategy	-Insource jewelry from designers for quality control, rent it out to users for a short period of time -Champion progressive value as a brand
Alternative Thinking What's different?	-No need to purchase jewelry without assurance that it will be well-utilized
Dominant Thinking What's normal?	-There is great value in ownership
Social Learning Outcome	-There has been interest from women from 18-45 -Smaller designers benefit from this platform
Challenges/Deterrants	-Funding -Navigating budgeting and tax regulations

System Issue	Fashion Industry Jewelry
Status Quo (Current System Organization)	People buy jewelry that often goes unworn; jewelry is often unaffordable, particularly if it is not regularly worn; designers are often ripped off by high street
Resilient Change (hypothetically)	Allow people to rent jewelry
Transitional Change (hypothetically)	Allow guide dogs to enter facilities typically restricted to animals
Transformational Change	Require all public and commercial facilities to assistants on hand to aid blind people

Table 20: Joli Analysis, per Pelling’s framework

Table 21: Joli Examples of Adaptation

Company	Motivators								Facilitators							
		H		H	H			H				S			S	S
GoMore																
KBHFF																
Resecond																
NEST																
Be My Eyes																
Low-Fi																
Joli																

Table 22: Motivators and Facilitators, Categorized



Upon review of interview findings, motivators and facilitators for starting the company were identified and categorized according to the descriptions listed in Figure 4. The filled circles represent categories of motivators, while the hollow circles represent categories of facilitators. Larger impacts of the company (on their respective industry, for instance) were also identified and used to determine where on the spectrum of adaptation that specific hack belongs.

Search	Number of Tweets	Number of Retweets	Distinct Users	First Tweet	Avg. tweets/month
#cphftw OR cphftw	815	1639	226	11/2/2012	20
hack OR hacker OR hacking	333	138	234	4/30/2010	5
sharing economy OR collaborative consumption or peer-to-peer OR circular economy	157	157	87	1/15/2011	2

Table 16 is a summary of all of the public tweets from Copenhagen on record with the search words listed in the first column. It should be noted that about 12% of all Twitter users have private accounts, and only 10.3% of users allow geolocation (Bosker, Huff Post). Private users and the 90% with geolocation switched off would not appear in search results.

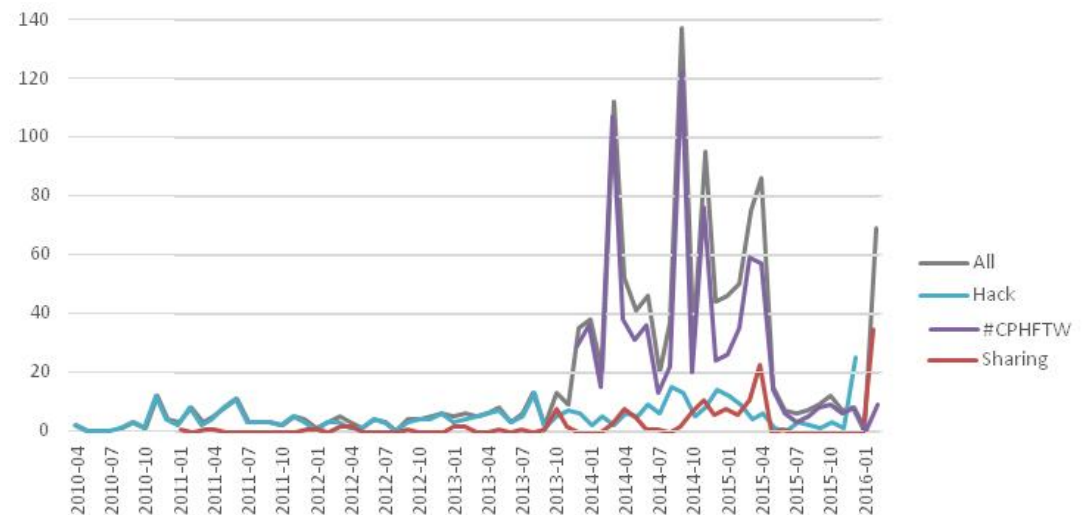
search_words	tweetdate	TweetCount	Event
#cphftw OR cphftw	09/01/14	91	Town Hall #3
#cphftw OR cphftw	03/11/14	62	Town Hall #1 (+logo contest)
#cphftw OR cphftw	11/21/14	41	Town Hall #4
#cphftw OR cphftw	03/28/14	25	Nordic Startup Conference
#cphftw OR cphftw	04/09/15	22	Town Hall #5
#cphftw OR cphftw	06/03/14	21	Town Hall #2
#cphftw OR cphftw	12/17/13	17	#CPHFTW hashtag launch
sharing economy OR collaborative consumption or peer-to-peer OR circular economy	02/25/16	15	Circular Economy book launch
#cphftw OR cphftw	04/10/14	15	CPH Pioneers Unplugged Event

The main takeaway from the Twitter analysis was that specific events induced high engagement – particularly within defined communities. The creation of #CPHFTW and “Town Halls” for the startup community initiated important conversations and attracted attention from outside the startup community, as well. Similar trends were seen for other niches, including those passionate about the circular economy.

Table 23: Summary of tweets

Table 24: Days with highest Twitter activity

Figure 21: Peaks in Twitter data



According to the cases examined in the interview process, hacking does not necessarily produce transformative adaptation. In select cases, hacking can introduce transitional change by pushing barriers that lead to changes in regulations and rules. For instance, GoMore initially needed to provide drivers that used their service a separate insurance that would cover the liabilities of a rental car. Now, after receiving support from the Danish government and developing a robust customerbase, insurance agencies are working to develop a new type of insurance that would allow GoMore drivers to drive under their own insurance. While it is a small step, it symbolizes the disintegration of institutional stalwarts to make room for new urban needs. In the face of climate change, both Denmark and the City of Copenhagen have been forerunners in the fight. Although Copenhagen has historically been a “green” city, new public initiatives are pushing the private sector, as well. The Background chapter of this paper noted the disproportional focus on energy sources in the Copenhagen 2050 proposal. Hacking can potentially bridge public interests and market power.

The case studies indicated, however, that they are more likely to build resilience for specific communities that are impacted. In the context of climate change, resilience - for reasons specified in the introduction - cannot be a standalone solution. Transformational changes need to occur within sociopolitical frameworks to be able to reclaim environmental sustainability. In the context of economic interests, resilience does not overturn the underlying challenges. Still, resilience is not devoid of value. While Pelling’s Resilience - Transition - Adaptation framework has been a framing theory of this paper, there are several definitions for “resilience,” many of which diverge from Pelling’s. In a world increasingly sliding into a “risk society,” resilience is crucial for elements beyond the foresight of planning (Beck, 1992). In our case study, hackers acted both proactively and reactively and in many cases were able to call enough attention to the problems they were addressing to either induce a response from more influential actors or give the targeted audience the ability to cope. Be My Eyes is an enormously successful company - with users in over 100 countries - whose impact remained resilient. Hans expressed a vision to have blind people around the world helping each other learn. While this effectively serves Be My Eyes’ mission, it does not touch the societal infrastructure that leaves blind people in need of extra assistance.

While each of the interviewees exhibited some characteristics of the hacker ethic, they were not united in their core principles. Anne, of Low-Fi, particularly identified with the notion of a hacker as someone who can figure things out and get results. Claus from Resecond was eager to identify as someone that can find creative solutions to problems. But in neither of these cases was an identification with the hacker ethic the key driver for starting their companies. Each of them, and each of the other case studies examined, operated with a unique set of values. Anne valued music and creative content, and it compelled her to do something about the dilution of music as she perceived it. Claus, in contrast, was driven by a concern for the sustenance of the planet. Both of them, however, benefitted from a hacker mentality in that it led them to a proactive solution. In the context of adaptation frameworks, the hacker mentality offers adaptive capacity. But to whom, and for what purposes that capacity is leveraged is highly contextual.

Hence, an analysis of initial conditions is important for planners looking to leverage hacking as a tool for proactive adaptation.

But while each case study was motivated by unique catalysts, the notion of being more “green” and less wasteful was a constant in every conversation - a testament to the overall culture of the city. While GoMore tackled an evident environmental concern by attempting to minimize the number of cars that need to be driven and/or purchased, Stine spoke about Joli being a positive force for the environment. As a rental platform with 4-12 day rental periods requiring frequent shipping (potentially all over the world), Joli’s status as a “green” company is questionable. However, the desire to be a green company can be attributed to governmental and planning initiatives in Copenhagen and Denmark at large. Joli is 1 of the four case studies that indicated government funding as a key facilitator. It is also one of the two that received the funding because it promoted sustainable practices.

TRUST

All interviewees but one spoke of trust as either a crucial component of allowing the company/service/initiative functional and productive. They expressed a belief that Denmark's populace was on the whole less concerned about security threats and more open-minded to new ideas. Most hypothesized that this was due to the small size of the country and a largely homogeneous population. However, Denmark's immigrant and refugee population is increasing.

Both interview and casual conversations with residents yielded opinions that racism was a problem in Denmark. The strength of the country's social welfare system minimized the effect to some degree, however the homogeneity of the country caused a more stark divide between Danes and foreigners. One interview used the words "foreigner" and "stranger" interchangeably, though unmaliciously. This criticism of prejudice came solely from Millennials. It also was not a contested opinion amongst Millennials that I spoke to. In addition, this generation was more likely to feel that Copenhagen was not uniquely sharing-friendly – that the government supported and advanced "sharing" through taxes, but there was no sense of neighborly duty on an individual level. The sentiment from the older generations was overwhelmingly that sharing was part of Danish culture. This generational divide seems to be driven by different urban memories and new senses of identity due to globalization

Soren Riis of GoMore noted that Denmark is actually the most trusting country in the Europe, according the World Economic Forum. But although Denmark may fare well, relatively, in terms of trust, trust levels are generally declining across Europe. This is on account of conservative political swings and exasperated by refugee influx across the continent. Moreover, due to the largely homogeneous cultural makeup of the Nordic region, there has been backlash (both subtle and overt) to political refugees. One story that was shared in the interview regarded a woman at a theatre who needed a late ride home after the show. She was lucky to find a pair of fellow travelers at that time of night, but was initially hesitant to accept as a consequence of the passengers' Muslim name. She ended up accepting the ride and being so please that she reviewed GoMore on Facebook. Soren says "You find out actually strangers are actually not that different," and the social/community

aspect of GoMore has, according to testimonials from customers contributed to that. Still he notes that the political agenda has been "a little bit hard on foreigners and strangers." The interchange use of the words "foreigners" and "neighbors" in this context suggests a clear divide, even in the virtual geography of Copenhagen.

While the woman in the anecdote overcame her initial race/religion-driven skepticism, there are certainly countless incidents of the same deeply rooted prejudices that caused people to decline rides with some of the few people they might deem untrustworthy. Allow the Internet, combined with social media and smart phone technology, allows a broader, more diverse population to engage with new ideas - it also allows people to hide behind a mask of anonymity. Without some form of accountability for discriminatory usage of new technologies, prejudices will only get deeper. If we compare this case to that of a taxi driver denying a ride due to a customer's race, that would automatically be considered racial profiling. There is an element of public shame attached to discrimination. In a physical, public space, the shaming factor can serve its role as a de facto form of accountability. On the Internet – unless consciously incorporated by the designers – there is no shame to denying an interaction based on assumptions of race, religion, income, gender, etc. Thus, while the GoMore model has the potential to break down social barriers that perpetuate the urban fabric, the designed outcome actually allows these barriers to perpetuate.

INTERNATIONAL INFLUENCES

It was interesting to see the various types of international influences that played a role in each case. KBHFF drew inspiration from a Park Slope organic food co-op. The idea behind GoMore was prompted by a similar German idea and an important piece of financial support was obtained with backup from the New York Times. Their riders also travel all across Europe. Resecond was inspired by an American author and set out trying to bring her ideas to life in Denmark. Be My Eyes benefitted from starting in Denmark, but received massive funding and support from Singularity University in San Francisco. They were able to push Be My Eyes into a practical, ambitious startup – illustrating how different cities have unique

things to offer. Low-Fi is largely based in Denmark, but has a surprisingly strong userbase in Santiago, Chile and other offshoots around the world. Joli has just launched, but their business model was in part motivated by exposure to sharing companies around the world. Even contained in Copenhagen, international influences are constant.

PERSONAL RELATIONSHIPS AS FACILITATORS

Although often a given or overlooked factors, each interviewee noted the importance of a personal relationship in allowing them to get to the point they are currently at. This is important to note because of its cultural specificity. In a city where innovation and entrepreneurship are seen very positively and have a relatively high success rate, with approximately 50% of new businesses in Denmark being successful (ref email from Ministry), it makes sense that family and friends would be supportive. In some cases, like Low-Fi, these support systems offered financial backing as well. The ability to experiment or pursue a passion is acknowledged as privilege. In places where this type of support is not a given, something would need to act as a supplement.

A PROLIFERATION OF NEOLIBERALISM

The connection of hacking to neoliberalism is apparent in the very ideals that it operates under (Coleman, 2012). The one distinctive element is something that has been maintained only within hacker niches. The idea of productive freedom, where intellectual property is cast off, is only viable if and when every person buys into it. The capitalist economy is prone to a Tragedy of the Commons and productive freedom element of hacking is contained within hacker niches.

The case of Low-Fi illustrates the difficulties of working within the same economic system that created the problem. Stine says:

“...So what we’re trying to do here is basically create a grassroots movement where music starts being this thing...[that] happens between us. Between me and the musician, or the host and audience...It’s a beautiful, circular thing where people feed off each other”

“And of course we have a business model...but if we make money, we can do more stuff.”

Low-Fi is an intensely mission-driven initiative. However, while it may have tweaked certain aspects of a linear consumption model where money is exchanged for a service to include different sets of users – different inputs, perhaps – the business model is not as circular as the founders would like it to be. The interaction of both groups of users – audience and musicians – with the Low-Fi platform is one-directional. Anne equates the functionality of the platform with the ability to “book” – a word that implies a user-initiated process. Although there should be a mutual benefit, the user’s benefit is given more weight because they essentially have all control. However, what gives Low-Fi circularity is the value that hosts place on music. If the host does not consider the concert to be a service provided to him, but rather a communal experience with the musicians, it strays from the norm.

Low-Fi does not systemically differ from either modes of consuming music, or modes of general service consumption – nor does it intend to. Low-Fi simply strives to be an oasis within what Anne considers and unsustainable music industry. An incremental approach is taken in building the community within

this oasis, where hosts may invite guests previously unfamiliar with Low-Fi and the guests, upon initiation, buy-in to the idea of Low-Fi and become part of the community. Additionally, Claus from Resecond ironically states:

“Mayor decided healthy people were a good investment.”

While this statement was said tongue-in-cheek, it hints at the irony of how society makes value judgments. Even in a city like Copenhagen that is a leader in progressive socialism, the value of a person’s health is described by economic rationale. Given this consideration, it would appear that the quickest way to bring about change is to offer an economic incentive. Resecond – as a hack on normative value systems – does not use this strategy. However, the question of whether a change driven by economic motivation could feasibly be transformative at a cultural level is unresolved. Climate change – a primary driver for Resecond and a secondary one for most of the other cases examined in this study – is an anomaly in that there have been many cases where a move for change was driven by humanitarian concerns in lieu of short-term economic benefit. Of course, many groups of people – sometimes entire nations or cities – lack the luxury of deciding whether long-term sustainability trumps the importance of economic welfare because climate change is a threat that affects their immediate livelihoods as much or more than economic threats. Due to the scope of climate change, the fight against it has been largely delegated to international groups, national governments, and cities.

These institutions, while sometimes in pursuit of profit, have an obligation to serve and spend for the benefit of their constituents. This obligation is not burdened by choosing to fiercely combat climate change, but rather fulfills it. Economists even posit that government-debt creates a pareto improvement to the presence of public goods (Public Finance Review, 1989). On the other hand, an individual’s primary responsibility is to him or herself and him/her family. The sharing economy – especially in a place like Copenhagen where sustainable-thinking is almost normalized – presents the opportunity to be both self- and publicly serving. This is not to diminish the work of non-profits, civic groups, advocacy groups, and many other organizations work for social good. It is not to say that public service was non-existent before the sharing economy. It is also not, by any means, to say that the sharing economy is inherently altruistic. On the contrary, even with the best intentions, the sharing economy can create or perpetuate social inequities.

While sharing has not been a transformative concept, targeted industries have undergone adaptation in some capacity. New actors – hackers – influenced power dynamics by either providing additional coping capacity or applying pressure on larger industry influencers. #CPHFTW – this grassroots community of hackers – has created a social movement with both virtual and physical presence. Individual hackers have successfully brought about adaptation within their own respective subsystems. We examined each case through the lens of Mark Pelling's resilience – transition – transformation framework and determined what type of adaptation the hack brought about (if applicable) or the adaptation potential of the hack, and cross-evaluated it with the characteristics of the hacker ethic that were displayed. To determine whether the collective efforts of sharing economy companies were able to further develop a true sharing culture in both Copenhagen at large and within Copenhagen's startup ecosystem, we assessed the evolution of the public dialogue around the sharing economy through a Twitter analysis and evaluated themes of events within the #CPHFTW network.

In the case of the sharing at large, there has been little indication of a transformative cultural shift. Although Copenhagen is innately compatible with the idea of sharing due to its political system and understanding of sustainability issues, neither the general population nor the startup community has mobilized around the issue. There is interest and excitement for the sharing economy, and engagement during events surrounding it. However, if creating a sharing culture is a priority for the city of Copenhagen – which evidently is the case considering government programs promoting sharing – they need to cultivate a more citizen-based approach to cultivating it. Currently, government programs are creating a superficial sharing environment – which in some ways shows signs of transitional adaptation, can prevent a true transformation due to lack of citizen-level passion and leadership.

#CPHFTW has created a community around the hacker ethic. Formed in response to an environment unfit for the type of innovation and growth that a startup ecosystem needs, #CPHFTW was a targeted attempt to create a viable startup hub – and it succeeded. However, its success depended on a group of existing, excited, willing participants to attend

events, spread the message, and actively engage beyond #CPHFTW sponsored events. The #CPHFTW newsletter demonstrated the wide range of hosts and interests that proactively furthered the discussion around startups. Whether that constituency exists among people passionate about sharing and the sharing economy is left up for debate. One promising initiative is a group called SharingLab.dk. They are a non-profit think tank based in Copenhagen whose work centers around how sharing can empower urban communities (About & Contact, SharingLabs). In collaboration with VIA University College and supported by the Ministry of Housing, Urban, and Rural Affairs, Sharing.Lab is still a relatively small initiative with 1/5 the number of Twitter followers and 1/20 the number of likes of Facebook as #CPHFTW. Created in 2015, they have also been in existing for a full year less than #CPHFTW. Future research on sharing in Copenhagen should engage with Sharing.Lab to better understand the existing sharing environment, trends for the future, and identification with the hacker ethic.

CPHFTW is a niche in the city. And this is their best role because it helps them maintain a certain “coolness”. The question is, do we want everyone to be a hacker? No, because the idea gets diluted and changed - and it turns the real hackers off. So for everyone to constantly feel like they're hacking is counterproductive. What we do want is to instill the hacker ethic in people in the process of development to give them the adaptive capacity to act on a catalyst. It's important, also, that catalysts are not always “push” factors, but that there is an informed population that can be proactive and visionary.

The challenge is to ensure that “hacking” does not become exclusive and privileged. That is contrary to both the hacker ethic and the nature of a good city. In order to prevent exasperating the divisions in cities - among class, race, lifestyle (Marcuse, Cities in Quarters), and religion - it is necessary to ensure that every group of citizens is empowered to hack. I believe that starts with education, is cultivated by city life (through programming and design in public spaces), and is solidified in several different niche groups of hackers.

In Copenhagen, #CPHFTW stands as one niche that creates a community of people interested in tech startups. Another niche is the food community which, though not a centralized, cohesive group, has been hacking the food distribution system to bring local, organic food to its members and has pushed the mainstream food distributors to adapt accordingly. These groups do not demonstrate all parts of the hacker ethic, especially when adopted outside the tech industry- but it serves as an example of how non-hackers can still hack if empowered.

In sum, the role of hacking in transformative adaptation is to provide social learning by bringing alternate views to the forefront. While not crucial, the support of a niche community increases the likelihood of a transformative effect. The hacker ethic offers the adaptive capacity needed to act on a catalyst. It should be leveraged to empower citizens to hack. It should be instilled at an educational level and perpetuated in public city life. This can be done through programming and design. Finally, niches should be supported through government funding, and collaborated with in such a way that does not render them obsolete, but creates a symbiotic relationship where hackers, businesses, planners, and policy-makers push one another to quickly adapt to the needs and demands of citizens.

1. Make universal Internet access a top priority

Nothing has powered the evolution and popularization of hacking more than the Internet. It has acted as a democratizing force, reducing the technical savvy needed to communicate with remote people or computers, and thus empowered more people to hack. Moreover, the definition of hacking has been popularized. The Hacker Jargon Files – the original doctrine of 1990s computer hackers, characterize hacking as “an appropriate application of ingenuity’. Whether the result is a quick-and-dirty patchwork job or a carefully crafted work of art, you have to admire the cleverness that went into it.” (“The Meaning of ‘Hack’”). While this characterization has been maintained, it is being applied to a far greater range of fields.

Today, the Internet acts dually as an important public forum and connective force. While it does not eliminate inequality and prejudice, it provides equal access to information and ideas. The cases examined in this study were often significantly influenced by examples from abroad and have been able to share their mission with people all over the world.

Copenhagen’s budding startup ecosystem has already created enthusiasm around hacking and offers a supportive system, with incubator programs and a community of mentors to encourage citizens to take action. Noting the cautions and limitations outlined in a previous section, the following recommendations are made:

1. Modifications in Grant Allocation Process

Planners should be involved in the grant allocation process, and grants should be conditional. This could promote hacking that promotes larger city goals, while still allowing hackers to address their personal goals. Including planners would offer a more nuanced perspective at implications, particularly in terms of equity. If grantees do not agree with the conditions, they should have the opportunity to petition these conditions, but as a rule grants should not be offered to initiatives that are counterproductive to Copenhagen’s sustainability initiatives, or those which perpetuate prejudices.

2. Celebrate Hacking

Create prototype spaces in public parks and plazas where new projects can be displayed and tested, in order to create a permanent place for new ideas in the city. Copenhagen is currently brimming with entrepreneurial energy, and prototype spaces are one way to channel it into public life. The spaces should not be limited to new companies or tech projects. Diversity should be maintained among projects in the space, and can include anything from new designs for public benches to previews for theatrical performances.

A sense of community is something that is clearly desired. Virtually every case in this paper had a social component to it, where there was a sense of camaraderie or community between users, which became, in the view of the founders, a critical component of success. In contrast to Analisa’s – an expat from the US -comment about a lack of neighborliness in the city and conversations with residents about how people view taxes as their primary responsibility to society, and consequently are not a socially connected - #CPHFTW, a community of hackers and entrepreneurs, is actively building community, which is rooted in the sense of ownership that people have within the organization. #CPHFTW hosts Town Halls, they support each other, become invested in what happens within the community, and are driven by being in that environment.

Planners should aim to replicate that energy, without undermining the work that #CPHFTW is doing. As a complement to these spaces, annual or biannual festivals can be held to collectively celebrate the creativity within the city.

WORKS CITED

1. "10 Grundprincipper." Kbenhavns Fdevarefllesskab. København Fødevarefællesskab. Web.
2. "A history of hacking." St. Petersburg Times. St. Petersburg Times, 2000. Web 10 December 2015. <<http://www.sptimes.com/Hackers/history.hacking.html>>.
3. "About & Contact." SharingLabs. Sharing.Lab. Web.
4. Baumol, William J. "Entrepreneurship in Economic Theory." *The American Economic Review* 58.2 (May 1968): 64-71. JSTOR. Web. 28 November 2015.
5. Beck, Ulrich. *Risk society: Towards a new modernity*. Vol. 17. Sage, 1992.
6. Belarbi, Mohamed Amine. "Startup From The Bottom: Here Is How Uber Started Out | Gulf Elite." *Gulf Elite*. 2014. Web.
7. Bosker, Bianca. "9 Quirkiest Facts About Twitter: Gaze Into The Soul Of The Twittersphere." *The Huffington Post*. HPMG News, 11 Oct. 2012. Web.
8. Botsman, Rachel and Roo Rogers. *What's Mine Is Yours: The Rise of Collaborative Consumption*. New York, NY: HarperCollins Publishers: 2010. Print.
9. Botsman, Rachel. "Defining The Sharing Economy: What Is Collaborative Consumption--And What Isn't?" *Co.Exist*. Fast Company & Ince, 27 May 2015. Web. 27 May 2015. <<http://www.fastcoexist.com/3046119/defining-the-sharing-economy-what-is-collaborative-consumption-and-what-isnt>>.
10. Brodersen, Sara Green [2015] *The share economy: Motivations and strategies for corporations*. Master thesis, IT University of Copenhagen/ Copenhagen Business School.
11. Christensen, Clayton M., Michael E. Raynor, and Rory McDonald. "What Is Disruptive Innovation?" *Harvard Business Review*. Harvard Business School Publishing, December 2015. Web. 2 December 2015. <<https://hbr.org/2015/12/what-is-disruptive-innovation>>.
12. City of Copenhagen. *Technical And Environmental Administration*. State of Green. Sept 2012 ed. Print.
13. Cusumano, Michael A., Steven J. Kahl, and Fernando F. Suarez. "Services, industry evolution, and the competitive strategies of product firms." *Strategic management journal* 36.4 (2015): 559-575.
14. Davis, Daniel. "Learning with urban data." *Datamining the City*. Columbia University. 4 November 2015. Class Lecture.
15. De Villa, Mia. "Denmark Towards a Sharing and Collaborative Economy 2014: High Ambitions but Lack of Legal Frameworks." *Collaborative Consumption*. N.p., 27 Feb. 2014. Web. 10 Oct. 2015. <<http://www.collaborativeconsumption.com/2014/02/27/denmark-towards-a-sharing-and-collaborative-economy-2014-high-ambitions-but-lack-of-legal-frameworks/>>.
16. Dinshaw, Ayesha. "What Is the Role for Transformation in Adaptation?" *World Resources Institute*. World Resources Institute, 11 Apr. 2014. Web. 2016.
17. Geoghagan, Harriet. "Danes lead the way toward a true sharing economy." *Veridu*. Veridu, 6 March 2014. Web. 2 December 2015.
18. Fainstein, Susan S. "Planning theory and the city." *Journal of Planning Education and Research* 25.2 (2005): 121-130.
19. Fainstein, Susan. "Resilience and justice." *International Journal of Urban and Regional Research* 39.1 (2015): 157-167.
20. Ferenstein, Gregory. "Pew: Twitter is a Mainstream Liberal, But A Conservative Wonk." *Tech Crunch*. WordPress, 5 March 2013. Web. 10 December 2015. <<http://techcrunch.com/2013/03/05/pew-twitter-is-a-mainstream-liberal-but-a-conservative-wonk/>>.
21. "Hack." *Oxford English Dictionary*. Oxford University Press, 2015. Web. 28 October 2015. <http://www.oxforddictionaries.com/us/definition/american_english/hack>.
22. Heinrichs, Harald. "Sharing Economy: A Potential New Pathway to Sustainability." *Gaia* 22.5 (2013): 228-231. ProQuest. Web. 20 Oct. 2015.
23. "How Denmark became a Cycling Nation." *Denmark*. Denmark, n.d. Web. 3 October 2015. <<http://denmark.dk/en/green-living/bicycle-culture/how-denmark-become-a-cycling-nation/>>. Julian Agyeman, "Sharing Cities" (Friends of the Earth, London, 2013).
24. Kates, Robert. "Transformation adaptation when incremental adaptation to climate change are insufficient." *PNAS* 109 (2012): 7156 – 7161 N.p. Web. 30 Sept. 2015
25. Levitas, Jake. "Defining Civic Hacking." *Code for America*. Creative Commons, 7 June 2013. Web. 20 Oct. 2015. <<http://www.codeforamerica.org/blog/2013/06/07/defining-civic-hacking/>>.
26. Levy, Steven. *Hackers*. Sebastopol, CA: O'Reilly Media, Inc.: 2010. Print.
27. Lonsdale, K., Pringle, P. & Turner, B. 2015. *Transformative adaptation: what it is, why it matters & what is needed*. UK Climate Impacts Programme, University of Oxford, Oxford, UK
28. Marcuse, Peter. "Cities in quarters." *A Companion to the City* (2000): 270-281.

29. Pelling, Mark. "Adaptation and transformation." *Adaptation to Climate Change: From Resilience to Transformation*. Routledge, 2011. EBSCO Publishing. Web. 30 Sept. 2015.
30. Reckien, Diana. *Untitled Presentation*. Our New Normal. Columbia University, New York. 22 September 2015. Class Lecture.
31. Revi, Aromar, et al. "Towards Transformative Adaptation in cities: the IPCC's Fifth Assessment." *Environment and Urbanization* 26.1 (2014): 11-28. Sage Journals. Web. 30 Sept. 2015
32. Robehmed, Natalie. "What Is a Startup?" *Forbes*. *Forbes Magazine*, 16 Dec. 2013. Web.
33. Rocha, Vera Catarina. *The entrepreneur in economic theory: from an invisible man toward a new research field*. No. 459. Universidade do Porto, Faculdade de Economia do Porto, 2012.
34. Schumpeter, Joseph A. "1934." *The theory of economic development* (1911).
35. Skytte, Claus. *The Consumer: Sharing Economy in Denmark*. SkytsEngel, 2015. Kindle.
36. "The 414s: The Original Teenage Hackers" *CNN*. *CNN*, 10 March, 2015. 11 Dec. 2015.
37. "The World's 10 Happiest Countries." *Forbes*. *Forbes Magazine*. Web.
38. Tuomi, I. 2002. *Networks of innovation*. Oxford: Oxford University Press.
39. von Hippel, E. 1986. Lead users: a source of novel product concepts. *Management Science*, 32.7, 791-805.
40. Wadhvani, R. Daniel. "How Entrepreneurship Forgot Capitalism: Entrepreneurship Teaching and Research in Business Schools." *Society* 49.3 (2012): 223-229. Springer. Web. 28 November 2015.
41. "Yellow Taxi Complaint." NYC 311. City of New York. Web.
42. Zapico, Jorge Luis. "Hacking for Sustainability." *Diss. KTH Royal Institute of Technology*, 2014. *Hacking for Sustainability*. Creative Commons. Web. 30 July 2015. <<http://jorge.zapi.co/phd>>.