

Maximizing Product Utilization via Place-Based Sharing

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Introduction

Our world is facing important challenges, including population growth expected to reach 9.8 billion by 2050, the exceeding of planetary boundaries (Steffen et al. 2015, WWF et al. 2016, Venter et al. 2016), urbanization, the spread of urban slums (WBGU, 2017), and digitization which is expected to lead to significant job loss due to automatization (Stengel, 2017; Chang et al., 2016; Berger & Frey, 2016; World Economic Forum, 2016; Ford, 2015; Cowen, 2013; Frey & Osborne, 2013). For these reasons, it is increasingly important to guarantee everyone has access to the goods they need for everyday life, without the necessity to own them. By implementing circular economy principles, we can address these interconnected challenges and approach a zero waste society (Stahel, 2016). Collaborative use can increase access to products while simultaneously reducing overall product consumption – and the energy resources needed to manufacture, distribute, and store them (Federal Environmental Agency, 2015). “A redirection of household expenditure towards less resource-intensive services [...] results in impact reduction across all footprint indicators” (Ivanova et al., 2015).

While the solution of “collaborative use” sounds easy, and studies reflect public willingness to share (Nielsen, 2014; Verbraucherzentrale, 2015; BMBF, 2016), a culture of sharing items between strangers does not exist in most of the developed world (GfK, 2015; ING-DiBa, 2015). One reason is that most sharing platforms are not convenient or desirable for the majority of the population (BMBF, 2016). Sharing items Person to Person (P2P), even via online platforms and apps, still have significant barriers to adoption. These barriers include high transaction costs, needing to arrange two transfers (drop off and pick up) each time an item is shared a single time, lack of trust between owner and borrower, and often a lack of inventory on both the supply (products) and demand (borrowers/people) side of the transaction. A study by the German Consumer Research Association revealed that only 9% of the respondents are interested in sharing and exchange platforms (GfK, 2015). The challenges inherent in P2P sharing have been demonstrated by the failure of dozens P2P “stuff sharing” platforms (Kessler, 2015).

Place-based sharing implemented as Libraries of Things (LoTs) are starting to overcome these barriers (Ameli, 2017). In cities where P2P sharing platforms have failed, LoTs are experiencing greater success by providing a trusted place to exchange shared items—and have the added benefit of bringing people together to build community. Ideally, with a convenient, walkable location and predictable hours, LoTs can provide a safe place where people can pick up items when they need them and return them when they are done using them. Based on data provided by myTurn.com, pbc. sharing items via LoTs can increase product utilization 10 to 100 times (depending on type and durability of the item) and thus resource efficiency compared to individual ownership. The addition of reservations, and self-service kiosks with electronic locks has the potential to make sharing even more convenient than purchasing, storing, maintaining and eventually disposing of products.

Today there are at least 147 Tool Libraries, 98 more general Library of Things that are directly benefitting at a minimum 200,000 people. While indirect impacts can be difficult to estimate, we know from a sampling of LoT users, they have an average family size of 2.7 people. Further, the tools from LoTs are also often reported to be used for neighborhood improvement projects, like helping build a park in Seattle or doing environmental restoration in Edinburgh, that can positively impact hundreds or even thousands of people at a time.

Research Question

If they have so many advantages, why haven't Libraries of Things been widely implemented? What are the most important factors that could make a difference? Is there a model which could help scale the whole process, and if yes what does it look like?

Methodology Limitation and Scope

To answer the research question, a combination of different methods were used to gather empirical data: desk research of existing studies and materials about LoTs was conducted, and interviews with providers and volunteers from different locations were conducted. This study is part of a bigger research project and relies on 13 semi-structured in-person interviews with founders and volunteers at six LoTs (locations include Brussels, Edinburgh, Ottawa, Montreal, Toronto, and Baltimore). The interviews were audio-recorded, transcribed using MaxQDA and subsequently coded and analyzed. The authors employed a thematic analysis approach (Braun & Clarke, 2006) to interpret all the empirical data. This data was used to first draw a generalized Business Model Canvas (BMC) (Osterwalder, Pigneur, 2010) of existing LoTs. This model helps to visualize the idea of a business within one diagram and we used it to reduce the information to its core to get a deeper understanding of all the business processes. In a second step, the empirical data was used to identify barriers to implementing and stabilizing LoTs in their respective contexts. In a third step, the barriers are put into the picture of the BMC (put into the bigger context of ongoing global challenges) to understand which processes are affected by them. Finally, with the help of a general stakeholder-map the identified barriers reveal on which level improvements are needed.

Taken together, this multimethod approach provides a strong foundation from which the researchers are able to design one possible path for success in the future.

Research Outcome

1. Generalization of the Concept of Libraries of Things

With the help of a Business Model Canvas (Osterwalder/Pigneur, 2010) the core idea of the concept of the LoT can be visualized. To get to this generalized figure of a LoT, a BMC was drawn and analyzed for multiple locations. Through this analysis the common components and ideas were deduced, and the different Canvases distilled to the most frequently mentioned aspects for further research. This common lead to the generalized BMC of a LoT see below (Figure 1).

The value proposition is to guarantee access to products at an affordable price and to establish more sustainable lifestyles for community members. The customer segments varied and could not be reduced further. LoTs try to get community members involved as employees, volunteers, or members who really need the service. The members encompass many different groups including students, self-employed people, low to medium income community members, and even other organizations.

The interaction between the LoT and community members happens in person, via social media, the LoT's main website, and in direct and automated fashion via the lending library management software platform (tracking,

reservations, automated reminders, etc.). The in-person, personal, and transparent forms of interaction with the LoT help build a stronger sense of community between members.

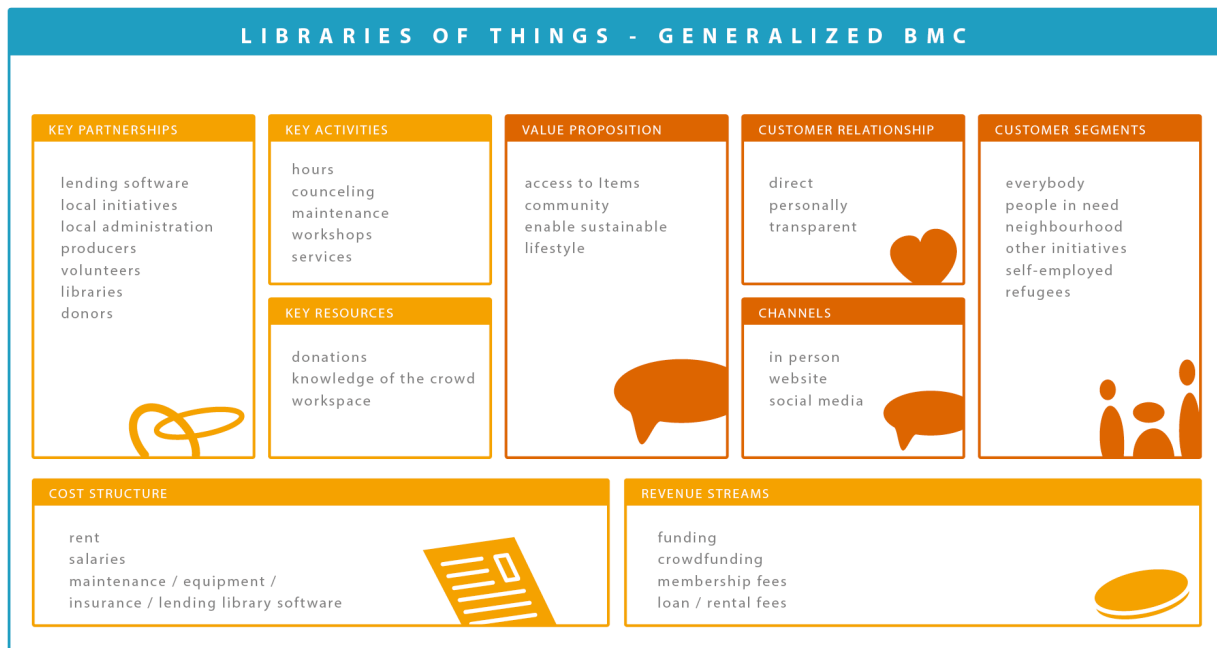


Figure 1: Business Model Canvas of Library of Things. Source: Own Picture, based on Osterwalder/Pigneur (2010)

To provide the service the LoT relies on several key partners include the provider of a lending library management software, local employees, volunteers, and experts (to teach classes, maintain products, etc.) to keep the institution running and ensure continued service delivery. The key activities are maintaining the space, providing access to the products (often with counselling or education on use), maintenance, and in many cases, workshops and lessons. Key resources required are staff or volunteers, physical products (donated or purchased), and space. To finance the service, LoTs derive revenue through a combination of membership fees, loan or rental fees, late fees, grant money and often crowdfunding campaigns. The LoT spends money on rent, salaries, products, maintenance and repair of products, the lending library management platform, and professional services like insurance, legal, and accounting. Some locations have been up and running for years and are running smoothly or even expanding. Based on aggregated data from myTurn.com, the LoTs that are adding members and continuing to grow the fastest are the ones that operate more like a business. This model typically includes membership or loan fees, a larger social media presence, and higher operational efficiency.

Experiences of operating LoTs were collected to identify some barriers to implementation and that can lead to more fiscally and organizationally sustainable locations.

2. Identification of barriers

LoTs can overcome the barriers that keep people from taking action; however, there are barriers to overcome to implement fiscally and operationally sustainable models.

Identified Barriers that can be deducted from the empirical data are:

A. Communication (internal / external) barriers

Internal communication was found to be a challenge for almost all the initiatives. Founders and organizations often had trouble finding a dedicated team with all the appropriate skills, and even in finding the right tone to communicate with each other when addressing barriers. Initiatives need a core team that is cohesive, has a

broad range of knowledge (or access to professionals who can fill in gaps), and a balanced distribution of duties amongst the team members:

“And to be honest I have never once seen somebody, who said they gonna set it on their own, actually succeed doing it. Never once. Not that I witnessed it. [...] I have mentioned a skillset, but passion supersedes all of them. If you got a passion over something you will make it anyway.” (Toronto, Ryan)

Because the workload is so immense to run a successful LoT, and only grows with membership, it is crucial to have a team:

“I am overwhelmed by the amount of work personally. It hasn’t always been this way. But these days I feel that we are really short on our staff.” (Toronto, Ryan)

“And Frederique and I thought it would be a weekend project. We kind of thought we will open on Saturdays and organize a bit on the weekend. We never envisioned it would be something that big and that time consuming.” (Ottawa, Bettina)

Most LoTs are nonprofit organizations, and it takes skills, experience, and patience to work with people who are primarily, at least when getting started, volunteers.

The second challenge is the communication with external partners. This is especially true when starting in a city or town that does not already have a LoT. Landlords, funders, municipal workers and officials who are not familiar with the concept often do not know how to assess the risks, chances for success, and potential community benefits. These poorly understood variables may cause potential partners to be more reluctant to support, promote, and help fund a LoT. This can lead to situations where LoTs need to get started in creative and sometimes unconventional ways:

“We started off in our garage, cause we couldn’t find a space right away.” (Ottawa, Bettina)

“I first had all the tools in my basement and came here to the police-box [also known by science fiction enthusiasts as a “TARDIS”] every Saturday for roundabout a year.” (Edinburgh, Chris)

Thus there is often a barrier ramping up quickly and establishing a stable membership base from the beginning.

B. Financial & Institutional barriers

I used my bank-account to finance one [LoT].” (Toronto, Ryan)

The country, region or city that a LoT is started in can have a large influence on its future success. In some countries it is relatively easy to attain a charity or nonprofit status right away whereas in other countries it’s quite difficult to become a nonprofit organization. Almost all private foundations and many governments will only award grant funding to formal nonprofits or charities. Once a LoT attains nonprofit status, their location may be a determinant of their fundraising success. Some LoTs have more access to grant funding from their local or regional governments and from local foundations than others do. The existence of government-based funding programs and the presence of one or more community-focused foundations can increase a new LoT’s likelihood of funding. Still, it can be very difficult to convince funders to provide start-up funding to allow the new LoT to rapidly grow an initial membership and start to generate earned from membership fees. One strategy to help overcome funding barriers is to use a crowdfunding or other campaign to “pre-sell” memberships before the LoT opens. While these are often successful, there are still many other barriers to overcome, and the crowdfunding itself requires work and promotion.

C. Operational barriers

“The more people are aware of it, it’s just gonna keep going. It just takes someone TO DO it. To start it. To take that lead.” (Toronto, Kevin)

Given the community and environmental benefits, it seems it should be easy to find a team dedicated to getting a LoT started; however, this is often a challenge. One paid staff member (via grants, crowdfunding, partnering or growing out of another organization), who takes ownership of the creation of the LoT can make the difference between success and failure. Research has shown that each successful, growing vibrant library

has typically one 'leading figure' that takes ownership of the project. This is especially important at the start of the LoT.

"Just by having everything out here, organized and available. That's most of the battle. Just existing."
(Toronto, Ryan)

The operational barriers include the problem of finding enough volunteers to keep the doors open. Especially in bigger cities, there can be high turnover of volunteers. This means that volunteer education and training, and having easy to use tools, is essential:

"You are constantly trying to find new volunteers. You always have people that you teach and then they leave again. We teach new volunteers constantly. And if you are lucky some will stick with you at the end." (Ottawa, Bettina)

"Our biggest challenges are staffing the locations. Sometimes the night before we don't have people yet. So it is a challenge that the locations are always open. Continuity between volunteers is a big challenge." (Toronto, Lawrence)

And the other aspect is to cherish people and make them feel part of the LoT community.

"So making people feel special for doing this. Celebrating them for coming. So when people come here we are celebrating them: Thank you for coming. Thank you so much for being a part of this! You are building this wonderful solution. This is the bigger whole that you are part of." (Toronto, Lawrence)

"The only thing that I think we are doing differently is that we have a level of inclusivity. And a family feel. Where people feel invited into something special. So they also feel responsible for taking care of it. We do a lot of social stuff." (Baltimore, Piper)

It is important to strengthen the connection between the volunteers, the initiative, and the neighborhood that the LoT is serving, which is also often the source of additional staff and volunteers.

3. Generalized Business Model Canvas with identified barriers put into context.

Expanding the Business Model Canvas to include the barriers listed above, make it clear that there are multiple levels where there are challenges to be overcome. In the following figure, the barriers are listed in the Business Model Canvas to get a deeper understanding of what has to be improved to create a more efficient process. Trying to assess the impacts of LoTs from a wider ecological perspective (e.g. using the UN Sustainable Development Goals) through the lens of the BMC shows that our model is not complete. There are some restrictions missing so far: the ecological challenges, such as resource / energy scarcity and the aim to deliver services that act within planetary boundaries (Steffen et al., 2015). The technological and social challenges of greater digitalization / automatization (Frey & Osborne, 2013; Ford, 2015; Berger & Frey, 2016) are not taken into consideration. Without putting the whole concept into the bigger picture of global challenges the outcome modeled may only be viewed through established economic and capitalistic paradigms when there may be a potential for greater positive impacts. Therefore, in Figure 2 we examine the concept of a Place Based Sharing System like LoTs in a larger framework of overall global challenges to help understand how collaborative consumption may fit into future solutions:

The following main leverage points thus can be identified:

- Communication within the initiative has to be improved involving new technologies and means of communication.
- Communication of the initiative with its surrounding has to be improved to overcome barriers of misunderstanding and lacking knowledge.
- Financing has to take place without asking members to pay more for the service to not put the access for everybody at risk.
- Institutional difficulties have to be overcome to guarantee a smooth start from the very beginning.
- Operational difficulties have to be overcome to allow the initiatives to focus on their main task.

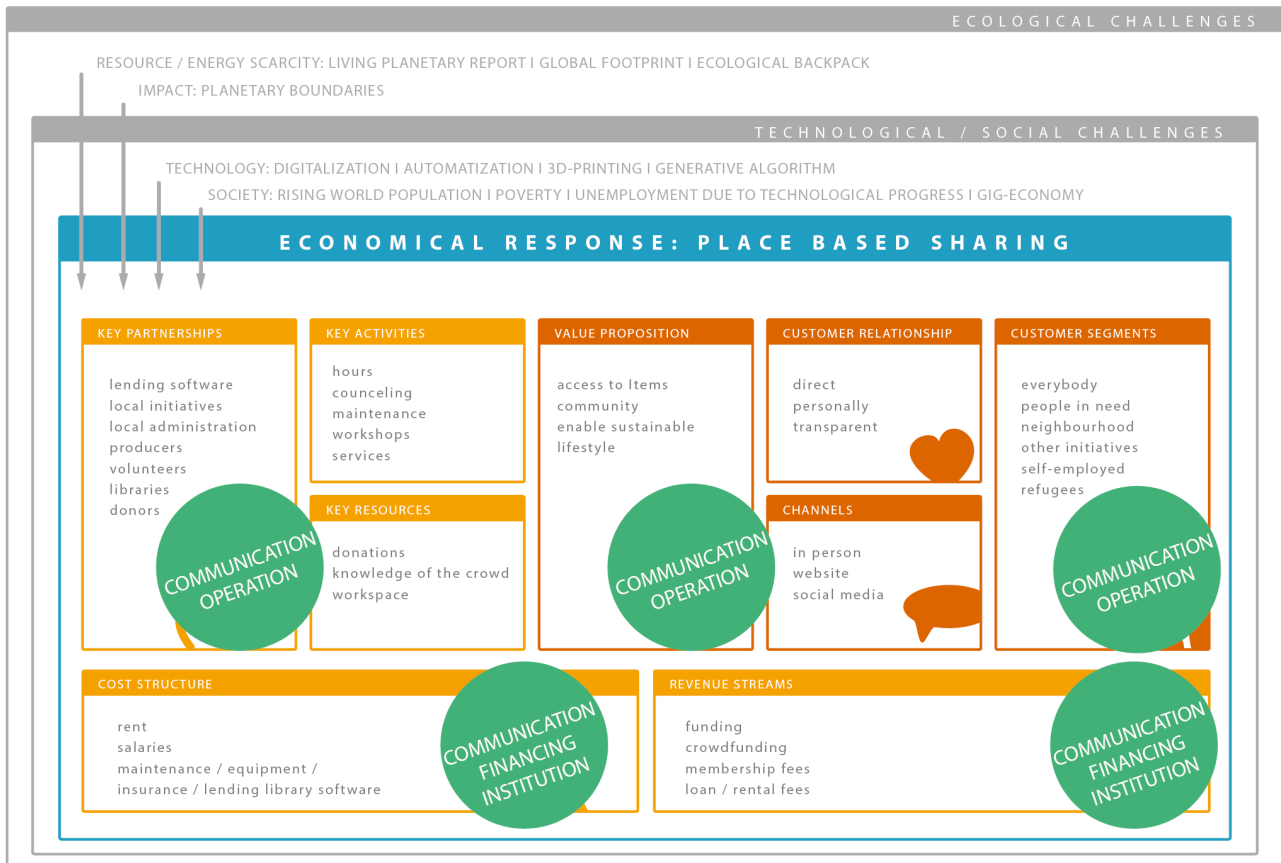


Figure 2: Place Based Sharing to confront global challenges, including barriers. Source: Own Picture.

To understand *who* can take *what* action on which level to have the most positive impacts, it helps to visualize all stakeholders of the system in a stakeholder-map (Figure 3).

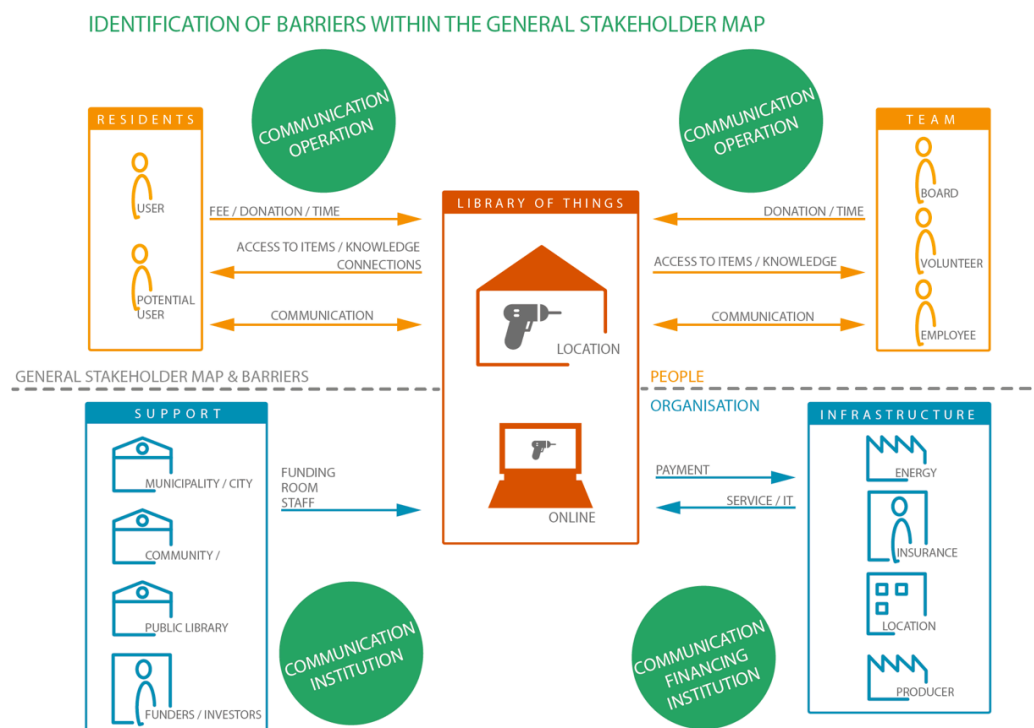


Figure 3: Identification of barriers within a stakeholder-map. Source: Own picture.

The stakeholders involved can be separated into different groups: main actors, people involved into daily business (yellow), actors in the background enabling the concept to come alive (blue) and the LoT itself with its various forms of appearance. These groups are confronted with different barriers identified appear in different locations within this stakeholder map. This picture illustrates the situations and circumstances in which these barriers work and reveals the underlying processes that are affected. It demonstrates a need for a mechanism to facilitate communication on different levels to overcome the operational, financial and institutional barriers.

Opportunity: tap into municipal community engagement goals

Given the many barriers to starting and running a LoT, it is apparent that a different approach will be needed to scale this concept more quickly. One such approach is to tap into existing institutions that are better funded and are already established to serve the public good. Specifically, we'll analyze how, with the assistance of new software platforms, municipalities can help find funding and resources to more easily establish and support LoTs.

With more than half the world's population living in ever more economically productive cities, and urbanization continuing apace, large-scale environmental problems resulting from consumption economic models and lifestyles are already happening. Meanwhile large amounts of equipment and goods are barely used. The "Sharing City" concept combines the benefits of Sharing Economy and Collaborative Consumption with urban development and community building, and promises to mitigate the problems of overconsumption and waste while increasing access to underutilized equipment and goods (Sikorska & Grizelj 2015).

Additionally, a Sharing City "can create a sense of community among strangers, which helps to facilitate trust and social inclusion. From an environmental perspective, sharing can reduce overall use of resources" (WEF 2017: p.8). The latter results from the fact that consumers often discard still functioning products (30% of all discarded appliances are still functional) and replace them with new ones (Mont & Power, 2010). On a macro level, this exacerbates unsustainable consumption levels. One of the consequences of this is that with limited space not least for disposal in cities, municipalities struggle to cope with waste (City of London, 2014; Fell, 2012). However, within the existing examples of Sharing Cities the main focus is not on consumption, but on mobility, housing and workspace (WEF 2017). The potential of sharing many of the other items of daily life is too often not considered. And this also applies to so-called Smart Cities: Smart City concepts are most often oriented towards the reduction of energy, water, resources, and waste. However, when it comes to the efficient use of resources through sharing services, only the sharing of cars, bicycles, and accommodation are considered (McKinsey 2018, Yesner 2017, Cocchia 2014). This is a significant deficit.

Hence the question is how can Sharing and/or Smart Cities enable the sharing of a great variety of both less frequently used, and eventually, everyday products, while overcoming the barriers to establishing LoTs mentioned above? LoTs can help municipalities meet their goals for engagement with residents, reduce waste (and the GHGs associated with the production, transportation, and eventual disposal of products), and increase affordable access to products.

There is a platform for municipalities that has the potential to solve many of the communication problems on the different levels (identified in Figure 3) that LoTs confront. UQ (Our Neighbourhood, i-puk.de) is a software platform that facilitates communication both internally within municipal departments, and externally between municipal departments and community members. By opening up communication channels, UQ makes it easy for residents to engage with their municipality, and for the municipality to learn from the collective intelligence held by its community.

There is also a platform that has the potential to solve many of the operational and logistical challenges that come with starting and managing a LoT. The software platform myTurn.com is designed to make it easy to manage members (or library users), inventory, loans, reservations, the option to charge fees to help support the LoT, and more.

Combining the municipal and community engagement features of UQ, with the LoT management platform myTurn, provides a path to more rapidly scale up and ensure the success of LoTs, as well as help cities reach their waste, engagement, and environmental goals.

So, which of the hurdles mentioned in the previous sector can be overcome by UQ and myTurn and how? The answers are displayed in table 1 and table 2 below.

BARRIER		WHY – THE NEED	HOW – THE SOLUTION
Communicational Barriers	Government / Administration	Government agencies are often “siloes” with limited effective communication and cooperation between departments, even when working on systemic problems. Communication within administrations needs to be improved in case several departments are involved in order to get possible projects with and about LoT’s up and running and to support the exchange of best practices on an administrative level. Thus a network between different administrations could be established to promote and spread the idea of the LoT beyond cities.	On administrative level UQ supports communication between different administrative bodies of a city / municipality. This participatory portal supports the administration’s work processes as well as its public relations and communication. It is cross-agency and both subsidy-compliant and process-open. It can be implemented on city, municipal, or regional-level. The possibility to integrate all kind of different apps makes it adaptable to different goals and needs of a neighborhood.
	Administration & Community	Communication between the administration and the civilian population must be facilitated and simplified so that on the one hand the administration can recognize the needs of the citizens at all and on the other hand the citizens can find a direct contact person with their concerns. Only then the administration knows how it can possibly help a LoT or a group of people interested in starting a LoT.	While each city / municipality is at a different stage of development and has varying resources, they universally have the need to improve communication with residents. However, a lack of easy to use online tools can cripple effective communication between municipalities and communities. Easily accessible online communication tools are needed both to inform people about new initiatives, and to allow residents--who know their communities best--to advocate for the best solutions for their local area. UQ supports the interaction processes between administrative bodies and residents by allowing them to post and manage their own projects.
	Community	On the community side, UQ allows and supports autonomous self-organization of residents. Projects like a LoT can be created, and individual participation apps can be integrated and the integrated tools offer support in all phases of participation, knowledge transfer and self-organization. Individual roles and rights for self-organization can be set up for the initiatives involved.	On civil society side UQ allows and supports autonomous self-organization of residents. Projects like a LoT can be created and individual participation apps can be integrated and the integrated tools offer support in all phases of participation, knowledge transfer and self-organization. Individual roles and rights for self-organization can be set up for the initiatives involved.

Table 1: How the identified barriers can be overcome by a combination of two platforms

Barrier	WHY – THE NEED	HOW – THE SOLUTION	BEST PRACTICE / QUOTE
Financial Barriers	Since LoTs are a relatively new concept, there is not an existing funding program to get them started. Once they are started, they need to be financially sustainable to continue to offer their community benefits.	<p>UQ helps connect residents with the municipal government to and potential financial and other support to start and run LoTs. This helps LoTs find appropriate funding opportunities and the municipality can provide support for starting crowdfunding campaigns. Municipalities can help LoTs find public spaces to start, reducing or eliminating the cost of rent during the startup phase.</p> <p>myTurn helps community members financially support starting a LoT with the ability to “pre-sell” memberships before the LoT opens. After the LoT is open, myTurn allows for managing multiple revenue streams including from ongoing memberships, rental fees, and late fees. Further features like automated reminders, late notices, holding credit/debit cards on file, help reduce the loss of items and ensure items (and potential revenue) can be maximized.</p>	<p>“We doubled the utilization of our Lending Library in the first year using myTurn!”</p> <p>“We’ve reduced our inventory loss to nearly zero with myTurn’s superior asset tracking capabilities, email reminders, reports, and analytics.”</p>
Operational Barriers	There are many logistical hurdles to starting and managing a LoT that include managing members, hundreds to thousands of inventory items, tracking loans, ensuring items are returned, and managing financial and utilization reporting can be time consuming and costly.	<p>The myTurn platform was developed from the ground up to manage all aspects of running a LoT as simply as possible. Rather than using spreadsheets, generic online calendars, or even paper and note cards, myTurn helps automate the tasks associated with operating a LoT. Specifically, myTurn makes it easy to import, add, and edit inventory; manage members and subscriptions; track loans or inventory items to members; send automated reminders and late notices; allow members to reserve items in advance so they have the items when they need them; allow admins to turn reservations into orders so items can be set aside in advance to make the pick-up process faster; and even allow members to check items in and out themselves, extending hours and availability if items.</p> <p>Just as accounting software has become an indispensable tool for accountants and businesses to manage their finances, the myTurn software is becoming the essential tool for optimizing product usage and managing LoT operations.</p>	<p>“We would have never started our community sharing program without myTurn. We’re now helping thousands of people in our low and mixed-income neighborhoods make their homes more efficient, improve their neighborhoods, and start new businesses.”</p> <p>“Incredibly easy to get started, we were up and running in minutes.”</p>

Table 2: How the identified barriers can be overcome by a combination of two platforms.

Solution & Beneficiaries: combine engagement and lending platforms to radically increase place-based sharing

UQ already works with three cities and three administrative districts (combining 82 municipalities) providing more than one million residents access in Germany and can increase the visibility of the LoTs concept, while also connecting communities with funding opportunities. myTurn, which already serves over 350 specialized (e.g. kid and baby item, tool, kitchen, sporting good) and general LoTs in addition to education and business customers, can provide the platform to make it easier to start and manage new locations. Combining these two resources has the potential to reduce barriers and radically increase the utilization of shared products.

The main benefits are displayed in Figure 4 below.

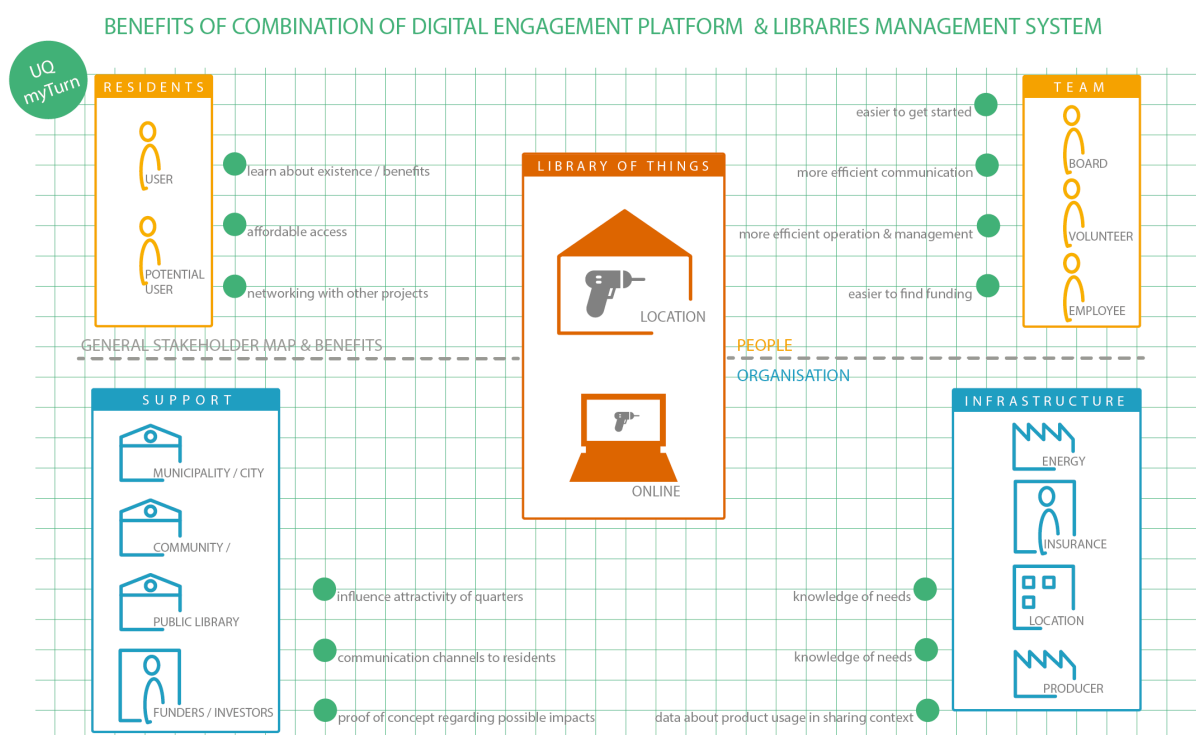


Figure 4: Benefits for LoT when implementing Combination of Digital engagement platform & libraries management system. Source: Own Picture.

The process to get started can be as easy as:

1. UQ allows citizens to learn about the possibility of a LoT and discuss it with neighbors
2. Once a neighborhood has decided they want to start a LoT, they can use UQ to communicate the need to the municipality
3. The municipality can use UQ to better coordinate between departments and communicate with the residents about the project, potential funding sources, and public space that might be available to start the LoT
4. Simultaneously with step #3, myTurn can be used to start pre-selling memberships to also help with funding
5. Once space, funding, and potential staffing (paid and volunteer) are obtained, myTurn is used to start to track products that are donated to or purchased by the LoT.

6. Once the LoT opens, myTurn is used to help ensure best practices are followed in managing the LoT and to operate the LoT as efficiently as possible

Combining these two platforms – the digital engagement platform Unser Quartier (UQ) from I-puk, and myTurn.com’s Library of Things management system – has the potential to break down barriers between government and communities, while helping to radically increase sharing and potentially reduce waste and improve climate resilience.

Further Research

Additional research is needed on a number of topics, including:

While UQ helps find funding and connect stakeholders, it only currently operates in Germany. For LoTs to have a worldwide impact, similar tools and funding maps will be needed in other countries.

Research is needed on the impacts of LoTs in communities, including if and how much they can reduce income inequality (e.g. how significant is the difference on quality of life between owning products, or having convenient access to them).

Research is also needed on the Life Cycle Analysis of specific products to better estimate the environmental and climate impacts of wide scale sharing via LoTs.

The previous item can also tie in to potential rebound effects and how they might blunt positive impacts. This might include people who can save money with access to products instead doing more travel by airplane.

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