

NEWS

PROJECT

BRISE-Vienna - Building
Regulations Information
for Submission
Envolvement

📍 Vienna, Austria

TOPIC

Digital transition

EDIT 06 OCTOBER 2020
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BRISE Vienna - building the future of EU cities

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European cities are as diverse as the continent. Some are growing, some are shrinking, but all try to figure out, how data and digital technologies can help them improve services and solve real-world problems.

Many cities start their journey towards a digital transformation by looking towards smart & connected solutions such as smart lamp posts, smart parking or real-time traffic monitoring. Often, a few months down the road, city administrations realize that going digital is a far more radical, all-encompassing, and transforming approach than it seemed by looking at it from the outside. They usually then decide to either stay at the surface and decorate their operations with a few digital gadgets, or they take a few steps back and try to harness the full potential of digital technologies for their citizens and city operations. This takes long, requires a tremendous effort, and usually transforms the city as an organisation - but it eventually pays off.

The City of Vienna (A) serves as a great example for understanding the full implications of digital technologies on urban development and city operations and - at the same time - it provides a blueprint for approaching the digital transformation of city operations in a way that drives real value creation. The **BRISE Vienna project** shows how it can be done and it serves as a reference for every city in Europe that wants to benefit from the potential of data and digital technologies. The goal of BRISE Vienna is to fully digitize the process of building permission and - through this - at least half the time it takes the municipal authority to issue a building permit. At its core, however, the project is about a lot more: it is a new approach to shape the digital transformation of our societies in a way that puts citizens, public-value, sustainability and data sovereignty at the core of the digital transformation.

We can best understand the relevance of BRISE Vienna by looking into the key building blocks of the Viennese approach to digital transformation as the projects unfolds. These are in principle the following three:

1. **Solve a real world issue**
2. **Build on state-of the art digital technologies (where it makes sense)**
3. **Understand users and stakeholders**

Let's take a look at how Vienna goes about each of these points in order to build the municipal building authority of the future.

1. Solve a real world issue

Vienna is an attractive city. It has been ranked as "most liveable city" in the world ten times by the Mercer index^[1] and for the second time by the Economist^[2]. Vienna is a social city. With approx. 25% of the housing stock being owned by the city and another 25% being subsidized to cap rents^[3], it is one of the few cities in Europe which is able to conduct active social policy by impacting on rent prices in a systemic way.

The attractiveness of Vienna, however, poses a major challenge to the city since it attracts new residents year over

year. Between 2004 and 2019 the city has been growing by an average of 20.000 new inhabitants every year [4] and all of them need housing as first and foremost requirement for living. All indicators show that this increase in population is not likely to stop any time soon. As a consequence, Vienna has been seeing a thriving building industry over the course of the last years with an average of over 10.000 new apartments being built every year for the last 5 years [5].

With more than 13.000 building permits required every year, the municipal building authority has a tough job to fulfil. The majority of building permits are the product of a lengthy process, involving several steps of paper-based submission of plans, manual revision of the plans, manual checking on compliance with city-wide and location specific regulations, in-situ observations of the building site, feedback cycles with the developers, citizen engagement processes, public hearings, etc. Thus, it should not come as a surprise that **issuing a building permit on average takes as long as 12 or more months**. During this time, no construction can be started, new inhabitants need to wait for their move and no rent can be earned.

Time-lags in the provision of housing due to administrative processes is a key challenge which Vienna needs to solve.

A shortening of the building permission process thus will not only grant earlier access to housing for residents that are waiting for their apartments and thus takes pressure of the Vienna rent market, it also spurs the local economy and raises tax income for the city.

2. Build on state-of-the-art digital technologies

How can digital technology help to speed-up the building permission process? To understand this, let us take a somewhat closer look at some key steps in the process. This is a comprised version of how building regulations are issued today:

1. The planner or developer submits several plans and documents of the along with a precise measurement of the site. These plans are paper prints of the building in various cuts and angles.
2. The building authority checks whether these plans are congruent with the building code and law. This - in essence - involves two steps:
 - o The shape of the building has to be in line with the spatial regulations on the site i.e. distances to neighbouring sites need to be kept, the height of the building must not exceed height limits etc.
 - o Building functions and other variables need to be congruent with particular rules for the city and the site. A green roof may be required, the insulation may need to be of a particular quality, etc.
3. The developer receives the result of the review by the building authority, changes his plans and submits them in a modified version. Again as paper prints and in 2D.
4. Once all issues have been dealt with, the neighbours and other residents are invited to review and comment the 2D plans.
5. Once all issues of the neighbours have been dealt with, the developer receives the permission to build the house.
6. In many cases this process will undergo several feedback loops, since the developers too change their project while being in the permission process, due to changing demands of investors.

Digital technologies are particularly good in recognizing patterns, dealing with large amount of information and connecting various stakeholders in one virtual place. So where in this process, do we encounter elements that allow for digital technologies to step in?

First and foremost, **BIM (Building Information Modeling)** allows us to work with a 3D building model instead of 2D paper plans. By giving developers and planners the choice to submit an electronic 3D model of their building, the plan becomes machine readable and a digital process can be initiated around it.

Going from 2D paper plans to 3D BIM models enables the municipal authority and the developer to **communicate in a new language and apply digital tools** which help to speed up communication substantially. By applying BIM based modelling, the Vienna building authority can create a basic 3D shape out of the site under consideration and – even more important – it can automatize the review of the planned building with regards to technical and legal requirements. The 3D model helps to immediately determine and visualize the space which limits the boundaries of any new building on this particular site. Automated routines can now compare the 3D model of the planned building to the 3D reference model of the site and check for compliance automatically. This saves the building authority an enormous amount of time and it makes sure no mistakes are made due to uncomplete 2D plans.

Second, Machine learning and Artificial Intelligence helps to identify the exact rules and regulations that apply to the specific site at hand.

By applying AI-based algorithms, the building authority can search relevant legal documents such as the land use

plan, development plan or text-based regulations on relevant provisions for the building site. These are the basis for the checking routines for the BIM model analysis and for comparing the model of the developer to the reference model by the city.

But AI can do even more than informing the checking routines. It also helps the building authority to quickly identify legal provisions or precedence from past court decisions on issues similar to the planned building at hand. By applying semantic analysis to legal text documents, the Vienna building authority stops relying on the historic knowledge of experienced individuals in the office and makes sure to uncover all legal provisions and precedence with relevance to the planned building. This again saves plenty of time and increases the quality of the outcome.

A third application of AI within the BRISE process of digital building permission refers to the automated checking of the submitted documents. An intelligent algorithm can check for existence, completeness and correctness of information before a city official starts to work on the documents. Again, Vienna gains time and developers receive instant feedback on the completeness of their submission.

Third there is Augmented Reality. By visualising the future building to all involved stakeholders, decision making becomes much more realistic and lay people (such as neighbouring residents) do not need to figure out cryptic 2D plans before understanding the implications of the building on the surrounding environment. Augmented Reality helps position the virtual building on the real site and visualize it with e.g. a tablet in-situ or via a web-based instrument. Shading, distances, heights, and other effects of the buildings can be experienced in a much more realistic way, contributing to a better and more realistic citizen engagement process around the new building.

Through building on these state-of-the-art technologies, Vienna does not only drastically speed-up the process of issuing a building permission, it also increases the quality of the outcome for all stakeholders involved.

3. Understand users and stakeholders

Digital solutions that create real value for cities are per definition multi-stakeholder solutions. As data-driven approaches unfold their full potential, they connect various stakeholders, users, and municipal staff along a user friendly and machine-supported process of value creation. A multitude of roles, special knowledge, information, data types, interfaces and activities need to be aligned in a way that is simple, intuitive, and easy to handle for each person involved in the process.

In the case of BRISE Vienna, amongst others this will mean that:

- the **planner** needs to have seamless integration of his own tools and work environment into the process.
- The **municipal worker** needs to have an easy dashboard to digitally follow the process of building verification and permission, helping to understand each next step and reminding him of the tasks to be executed.
- The **citizen** needs a simple and easy to use application to understand the impacts of the new building for him

We have often read the phrase that “interdisciplinary collaboration lies at the heart of a successful smart city”. This hackneyed phrase reads like a typical empty statement – yet it is quite true and up-to-date. Here is what is meant with this phrase:

In order to arrive at an improved and digitally supported process it is necessary to understand the perspective and detailed intricacies of all stakeholders involved.

An architect of a seamless digital system connecting various stakeholders, needs to understand the system from the eyes of each user. Adopting the perspective of key roles involved and understanding them from the inside – **immersing oneself into the mindset of the user** – is a key imperative to get this right. This can only be done by collaborating in a team that represents the different users, experts and roles involved, supported by experts who are able to transfer their perspective into requirements for a digital system.

In BRISE Vienna, the first step towards a seamless and integrated digital process consists in understanding and describing key roles in the process from the perspective of the individual. It helps to see behind the motivations, needs and challenges each individual brings to the process and it is the requirement to design a system that is capable of fading into the real life situation of each user involved, picking him up where he stands at this very moment.

Vienna focused on 10 different roles that are involved into the process of applying for and granting a building permission. It worked out statements, needs, possibilities and challenges from the view of those different roles, providing a rich 360° view on the process itself. The 10 roles are listed below:

ROLE	STATEMENT	NEEDS, CHANCES, CHALLENGES
 CONSTRUCTION OWNER		
 Bertram, 34, Buyer, Private person	<p>The transparency of the procedure, including risk assessments and time estimates, gives me an overview and planning security.</p>	<ul style="list-style-type: none"> • The longer it takes, the higher the costs. • Plannability influences the availability of workers.
 Housing construction company	<p>Every year we have many big projects and work in a big team.</p>	<ul style="list-style-type: none"> • Society expects cheap housing. • The operation of the building is an important phase in the construction life cycle.
 Investor	<p>I benefit from the usability of the resulting data over the entire life cycle of the building.</p>	<ul style="list-style-type: none"> • The elimination of duplication reduces my process costs.
 PLANNER		
 Petra, 42, self-employed architect	<p>The data I am provided with makes my life much easier. The modelling opens up new business opportunities for me.</p>	<ul style="list-style-type: none"> • Free, creative work is close to our hearts. • Feedback before submission helps us. • Our services must be protected and remunerated.
 Builder	<p>The data I am provided with makes my life much easier. The modelling opens up new business opportunities for me.</p>	<ul style="list-style-type: none"> • Speedy approval is important to us. • An important focus is on joint planning and tendering for sub-trade. • We also have the completion of construction in sight.
 EVALUATOR		
 Günther, 53, surveyor, structural engineer	<p>I receive my orders digitally via the portal and can process them there immediately. I receive all changes immediately. This shortens my throughput times.</p>	<ul style="list-style-type: none"> • Low administrative expenses and focus on the preparation of the expert opinion.
ROLE	STATEMENT	NEEDS, CHANCES, CHALLENGES
 CITY OF VIENNA		
 Sabine, 37, speaker, MA37 administrator	<p>I receive pre-checked documents and can concentrate on the special features.</p>	<ul style="list-style-type: none"> • Qualitative submissions mean fast procedures. • Long proceedings fall back negatively on us. • The strain is high • We want to be there for our citizens.
 Daniel, 43, speaker, other departments	<p>I can directly access complete documents and help my colleagues to complete the procedures.</p>	<ul style="list-style-type: none"> • Responsiveness is our challenge. • The availability of complete information is not always guaranteed.
 CITIZENS		
 Angelika, 59, retail saleswoman, resident	<p>I receive early information about building projects in my area. As well as my rights and the possibility to view the project virtually. There it was clear for me that I have no objections to the project.</p>	<ul style="list-style-type: none"> • I don't want to be „ambushed“. • I want to be sure that the exposure is minimised. • My rights must be respected.
 Interested party	<p>The information offered by the magistrate is exemplary.</p>	<ul style="list-style-type: none"> • Missing information leads to irritation. • The right contacts must always be easy to find.

From here the task is to dig into the real-world situation of each role involved and design interfaces, information exchange and points of interaction that make it easy and quick for each person to play his or her role in the process.

Obviously, there is more to creating a digital system of building permission than these 3 points. There is data integration, interfaces and standards, user resistance and political pressure. A key criterion for success also consists in rethinking the entire process along the potential of digital technologies instead of just digitizing an existing process. By starting with the described points, however, and handling them right, cities make an important first step towards becoming citizen centric, user friendly, efficient, and smart.

Vienna BRISE is a project that serves to observe an almost ideal approach towards the digital transformation of municipal services. It solves a real-world problem and helps to provide more and better housing in shorter time. It makes use of state-of-the-art technology to not only solve this issue, but also make application easy and smooth along the way, and it builds on the user's perspectives to make sure the system will be useful and a real value not only to the families who are waiting for their new homes, but also for those who are delivering those homes.

BRISE Vienna allows cities across Europe to learn from the experience gained underway and it gives a blueprint for replication imitation in other cases and in other dimensions.

Want to learn more about BRISE Vienna? Here's where you can find out:

<https://digitales.wien.gv.at/site/projekt/brisevienna/>

[1] <https://mobilityexchange.mercer.com/Insights/quality-of-living-rankings>

[2] <https://www.economist.com/graphic-detail/2019/09/04/vienna-remains-the-worlds-most-liveable-city>

[3] https://www.huduser.gov/portal/pdredge/pdr_edge_featd_article_011314.html

[4] <https://www.wien.gv.at/statistik/bevoelkerung/bevoelkerungsstand/index.html>

[5] <https://kurier.at/wirtschaft/immobiz/rekord-bei-wohnungsneubau-in-wien/400381913>

[MT1] Bild Prüfvorgang

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