Innovating an ecosystem to create value and growth opportunities based on real estate related data

Jukka Pulkkinen, Dr.Sc. (Tech.) *
Mikko Mäntyneva, Ph.D. (Econ.)

Häme University of Applied Sciences
Smart services research unit

PO. BOX 230
13101 Hämeenlinna
Finland

*corresponding author
Jukka Pulkkinen
jukka.pulkkinen@hamk.fi
tel. +358 50 461 8927
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Abstract

New technologies and data related to them bring value creation and growth opportunities. The paper focuses on how to co-create and innovate by applying buildings' related information to improve their lifecycle management, which positively affects both operational costs, as well as open new business opportunities and in this way increase the value of the real estate. The research pays a special attention to remove obstacles from the open data flow that is mandatory to create real estate ecosystem. The research is based on a case study and examines an on-going project called Platform of Trust. This ecosystem facilitates collaboration between a Real Estate Provider, a Real Estate User and a Developer to find new business opportunities from simple visualization of data to more complex new business models.

key words: innovation, ecosystem, platform economy, data, Internet of Things

conference track: Innovation
1. INTRODUCTION

The economic value of real estate, and especially buildings, easily exceed billions of euros even in a mid-sized city. However, the value of real estate would be even much greater by better utilization of all untapped potential. The untapped potentials can be easily found in the area of low capacity spaces, energy efficiency, and better indoor air conditions etc. Removing the barriers to exploiting this untapped potential opens up opportunities for economic growth even in the case when the whole real estate market is shrinking. To address this question, the current building lifecycle management and the flow of information needs to be understood. The building lifecycle consists of three phases: design, construction, and operation. In order to manage and execute all tasks related to building lifecycle several parties are needed like e.g. a builder, an architectural firm, the main contractor, a site management, different subcontractors, authority, a real estate operator, a resident, customers, building users etc. to mention few of those. All these parties create real estate ecosystem. The data does not flow smoothly between different parties and the big part of data is actually lost when moving from construction phase to operation phase or it is not maintained so data is not trustable in the long run. On the other side, the Internet of Thing (IoT) provides even more data that could be utilized in the management of the building during their lifecycle (Isikdag, 2015). “Things” means some physical objects like for example a window in a building. Internet of Things means that physical object communicates trough internet like for example indicates if the window is open or closed. This type of data is more and more available due to the technical development in this field but it is not yet widely used in building environment (Chang, Dzeng & Wu, 2018).

2. RESEARCH SETTING

Our research focuses on how to apply buildings’ related information to improve their lifecycle management, which positively affects both operational costs, as well as open new business opportunities and in this way increase the value of the real estate. The research pays a special attention to remove obstacles from the open data flow that is mandatory to create real estate ecosystem. The research is based on a case study and examines an on-going project called Platform of Trust to build a platform and an ecosystem to
- support more efficient management of the building’ lifecycle and
- open new and growing business opportunities to real estate related data and its utilization to generate value-added services.

The project aims to create an international level platform to manage accurate online building information over the whole lifecycle and make all information available to the ecosystem. The ecosystem consists of building owners like big cities and companies interested to provide innovative services to them. These companies vary from small start-ups to bigger companies and they all create together the real estate ecosystem.

Our research question is:
How to create growth in the real estate market by better utilization of hidden assets during the whole lifecycle with the help of an ecosystem created on the top building information.

3. THEORETICAL FRAMEWORK
Built environments are both technical and social ecosystems and the coordinated development of them is a challenging endeavour. This article is about how to steer a coordinated co-development between various stakeholders to make a data-driven ecosystem a reality. The framework for the open data flow in the real estate ecosystem covers three areas: data flow, trusted data, and marketplace. All three elements are needed to release untapped business potential with the help of data and make economic growth possible.

Innovation in a built environment requires an ecosystem approach where local authorities do not act in isolation but in collaboration with other stakeholders in the ecosystem (Chourabi et al. 2012). Built environment related innovation is closely related to smart city development. Komninos et al. (2012) argue that smart cities are part of an open innovation ecosystem. In order to support the innovation ecosystem development, various public-private partnerships should be created and fostered (Lee & Hancock 2012). Den Bergh & Viaene (2015) emphasize the need for experimentation in order to support the adaptation of facilitating/permitting technology.

A Building Information Model (BIM) is defined as “shared digital representation of physical and functional characteristics of any building object” (Volk, Stengel and Schultmann, 2014). The BIM was originally developed to describe the basic concept of architectural information modeling, model components and information exchange (Chang, Dzeng and Wu, 2018). Based on the research the improved efficiency can be achieved and substantial cost savings throughout the increased interoperability with the help of BIM can result even in building operator up to two-thirds of the overall yearly spending (Eadie et al., 2013). Nevertheless, the usage of BIM is much lower in the operational phase of the building compared to project phase due to the lack of automated data capture and the lack of maintaining information up-to-date (Volk, Stengel & Schultmann, 2014). The IoT could provide a good solution to automated data capture, but according to the research, the integration of these two technologies is still very limited. Currently, it has mainly focused on the automatic transmission of sensor information to BIM (Chang, Dzeng & Wu, 2018).

On the other side, the integration of BIM and IoT creates a good platform to build a new real estate ecosystem including all parties related to the whole lifecycle management by utilizing the gathered data. Vargo & Lusch (2011) define service ecosystems as “relatively self-contained, self-adjusting systems of resource-integrating actors connected by shared institutional logics and mutual value creation through service exchange”. Actually, there is a big economic growth potential especially to new start-up companies in this new industry segment and that encourages innovation activity within the ecosystem further. There are many domain-oriented service communities in which the composite services come from one domain or multiple domains (Xu et al., 2015). This paper focuses on how to innovate and create a shared trust based ecosystem utilizing the information developed from gathered data and enable economic growth.

3.1. Data flow

Based on previous research regarding the communication in the building automation and ICT systems, there is a large number of different interfaces and lack of openness, which makes it difficult to build a common platform to be used for an ecosystem (Salo, 2017). In addition to this, many IoT device suppliers are having their own customized cloud services created for their own services purpose, which makes interfaces for a common open platform even more challenging. The motivation behind these IoT device suppliers’ cloud systems is to create services on the top of their own devices and protect their own business areas. Nevertheless, this ends up many times very narrow business scope to their customers and this may reduce the attractiveness of their solution. Therefore, there are several technical and business reasons why the data flow between different parties during the building lifecycle is not easy
and there are many data silos hindering valuable information usage by relevant parties. In order to get rid of data silos, new interfaces need to be created in every project and it is very time-consuming and costly exercise, which requires special software skills. This extra cost can many times hinder using data to build information and valuable services to some parties in the real estate ecosystem. Therefore, to create the openness to data interfaces is one key issue in order to remove the barriers to explore the untapped potential on the real estate market to open new business opportunities.

3.2 Trusted data

The ownership of data is under discussion due to the huge increase of data in recent years and the current laws do not completely govern the ownership and other issues related to data created by IoT devices (Farkas, 2017). The governments pay a lot of attention to this topic, the European Commission has declared its Digital Single Market Strategy in Europe, and a free flow of data is one keystone to implement this strategy (Malgieri, 2015). Different models to data ownership and earning models are presented and one example is decentralized ownership of data where the data contributor becomes a shareholder (Dao, 2018). This model tries to motivate sharing data actively by providing economic benefits to the data contributors that make their data available. Therefore, there are several different aspects, which underline the importance of creating trustable data to be used in the real estate ecosystem. Thus, it is obvious that clear data management guidelines must be developed to explore the untapped potential on the real estate market to open new business opportunities.

3.3 Marketplace

Gawer and Cusumano (2013) have studied industry platforms and ecosystem related innovation. According to them a major benefit for innovating in an ecosystem are the network effects and multisided markets. Rong et. al. (2015) propose that applying Internet of Things related data can lead to a co-evolving business ecosystem. The marketplace for the data is also one element that has to be well covered. Without a proper and well-functioning marketplace, the adoption of the Platform related solutions especially from the user experience perspective is expected to be poor.

Mobile device applications (apps) have become a popular user interface for consumers to apply various solutions (Petsas et al. 2013). The growth of the number of apps has been rapid. One cornerstone in the app economy are the app stores. Currently, the dominant players on this front are Google Play and Apple’s App Store. The business logic differs between various apps. In many instances, the app is the core solution, meanwhile, in some instances, the app is more or less a user interface to a major system. The latter is more or less the case in this Platform of Trust concept. The business model is still to be refined, but it is expected to focus on capitalizing to the value generated by the real estate related data on the Platform, rather than earnings through selling apps. However, the mobile device related apps are not the only alternative while distributing the data. On a desktop setting, there are competing alternatives provided among others Google, Microsoft, and Apple. Besides these commercial platforms, there is potential for an open source development community and their own distribution channels for apps.

4. THE PLATFORM OF TRUST

Considering the challenges regarding the economic growth in real estate market with the help of data, the model to create a common ecosystem is presented in the way that barriers to hinder business based on data are removed. The ecosystem is based on a new platform called
the Platform of Trust and it consists of three elements: Data-platform, Trust machine and Marketplace. *Data-platform* has a unique data structure having all the needed information in the real estate environment like temperature, humidity, energy consumption, indoor air quality measurements, IoT devices to mention a few of those. The keystone of Data-platform is library including interfaces to different devices and interfaces are freely available to parties in the real estate ecosystem. This means that ecosystem party does not need to make his own interface in the project that is very time consuming and costly because the ready interface from the library is available. *Trust machine* is one important element in the platform. In order to make business based on data, the ownership of original data, as well as ownership of all results derivated from data, needs to be defined carefully and transparently. Trust machine govern all agreements for the business transactions done by real estate ecosystem. Actually, the name of the platform even refers to trusted data, which emphasize the importance of this part. *Marketplace* is an App Store for all commercial applications created for the real estate ecosystem. Marketplace includes also development environment to application creation so that even small start-up companies can easily start their own business in this environment. Application creation is based on collected data on Data platform so there is no need to make project specific interfaces to collect data. We can summarize that Platform of Trust is significantly lowering the barriers to making new applications for the real estate environment based on collected data. This is done by making common standardized interfaces to data collection without the need for project-specific interface, by creating trust between business parties regarding the handling of data and by having development environment in common App Store to make the application available for all parties in real estate ecosystem.

The ultimate target of the ecosystem is to create economic growth on the top of Platform of Trust and actually, there are many different business opportunities opening for several different purposes. To address these opportunities, the ecosystem parties are divided into different groups, which are called Developer, Real Estate Provider and Real Estate User. *Developers* are developing new applications to Marketplace to be available to both Real Estate Provider and Real Estate User. Developers are typically software companies and their size varies from small few person start-ups to a larger corporation who has the capability to develop an offering to real estate market. The attractiveness of the market from Developers’ point of view depends on the size of the ecosystem – the larger the ecosystem the more business can be expected. *Real Estate Providers’* business is related in one or other way to real estates. They are either real estate owner, operator, insurance companies, store chain, university, hospitals etc. Big cities and states are typically real estate owners managing a large amount of buildings; the operator takes care of daily operation and maintenance of buildings; the insurance companies may also use big fleet of buildings in their office network and same categories includes also retail chains. In addition to these, the university and the hospitals are also mentioned as an example for Estate Providers because their operation is done in specific buildings and they have many different special requirements for the building environment to make a high quality services to their students and patients. *Real Estate Users* and typically customers or otherwise target group for the Real Estate Provider. They are simply resident, student, patient etc. using real estate for their own purposes but not making business with real estates.
There are several different types of business opportunities inside the ecosystem by developing new services based on data from real estate. Typically, Developers develop software for the new services but business targets and the owner of the business itself may vary a lot. Analytics and machine learning are an important part of new smart services and using these methods naturally increase the value of the services to customers. One area of business is simply visualization and visualization is done mainly for Real Estate Providers who pays about the services but the target group for the visualization can be also Real Estate Users. This is the case when Real Estate Provider wants to present some information like e.g. indoor air quality to residents. Visualization can be done to collect data or then sometimes we may want to visualize the results of analytics. Actually, it is very typical to present the result of analytics by using visualization because then the results are more understandable. In this case, the value of the services is higher compared to visualizing only gathered data. One important area of business opportunities is to find a way to reduce somebody’s cost. Real Estate Providers are very keen to find cost savings and collected data together with smart services provides many opportunities in this field. Costs can be reduced by improving the efficiency of maintenance process with the help of data; by reducing the energy bills with better control of heating and ventilation systems; by increasing the utility rate of current spaces etc. Finally, Real Estate Providers can create new types of business models to Real Estate Users. One example is Housing as a Services (HaaS) to provide comprehensive housing experience for the resident including better and flexible usage of spaces to different purposes depending on resident’s interest. Expanding this to next level means the District as a Services (Daas) where all different type of services in a certain district are combined to one service package to residents. This category can include for example a university campus where all services in a campus itself and the surrounding environment are combined to one service package to a student.
typical feature for all these new business models is the need to have a lot of data in order to create services with high value to users.

5. DISCUSSION AND CONCLUSIONS

Our research reveals the potential for innovation, economic value creation and in this way economic growth with the help of the Platform of Trust ecosystem. The ecosystem facilitates collaboration between Real Estate Provider, Real Estate User and Developer and finding new business opportunities from simple visualization of data to more complex new business models. The Platform of Trust has been built, technically functioning platform is in place, and data flows from measurements to platform. There are several pilots to develop new business cases and the creation of an ecosystem is ongoing. Currently, there are 20 Developer and 18 Real Estate Provider members in the ecosystem. The number of participants shows the big interest for the Platform of Trust among Finnish real estate markets. There are also 12 pilot projects ongoing or starting and concrete results can be expected in the year 2019.

Reference list


