
Controlling Risks Through Flexibility and Urban Integration: The Regeneration of Otaniemi Campus in Finland

Antti Ahlava, Jarmo Suominen and Saana Rossi

Abstract

Aligning Aalto University's scientific and economic potential and risk management with the growing Otaniemi campus takes place with flexible and integrative spatial and urban concepts. The campus development wants to maximize the usages of existing resources, optimize the flexibility of uses and minimize fixed costs of users for changing future as well as to produce urban, street-level places for enhanced social encounters and open innovation. This living laboratory of campus development aims at flexibility also in energy production, as well as at increasing self-sufficiency, made possible by local energy solutions, a smart utilization of electricity network and by changing consumer behaviour. The new internal service operator role for renting relevant resources has diminished surplus areas of academic units and the freed spaces are treated as shared resources for work, housing and services according to the principle of Building as a Service (BaaS). New types of gardens support biodiversity cycles. The university has also implemented on-demand public transportation service supporting flexible mobility to other campuses. The campus sustainability programme connects the university with external partners, such as industry, government, and various organisations of civil society. Through this

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multi-faceted development, the mono-functional green-field campus receives company from a new diversified city with mixed-use urban development. Partnering is crucial, contributing to sharing economical risk, social and humanitarian programs, sustainability networks, city partnerships, greening events, and cross-disciplinary academic programs. Along the philosophy of BaaS, companies and partnering research institutions are welcome to locate their personnel to the thematic quarters of the campus, supporting co-creation and empowering the culture-economic ecosystem.

Keywords

Service architecture • Building as a service • Sustainability • Participatory design • Partnering

1 Introduction: Addressing Environmental, Field-Specific and Economic Resiliency

Even if the focus in urban risk management has conventionally been in preventing natural catastrophes and diminishing their damage (see e.g. Coyle 2011, or Serre et al. 2012), urban development and regeneration can also cause risks for urban heritage and local urban economies. The risks linked to the growing campus of Aalto University in Otaniemi area, are related to (a) to the difficulty of moving the locally rooted vitality of the two shrinking campuses from elsewhere to the growing campus in Otaniemi, (b) the threat to the natural and cultural environment in global and local perspective and (c) the economic challenges caused by the diminishing government funding for the university.

When Aalto University was created, it was a merger of three leading universities in the country in the fields of technology, economics and design. All of these former universities established in the 19th century had their own campuses, but in the year 2011 the Board of Aalto University Foundation decided to concentrate the activities of the joint university to the former Helsinki University of Technology campus in Otaniemi, also promoted nowadays as Aalto City. The motivation behind this decision was to support interdisciplinary collaboration. The economy campus in Töölö at the centre of Helsinki and the art and design campus in Arabia had developed their own local, well-rooted and functional ecosystems with accompanying business and research partners, research and post-professional education institutions, and even with retail. Now the task of the campus development of Aalto University is to relocate not only these academic units to Otaniemi, but also trying to attract their symbiotic partners—the whole ecosystems of urban life and contextual economy—to join the move to Otaniemi campus, formerly known merely as

a sub-urban satellite-type technology campus (Hoeger and Christiaanse 2007, 268–271). In order to support field-specific diversity and to help to re-root the micro-cultures, the regeneration of Otaniemi has had the purpose of thematic development of the sub-areas of Aalto City in order to catalyse local economies and cultures. The university welcomes partners to locate their units and personnel in shared buildings on campus, and develops shared premises for open innovation. The main motivation behind this principle of land-use and locating activities has been to foster scientific research and cross-disciplinary theme-based collaboration, but there are benefits for the urban life as well.

The campus development of Aalto University aims also at flexibility in energy production, as well as increasing self-sufficiency, made possible by local energy solutions, a smart utilization of electricity network and by changing consumer behaviour. Aalto University collaborates with energy companies St1 and Fortum for example in an experimental five miles deep geothermal 10 MW plant (St1 2015), producing possibly all of the hot water of the campus in the future, adding resilience through independency (Fig. 1).



Fig. 1 Alvar Aalto: Land Use Plan, Otaniemi, November 7th, 1949. Copyright Aalto University Archives

2 The Cultural Heritage of Otaniemi

One risk, caused by the removals to Otaniemi, is the threat the new urban development brings to the heritage of the area. There are remarkable architectural and natural values possibly at threat. The original city plan of Otaniemi area was made by the acclaimed architect Alvar Aalto and many of the buildings at the core of the campus have been designed by him as well. This risk has been treated in collaboration with the Finnish National Board of Antiquities (NBA) (2016), which has declared the core area of the campus as protected cultural environment. The university is collaborating with the NBA in order to maintain cultural and architectural values of the core, as well as to take these into account in the development of the adjacent land. Changes in the area been monitored and supported by a constant dialogue with the NBA, municipal planning authority and Alvar Aalto Foundation, as well as by using high profile architectural competitions in the development of the area.

A parallel risk stemming from the cultural heritage of Otaniemi is that the protection of the cultural environment might hinder campus development. Buildings with long corridors lined with small offices and lecture halls are ill suited for highly mobile and collaborative group work. According to a recent facility satisfaction survey conducted at Aalto University, over half of the staff preferred multi-functional group working spaces over individual offices (ACRE 2015a). Work and studies are increasingly dependent on computer use, but most lecture halls don't have enough electrical outlets or table space for laptops. According to Aura Kivilaakso from the NBA, however, it is critical for the conservation of protected buildings that they remain in active use, and thus they also have to adapt to changes in the needs of the users and technical requirements (2010).

The old main building of the University of Technology, nowadays called the Undergraduate Centre, and Library Building—both designed by Alvar Aalto—have been challenging to renovate due to their protected status (Wallin and Staffans 2015; ACRE 2015b). The addition of non-permanent structures has allowed, however, to turn both buildings more accessible, and new meeting and group work spaces have been created by furnishing previously empty hall spaces and creating “learning hubs” (self-steered spaces for individual students and their group work) in suitable areas (Rytkönen et al. 2015).

3 Natural Environment

Regarding the global scale environmental sustainability—lower energy use and less CO₂ emissions—the university aims at a smart utilization of electricity network in producing and storing electricity with local energy companies and network providers and by changing consumer behaviour through cross-disciplinary education, sustainable entrepreneurship, greening events, optimised and shared use and smart mobility (Aalto University 2016).

In local scale, the crucial prerequisite is that Otaniemi campus is located next to a natural preservation area in Laajalahti bay of Baltic Sea. Laajalahti is one of the key bird reservoirs in the metropolitan region (Parks and Wildlife Finland 2016). The risk that new development would threaten the nature reserve has been eliminated by thorough environmental assessments as part of the planning processes. This concerns for example distances of construction from the border of the reserve and building heights.

However, there is also an opportunity for experiments in architecture, while as simultaneously supporting the diversity of the nature. One example of this is the recent design for a new housing area by the coastline near the nature reserve. The buildings are clad with a wooden grille structure, where the protected flying Russian squirrels can live (European 2016).

The Decaying Gardens produced by Aalto University and Helsinki University are supporting biodiversity cycles and there is also a popular new allotment garden at the university campus. The university has also implemented so-called Kutsuplus on-demand mass transportation service enhancing flexible mobility to other campuses.

4 Flexibility and Changeability as Economic Guarantee

The government of Finland has repeatedly cut university public funding and the similar funding in Europe is in general economic problems at the moment. However, improving urban areas in economically unstable circumstances can be supported by socio-economic diversity (Cooper et al. 2009). The opposite of this diversity is actually how the core of Otaniemi campus—designed by Alvar Aalto—is based on low degree mixing of users and user groups and, one could argue that there is a strong sense of formalism instead: the original plan from 1949 is based on concentrating buildings and roads on forested hills and ridges, while light traffic takes place on the lawns of lower fields. In the area produced by this original campus plan, the distances between different uses and user groups are huge, supporting private car traffic. In order to increase local cultural and economic diversity, the networks and life of a campus can be supported by an adaptable spatial network, which supports collaborative culture (ibid.). Network typology is changing from the decentralized, department-based solution to a distributed and more integrated structure. It is required that new connecting nodes are identified and developed.

By using contemporary terminology of urban design, the urban regeneration of Otaniemi could move from a field condition (Allen 1999) of an anonymous matrix of figure (buildings) and ground (nature) towards a model, which is more user and culture based. The inherited reality in Otaniemi campus follows Allen's (ibid.) principle of field configurations, which unify diverse elements (the principle of following the contour lines of the landscape) while respecting the identity of each other (university, services and housing separated from each other), but simultaneously remain abstract. Emphasised field conditions in Otaniemi, such as the areas

from south, west and north from Alvar Aalto's campus, are following the principles of his original plan in an even more field condition type manner, based on solitary buildings standing on loose grids in forest. Compared to this kind of Finnish adaptation of Garden City thinking, the aim of an economically and culturally sustainable campus development rather has an emphasis on diversity, usability and pedestrians, where the users and uses mix and meet, and emergent changes are allowed instead of large fixed systems and structures (Cooper et al. 2009). The new campus development of Aalto University is aimed to produce urban, street-level meeting places for open innovation and social encounters (Aalto University 2015b). Accordingly, new internal renting model has diminished surplus areas of academic units and the freed spaces are treated as shared resources for work, housing and services, increasing the diversity and possibilities for interdisciplinary activities.

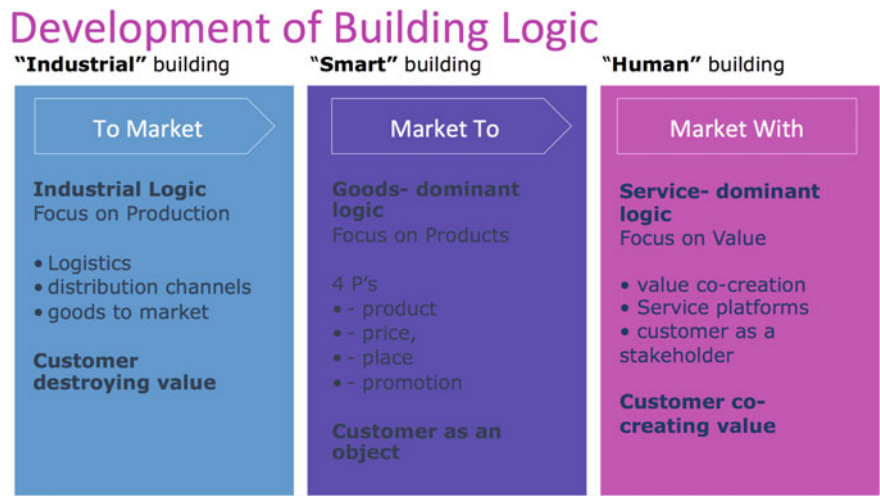
5 Building as a Service

One method of decreasing economic vulnerability at Aalto University is the *Building as a Service* or BaaS principle. This means a shift from a product-based logic to instrumental value in real estate development and architecture. This principle changes business models in the development processes of building and real estate. Here a customer becomes a partner in the creation of value for its operations. BaaS could be described as a disruptive innovation due to the potential of the paradigm shift to allow creation of simpler and more cost-efficient, user-oriented spaces.

Disruptive innovations have shaped the real estate industry and its growth in the form of technical advances and for example innovations in land use, the Harvard Real Estate Conference on Disruptive Innovation in Real Estate panelists concluded in 2014 (Harvard GSD 2014). Instead of disruptive technology, which is based on "product innovation", the BaaS principle, however, introduces a new way of thinking, a new logic, which would allow developers to create better service platforms and enhance customer experience by significantly altering the way buildings and spaces are designed, sold and used. This service-based innovation also enables new markets for customer oriented service operators (e.g. co working operators like We Work or accommodation operator AirBnB).

The shift from product based to service dominant logic can change business models, turning the conceptual focus of activities on instrumental value instead of intrinsic value. The customer thus ceases to be a target of action, and instead becomes a co-creator of value. In this logic, a solution is no longer based on the absolute properties of a product itself, but on the product's ability to serve the customer, and the product itself becomes mainly a mechanism to provide service, a service platform. The value of the product is determined by the beneficiary in this model: value becomes idiosyncratic, experiential, contextual and meaning-laden.

Table 1 The types of logic in relation to markets (Jarmo Suominen, modified from Lusch and Vargo 2007)



Service Architecture (a new professorship at Department of Architecture in Aalto University) describes the conditions of value co-creation and makes it possible to increase customer value instead of just adding product value. Environments, buildings and spaces could be evaluated as value conditions for value co-creation. Basic evaluation criteria is then the questions, do the conditions increase or destroy the value created by activities within?

As part of its strategy pertaining to the university premises, Aalto University will offer service-oriented solutions and spaces in Otaniemi. Increasingly, Aalto University buildings will no longer be just spaces, but also an ecosystem of resources managed and enabled by new service operations (Tables 1, 2).

6 Urban Integration

Campus sustainability programme (Aalto University 2016) combines the university with external partners, such as industry, government, and organised civil society. The mono-functional green-field campus gives space to a diversified city with mixed-use urban development. Partnering is the paradigm, with sharing economical risk, humanitarian programs, sustainability networks, city partnerships, greening events, schoolchildren interaction and cross-disciplinary programs. Companies are welcome to locate their personnel to the thematic quarters of the campus, supporting co-creation.

To enable the shift for decentralized to distributed, integrated network typology, Aalto University will promote multi-disciplinary collaboration and innovation according to its strategy, Aalto University is planning for new spaces with open entrance floors with “Open Innovation spaces”, “Hubs” and “Working Cafés” suitable especially for meeting, mobile work and group work. Academic and artistic work that requires more dedicated and private space, is to be located in higher levels or the building, to ease moving around in the buildings as well as not to disturb the atmosphere of an open innovation environment (Aalto University 2014).

The trend of open, flexible meeting and working spaces catering to different levels of mobility in both staff and student use is visible throughout the University development and renovation projects. Väre, the new building for the School of Arts, Design and Architecture, set to be completed in 2018, will include large areas of flexible, round-the-clock meeting and exhibition spaces and working cafes in the lower levels, and dedicated material workshops and studio spaces reserved on the upper levels.

Dipoli, a former Student Union centre and congress centre, was recently purchased by Aalto University Properties Ltd and is being renovated into the new main building of the University, set to house the Aalto management, services and a wide selection of open meeting spaces to promote multidisciplinary interaction and to showcase Aalto University to stakeholders (Aalto University 2015a). The Aalto main library is renovated into a modern learning centre with a comprehensive array of services targeted toward staff, researchers and students alike. The bottom floor of the Learning Centre is also to be used as a meeting place and café, and the centre will emphasize group and individual meeting and working spaces and services that promote learning and research, such as instruction in study skills or research methodology, over traditional library services such as an extensive printed book collection.

7 Building as a Service: Learning Spaces and Student Involvement in Campus Development

A thorough understanding of the needs and wishes of users for spatial development as well as their collaboration in the development actions, ensures the quality, versatility and adaptability of new spaces, and increases the engagement of participants (Bovill et al. 2011). Involving people in development processes from an early stage also makes them less unwilling to implement changes (Rytkönen et al. 2015). In Aalto University, faculty, staff and students as well as key stakeholders from the outside the university are included in campus development processes through workshops, student projects, studies and co-creation.

An increasing amount of teaching and research resources are allocated for campus development activities (Ahlava 2015). Courses, assignments and theses are focusing around different aspects of campus development to investigate a multitude

of prospects and possibly provide ideas and plans for development. Student competitions have yielded already completed sustainable projects that enliven the campus area, such as the Decaying Garden where tree stumps are left at their growing sites to foster specific ecosystems, and the Otaniemi Urban Garden where faculty and students can rent gardening plots to grow their own food on campus.

Characteristic to Finnish universities and especially Aalto University, the student body, most importantly through the Aalto University Student Union AYY, is a proactive player in campus development. AYY owns most of the current housing in Otaniemi, and is developing more student housing near and on campus (Wallin and Staffans 2015). AYY is collaborating with Aalto student associations KY and TF in an effort to build a student centre in the heart of the campus area, near the key Aalto University development sites such as the Undergraduate Centre, the new Väre building and the Learning Centre.

By including students in development processes of learning spaces, the key principles of BaaS become realised even before the project itself has been completed: the co-creation of value and the user and service orientation of space is included in the design processes. The goals of the students to learn, of the University to teach and of the institution as a whole to create new knowledge and innovations are fulfilled even during the process to ensure that the spaces being designed serve those purposes. The commitment of the stakeholders to continue active development of their environment becomes ensured through co-creation. By involving students in development, the university also teaches key workplace skills such as communication, teamwork and organisational development, which support the abilities of graduates to have social impact.

This participatory process could be called as post-production of customer/user value where university will develop solutions (define solutions space), methodologies (robust development) and opportunities (choice architecture) to its stakeholders.

8 The University Campus as a Test Laboratory for Urban Development

In order to support the faculty, the goal of the campus development of Aalto University is to create and transfer knowledge that has societal impact and long time span, but also adaptable and open to change in order to enhance interdisciplinary collaboration. For students, which have a shorter cycle span, the campus is adaptable to change. The goal of the university is to create societal impact also in the actual campus development. Some of these developments are light, fast and inexpensive, following the model of *tactical urbanism*.

Tactical urbanism refers to short-term, community-based projects—bottom-up initiatives created by the users of a space with the intention of enlivening public spaces and influencing decision makers and developers in the area to see new potential and implement permanent improvements to the area in question. (Lydon

and Garcia 2015). In Aalto University, prime examples of student-led bottom-up projects that have become institutionalised are the Learning Hubs, and Startup Sauna. The first Learning Hub in Aalto was created as a pilot project by the students of international design business management, and functioned as a test site for the year 2011. Based on the experiences, user feed back and popularity of the first hub, over 15 have since been established in Aalto University, and are now in heavy use (Aalto Learning Centre 2015). They also serve as prototypes for the design of the Learning Centre. Startup Sauna, a start-up accelerator for new companies, was founded by Aalto Entrepreneurship Society following their successful summer start-up mentoring program, and has since mentored 173 start-up companies as of November 2015 (Startup Sauna 2015). Other examples of tactical manoeuvres at Aalto City are seasonal festivals, the forthcoming multi-functional Aino Square and temporary, community-built outdoor furniture.

9 School as a Service: A High School Integrated to Local Learning Communities and Former University Facilities

The role of the school has changed fundamentally. From the temples of teaching they will change to labs for learning. Focus is on conditions that are best supporting new learning methodologies and will increase the value of activities.

One example of BaaS thinking in practice in Otaniemi is the School as a Service project. The university is developing, together with the local municipal school authority, a new type of school, a Co-School. School as a Service is being developed with the City of Espoo and it will open to students in autumn 2016. The concept has also been developed further in collaboration with Royal College of Art, London and Tongji University School of Design and Innovation, Shanghai, during 2015–2016.

The Co-School is based on shared spaces and integrated communities of practice (Lave and Wenger 1991) between the university and the school, the practice of flipped classroom elevated to the level of flipped school (emphasising discussion instead of reading at school) and campus thinking instead of hermetic school buildings. The school becomes a service, not only a physical place. Various locations at the premises of the university are shared. There is an underlying paradigmatic change of the processes of planning and design interaction with physical design. Spaces and their uses become creatively decoupled. Flexibility and sharing maximises use ratio, but also social encounters. The co-school pursues a service dominant logic, bringing new contents to learning, transforming school towards a platform for social learning, developing new spatial practices supporting motivated learning, pursuing learning everywhere and the joy of learning.


In practice, School as a Service concept will include elements of “something old, something new, something borrowed and something blue” (see Table 3). More precisely these elements are following, something old: the Co-School will have its own home base in an existing building. The building will be renovated to contain basic learning spaces and administration. Something new: there is a proposal to create a new student lounge as an identity-injecting element to the new high school. Something borrowed: shared resources in Aalto campus enable both the utilization of vacant spaces and the integration to the existing communities of learning (e.g. Design Factory and Startup Sauna). Something blue: the ecosystem of on-demand resources are branded and developed for open purposes of shared use for all stakeholders on Aalto City (Table 3).

There are various physical, social and virtual resources and systems in within a ten minutes’ walk. Figure 2 shows the most immediate resources for the Co-School project. The school is defined both by its own immediate base and by its close neighbourhood and accessible resources as an ecosystem of learning. Campus is seen as a service platform as a consequence (Fig. 3).

Table 2 A comparison of two concepts: the conventional principle of school as a product and the innovative school as a service (Jarmo Suominen, Aalto University)

School as a product	School as a service
Operand resources	Operand resources
Tangible	Intangible
Value added	Co-creation of value
Goods	Service
Products	Experiences
Transactional	Relational
Units of output	Processes
Promotion	Conversation/Dialog
Brand quality	Customer equity
Profit maximization	Financial feedback

Table 3 The characteristics of the school as a service model in Otaniemi (Jarmo Suominen, Aalto University)

Something new	Something old	Something borrowed	Something blue
			
<ul style="list-style-type: none">• New Structure• Identity building, lounge and meeting point• Private, dedicated school use	<ul style="list-style-type: none">• Existing Structure• For learning and shared use• Semi private	<ul style="list-style-type: none">• Shared accessible platforms• Semipublic	<ul style="list-style-type: none">• Open, shared resources• Public

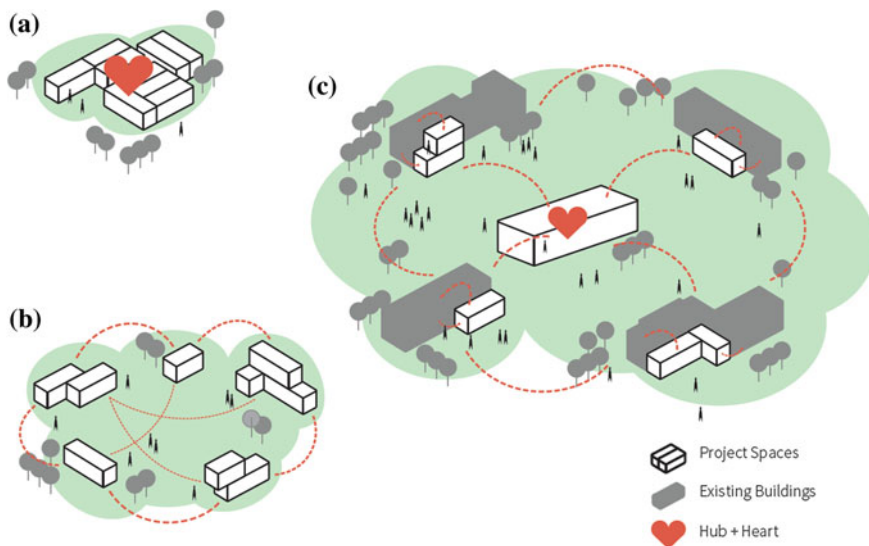


Fig. 2 **a** The Co-School in Otaniemi has a heart, a base building, where the pupils gather every morning. **b** The learning spaces, shared with the university, are spread throughout the Aalto campus. **c** The Co-School might also have new additions to existing buildings (Shiyang Shao and Huan Wang, Aalto University)

Fig. 3 The map of the facilities of Co-School in Otaniemi (Joshua Page, Aalto University)



10 Conclusions

Universities are currently facing a changing environment: working methods are evolving globally, and work has become less tied to a specific location or time, and more collaborative (Rytönen et al. 2015). At the same time, universities experience financial distress due to increasing cost of education per student, increasing demand for higher education, and a period of slow economical growth that has decreased state funding for universities in many countries (Altbach et al. 2009). This paper has described the methods of Aalto University in Finland to tackle these challenges. Generisable solutions from its campus development related to risk

management, have been (a) creating a diversity of scientifically and culturally thematic cross-disciplinary areas and shared spaces on campus, mixing the people of the university with other institutions and companies, (b) local energy production, changes in consumer behaviour and a clever use of the energy network and (c) utilising the principle of Building as a Service. The first solution can be useful in regenerating cultural vitality in the case of removals, the second in environmental challenges and the third in economic challenges also elsewhere.

Facilities make up a large portion of costs for universities, and their utilisation rates are declining heavily due to a more mobile working culture. For example in Aalto University, utilisation rates for spaces are between 20 and 40 % during office hours, and there is great pressure to increase the rate of use and reduce the amount of total spaces by condensing the campus to a more compact and functional system (Rytönen et al. 2015).

In adapting to these changes, the proposed and tested ideas of Building as a Service, co-creation of new spaces and institutional support for bottom-up community initiatives to enliven campus areas could be implemented and used to create a more user-based, flexible and sustainable campus for tomorrow. This will potentially also lead to the development of the more agile use of university spaces as a service. As a consequence of this logic, the whole campus as a part of a city could be defined as a service, and more precisely, as a service platform enabling new markets for service operators and better conditions for value co-creation.

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