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Share it – Don't Own it: Space Sharing as a Smart Solution for Cities and Regions?

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1 ABSTRACT

According to Time magazine the sharing economy is one of the ten ideas that will change the world (Walsh 2011). But does this concept also apply to space? Is sharing a concept for resource efficient spatial planning? Resource efficiency planning means using the limited resources – and this means also space – in a sustainable manner while minimising impacts on the environment. The overall goal is to create more with less and to deliver greater value with less input.

"Have space you don't fully use? Offer for people to rent it. Make some money." (uniiverse 2013) With this slogan, the Platform uniiverse advertises their internet service to share private spaces – from couch, rooms and apartments, offices, storage, gymnasiums, parking lots to all kinds of rooms.

After times of seemingly limitless growth and endless consumption, the scarcity of resources is obvious and requires resource friendly and saving planning concepts. Concepts like Smart City and Smart Region have a strong focus on technological solutions and newly built structures. How to handle the existing settlements and housing stock? Are only newly built neighbourhoods smart cities? In any case, there is need for smart spatial concepts and smart approaches for existing structures.

One possibility of smart development in the existing structures is the sharing of space and infrastructure. In the field of mobility diffenent sharing models are common. Starting with the shared space (an urban design approach which seeks to minimise demarcations between vehicle traffic and pedestrians) und to the traditional public transport. Car sharing is also offered by private sector as the project Sharoo (powered by Migros subsidiary m-way AG with participation of the Swiss Mobiliar Holding AG, successfully shows (sharoo AG 2013).

With exchange platforms like Napster the idea of shared economy became mainstream. But the real benefit of collaborative consumption and sharing turns out to be social. In an era of individualism, the peer-to-peer sharing "involves the re-emergence of community," says Rachel Botsman (2010) and is therefore very important in bottom-up planning process, because people learn to trust each other (ibid).

Seoul adopted the "Sharing City, Seoul" strategy in 2012 and has been promoting and supporting the shared economy my and their start- ups specifically, but also focuses on the sharing and more intense use of infrastructure. Did this idea already spread? Are there other cities and regions following this exciting way? Which smart sharing models can contribute to spatial planning and development?

2 WHAT'S SMART SHARING?

Smart Sharing combines two different concepts: the principle of sharing and the Smart City/Region.

Sharing is the joint use of a resources or space and also includes in a broad sense the collaborative consumption of goods and services. By sharing instead of possessing resources are saved. The possibilities for common use (eg, vehicles , apartments , programs , homes, gardens , services, etc.) are manifold and not new. "New" technologies e.g. smartphones, however, multiply the opportunities for sharing . The actual time spirit and lifestyle makes the "we" more attractive and pushes the need for personal ownership more and more into the background. By sharing on the one hand natural and spatial resources are saved and on the other hand personal time and financial cost are reduced. For example, the laundry room revival - historicly arosen from infrastructural needs, now rediscovered as a resource-saving service facility. Sharing and renting is reinvented by innovative technologies.

The so called commons refer to the cultural and natural resources accessible for everybody, including natural materials such as air, water, and earth. There are freely available to all potential buyers and is therefore also used and shared together. By definition, public goods can be provided by the State or by private providers (e.g. Wikipedia). Public goods and common goods are public goods by non- excludability property. The concept of "collaborative consumption" was published in 1978 (Felson/Spaeth). With the book "What 's

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Mine is Yours " by Botsman/Rogers (2010) it rose in popularity, expecially in the US. " *Sharing is ... Connectivity Connectivity is progress ... It's not how smart you are ... but how connected you are!* " writes the communication scientist Dominik Haller and outlines the "post -ownership" movement, currently led by innovative thinking "digital bohemians", which focus on sustainability and are not waiting for politicians and companies to change (Haller, 2013). This new attitude of "sharing instead of owning" reflects milieu bound trends, their impact on the spatial development have hardly been explored. The main effects of sharing are described as follows:

- **Resources:** Sharing helps to use resourecs more efficient and to adapt to a world with fewer resources. Botsman (2010) points out that sharing might help to achieve sustainability goals by reducing waste and pollution as well as extending the life-cycles of products. Fewer assets bought and sold means that there is more value taken from the same environmental resources as well. There is no doubt that the emergent paradigm of sharing resources will expand and flourish in future, especially in the face of continuing economic recession, government austerity and environmental concerns.
- **Social innovation and trust:** Various forms of sharing amongst residents, neighbours and colleagues can strengthen communities and builds trust into the society which leads to greater resilience in times of economic and environmental stress. Even with the growing individualisation of lifestyles sharing helps to keep society values be strengthening of neighborhood community relationships in both urban and suburban areas.
- **Economy**: Sharing leads to lower sales and in the long run possibly to a shift in production and employment structures. Some worry that sharing creates an informal economy, which lacks the safety nets of social security, health insurance, anti-discrimination, and taxation. These are aspects to be tackeld with this “new” economy and sharing also creates new kinds of demand.
- **Technical Innovation:** The introduction of new technologies (smartphones, apps and websites) in the past years enables more opportunities for sharing and renting. A lot of innovation and development made the sharing-coordination possible through modern technology.
- **Urban development**: At the moment cities and agglomerations are the hubs of sharing economy. The impact of “space” sharing and sharing in general on the spatial development have hardly been research.

The Smart City/Region is defined by the City of Vienna as an intelligent, sustainable city – responding to the challenges of a changing energy , mobility and economic system that aims to ensure the quality of life of citizens in the long term" (Magistrat der Stadt Wien, 2014) . In recent years, numerous Smart City research projects have been carried out in Austria, a special funding programm was created (Klima und Energiefonds, 2014), EU initiatives have been provided with substantial funds to accelerate the use of efficiency-enhancing technologies in Europe Smart Cities. As a result of this a lot of cities call themselv "Smart City" nowadays, although or because it is not clearly defined yet.

The climate scientist Boyd Cohen has developed a worldwide "Smart City Index " (Cohen, 2014), which is updated annually and is based mainly on quantitative data (Cohen, 2013). Looking at the indicators of the Smart City Index, the spatial development is not included. Most Smart City put technological innovations and approaches at the forefront, such as civil engineering, traffic engineering, network engineering or information and communication technology solutions. When its about the urban envirionment, the Smart City Concept appears especially in development areas, e.g. in Vienna the Car-free model housing, Bike City, Marx box or the Seestadt Aspern (Magistrat der Stadt Wien, 2014). The Smart City aims to use resources in an intelligent and sustainable way. The new construction rate of buildings in Austria as well as in Germany is less than 1% per year, most of the today and future living, working and leisure space is already built. Use the existing stock, continue to build on the stock , organizing the existing stock resource efficiently - these are key challenges for the Smart City designed for smart urban development and smart renewal processes. One possible approach is the common use and sharing of resources.

3 POTENTIAL SHARING GOODS

The service platform Task Rabbit (Task Rabbit, 2014), especially available in American cities, has developed a sophisticated system. Based on the principle of neighbourly help, Task Rabbit offers help for supermarket shopping, assembling of furniture or small repairs locate in the neighborhood. Task Rabbit is based on trust between the a people, which is built up by background checks, personal profiles as well as ratings and reviews. Unlike traditional barthering circles, for example in a number of regions in Austria work with their own currency or time accounts, the Task Rabbit is paid after the task is fulfilled online by credit card.

This model allows easy neighborhood assistance and inspires trust, but without dependence and fits indidvidual lifestyles. Tje task rabbits develop a develop a virtual trust value by the ratings and reviews over time - similar to online shops. The experiences of Task Rabbit show that employees with high trust levels are booked more often. According to Botsman/Rogers (2010) , this trust value could be similar to the credit rating in the future and uses as an integral part of a personal portfolio, if it's provided platform independent.

4 POTENTIAL SHARING AND DEVELOPMENT OF KNOWLEDGE

A small revolution in the field of software development was started by open source programs. The Internet community develops - jointly and transparently - different software applications that are available for free. Start -ups discovered the possibility of crowdfunding and crowdsourcing for innovative projects, which become financed through many small amounts. This offers a new dimension for innovations as probably these projects whould not have been financed by banks.

Crowdsourcing of spatial data in planning processes - the entering, updating of data and collections of ideas – gets more and more popular. The number of applications of online-based participation tools grows increasingly. In Vienna 8,500 people discussed about – their wishes, concerns, needs and ideas - "Living togeter in Vienna" in 651 Charter groups. The results were put together in the "Vienna Charter" (Wiener Charta, 2013). On www.muenchen- mitdenken.de citizens were involved in the revision of urban development plan ("Perspektive München"). www.muenchen- mitdenken.de was viewed more than 180,000 times within the period of three months. On www.schau.auf.linz.at anyone reports on problems, deficiencies and opportunities for improvement on site using an online portal. The following informations is available fo everybody: when a message was delivered and how long did it take until the defect has been fixed (Stadt Linz, 2014).

Crowdfunding is also used for secure and design open spaces. The association Bodenfreiheit in Vorarlberg is looking for people who are willing to spend each month, an amount of at least 10 euros to buy open spaces which are already dedicated residential areas. When these areas are bought, the will not be built up and are made accessible by the public (Bodenfreiheit, 2014).

The "Power Sleep" app from Samsung uses sleeping smartphones for research (Samsung, 2014). The basic idea is: the processing power of smart phones is inactive at night and is therefore availalbe to use it for creating a database. The processing power is used to compare protein sequences stored a research database (SIMAP database). This SIMAP evaluations support scientists in disciplines like genetics, biochemistry and molecular biology as well as cancer research and was initiated by the University of Vienna. In general, the potential is great, because in Austria there are about seven million smartphones, which could be used for such projects, thereby saving resources.

5 POTENTIAL SHARING SPACE

The possibilities to share space are manifold such as living space, working spaces, gardens, sports facilities, meeting halls, parking lots, garages, storage rooms, courtyards, streets and squares.

The so-calles "shared space" is a planning approach to to minimise demarcations between differnet modes of transport by removing features such as curbs, road surface markings, traffic signs and regulations (FGM , 2014). The principle behind this is quite simpl: all road users feel fundamentally insecure and therefore the attention is increased massively. Experiences and surveys show that this leads to a reduction of road accidents and an increase of use as well as quality of public space.

Fig. 1: VIENNA, Mariahilfer Straße rendering: In a citizen survey in March 2014 (with a stake of almost 80% of the voters) the inhabitants of the neighbouring districts were in favour of the traffic calming Mariahilfer Straße with 53.2%. Shared space or pedestrian zone covering a distance of 1.6 km. Picture Credits: APA/STADT WIEN/ B+B ORSO.PITRO.

Not only in the public space but also in the private space, there are numerous examples of common usage, especially for touristic use. Examples are: couchsurfing, an Internet- based guest network for the exchange of accommodation with 7 million members in more than 100,000 towns (couchsurfing, 2014) worldwide, private renting of rooms like Airbnb, founded in August 2008 with headquarters in San Francisco, another worldwide community for private accommodation (Airbnb , 2014) or houses and home exchange. One exhange of living space in Vorarberg – announced by the exchange platform of Radio Vorarberg - has become a pilot project in the country of Vorarlberg (ORF, 2013). A young family of five people from Wolfurt had offered their too small apartment in exchange for a house and the change was successfully completed.

Particularly in the age group 50 + there are innovative examples, when it comes to share living space. On the one hand, the costs are reduced by sharing and on the other hand it is more possible to stay in the communiy. Nevertheless the focus is again projects with new constructions. However, many older people live in large flats over 100 m², the general these units could be easily converted to residential communities, corresponding individual and communal areas. This has tow effects: more exchange of the inhabitants and resources saving (space, energy , heating, ...). The combination with thermal renovation this community housing projects causes a higher energy efficiency than thermal renovation alone. Increasing only the higher occupation density brings an energy-saving effect (Brandl, 2012, P. 111). Moreover mobile services are organized easier and more cost –efficient, if needed. There is variety of models possible - from small apartments including bathroom in a shared large apartment up to a family house with common areas. This ensures privacy and takes advantage of the common facilities . But do these forms of housing really have a chance? Is this too much social romanticism?

In summer 2011 the project "Living for Help " was started in Erlangen (Amt für Soziales, Arbeit und Wohnen, 2014). The basic idea is to provide assistance in everyday life for the provided living space. The project is aimed primarily at residential partnerships between seniors/families/singles and students. The additional costs of living are paid and the assistance such as help with housework, gardening, shopping, walks together, tuition for kids, babysitting are arranged individually. Only any kind of care services are excluded. The city proposes one hour assistance per month in exchange of one m² living space (Ibid). The number of students interested in this project is very high in Erlangen, because affordable housing is hardly available. The website of the Amt für Soziales, Arbeit und Wohnen brings is the link to establish the residential partnerships (mitwohnen.org is a search engine for housing providers and housing seekers). It is

particularly interesting that in this example the city itself is active in shared living. This "public" support the offer is very trustworthy and speaks out to thus users, which might not have considered such a flat model in other circumstances.

Urban Gardening is a popular trend for several years where people join together for gardening. The organization forms are very different. Partially located on public or private space, organized with access restriction or simply accessible for all, such as on tree slices and green stripes in the road space or flower beds in the park. Urban Farming , also known as "City Farming", in neighborhood gardens ("Community Gardens") in a public space, to semi-public or private green on buffer stripes and on former agricultural and fallow land (incl. Brownfields) increased the diversity of green features in the city. It allowes a "Do it yourself" urban nature experience and strenghens the relation to food production. The City of Vienna promotes neighborhood gardens. The Municipal Department 42 lists 20 supported garden projects (February 2014), more gardens are in the planning stage. Urban Gardening seems to be optimal entry into the sharing of space.

6 SHARING AS AN INTEGRATIVE DEVELOPMENT MODEL?

Cities and regions wolrdwide increasingly recognize the potential of sharing. In Europe, Amsterdam wants the first European Shared City and has decided at least not to ban shared economy such as Airbnb (Share NL, 2014), Urban Gardening is funded by municipalities or at least initiatives such as Bodenfreiheit (see Chapter 4) for the preservation of open spaces are less hindered. Overall, the debate in Europe is still at the beginning.

The South Korean capital Seoul has declared itself a shared city in 2012 (Johnson, 2013). As one of the global megacities Seoul is facing extraordinary challenges in terms of population and mobility development, environmental impact, etc.. Seoul has begun to promote shared economy companies and sets sharing initiatives. A mission statement for the " common use" has been adopted and includes the following objectives and measures:

- A label for selected sharing services to establish trust
- To promote sharing companies to strengthen their perception in public and funding of 10 sharing companies with € 180,000 to build or improve their services and also to support 20-share-startups (counseling, subsidy and provision of office space) with innovative ideas and thinkers.
- establishment of the "Shared Seoul Promotion Committee " consisting of actors of different sectors (e.g., science, law, media , transportation) to disseminate the Shared City idea in all policy
- International branding of Seoul as a Shared City and as a future-oriented innovation center. Organization of an international conference on the Shared City to exchange know-how.
- The communication between the administration and the economy should be improved through shared data and the Department of Social Innovation acts as a focal point for the Shared City Seoul.
- In addition, Seoul offers 492 carsharing vehicles, opens the parking of governmental and municipal buildings outside of work hours to the public, supports common living of senior citizens and student , openes common tool boxes and bookshelves throughout the city and much more. With support of the city companies like Woozoo, a company that remodels the old houses into the shared living or SOCAR - a car-sharing company, a children's clothes exchange or even a food sharing platform impfove their services. The Creative Commons Korea (CCK) platform is the official partner of the city to share information and resources via an online platform.
- The Shareable Cities Resolution was adopted by the US Conference of Mayors[1] in June 2013 (Collaborative Consumption, 2013). This resolution, supported by 15 mayors (including San Francisco and New York City), "*states that mayors resolve to make their cities more shareable, encourage better understanding of the sharing economy, and create local task forces to review and address regulations that may hinder participation in the sharing economy*" (ibid).

[1] The United States Conference of Mayors (USCM) is the official non-partisan organization of cities with populations of 30,000 or more. There are 1,393 such cities in the USA today. Each city is represented in the Conference by its chief elected official, the mayor.

7 WHAT ARE THE BENEFITS?

The saving potential of space, energy and resources through shared residential, green space and mobility for the city is obvious, though still little quantitatively and qualitatively studied. In addition, the potential of indirect savings through reduced costs for development of infrastructure, concentration of the services or greater efficiency in their use.

Brandl has estimated the potential of the residential communities for the Viennese generation 60 + in her dissertation and comes to an estimated annual savings of heating load of 366 GWh for Vienna, when in 2035 just 10% of the population aged 60-85 live in residential community housing projects. This corresponds to a reduction of the heating demand (individual) of 77 % (Brandl, 2012, P. 117). In addition, Brandl states that the spatial saving potential is enormous, as if 2035 probalby 60.000 elderly live in residential Communities. If they live there on olny 50 m² instead of 100 m², a savings of 3 million m² is possible (Ibid., P. 118). This scenario describes only the potential of space savings projected for the generation 60 +, whose share of the population in the future will dynamicly grow. The attempt to reallocate the model on the general potential of the City of Vienna, leads to the following potential assessment.

The number of one-person households has been rising for decades continuously. The proportion was 45.6 % in 2013. Statistics Austria expects the following developments: the number of single households will continue to rise above average. In 2030 there will 1.56 million single households in Austria (+17.4 %, 1.33 million in 2011). The main reason for this trend is the aging society and related to a strong increase of single housholds after the death of the partner or divorce (Statistik Austria, 2013a). In Vienna an increase of 12.8 % (up to 445 086 people) in 2030 is expected (Statistik Austria, 2012). Also the average living space per person is growing constantly up to 41,2 m² (2001 : 38 m2) in 2011. The average apartment size in Vienna is between 68.8 m² and 78.4 m,2 (2011). The savings potential through smart sharing is related to the apartment size - the larger the apartment the better the apartment is suitable for sharing. Based on the existing housing stock 2011 in Vienna the following saving potential is calculated (see Table 1):

	up to 45 m²	45 up to 60 m²	60 up to 90 m²	90 up to 130 m²	more than 130 m²	Total
Single households Vienna 2011	93.358,00	102.236,00	133.028,00	40.150,00	10.995,00	379.767,00
Assumption share of residential communities in %	0,00	1,00	6,00	11,00	15,00	
Saved apartments by smart sharing	0,00	511,18	3.990,84	2.208,25	824,63	7.534,90

Table 1: Potential saving of apartments with smart sharing in Vienna. Source: STATcube – Statistische Datenbank von STATISTIK AUSTRIA, Registerzählung 2011.

These estimates demonstrate that in Vienna around 2,500 apartments larger than 90 m² could be obtained immediately from the stock if 10% of the single housholds share an apartment – and this is only the potential of the already existing single-person households in 2011. Based on the average living space of 41,2 m² (Statistik Austria, 2013b) it is additionally also possible also to share apartments in the category 60 m² up to 90 m² without degrading the quality of life eventough the potential here is more limited. It is the same with the apartments with 45 m² up to 60 m². So already with the single households in 2011 7,500 homes could be made available only through smart sharing immideately.

Based on the population projection 2030 - with a further increase in single households in Vienna – 50.368 new single person households are expected (Statistik Austria, 2012) and thus increases even the potential of saving apartements (see Table 2).

	up to 45 m²	45 up to 60 m²	60 up to 90 m²	90 up to 130 m²	more than 130 m²	Total
Share single houshold/apartment size 2011 in %	24,6	27	35	10,5	2,9	100
New single households Vienna 2030	12.391,51	13.600,44	17.630,20	5.289,06	1.460,79	50.372,00
Assumption share of residential communities in %	0,00	1,00	6,00	11,00	15,00	
Saved apartments by smart sharing	0,00	68,00	528,91	290,90	109,56	997,37

Table 2: Potential saving of new single apartments in 2030 with smart sharing in Vienna. Source: STATISTIK AUSTRIA, Haushaltsprognose 2012, Registerzählung 2011.

The total number of saved apartments through smart sharing corresponds to the planned final development of the largest urban development area in Vienna with 8.500 apartments, Seestadt Aspern a former airfield. Of course, to move only a few percent of single households in residential communities requires a large-scale

activation and participation process. In general, the potential savings through smart sharing are larger in agglomerations than in rural areas, on the one hand due to the social mix and the other by the low proportion of single-family house. Nevertheless, smart sharing is also an option for small and medium-sized cities. The main benefits of sharing in spatial/urban development are described as follows:

- **Less consumption** of space, energy and resources by smart sharing in the existing housing stock.
- Indirect savings through **reduced costs** for development of infrastructure and more efficiency by the concentration of services.
- More efficient use of space and existing infrastructure e. g. gardens, sports facilities, meeting halls, parking lots, garages, storage rooms, courtyards, streets and squares.
- The social dimension of space sharing leads to social innovation in spatial/urban development.
- Transparent planning processes, online **participation** and open source data opens up new perspectives in spatial/urban development thought they have to be reasonably used.

8 WHAT'S NEEDED?

The sustainalbe use of space and resources is a fundamental principle of spatial planning and legally anchored at all levels – European spatial development, the Austrian Spatial Development Perspective, spatial laws of the provinces, urban development plans and regional and local development concept. Traditionally spatial planning attempts to minimize conficts by the spatial separation and compatible mix of uses as well as moderate densities. Sharing as a principle for spatial planning means a paradigm shift. Space is not distributed anymore but commonly shared and used. The balancing of private interests (land ownership and individual use) and public interests (regulatory and development planning) needs participatory and negotiation-based planning processes focused on this new common perspective. Sharing is done by individuals, companies, ad-hoc groups or associations, often in variable, rapidly changing forms of organization and involved parties. Within this system the "users" of planning are a fuzzy, moving, a more or less loose community, so the participant's circle (e.g. by voting rights) is not conventionally clearly identified or defined anymore.

Sharing is facilitated and support by the hype of online tools providing more capacity of self-organization. The apps give the advantage of omnipresent access. Possessing, hoarding and collecting of space and objects are not so much in the foreground of a successful lifestyle anymore.

For some sharing seems to be antiquated and socially romantic - it is reminiscent of commune, cooperative and clubs. Others fear "forced" sharing and therefore a limitation of personal freedom. However, experience shows that this is hardly the case. On the contrary, the social profit is in the foreground, which also coincides with the individual profit.. "The reduction of ownership brings us more access: to people , to experiences and to stuff. And that makes us happy and makes us more sense,.."explains Lena Sönnichsen, Head of PR & Social Media by Airbnb (quoted in Haller, 2013). Money loses significance, personal relationship are built up and trust strengthens the community. The environmental impact is reduced due to the lower production and disposal of goods and resources.

Far too little recognized and researched is the potential of the house and apartment sharing. Advice in social processes is needed, such as in revitalization of single familiyhouse settlements (abdondand becaouse of the generation change), community use large apartments especially in "Gründerzeitgebäuden" and the reuse and conversion of commercial estates. Knowledge could be obtained from experience of building communities (see Noack, 2013) - the experience in jointly planned and built settlements and houses. Housing subsidies should be available not only for construction, but rather on the efficient use and reuse of the existing building stock .

For models of the space sharing trust is an essential core value among stakeholders. In particular by sharing between strangers on the Internet through P2P platforms (peer -to-peer , such as the above-mentioned services platform Task Rabbit) as well as sharing F2F, in which the users face-to-face their immediate circle, such as a neighborhood garden, a house or share an apartment. A masterthesis in the Department of Spatial Planning at the TU Vienna developed proposals for a platform to share of vacant or under -used private garage spaces in the densely built-up urban area to enlarge public space (Stoeger , 2013).

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9 CONCLUSION

To sum sharing has great potential for an economically, socially and environmentally sustainable urban and regional development. Even if sharing has already reached a certain level of popularity and can be seen as hype for small parts of the population (about carsharing, couchsurfing, urban Gardening), it needs encouragement of civil society and economic efforts through a bunch of incentives. A successful implementation of the sharing model therefore includes the anchoring in strategy papers and planning instruments of provinces, cities and communities. The local level (the community, the village, the quater) need expert support, motivation and promotion as well as first-hand experiences and knowledge "on the spot", which should be integrated in the strategic approachon the higher level (Zech et al. 2011 P. 17).

Sharing is promoted by smart communication as well as supported by smart technologies in construction and reconstruction of settlements, buildings, open spaces and transport infrastructure. However, the primary challenge is not the technical solution, but the smart combination of technical and social innovations. This includes planning- and process-know-how to raise awareness and participation, steering and cooperation skills within smart governance of diverse stakeholders from economy, civil society and policy.

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