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COVID-19 and Digitalization: Its Influence in the Dutch Real Estate Market Process

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Abstract

COVID-19, disruption in society and real estate - which clearly bear characteristics of this era - and the user will have an impact on real estate. Disruptive real estate organizations clearly respond to the agility and modularity of the built environment and therefore determine the right of existence of real estate organizations. This also influences the current and future financial and functional valuation of real estate. The added value of the possible applications of digitalization of real estate processes is expressed in agility, modularity, more effective and efficient transactions, increasing transparency and a better basis for investments. This will increase confidence in fundamental parts of the real estate economy. In recent months, COVID-19 has held sway over the Netherlands and almost everywhere else in the world. Although COVID-19 began making its way through Asia in January, the Netherlands and Europe were surprised by it. The intelligent lockdown, announced in the third week of 2020 and later lifted, has now become a partial lockdown again in October 2020. This has a major impact on people's daily lives: how people live, how they work, how they shop and get groceries. Things like 'place' and 'connection' suddenly take on a whole new meaning. This has meant quite a lot for real estate. Considering the fact that COVID-19 will be present in many ways as long as no vaccination or effective medicine is available, COVID-19, as well as digitalization, will have considerable consequences for real estate, urban development and building production. The methodology is based on literature review of papers from the recently written collection of essays RICS Research & Innovation (Kok et al., 2020) in which the experts, based on current knowledge, research and insights, present a picture of what COVID-19 means for our real estate and urban development. In the following sections, we present a number of important insights and conclusions as well as a number of current research developments. These insights and conclusions are: (1) the Unique Object Identifier (UOI) respects existing identifiers and connects them, (2) COVID-19 can also stimulate the integration of technology in real estate, and (3) urban strategy foresees a future of networked regions.

Keywords: COVID-19, digitalization, research, innovation

1.0 INTRODUCTION

COVID-19 has had a significant hold over the Netherlands and nearly everywhere else in the recent period. The Netherlands, like other places in the world, were taken by surprise. The intelligent lockdown in the Netherlands was gradually phased out, and reinstated locally in urban areas as needed. This has an impact on living, working and shopping and therefore directly affects the use of real estate. Considering the fact that COVID-19 will be present in many ways as long as no vaccination or effective medicine is available, this means that COVID-19 will have a significant impact on real estate and urban developments. Perhaps if we look back later on this period and any new lockdowns, this pandemic will turn out to have been the starting point for drastic (real estate) changes. The literature review of the essay collection and the RICS webinar that followed (see RICS, 2020) discusses how different aspects of the city and real estate may change.

Many were taken aback by the empty shelves in the supermarkets during the first panic days of the pandemic. Supply chains were running at full speed, yet a large part of the retail sector either came to a standstill or switched to online. Multi-channel has now really proven itself, and COVID-19 abruptly increased the demands on 'last mile' logistics spaces. Much more will change in the area of supply chains. Not having strategic production for facemasks located in your own country appears untenable. On top of that, a trend of onshoring in the light of growing trade tensions can be seen, and it is clear that logistics and warehousing will continue to grow in importance.

The public space is also in the spotlight. The importance of parks and green space was high during lockdown. Guaranteed distance on streets and squares will remain the focus of attention in the coming period. Space is scarce. We need terraces to be able to achieve some turnover. And the fact that the car is currently is considered a 'safe' means of transport – what will that mean for traffic pressure?

Without the technology and means of communication we have available, the lockdown would be very different. Systems such as Zoom and MS Teams contributed to the fact that communication could continue and that many people could begin working from home or elsewhere relatively quickly. The integration of technology into real estate will be accelerated, first because of the possibilities with technology to create COVID-19-proof, safe working and social places, and because of Blockchain.

The big question is whether we will have a greener and healthier world after COVID-19 struck the globe. Pollution and emissions have fallen, that is a plus. But we will squander this benefit if governments do not codify some changes. The progressive part of the business world does not help with decisive changes, and the parties active in the built environment, who want to invest in sustainability and health, need support in the form of a regulatory government. This collection of essays was written in preparation of the RICS webinar titled 'The Triple R of COVID-19: Reset, Recovery and Restructuring' (RICS, 2020) in which, on 24 June 2020, professionals with extensive experience brainstormed about what COVID-19 can mean for our real estate and urban development.

Just like last year, the members of the RICS Department of Research & Innovation in the Netherlands have written a collection of essays. The basic theme this year was obvious: how can we design real estate and space in such a way that it responds to long-term developments and better can deal with crises, such as the current COVID-19 outbreak. This theme has been explored by eight sector experts, recorded and converted into short essays covering, among other things, the logistic Transport chain, inclusive area development, the importance of housing quality, multifunctional cities and changing mobility. There follows a number of important essays from section 2 (Digitalization and COVID), 3 (Post-COVID) and 4 (Revaluing the Space of Place).

■2.0 INFLUENCE OF DIGITALIZATION ON REAL ESTATE

Looking at the impact of digitalization on real estate, we were already able to draw a number of conclusions in 2018 (see Veuger, 2018): (1) a proven practice is beginning to emerge between, for example, Blockchain and real estate, (2) this is expected to develop further in the form of the registration of transaction processes and a DNA passport for a real estate object, and (3) completeness and transparency are the basic ingredients for trust in the system if real estate is to remain agile. In addition, research into Blockchain and real estate increased explosively in 2018 (Schouwenaars, 2019; Veuger, 2019). In order to follow up on the aforementioned studies, aggressive (digital) behaviour on the part of real estate and management is necessary in order to respond to social demand. Digital behaviour also leads to new earning models of the social and economic spin-off of disruptive real estate, such as funding. If the Dutch real estate sector embraces Blockchain and succeeds in realizing innovations, then there are opportunities to convert the disruptive character for real estate entrepreneurs in order to sell these new services. The World Economic Forum also focuses on this with its Blockchain Deployment Toolkit (BDT). But what other recent developments in digitalization and real estate are important?

2.1 Blockchain Deployment Toolkit

The pressure that the COVID-19 outbreak has put on world trading systems, including real estate, highlights the urgent need for global cooperation to maintain and strengthen the resilience of the international supply chain in relation to real estate. To help organizations improve their preparedness for a future pandemic and to support, accelerate and secure a post-COVID-19 economic upturn, the World Economic Forum (2020) released the Blockchain Deployment Toolkit (BDT) in 2020. This gives stakeholders more opportunities to optimize and maximize benefits in the business case in the new reality. Risks can also be minimized with this technology. Resilience in the supply chain is mainly determined by trust, transparency and integrity. These elements are improved by Blockchain because it offers a shared truth. The current COVID-19 pandemic puts even more emphasis on the need for organizations and governments to improve the integrity and origin of, among other things, sustainable materials, but also food, goods, industrial and consumer products.

The first toolkit is a first milestone of more than a year of efforts to identify best practices of Blockchain's deployment in the different sectors. The Blockchain Deployment Toolkit leverages the global expertise of more than 100 organizations – including governments, businesses, start-ups, academic institutions, civil society, international organizations, and technology and supply chain experts – and helps companies manage the complexity of Blockchain organizations. The toolkit will also accelerate its positive impact. Nadia Hewett, project leader Blockchain and Digital Currency at the World Economic Forum, says, 'The toolkit is essential for designing solutions that work for a multitude of actors, including smaller players who may not have access to the resources needed to unlock the value of Blockchain technology. Therefore, the toolkit can level the playing field for SMEs. There are many lessons to be learned from the current pandemic, and this toolkit is a starting point for improving long-term pandemic preparedness and accelerating economic recovery led by public-private partnerships.' The Blockchain Deployment Toolkit has already been tested in various contexts by organizations that develop Blockchain within their supply chain:

- The Abu Dhabi Digital Authority (responsible for defining technology and IT policies, recommending a standardized system implementation for all government entities in Abu Dhabi, management and use of government data, security of government IT systems, communication network and government data),
- Hitachi (brings together information technology and operational technology to help in the transformation to the IoT era),
- Saudi Aramco (Saudi Arabia's state oil company and the world's largest oil company in production and reserves) and
- a number of small and medium-sized enterprises.

2.2 Recent Development: A Building Passport

The Blockchain study for a sustainable construction sector was recently launched (Emerce, 2020). In this study the project partners investigate whether they can develop a safe and reliable building passport that contributes to the innovation for a climate-proof, sustainable, healthy and safe Netherlands. Within the theme Climate & Circular Economy, the project partners are investigating whether they can develop a safe and reliable building passport with Blockchain. A building passport in which the various chain partners in the construction industry can share information with each other will reduce the waste of materials and ultimately enable more sustainable construction. They saw that a building passport was not yet being used across borders within the real estate sector. Blockchain enables us to record integral data that is irrefutable and therefore more sustainable but also better modular construction because data is irrefutable without privacy data being visible. The first results are expected after the summer of 2020.

The built environment and agile buildings will always play an important role in our society. But one question is whether we actually know enough about our buildings in which we live and work and where all the information is located. The Foundation for International Blockchain and Real Estate Expertise (FIBREE) is currently working on the research Unique Object Identifier (UOI). This UOI system serves as the key to access interoperable databases with dynamic information about new and existing buildings or their built environment. This makes it possible to review specific information about an object and all its details on the basis of an assigned role and access rights, such as when purchasing a house. But can we handle an extreme amount of real estate data?

2.3 Extreme Amounts of Real Estate Data

Is artificial intelligence a solution for extremely large amounts of data? Artificial intelligence through algorithmization will increasingly play a role in the decision-making of real estate organizations. Harari (2017) already stated that the world could submit to data-ism, a data belief that every human action is a matter of the right algorithms and sufficient capacity for data processing. Internationally, only limited research is currently taking place into the influence of algorithms on society and the real estate economy in particular. Artificial intelligence and its influence on society is not new. Its origins date back to the 1930s with Alan Turing's Turing Machine, with which he broke the German Enigma Code and started the beginning of the end of the Second World War. For some time now, science has been looking for a computer that can withstand the Turing test. Another example of the great influence of algorithms is the Coin algorithm developed by JP Morgan. This is a software program that can read through thousands of contracts in a short time and provide advice instead of 300,000 hours of ordinary lawyers (Stolze, 2017). It is good to realize that algorithms outsource (thinking) processes and decisions. A combination of hard and soft factors that are weighed up is not possible with this artificial intelligence. The question is whether we use big data models correctly and do not unintentionally lead to inequality, discrimination and vigilance. The fact that technology develops faster than people's adaptability is not new either: the parachute was only invented after the first plane flew. Ethics for individuals and organizations remains important to properly assess and use real estate data (RICS, 2007a, 2007b) because we produce an extreme amount of data that is increasingly difficult to secure, but also increasingly difficult to organize, archive and keep accessible. However, we do have a certainty that digitalization will have a major impact on social development - also as a result of COVID-19 - real estate processes and therefore the real estate economy. When all available data is digital for a building, we speak of a building passport we will need in order to be a control on this building data. This can be done by a Unique Object Identifier (UOI).

2.4 Unique Object Identifier (UOI)

The project ‘Regie op Bouwgegevens’ (FIBREE, 2020) was carried out by the core team that is a collaboration between the Ministry of the Interior and Kingdom Relations, the Land Registry and the FIBREE Foundation. The report was published by the core team of the project and is the final piece of the first research phase. The second phase is currently being carried out. The content of the report should be seen in conjunction with the additional information that provided by FIBREE (2000) - can be found at www.fibree.org/uoi-nl. The Unique Object Identifier consists of three components, each of which requires explanation: (1) Unique, (2) Object and (3) Identifier. Unique stands for the uniqueness of the UOI. The UOI design must be constructed in such a way that identical UOIs cannot occur. In time, it is obvious to define the meaning of Object as broadly as possible as an object that is observable (FIBREE, 2020, p. 14). In this way, this definition of an object covers the infinite range of potential UOI. The six conclusions of the study (FIBREE, 2020, p. 36-38) are presented here successively.

The broad added value of the UOI is great and can be well applied in real estate management. The technology can be applied in real estate and facility management to make processes more efficient and cost effective. This is shown in the report of Unique Object Identifier (can be elicited from https://drive.google.com/file/d/1rF-QKeMAukEemr6buLziit_W4blWBmZJ/view). Almost unanimously, the nearly 100 practitioners consulted confirm that the presented UOI system can have a large added value. For broad implementation and adoption, challenges are still seen. The layered structure of the UOI, and with it the possibility of retaining a linkable and flexible taxonomy, makes it unique in the world, relative to other identifiers. In addition, the UOI system fills an open space within the NEN-3610 framework. On the other hand, this first research phase produced several recommendations for the systematics through development.

I. Widely supported momentum present

There is a widely supported social and economic need for common shared ID in the form of an infrastructural facility, including for the harmonisation of existing data islands. In general, the UOI contributes to a significant improvement in transaction costs. In practice, the following effects are seen as the most important drivers:

- Social gain because information becomes available to all users;
- Knowledge and innovation because effects on the lifecycle of a building become more comprehensible;
- Customer convenience because the UOI system promotes trust, certainty and therefore peace of mind;
- Efficiency due to the possibility of having the right information available faster and more easily in a rapidly growing information landscape.

There is a great deal of interest in continuing to monitor UOI development, or in participating in it, provided it is sufficiently in line with one's own business operations or areas of expertise.

II. Layered structure makes UOI concept unique

The layered structure, based on a linkable flexible taxonomy, makes the chosen UOI system unique with respect to other explored identifiers and therefore attractive for practice. In order to keep use simple, it is important to keep content and infrastructure separate from each other. With regard to the UOI structure, the following possible iterations are therefore proposed, which may or may not be implemented in the next phase of the UOI concept:

- Extract object type coding from the UOI structure.
- Examine UUID / GUID application.
- Examine need for country code application.
- Investigate which are the minimum attributes you will need in the future, so that the UOI structure is in line with the new set-up segmentation and layout of a coherent building registration.

III. Connects to NEN, INSPIRE and ISO systems

The UOI system fills an open space within the NEN 3610 framework. NEN 3610 is the Dutch translation of the comparable INSPIRE and ISO standards systems. Connection to this is an important factor for broad market adoption in the Netherlands, Europe and internationally. In the preparatory phase, it is interesting to carry out further research into the way in which the UOI system can be fitted into these standard systems. In mid-2020 the reassessment of the NEN3610 will start, which offers an ideal opportunity to connect to it as much as possible.

IV. Government must create pull factor

Government involvement is a crucial success factor in achieving broad adoption of the UOI. The UOI is seen as an open source infrastructure component for the public domain. The greatest benefit is achieved with as large a number of participants as possible. Individual market parties find it difficult to take the lead in this, because clear short-term incentives strongly depend on the size and speed of market adoption.

By choosing the right follow-up pilot projects, the government is able to create an important 'pull factor' for the UOI system. Choose one or more concrete pilot cases with the broadest possible common denominator and initially focus on the building level with simple processes, many users and fast quick wins. The renewed energy label could be such a pilot case. Involve key stakeholders and experts from the outset.

The government can further contribute to promoting broad market adoption by strongly recommending UOI use as much as possible. For example, for policy purposes and reporting purposes, the government could consistently choose to use its own reports to provide the UOI and set up the government systems so that exchange with the government via the UOI system can take place efficiently. The advantages of this can then also be offered to the market, with the State Property Company leading the way where possible. As a government, focus mainly on the further development and application of the UOI system for Dutch application areas, but inspire, connect and exchange experiences with similar pilots that are organized internationally in a consortium (including through FIBREE, INATBA and Climate Chain Coalition). This promotes international convergence towards a unified global digital infrastructure for the built environment, of which the UOI system can be a fundamental part.

V. Further elaborate key elements in the preparation phase

During the research phase, several crucial components came to light in order to achieve rapid and broad adoption of the UOI system in the market. The feedback obtained is an important point for further elaboration in the preparation phase.

- Align as much as possible with what is already there. If parties can connect to the UOI from their existing information structure, this will have a significantly lowering effect. As far as possible, give companies the choice of the information level at which they want to implement the UOI.
- Formulate clear 'What's in it for me' answers for each role/organization involved in the chosen pilot project(s).
- Further elaborate the intended governance structure for the UOI system.
- Further elaborate the agreement system for the UOI system.
- Further develop the corresponding certification system. This creates peace of mind for market parties, because UOI compliance can then be easily enforced in their tenders.
- Investigate the possibilities and risks of the temporary use of a linking application to facilitate connection to existing identifiers.
- Also take into account how to get rid of it in the long run.

VI. Coronavirus crisis offers extra opportunity

The coronavirus crisis has a major impact on society and the economy. The virus is spreading all over the world and one by one it is landing in a lockdown, only to reopen gradually and conditionally. Existing certainties in many sectors are suddenly called into question. In these changing lockdown situations, how many people can be responsibly accommodated in shops, offices, schools and other buildings or their surroundings within the local social-distancing guidelines? Is the capacity of the vertical rises, of the air handling system or of the main entrance the determining critical factor? The added stable value that can be achieved with the UOI system for supervision, planning and individual stakeholder communication in such dynamic circumstances is obvious.

■3.0 POST-COVID-19: OPPORTUNITIES AND CHALLENGES FOR CITIES AND MULTIFUNCTIONALITY

One question is how central, urban multi-functional areas are affected by COVID-19. Kok et al. (2020, pp. 9-11) state the following. People are ultimately social beings that have a natural trend towards clustering. It is the urban public space with a sense of restaurants, cafes, shops and entertainment where people come together and meet, where friendships take shape, and where new ideas are often conceived. Large cities will therefore remain poles for economic dynamism and innovation. However, COVID-19 will remain among us

for some time to come. Without proper vaccination or medical treatment, distance measures, the one-and-a-half-metre economy, will continue to influence urban life, and we will have to take local outbreaks and lockdowns into account. To remain dominant, large cities will have to adapt, with major implications for urban development, spatial planning, and real estate. Views on public and private space, indoor versus outdoor space, health, and hygiene are changing. This will also influence the demand for real estate. The crisis is having a major impact on the economy, resulting in bankruptcies and restructuring, but will also lead to new initiatives. Among other things, the transformation of retail property seems to be accelerating. How will the real estate sector accommodate all these changes, especially now that income and returns are under pressure?

Flexibility is a necessity (Heid, 2013). How can space (Jacobs, 1961; Oldenburg, 1989) be optimized in the short term within the framework of distance rules? How can catering space be adapted or temporarily enlarged? There are similar questions for office space and hotels. Property owners will have to be creative in this respect, and work together with tenants in order to offer viable businesses a good chance during the gradual reopening. And, in the case of vacancy, how adaptable is the space to accommodate various functions. Multifunctional buildings and neighbourhoods with mixed functions seem more flexible and resilient at the time of change than mono-functional buildings and areas.

Given changing views on health, hygiene, and quality of life, deploying 'de-densification' appears to be a first response. In order to remain attractive, the trend towards further minimization of personal living and working space will have to be stopped. Market and regulatory pressures will intensify, and developers and municipal authorities will have to work together to prevent excessive land and development costs to the benefit of more and better space. This is essential if 'de-densification' is not to be the starting point of a new wave of suburbanization.

COVID-19 can also stimulate the integration of technology in real estate. Technology can contribute to healthier buildings in terms of air quality, touch-free circulation through the buildings as self-opening doors, lift control, and touch-free toilets and taps. Large cities remain poles for growth, prosperity, and innovation. However, central urban areas and urban multifunctional real estate will have to adapt to the post-COVID-19 period. Finding a good balance between urban clustering and personal space is essential. A high degree of flexibility and far-reaching integration of technology in real estate is essential. There is a major common task ahead for investors, developers, and urban authorities.

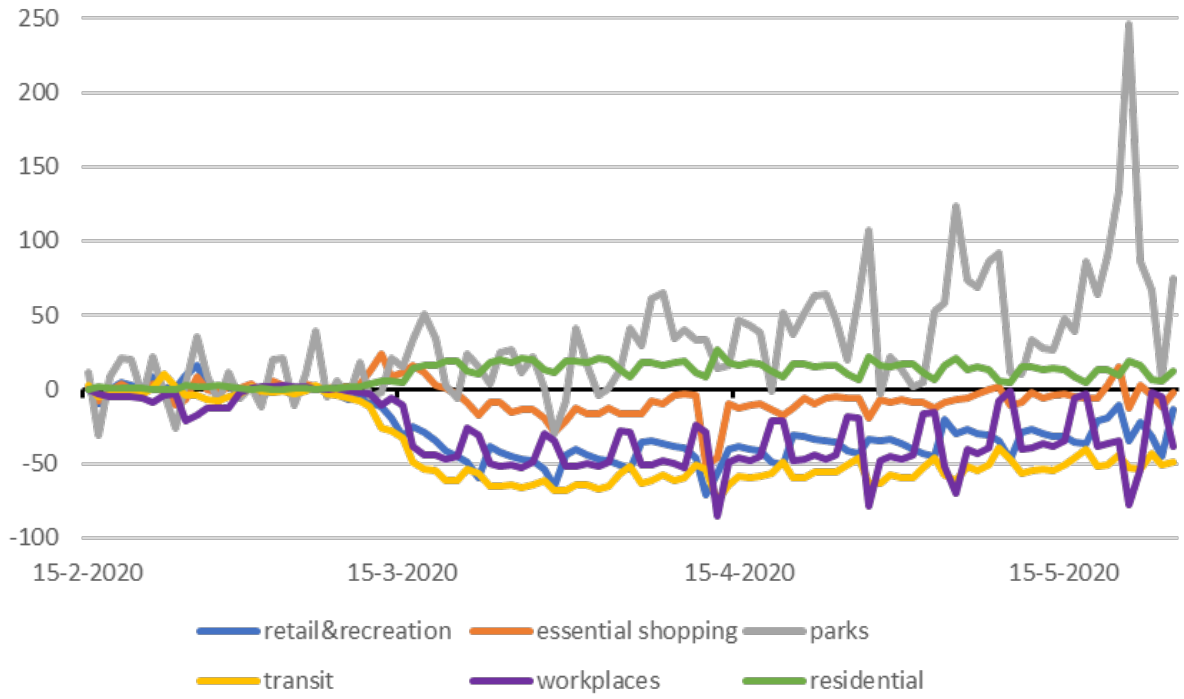

Figure 1 Dynamics in mobility patterns in the Netherlands (% change compared to 15 February 2020)
(Source: Google, 2020)

■4.0 REVALUING THE SPACE OF PLACE

The coronavirus crisis exerts a cause for reconsideration: will it be like before, or are we going to do things fundamentally differently? Peek (2020, pp. 6-8) states the following. Seen from the perspective of transition, crises are moments in which the tilt can take shape because failures of dominant regimes – think of the other side of globalization – become visible and experienceable for everyone. Alternatives from niches become more attractive or regimes are reformed. New bases of valuation, such as an inclusive society, help tilts to succeed.

His essay explores the rethink on the spot. The place where we're all longer-lasting – our home and living environment – now that we can't easily exchange it for workspaces in the office, at the customer's place, or at the coffee shop, in the car or public transportation, or for

a temporary stay in a hotel or Airbnb on a city trip or business trip. The place we learn to appreciate again as a home where it is good or less good to hide, as less interchangeable; as a home base rather than a base of operations.

The most recent influential rethink on the spot comes from Manuel Castells. In 1989, he monetized the spatial effect of the Internet – the technological source of the current transition – as the distinction between the time-honoured 'space of place' and the new 'spaces of flows' as 'the material arrangements [that] allow for simultaneity of social practices without territorial contiguity' (Castells, 1999). The 'space of flows' includes both infrastructure and nodes, as well as the set of activities and actors associated with non-place-based communication. A global network of capital and power has emerged that develops independently of localities and creates its own places. Castells speaks of a social dichotomy between connected and unconnected.

Thirty years later, as a result of the further development of mobile devices and accessibility, the 'space of flows' and the locally determined 'space of place' are increasingly interacting with each other. That is fortunate, because otherwise the lock-down would be much more drastic: without email, WhatsApp and video conferencing, there would be no work or school from home. At the same time, the crisis shows the vulnerability of the physical places within the 'space of flows'. The lock-down leads to empty airports, railway stations, central business districts, tourist destinations, hotels and restaurants. Life is again concentrated around the anchor points of the 'space of place', largely due to the interaction with the virtual 'space of flows'.

The distinction between the 'space of flows' – world of globalized capital investment and Grand Project (Christiaanse et al., 2019) in city centres and along arterial roads – and the 'space of place' of residential neighbourhoods and districts and local actors such as owner-occupiers and the housing corporations has not disappeared. In fact, the 'space of flows' is growing because governments in area development in particular are consistently opting to exploit land as much as possible. This has disconcerting consequences, such as new construction of micro-studios with exorbitant rents. The idea is that the user spends so much time in the 'space of flows' that it can do so with little 'space of place'. The lock-down lets us appreciate the virtual connectivity, but we now also notice that it is not a substitute for the spatial quality of the home and living environment.

What does this rethinking of 'the place' mean for area development? We are used to calculating spatial interventions within our own area. The urban environment is included as a cost item of transcending facilities and as a supplier of image, spatial qualities and purchasing power. The urban environment as a catchment area, an area from which we derive values. What if we tilt this frame and use the term 'catchment area'? As in traditional distribution planning: don't catch, but take care!

Area developments contribute to and care for their environment. That's how we make the city inclusive. Buitelaar (2020) shows that this is not a value-free concept and outlines four perspectives on the inclusive city:

1. In the 'maximum city', it is all about additional income; the most just solution brings the greatest amount of total happiness.
2. In the 'egalitarian city', equality is central; a general lock-down in response to a virus outbreak fits into this perspective.
3. In the 'accessible city', everyone is not 'equal', but has 'enough'; there is sufficient supply of spatial primary goods, such as affordable housing.
4. In the 'free city', it is about freedom of action and not about the outcome; the question is what happens to the externalities of this entrepreneurship.

Today, we are developing areas in a combination of the 'free city' and the ‘egalitarian city'. Enterprising, focused on the business case of the development itself, without involving the effects on the environment to a greater extent than is required by regulations. The profits are equalized at the level of the city. Let us aim for a combination of the 'maximum city' and the 'accessible city', as in the Donut economy (Raworth, 2017). In other words, use the capacity of the place for maximum returns, while at the same time achieving clearly defined multiple performances. This is not a value-free activity and therefore cannot be left to large professional real estate parties alone. Locally rooted actors from the 'space of place' must also be involved in the decision making process. Inclusive area development ensures residential quality as a decisive success factor of 'the place'.

Urban strategist, Greg Clark foresees a future of networked regions (Clark, 2020). These metropolitan areas of connected 'blended cities' are 'resilient' as a whole, but also in parts. This can be achieved by combining functions at lower levels of scale, and at higher levels of scale, by taking advantage of the benefits of agglomeration in separate and virtual contexts, such as universities, headquarters, museums and distribution hubs. We are already well underway with our Randstad and Brainport region. Major challenges continue to be reshoring, integrating and connecting primary and secondary industries locally through urban agriculture and smart manufacturing. Turning this into inclusive area development, too, contributes to the quality of our place of life.

■5.0 DISCUSSION

The big question is whether a greener and healthier life will emerge after the COVID-19 pandemic hit the world (European Commission, 2020). Pollution and emissions have decreased, that is a benefit. But we will waste that benefit if governments do not help the progressive part of the business community with decisive changes (ter Steege, 2020). Parties active in the built environment that want to invest in sustainability and health also need support in the form of a regulatory government (Rijksoverheid, 2020).

■6.0 CONCLUSION

From the previous subsection a number of conclusions can be drawn.

Conclusion I. The Unique Object Identifier (UOI) respects existing identifiers and connects them. By uniquely identifying objects, the UOI prevents users from misunderstanding each other. Finally, the UOI makes the most up-to-date object information available in a reliable way to any interested party at the moment they may/must have access to it. Six conclusions can be drawn: (1) widely supported

momentum present, (2) layered structure makes the UOI concept unique, (3) connects to NEN, INSPIRE and ISO systems, (4) government must create pull factor, (5) further elaborate key elements in the preparation phase and (6) coronavirus crisis offers extra opportunity.

Conclusion II. COVID-19 can also stimulate the integration of technology in real estate. Technology can contribute to healthier buildings in terms of air quality, touch-free circulation through the buildings as self-opening doors, lift control, and touch-free toilets and taps. Large cities remain poles for growth, prosperity, and innovation. However, central urban areas and urban multifunctional real estate will have to adapt to the post-COVID-19 period. Finding a good balance between urban clustering and personal space is essential. A high degree of flexibility and far-reaching integration of technology in real estate is essential. There is a major common task ahead for investors, developers, and urban authorities.

Conclusion III. Urban strategist Greg Clark (2020) foresees a future of networked regions. These metropolitan areas of connected 'blended cities' are 'resilient' as a whole, but also in parts. This can be achieved by combining functions at lower levels of scale, and at higher levels of scale, by taking advantage of the benefits of agglomeration in separate and virtual contexts, such as universities, headquarters, museums and distribution hubs. We are already well underway with our Randstad and Brainport region. Major challenges continue to be reshoring, integrating and connecting primary and secondary industries locally through urban agriculture and smart manufacturing. Turning this into inclusive area development, too, contributes to the quality of our place of life.

Future research will have to show what effects COVID-19 will ultimately have on the real estate sector. The assumptions in this research will have to be further clarified by follow-up studies and will require sufficient attention from the Dutch government as well as funding of this research if it dares to experiment based on the conclusions from these essays.

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