



SnapShot! on Digitalization

Real Estate Europe 2016

KPMG Switzerland





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Introduction

Digitalization in the real estate industry

In the Autumn 2016 edition of KPMG European Real Estate SnapShot! we covered the influence of digitalization on the industry in a special topics section. This edition of SnapShot! on digitalization combines the contributions of the KPMG countries across the continent.

There is no doubt that the digitalization trend is a global phenomenon and that this evolutionary development will affect most, if not all areas of our daily life. One would expect that national or cultural borders would not limit the expansion of the digital ecosystem. However, if you read through the contributions of the different KPMG Real Estate specialists across Europe, you may detect some correlation between the financial health and stability of a region or sector, and the development of digitalization in the property segment.

It is to be expected that any time lags that may currently still exist in the digitalization of the real estate sector will disappear shortly, notwithstanding the cultural aspects or the cost of labour in a certain geographical area. The dynamics of digitalization cannot be stopped by borders nor by local constraints.

Digitalization has changed the way we travel and will further change the way we

commute between individual points. It has also changed the way we work and the way we consume. We have adapted our ways to communicate and we have also raised the bar regarding service level expectations. We have become used to being fully connected and we expect our service providers to anticipate what we will ask of them. It even looks as though we are outsourcing some of our personal responsibilities to a non-tangible virtual community.

In the middle of this evolutionary development, buildings provide the places where many people spend most of their time, such as work, shopping, recreation and entertainment.

Real estate has always been about solid, physical and palpable buildings, but not anymore! Nowadays, it does not seem to be a contradiction to mix it with the abstract and intangible internet. The real world is now making increasing use of the virtual world to become more relevant and efficient, and thus higher performing and more profitable and competitive.

Building Information Modeling (BIM) supports the creation of smarter structures and ensures a more efficient collaboration during the development and maintenance of buildings. Connected sensors build the Internet of Things (IoT) and collect data from and about anything

and everything. Enhanced connectivity of systems allows property companies, their customers, suppliers, specialists and service providers to harmonize systems and make use of the vast amount of data that is collected around the world.

Technology has an impact on everything in today's business environment, and digital innovation has and will further change economies and markets across the globe. This will heavily influence buildings and infrastructure, which are very important assets for many of the traditional industries.

Some effects of the market changes can already be seen today. Take the retail sector for instance. The rise of e-commerce has already had a significant influence on the demand for shops and retail outlets. The more peripheral locations will face an even more difficult future and demand will most likely concentrate on prime locations with high footfall, where the purpose of the shop is to be a showcase for that which can be ordered online at or off the premises. Digital windows and interactive displays will limit retailers' space requirements, and consumer tracking, data analysis and reward programmes will be necessary to get consumers into the stores. Retail formats will have to be supported by experience, recreation and social environments, and the areas will need to

be managed like recreational destinations in order not to lose consumer traffic. This will lead to different building requirements but also to strategic collaborations or even mergers between digital companies and physical retail.

Home delivery or pickup services already play an important role and have resulted in high demand for well-connected high-tech large warehouses and also for smaller urban hubs due to delivery time competition. On the other hand, previously popular warehouses are left deserted because they cannot fulfil the demands of the high-speed digital economy.

From a real estate investment perspective, it is not easy to anticipate which usage segments will be more affected by the digitalization trend. Will logistic formats still be the same in 10 or 20 years from now or will there be a shift in demand, because 3D printing at home, drones or other technological achievements have changed the way logistics work in the future? It is still a fact that buildings and infrastructure are usually built and invested in for long periods of time, while the digital economy changes our environment dramatically in short periods of time.

Some companies, like banks for instance, are concentrating their distribution strategy on internet channels. This has

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resulted in a significant reduction of their retail footprint and led to the closing of hundreds and thousands of branches and sites. Who will occupy these sites in the future?

There will be shifts in the use of wider areas, such as transport systems, which will be under digital management in the future and therefore will have changed requirements in terms of streets or parking. We may need a smaller number of parking spaces if we optimize fleet management by the farming of data, optimizing flows through cognitive technologies and by offering fully individualized shared transportation modes.

We have entered an era of optimization and individualization. This has also changed the way we look at offices. We increasingly need buildings to act more as a connection hub than a traditional desk-based office. Tracking systems allow for optimum use of space and increased comfort because buildings can now adjust to the individual requirements of their users, even in the granularity of workspaces. Generation Y will soon make up more than 50% of the workforce and organizations need to rethink their approach to design, and develop or redevelop both new and existing space to

enhance user experience in order to attract people. This change will also be driven by technology and automation, which will replace jobs on one hand, and create new demand on the other. This new demand will not only have different technological and use requirements as increasingly more occupiers look not for space but rather for a workplace that connects into an environment with remote working, home office, co-working, networking and physical communication.

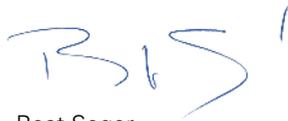
The more we move into the digital world, the less physical storage will be required. Such space becomes obsolete and in many cases it can be difficult to transform this space into another use. The movement of our data and knowledge into the cloud requires data centers that have the basic function to protect the equipment, provide power and cooling, and connect the systems to data highways. The concrete structures that were built some decades ago are mostly no longer required as data is floating and mirrored, and on-spot protection can be achieved differently. This is further proof that building structures have difficulty in keeping up with technological development and therefore a shorter lifecycle should be considered when investing.

It looks as though property will become more a service rather than just a structure that provides shelter and space. Modern buildings can produce energy, or at least be energy neutral, which will be a minimum requirement of users at a certain point in the near future. Buildings will be connected and a smart grid will allow smart management across cities and regions. Service providers will be able to optimise, because IoT and Data & Analytics will make predictive maintenance a state-of-the-art service. Properties will be able to integrate catering and services into the supply chain of service providers that exploit the full potential through digital networks and data analysis. Perhaps there are grounds to review the concept of elderly care homes, since most of us will be able to stay in our digitized homes for all our lives.

This brave new world allows a high degree of individualization, but also gives up almost full control over our presence, our movement and even our personal mood. It is therefore important to ascertain whether society is willing to sacrifice individual privacy. Perhaps this issue is no longer relevant, because we have already made the move into the data mining online world. We shop online, capital markets provide equity through the

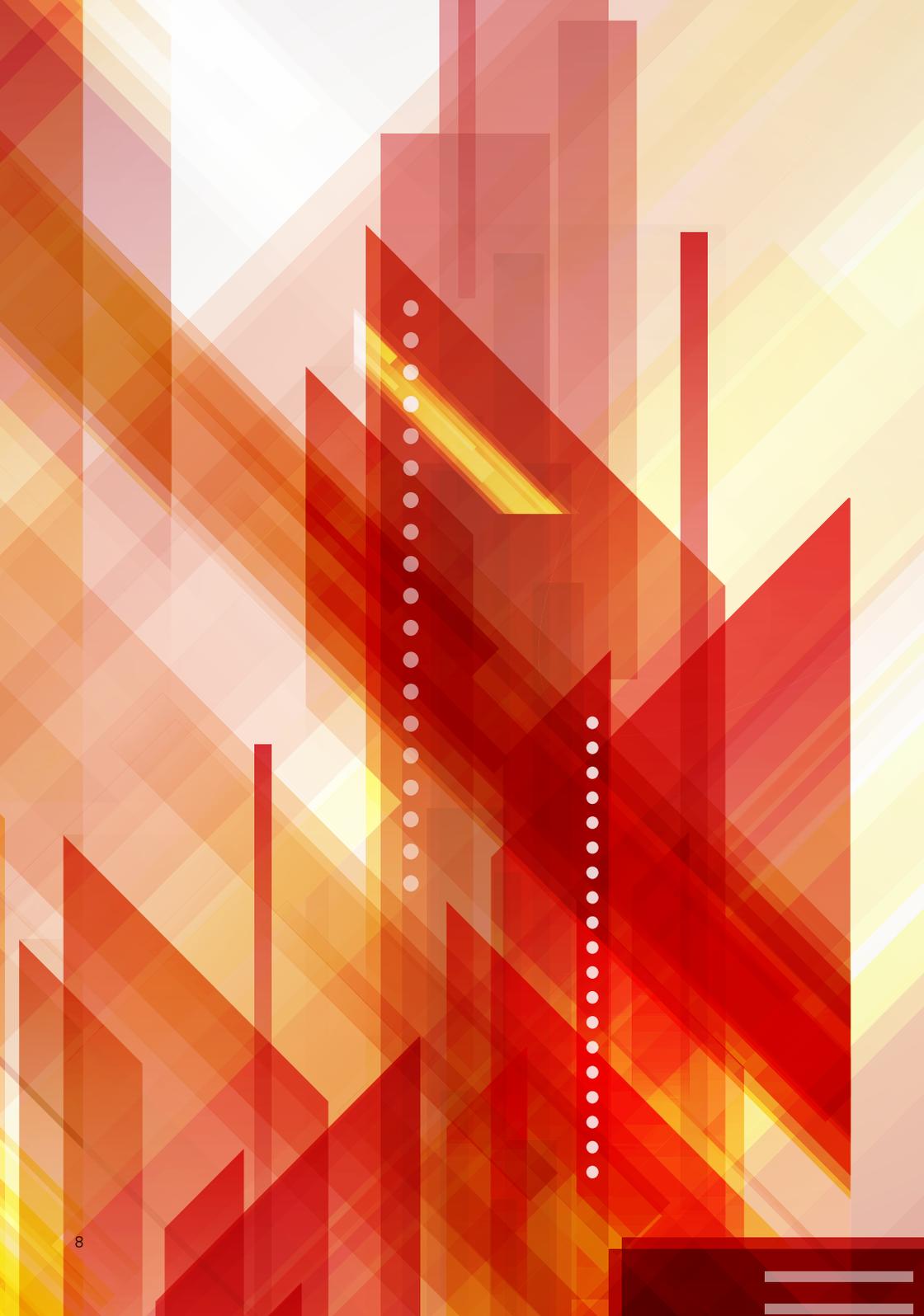
alternative route of crowd funding, we trade stocks directly on the stock markets, we increasingly execute transactions based on blockchain technology, we pay with smart devices or digital wallets, we allow ourselves to be metered while working out, and we work and socialize via digital networks.

Our data bonanza is already shared. If we integrate this knowledge into the built structure, we will experience how the digital ecosystem changes the physical world. This is a transition that many of us would not have thought possible just a couple of years ago.



Beat Seger

Partner, Real Estate M&A and
Head of Digital Real Estate



Switzerland

For about a year, the topic of digitalization has been on everyone's lips in the Swiss property sector. This can be seen clearly in the media's response to digitalization in the sector. Only two articles appeared on the topic in the mainstream press in 2014, but in 2015 there were 13 and in the first half of 2016 there were as many as 18. So, the property sector is just at the start of this change. In many places, digitalization is only now being discovered and uncertainty surrounding the effects of technological transformation remains high.

Currently, discussion is largely around the emergence of systems and applications such as the Internet of Things (IoT), portal-based building information management (BIM), wearable computing, cloud-based solutions, virtual and augmented reality, 3D printing, big data analytics, intelligent energy networks and storage systems and cognitive technologies. What all these

systems have in common is that they are based on technologies that are already available and they are being marketed with increasing success. These changes are impacting the demand for space. In industry (robotics systems and 3D printing), retail (online distribution and big data) and even in logistics (intelligent delivery systems and high volume storage facilities), advances in digitalization mean that less space will be required. However, at present the impact on statistical data is partly obscured by the current effects of population growth, increases in space per person and the growing flow of goods.

Switzerland

Sustained capital flow driving real estate investment

Digitalization in the property sector

Digitalization has come on everyone's agenda in the Swiss property sector. Although other sectors have already put the first phase of transformation behind them or are in the midst of upheaval, the heralds of technologically driven change have only just arrived in the property industry.

Players in the sector are unsettled. This is not surprising if one considers that stable values built on solid foundations will be transformed into a virtual digital world. Many property professionals can hardly imagine this, which is why a reluctance to leave the old way of thinking behind represents a barrier to commencing with digitalization.

Things and the internet

The IoT – the internet of things – is a bridge on the road to the digital era. In this field, digitalization is something tangible, because we still talk about things and not just bits and bytes. Sensors and controls have been around for a long time, and we have also become accustomed to omnipresent cameras. We understand that we now allow these things to communicate with suppliers and occupiers, and that everyday items are now also being integrated into this

communication network, such as smartphones, fire alarms and heating, door locks, lighting and the car.

On the topic of smartphones, is it really still appropriate to talk about a 'phone'? The telephone app on these devices is now incidental. Apps permit functions that now help us to deal with our daily lives and carry out our work. It has been less than 10 years since we added the term 'app' to our vocabulary. A hard disk drive in a personal computer with a capacity of 1GB gave rise to a feeling of elation in the middle of the 1990s, but today's flash drives on the smallest mobile devices can do 250 times as much, or more. Therefore, one needs to consider not only the terminology but also the size of the casing and the exponential development of storage capacity, before even mentioning processor performance. Actually, even the term 'mobile device' is obsolete. Today, we talk about 'wearables', because devices are fusing more and more with our daily existence and our bodies.

What is astonishing about this development is that it is impacting significantly on society's everyday life but it has hardly arrived in our professional property world.

Information and communications technology

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2

Media Advisory

3

- Finance and insurance
- Wholesale trade
- Education
- Retailing
- Personal and local services

4

- **Real estate**
- Advanced production technology
- Leisure and recreation
- Government
- Healthcare

5

- Oil and gas
- Tools industry
- Logistics
- Hotel trade

6

- Chemicals and pharmaceuticals
- Basic goods and production technology
- Mining
- Construction
- Agricultural and hunting

Level of digitalization by sector (USA, 2015)

Sources: McKinsey & Company and KPMG

Switzerland

Sector is picking up speed

The technological achievements so far attained in the property sector are not yet brimming with enormous innovation. The digitalization of building documentation, the creation of communications portals and procedural tools, such as electronic acceptance protocols, are the first steps in the vast field of digital possibilities.

Barcode or even sensor-verified security procedures, or use of GPS by facility managers, appear downright innovative.

However, it appears that digitalization is now picking up speed in the property sector. This is necessary if players in the sector want to ensure that they keep control of their business. The prospects for success increase if property and construction professionals demonstrate a readiness to co-operate. The future lies in networks and not in hierarchies or proprietary systems.

This is already standard in building information modelling (BIM). Multi-disciplinary control of process chains, in which every participant makes a contribution and through which it is directly available to all the others, is affecting processes in property development and realization, and so it is impacting on their innovation, quality and sustainability. However, there is a considerable need for catch up in order to

deliver its successful implementation, particularly as everyone involved needs to be able to use digital platforms to optimize professional input.

Building automation and control systems (BACS) also follow the digital building model, whereby they assist in optimizing control of the most cost-intensive phase in a property's life cycle. BACS also represent the interface to future developments in and around real estate, and so they are a central component in a property owner's control of the income from its premises. Digital management of user locations also opens up the possibility of extending added value to new areas of activity.

Once the essential characteristics of a property have been digitized, they can form the basis for achieving enormous gains in efficiency and transparency. Communication standards and co-operation play an important role here. For example, this sort of collaborative environment allows new paths to be trodden in finding and managing tenants.

In the case of development projects, steps towards property digitalization can be taken at the start of the construction phase, but the conversion of existing property stocks to a digital platform becomes laborious and sometimes even impossible. In particular, from today's

viewpoint, it is still questionable whether the investment associated with this transformation can be made financially viable. At best, it may be possible to cut through this Gordian knot by focusing not on the yield from the investment but on whether pressure on income from the property can be countered using technological upgrades.

Added value through networking

The value added by a network can be realised, for example, with a platform on which owners and managers can access all the data relating to the supply of space. Such a platform integrates the fintech functionality supplied by one or more partners, and is also connected to suppliers' ordering and merchandise management systems. The possibilities so created are obvious and not science fiction at all, since the individual solutions are already available today. The entire process of finding tenants, including credit checks and approval, and registration and deregistration, with the authorities and utility suppliers, up to and including moving in, handover and fitout can be automated in this way. Of course, viewings will still take place for the time being, but they will shift in part to virtual reality. Handovers will be able to take place without the presence of a manager and maintain existing standards, as the IoT and apps will take over the relevant

steps in the process and provide the information to the management database without delay. Naturally, such processes can also be translated in the same way to residential property, where the first credit providers have already partially automated the financing process.

What is positive in this development is that new fields of business will emerge for owners. Connected suppliers and service providers will be prepared to make a payment for the resulting transactions. Overall, businesses will profit from efficiency gains and clients will benefit from uncomplicated, transparent and cost-effective processes. Where there are winners, there will also be losers. The days of property portals may be numbered if the sector reaches agreement on a single data and communications platform. Property valuation will also change: at a time when bank secrecy no longer exists and almost everyone is a transparent consumer, there will be no reason to withhold transaction data from the data pool described above, especially as partial anonymization is technically possible. By combining management data with information on the properties and the basis of transactions, it will be possible to automate a large part of the business of valuation.

Switzerland

Digitalization permeates transaction processes

Working processes underlying the property industry will not escape the progress of digitalization. Cognitive systems will soon take over standard bookkeeping procedures. Such systems can also be applied to due diligence processes, which today are already underpinned by databases where the procedures are increasingly supported by digital systems. An obituary could also soon be written for the call to the repair service. With predictive maintenance, it is possible to deploy the maintenance service in good time before components fail; and platform-based push notifications or digitally managed call-up services will take on the necessary services with precision. The technologies described above are already in use.

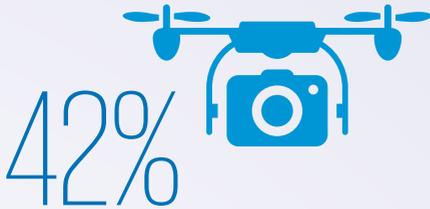
Whoever thinks that traditional trade skills will be protected from digital influences should be surprised if one day they encounter digital technologies increasingly on building sites. We do not have to go too far to imagine houses produced from a 3D printer. Initially, this technology will establish itself in the manufacturing of components on-site. Even today, drones are being used for design and monitoring construction. According to the 2016 KPMG Global Construction Survey, 42% of respondents use these self-piloted craft to oversee their large building sites.

Remote-controlled procedures, tracking of machines, people and materials, and automated and disparate centrally monitored supply and construction processes are already in use for larger construction projects. The prevention and detection of defects with the help of augmented reality, i.e. overlaying built areas with a digital model, is no longer a pipe dream. The increasing digitalization of the design process will not be without its influence on the implementation of construction, and it will advance the use of robot systems, which have been used for some time in the fabrication of timber components.

Data analysis points the way

The increase in networking is generating a vast amount of data, which is evaluated not only in order to understand what has happened but also to make predictions for the future. This evidence-based approach to extensive digital material with different sources and structures, referred to as (big) data analytics (D&A), makes it possible to detect concealed patterns and correlations that help to understand the present and manage the future. The effects of D&A will be far-reaching. There will be changes not only to targeted marketing and choice of location but also to premises, contract and maintenance management. D&A extends to project design and the choice of materials just as much as to financing procedures and

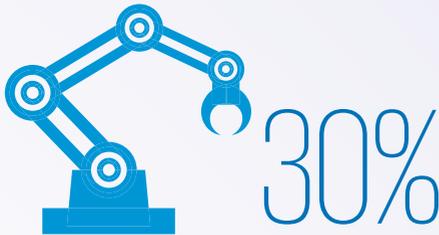
Use of technology in the construction industry



use **drones to monitor** construction status



use **Building Information Modeling** on a majority of their projects



use **robotics** or **automated technology**



use **radio-frequency identification** to track equipment and materials on site



use **remote monitoring** on sites



use **smart sensors** to track people on site



Source: KPMG Global Construction Survey 2016.
Note: two thirds of respondents generate turnover of more than USD 1 billion and one third between USD 5 billion and USD 20 billion.

Switzerland

supply chains. D&A will help us to tread new mobility paths and husband resources.

Forward-looking analytical resource management is not only fundamental for the realisation of a 2000-watt society, it also opens up further business potential for property owners. Energy production and intelligent network operation, proactive technical building systems and orientating consumer goods logistics towards the consumer's anticipated location and needs are only a few applications; ultimately they extend to the entire ecosystem.

Effective confrontation of cyber risks

A digitized world is accompanied by new challenges. Information stored on the cloud and data systems with network connections need to be protected from attack. The buildings themselves will become more vulnerable to cyber attack because of the digitalization of their components, and so the highest priority must be accorded to setting up protection mechanisms. There are numerous prominent examples of people entering successfully through the 'back door' or taking control of management functions or even the till drawers of cash systems.

With increasing digitalization, serious attention must also be paid to the protection of privacy and property. This can be ensured only partially by passing laws, because, unlike digitalization, regulation is not applied globally. For the moment, regulatory adjustments cannot keep pace with technological change; this is demonstrated by business models that attract billions in capital despite a lack of clarity in the legal position. It therefore makes sense that the security aspects should also be addressed using technological solutions. Blockchain technology represents a possible strategic direction. This decentralized system based on dispersed databases already forms the basis for virtual currencies and can be used as a reliable and binding basis for transactions in peer-to-peer business. As data is not held centrally, the system is (still) immune to misuse and is also transparent.

Against this background, some states have now started to press ahead with transforming their land registers using blockchain technology. If this trend establishes itself, it will not only enhance security and transparency, it will also make highly efficient transaction processes possible, supported by (digital) robots, into which properties as well as financing, insurance and other services can be integrated.

Evolution or disruption?

The property and construction sector is taking great strides into the gravitational field of technological upheavals. The question is no longer whether players in the sector will accept the changes, but rather how long it will take before individual segments within the sector are permeated by digitalization. It is also a matter of opinion as to whether one should speak of disruption or evolution in this context.

The basic function of buildings – to provide shelter and space for people to spend time and interact – will remain. What will change is the construction and operation of these spaces, the nature and manner in which they are used and the demands placed on them. Client relationship management will therefore become more important, as properties will become more mobile from the client's perspective and certain premises will become obsolete; in future, activities that still place demands on such premises today will no longer be undertaken or will be undertaken only to a limited extent. Digital evolution will affect the sustainability of a property's value.

Digitalization will open up new fields of business for the property sector. In order to grasp the opportunities on offer, the sector must invest in education and further training, and create the necessary

skills. An important factor for success will be a multi-disciplinary approach, as an inward-looking property and construction sector will not be in a position to replace the number of jobs that it will lose.

The challenges and opportunities opened up by this digital transformation must be approached at a strategic level. Operational and procedural measures are suitable for familiarizing oneself with the digital age, but they fall short of the mark. The cultural and social aspects in particular must not be left out in the cold. As a driver of creative innovation, the oldest of all networks – society – should be placed at the centre in the future, and it should exploit the technological achievements for its own further development.

Germany

There is no doubt that the massive trend towards digitalization will have a huge impact on the economy and society. Trends in the German real estate market are already influenced by the digital economy, which comprises information and communications technologies and internet-related companies.

Due to its strategic location in the centre of Europe and its excellent infrastructure, the logistics sector is one of the main drivers of Germany's economy.

The e-commerce boom which accompanies digitalization has led to increasing demand for logistics space in recent years. At around 6.0m sq. m, take-up increased by approximately 15% between 2014 and 2015, reaching a new record level. Moreover, the amount of newly constructed logistic space is also increasing. From approximately 59% of total take-up in 2015, the share accounted for by new-build space rose in 2016 to 66%.

As a consequence, logistic properties are becoming more and more attractive to investors. The record levels for transaction volume (up by around 30% in 2014 and around 40% in 2015) and the yield compression in the German real estate market are proof enough.

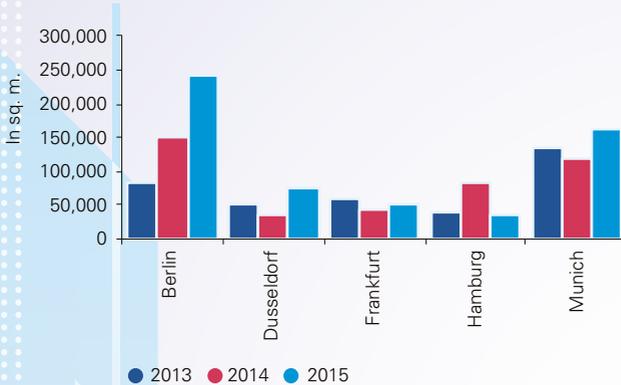
The question is: how is the retail sector itself impacted by the e-commerce boom

which accompanies the trend towards digitalization. Market participants expect demand for retail space in prime locations to remain stable. This retail space will be converted into showrooms and flagship stores, breaking down the barrier between over-the-counter retail and e-commerce by focusing on customer retention. Customers are inspired and advised in-store so that they buy products online afterwards. However, demand for retail space in B- or C-grade locations is expected to decline.

There is no definitive answer to the question of the impact of digitalization on office buildings and forecast demand for office space. Digitalization brings with it a fear that jobs will be replaced by technology and automation. However, it is evident that the digital economy also creates new employment. According to the Bundesagentur für Arbeit (the Federal Labour Agency), employment in the digital economy increased in four of the top five locations in Germany between 2008 and 2013. The increase ranged from 17.4% in Frankfurt to 44.0% in Berlin. It was only in Munich that employment in the digital economy decreased, by 9.2%.

According to calculations by Investitionsbank Berlin, the digital economy could create around 270,000 additional jobs in Berlin alone.

Development of digital Take-up



Source: BNP Paribas Real Estate

Digital economy companies are also driving demand for office space. The take-up generated by these companies amounted to approximately 625,000 sq. m in 2015, an increase of about 60% compared to 2013. An exceptional important role is played by Berlin as Germany's 'digital hotspot'. Whilst digital companies accounted for approximately 21% of take-up in the capital in 2013, their share of office space take-up in Berlin reached around 39% in 2015.

Digitalization brings with it other trends that influence the office sector: co-working, remote work and home offices lead to enhanced requirements for flexibility of office space. An up-to-date IT specification is crucial when letting office space in any case. Beside the impact of digitalization on

demand for rental space and investor interest in specific asset classes, digitalization comes along with other benefits such as the simplification of the transaction process and of development projects brought about by storing documents and data and making them available to potential investors or project members on the cloud or in data centres.

Furthermore, digitalization is giving rise to additional financing instruments such as crowdfunding, providing developers and investors with alternative routes to raise equity. Thus, digitalization does not only lead to a fear of vacant office and retail buildings; it also generates demand for alternative asset classes and can actually allow developers and investors to meet (increasing) demand.

United Kingdom

Our recently published report on how the UK real estate sector will look in twenty years' time unsurprisingly features much thought around the impact of digitalisation. Some key implications are outlined below.

Office occupiers increasingly need a building to act more as a connection hub than a traditional desk-based office

- Physical presence in the office is less important as employees can log in from almost anywhere and utilise virtual meetings
- Focus on informal collaborative spaces rather than formal meeting rooms and siloed desks. KPMG's new London office has more open meeting zones and integrated facilities such as cafes
- Corporates embrace office layouts previously typical of technology start-ups
- Company buildings become a marketing tool to attract clients and employees – tenants seek a cutting edge blank canvas to put their stamp on

New players operating in the real estate sector

- Firms such as WeWork and Workspace have capitalised on needs of start-ups and others for flexible office space they can grow/shrink in as they evolve. The traditional fifteen year lease does not apply

- Co-working spaces such as in London's Silicon Roundabout allow like-minded businesses and employees to share ideas – clustering at a new level
- Community and entertainment focus with the millennial generation's apparent blurring work and play divide
- Traditional real estate firms can take advantage of this model as it becomes more mainstream. While corporates are unlikely to do away with offices they may have a smaller central hub with satellite spaces on flexible leases

Retailers adapting to the rise of e-commerce

- Digital window displays, in-store apps and WIFI attract footfall
- Shopping centres embrace technology – Hammerson's Plus app guides visitors around stores and sends personalised offers based on location
- Opportunity to gather shopper data and use it to improve shopping experience, maximise revenue generation and ensure efficient use of space
- Value of data for others – new income source with permissions to share data

E-commerce changes for the logistics sector

- Increased demand for well-connected high-tech big sheds as logistics firms seek to replicate Amazon's digitalised model
- Smaller urban hubs sought after with delivery time competition
- Previously popular warehouses left deserted – some due for residential conversion, others rendered useless

Property as a service

- Real estate is no longer just about bricks and mortar in the rapidly changing digital world
- Landlords are increasingly likely to consider data analytics, catering and laundry services, integration into other services or parts of the supply chain, advertising and online links. Serviced offices for example are just the start of this trend

The Netherlands

The current growth of digitalization in the form of the Internet of Things ('IoT') and Big Data & Analytics ('BD&A') is permitting the industry to create the buildings of the future. This trend is currently unfolding right across the office, residential and retail real estate sectors.

Trends in digital technology are providing opportunities in real estate at portfolio level by improving performance measurement, value analysis and detailed forecasting. But advanced digitalization can do much more than that. It enables the sector to create smarter and future-proof buildings by improving sustainability, building efficiency and comfort for its users. In the Netherlands, we are experiencing an enormous increase in the use of IoT and BD&A technologies in the real estate sector.

By using advanced digital technologies in the building itself, the world's smartest and most sustainable office building has been created in the Amsterdam region. Housing over a 1,000 shared workstations across fifteen floors, producing more energy than it consumes and boasting more than 28,000 sensors, this innovative building is truly the office building of the future.

A fully automated system allows the building to be completely energy neutral by utilising its solar energy systems,

rainwater collection, natural ventilation loop and aquifer thermal energy storage. A digital ceiling tracks users everywhere, so the building knows where and when to shut down lighting and heating/cooling, and reschedule cleaning to save energy and costs. User comfort is increased by informing users where available parking spaces, desks and lockers can be found, and by personalising settings for temperature and lighting for individual workstations, all via their smartphones which users can charge wirelessly on every desk. The building even remembers their favourite coffee machine settings and weekly gym routine.

We see a similar trend in the residential sector where more and more residential developers are aiming at the construction of a digital living environment. Developers are experimenting with future-proof concepts by embedding, for example, 'care-concepts', energy-optimised living, smart living and lighting and predictive maintenance into new and existing residential buildings. An increasing number of developers are teaming up with investors, municipalities and even life- and health insurers to prepare for the digital living environment of the future. Residential complexes are being fitted with all kinds of sensors to gather data on the use and quality of homes, all to improve liveability and comfort.

The growth of digitalization can also be seen in retail property where numerous experiments have started with IoT and BD&A technologies. We see our clients monitoring shopper movements within shopping malls and measuring key synergies between different anchor stores within these retail centres. This has led to the introduction of Mall and Tenant Management 2.0, providing portfolio and centre managers with a new and effective toolkit to monitor and analyse real estate performance and value.

As with all technological innovations, success is largely dependent on successfully changing human behaviour. Both owners and users of real estate have to adapt to this new environment in which advanced digitalization provides a multitude of possibilities. Owners need to change and (re)develop their business models to support and use the new digital environment in order to benefit from it fully. Additionally, prerequisites such as data governance, data maturity and privacy protection need to be established as well. Users have to change their habits to enable these technologies to help them. An example of the need for changes in behaviour is the utilisation of the office building we mentioned earlier. Utilisation currently remains a challenge on peak days, as checking in at desks via Quick Response Code scanning is proving to overcharge most users, and desk

occupancy remains unknown. The building's owners need to think of ways to incentivise users to change their behaviour and allow digital technologies to increase their comfort and improve usage of the building.

In the Netherlands, IoT and BD&A are quickly becoming a core element of the real estate sector. Although the traditional sector still has a long way to go, there is definitely no turning back.

Luxembourg

Luxembourg is endeavouring to capitalise on its success as a global financial hub with a view to taking on a leading role in the digitalization of this and other industries, in order to diversify the range of services that it provides. The country is exploiting its expertise as a European and global leader in Information and Communication Technology (ICT), Big Data management, the emergence of FinTech, e-commerce and the Internet of Things (IoT). These initiatives can be summed up in three major trends which affect the real estate sector in different ways.

Growth in FinTech and Start-Up Communities

At the end of 2014, the Luxembourg government set up an initiative to establish the Grand Duchy as the leading European FinTech and start-up hub in fields such as digital wealth advisory services, block-chain, big data, machine learning and smart contracts. Boosted by the favourable environment and governmental support, growth in these start-up communities may add further pressure to existing demand for new office and residential space.

Document Digitalization and Cloud Services

The growing trend towards the digitalization of corporate archives and documents brings opportunities and challenges in its own right. First, it allows for more efficient use of space in existing office buildings by minimizing the use of physical storage facilities for paper archives. Secondly, it brings a challenge in terms of digital data storage, cloud computing and data centre capacity which the country handles with its ICT infrastructure. As at 2016, 27 data centres are in operation in Luxembourg, the majority of which offer Tier III and IV design service levels. This is an increase of 33% since 2013. This number is expected to grow further, in order to meet ongoing demand for accommodation of this type.

Growth of the E-Commerce Sector

The internet, mobility, social networking and the rise of price comparison websites have changed the game over the past decade and have created a new generation of customers who demand simplicity, speed and convenience for their retail and leisure experience. The transparency of offerings and prices enabled by the internet has consequences – more than ever before it is the customer who dictates the trend. In the past three years, e-commerce in Europe has been growing by an average

12–13% per annum, and it is expected to reach EUR500bn in 2016. This industry requires heavy logistical support to handle optimised shopping processes.

According to official statistics, in Luxembourg:

- 93% of people use the Internet;
- 78% of shops have an online presence;
- but only 7% sell online.

In this very competitive environment, the retail industry has begun adapting to allow digital services to be integrated into existing trading formats. It is expected that physical retailers may face challenging times ahead given the speed of the growth of the e-commerce sector. However, as Luxembourg's retail scene is supported by a stable economic environment and steadily growing consumer confidence, it is not expected that physical retailers will be heavily impacted, especially in prime high street locations.

Moreover, Luxembourg is ranked number two in the Global Logistics Performance Index. According to the World Bank, due to the country's strategic geographic location and support through air and rail cargo as well as river freight, the sector is expected to grow further with the help of positive government support. This may allow for yet further developments in the logistics real estate sector on top of the current growth in the presence of Third Party Logistics sector occupiers.



France

Real estate has always been about concrete, physical and palpable buildings. Not any more, one could say! Nowadays, it does not seem to be a contradiction to mix it with the abstract and intangible internet.

Real estate does indeed possess two characteristics that can benefit from digitalization: it represents a valuable investment and it involves complex processes. Changes are afoot in the architecture, engineering and construction industry, always information-intensive and formerly document-centred. Owners and occupiers of buildings are adapting their behaviour too. The real world is now making increasing use of the virtual world in order to become more relevant and efficient, and therefore higher-performing and more profitable and competitive.

This revolution includes strategic aspects of portfolio planning and investment and also operational aspects of the procurement, provisioning, management and marketing of properties.

- For occupiers, the biggest change will be the 'Uberfication' of commercial real estate: from the way people search for new premises (cartography, 3D asset tour, virtual reality...) to the way buildings are actually used to bring them more into line with the occupier's needs (energy consumption, smart buildings...).

- For owners, it's all about the speed at which they can access the data needed to give commercial real estate players a solid decision-making foundation. The emergence of BIM, combined with the increased use of mobile devices, is placing a new emphasis on data (and more of this is structured data).

In the future, digitalization of the real estate industry will continue to move in innovative directions: smart cities, Big Data, Open Data, crowdfunding, and the shared economy. In fact, this has already started with more and more business incubators putting an emphasis on real estate professionals.

In France, we are seeing many dedicated start-ups aiming at seizing the first-mover advantage, and the largest real estate companies are now integrating this into their overall strategy, clearly aiming at improving transactions and processes, and aggregating and sharing information.

The retail sector has taken the lead as illustrated by initiatives such as the joint project by Unibail Rodamco and NUMA in launching the incubator UR Link, dedicated to start-ups aiming to transform retail. This structure has led the way in this new segment, creating tomorrow's retail.



Austria

Experts agree that digitalization will dominate and revolutionise the real estate market. Digital transformation includes the optimisation of current IT systems and reports, the increased use of mobile applications and the growing use of virtual workspace.

The major benefits of digitalization are:

- Transparency
- Improved data quality
- Time and cost savings in planning, construction, operation and exit
- Risk reduction

IT interconnectivity between property companies and their customers, suppliers, specialist workers and service providers is playing an essential role in harmonising system interfaces and achieving these advantages.

Efficient tools for data analysis and evaluation are playing an important role in coping with the growth in available information, and are helping with further improvements in transparency.

Austria started digitising its land registry as long ago as the 1980s. This meant that land registry extracts were gradually becoming available within seconds. All documents archived since 2006 are available online, including purchase agreements, mortgages, etc. Older deeds such as partition deeds that cannot be

scanned, need to be inspected where they are held.

The last amendment to the land registry legislation took place in 2012, and this additional step made provision for the digitalization of partition deeds.

This digitalization process led private companies to create portals which provide convenient user-friendly access to those federal databases via a single platform. For example, digitised purchase contracts can be used as a basis to evaluate all real estate transactions in Austria and can provide a geographic overview of the results. This eases the search for comparable transactions and significantly increases transparency. Additional services include demographic and infrastructure-related data by region, prepared at micro-grid level.

This has been developed to a point where property valuations and reports based on comparable transactions can be created within seconds.



Italy

The Italian property market is tempting for foreign investors, with over 75% of investment in the Italian real estate sector dominated by cross-border investors. However, to be competitive in this market, it is essential that their investment operations are supported by digital services.

If Italian real estate is to continue on the path to recovery that has already started, it needs to enhance the available techniques and tools to meet international demand.

Nowadays, various solutions have already been proposed in order to support customers in organising the disposal process. These solutions facilitate the collection of the documents necessary for the sale, as well as preparing the data room for the transaction.

The market has sensed increased interest from customers and a growing focus on the most advanced professional and digitised services on offer from service providers. Thanks to the recovery of the sector and the growing maturity of the market, this is expected to be essential for a high-quality offer.

Digitised services in the real estate sector are expected to bring benefits to the organisation of the asset sale process in Italy. An increasing number of banks and investors are choosing this kind of

service, with the aim of ensuring greater transparency for buyers who benefit from the availability of comprehensive and reliable data in relation to the target asset.

This ensures that they have a deep knowledge of the characteristics of the target asset and provides them with a high level of protection in the whole acquisition process. In due course, all of this could also have a positive effect on the purchase price.



Spain

The real estate industry in Spain is now starting to experience the impact on assets of the fundamental shift to digitalization.

Office Space Adaptation

An example of this transformation is the recent major change of approach by BBVA in its new corporate headquarters in 'Las Tablas', a 114,000 sq. m complex on the periphery of Madrid where the concept of collaborative space is taking precedence over private space and telecommuting policies have become a priority for more than 6,000 employees. Another example of office space adaptation is the relocation of the head offices of KPMG Spain to a single skyscraper in the Four Towers Business Area in Madrid, where the entire office space of 23,000 sq. m is available to the 2,300 employees rather than allocating restricted private space for each employee.

Moreover, a policy of enhancing mobility inside and outside the office by improving remote network access for all employees in Spain has resulted in an improved use of space.

Retail Footprint Adjustment

Some shopping centre operators have adopted a real estate strategy which involves intensifying both traditional store and internet channels (omni channel). An example is Neinver's approach in its 'The

Style Outlets' shopping centre in Alcobendas. Here, data from users' mobile devices is collected during the purchasing experience. This information can be analysed immediately and significant value can be obtained from it. Other companies are focusing their retail strategy by concentrating their efforts on their internet channels alone, reducing their retail footprint. For example, Banco Santander has recently announced the closure of 425 branches in Spain and BBVA has forecast the closure of 2,800 branches over the long term.

Digital Transformation of Industrial Real Estate

The increase in online sales has led to a reduction in the footprint of retail stores and investment in new, highly technical fulfilment centres to distribute stock to customers more efficiently.

Directly connected to this is the planned investment by Amazon in El Prat del Llobregat, consisting of 60,000 sq. m for a new logistic centre which will generate around 1,500 new jobs in Barcelona province, or the investment amounting to EUR70m by El Corte Inglés in a new fulfilment centre in Tarragona province.

CEE

Technology has impacted everything in today's business environment, and digital innovation has changed economies and markets across the globe. It has transformed the traditional characteristics of numerous industries as well as the features of the real estate industry.

Digital advances and a number of evolving consumer trends had an inevitable impact on all asset classes and related business models. A combination of newly developed technologies has influenced how properties are built, how traditional workplaces are configured and designed, and how commercial real estate is operated, sold or let.

Office

By the end of this decade, it is predicted that Generation Y will make up 50% of workers, dominating the workforce. As more and more millennials enter the workforce, its structure and working space are changing. To attract and retain Generation Y workers, organisations need to rethink their approach to design and develop or redevelop both new and existing space to enhance the occupier experience and optimise space more effectively. Since technology has begun to impact office space, there has been a trend towards hot-desking, where employees do not have permanent desks but instead work in a large open and collaborative environment. Open layouts

allow a more efficient use of space and can save on rent and maintenance.

Technology also allows today's workers to work remotely, whether at home, in open-plan space in the office or even at co-working spaces. 'Remote work' offers numerous advantages and opportunities for cost savings, but it requires organisations to provide their employees with sufficient office supplies, equipment and mobile devices to do their job efficiently and effectively. This will involve substantial investment and to some extent it will add to IT security concerns as remote users connect devices from home or public terminals to access company email using high-speed internet and small shared networks.

There is likely to be more sharing of space between smaller companies and start-ups, with office space vendors providing customers with access to premium workspace without needing long-term leases, guarantees or additional liabilities. Such collaboration will allow organisations to make more efficient use of under-utilised space, and enable owners to maximise the potential of their real estate assets.

Retail

Online retail is changing the way in which we all purchase goods and services, and it is forcing retailers to tailor their business models to retain and satisfy consumers. There is a trend towards online shopping, and many businesses are embarking on online retail, with a consequential impact on retail and warehouse properties.

In Poland, Tesco doubled the number of its stores offering online services from 14 to 27 between 2012 and 2015. In line with this growth, the number of its delivery vans increased from 86 to 236. Carrefour and its competitor Auchan also offer home delivery in Warsaw and its suburbs. Zabka Polska, a chain of convenience stores in Poland, has partnered with courier company TBA Express to establish 4,000 nationwide in-store collection points for online orders. In Romania, Carrefour has redesigned its e-commerce platform, improved its interface on mobile devices and introduced a same day delivery service. The Cora hypermarket has also introduced online shopping in Romania in partnership with logistics firm TNT. In Hungary, Tesco is already present in the online shopping market and also offers a 'click & collect' service. CEE online grocery services are still less advanced than in Western Europe, but retailers across the region are prioritising such service lines to better meet consumer needs.

The increase of online retail is driving down interest in bricks and mortar retail properties but boosting demand for logistic property. Although e-commerce, with all its convenience, was supposed to bring an end to traditional retail, what is actually happening is consolidation and redefinition. Pop-up shops are a recent trend in retail, in which brands can try out a physical presence over the short or medium-term to see how they interact in different locations.

E-commerce is growing, and organisations will have to capitalise on online and physical shops, develop strategic mergers and ensure that they benefit from both online and local presence.



Russia

Digitalization is reshaping the real estate industry, shifting the focus in working patterns towards flexibility, customisation and speed. Digital innovation is penetrating every real estate sector, from visualisation technologies in construction to online letting services, leading to cost reductions, enhanced efficiency and an increase in the utilisation of properties.

Furthermore, digitalization brings investment in commercial property within the reach of a large number of individuals through online platforms, stimulating the development of crowd funding in real estate.

The most profound impact from digitalization is felt in the retail sector. Whilst maintaining their core role of creating a shopping experience, offline stores are evolving through the integration of new technologies and adopting an omni-channel approach. To keep up with the pace of change, retailers are making increasing use of gamification, with a view to capturing customer preferences and ramping up their engagement. For example, various applications that reward users for their purchases or the number of footsteps in a shopping centre, are gradually catching on.

Drastic changes in the retail sector have also triggered a supply chain overhaul, with proximity to customer bases and speed of

delivery assuming increased importance, and so driving demand for urban warehouses. A surge in demand from online retailers encourages the utilisation of technologies designed to cope with the demand volatility inherent in e-commerce, such as automated tracking systems or robotic pick-ups.

By enhancing employee mobility and creating a more connected working environment, digitalization is also transforming the workplace. In addition, new technologies, whether they be biometric authentication systems, phone-controlled smart locks or lighting systems with daylight sensors, are making offices safer and more comfortable.

All-encompassing Real Estate Advisory from one Source

The challenging and increasingly complex real estate markets and the ongoing technological developments require a clear focus and a flexible strategy. Our real estate team is involved in every stage of the asset and investment lifecycle, working with all levels of stakeholders throughout the real estate industry. Whether your focus is local, national, regional or global, we can provide you with the right mix of experience to support and enhance your needs and ambitions. We provide informed perspectives and clear solutions, drawing on our experience from a variety of backgrounds including accounting, tax, advisory, banking, regulation, IT Advisory and corporate finance. Our client focus, our commitment to excellence, our global mind-set and consistent delivery build trusted relationships that are at the core of our business and reputation.

M&A/Capital Market

- Structuring and execution of transactions (Lead Advisory)
 - Asset deals: Acquisition and disposal of properties and portfolios
 - Share deals: Mergers, spin-offs, IPOs, private placements
- Arrangement of indirect investments, such as funds or trusts
- Fund raising for specific projects
- Debt advisory

Investment Advisory

- Investment advisory for national or international indirect real estate investments
- Structuring of real estate investments within portfolios
- Qualitative and quantitative analysis of investment products
- Monitoring and investment controlling, portfolio performance measurement

Strategy/Organization

- Strategy development and implementation
 - Business planning/business modelling
 - Corporate/public real estate management
 - Asset and portfolio management
- Analysis of organization and processes; organizational development, internal control system
- Performance management/MIS/ investment monitoring
- Securing of digital readiness
- Risk management and financial modelling
- Turnaround and financial restructuring

Valuation/Due Diligence

- DCF-valuations of properties and real estate portfolios or companies
- Independent valuation reports for financial statements
- Valuations for acquisitions or disposals
- Feasibility studies and valuation of real estate developments
- Transaction-focused due diligence and process management
- Major Project Advisory

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