

# Real Estate Transactions in the Digital Age

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**Key words:** digitization, real estate market, land register, cadastre, transparency

## SUMMARY

Domestic and cross-border transactions of real estate are becoming increasingly important and are complex economic factors. It is a kernel task of the government to protect owner's rights and to install a transparent, efficient and secure framework. As well as in occasions of natural disasters the credit crisis has also demonstrated the need for a reliable real estate transaction system.

The paper points out the basic key principles that are necessary for installing a functional and effective real estate transaction system. With reference to the German system the important criteria are emphasized and presented. Especially for societies who are just about to build up a real estate market information system in their own country this is very interesting. They can learn from Germany's experience.

Most of the industrial countries have installed cadastre and land registration systems. These systems usually differ from country to country and have a long history of establishment. Even in high developed countries regulatory mechanisms, which are supposed to build trust and reliability, fail or cannot cover all contingencies as the credit crisis has shown. When it comes to emerging economies and developing countries situation looks even worse. Even basic conditions usually do not exist. Deficits are on a high level and land must be considered as dead capital since no formal system exists.

As experiences in countries like Germany show transactions can be accelerated through digital services and thus be made more cost-efficient. They are creating financial resources and leading to progressive process innovations. Demand for information for security rights over real estate is increasing. The legally secured documentation of real estate is essential for a successful operation of property transaction. It has to be clear to all participants who the owner of real estate is and its rights thereon. Cadastre and land registration fulfill these tasks which are crucial for any economic development. Without secure ownership investments are inhibited.

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## 1. INTRODUCTION

As everyone knows we are living in the digital age. Society is more and more penetrated and connected by information and communication technologies. Information and knowledge do have a growing impact on our lives and established as new social system in highly developed countries.

The digital world extends over many areas of our life, e.g. in arts, in private life or at work and especially in economy. It can be assumed that the branch of industry will be significantly affected and changed by the digitalization in the future. The high hopes are that digitalization will accelerate the economic life and simultaneously reduce many costs of several processes. Process innovation, as a result of digitalization, shall optimize and outwork process flows, especially those who have been too slow in the past. After all, the trend in the direction of digital economy is irreversible. A persistency in the old pads might lead to increasing costs and this is not in the interest of economic thinking person's (Kötter et al., 2010).

It is nearly impossible to gain correct economic figures but particularly real estate is economically regarded very important. About 130 bn. Euros per year was the value of the property economy within the value-added chain in 2009 up to the federal association of real estate agents in Germany (IVD, 2011). Accordingly, the processes of conveyance and hypothecation of properties are of special importance. Digitalization has optimized and accelerated processes too. For example the numbers of working days for a land registration in the land register in the state of North Rhine-Westphalia, Germany. Instead of 57 days in the past it just takes 15 days today (EUROPEAN E-JUSTICE, 2011). Also periods of performing a cadastral survey have fallen sharply. Still there is potential for optimization.

Due to different regulations, economic aspects, the high number of participants and many other reasons the real estate transaction process is very complex. The housing bubble in the US and the credit crisis worldwide have shown that the real estate market is not as solid as many people thought. Unlike other countries in Europe or worldwide such "bubbles" with its negative effects are rare in Germany. Studies have shown that the market is less turbulent and real estate values and prices are more stable (LBS, 2010). A key role does play the specific regulations and also the particular characteristics of the real estate transaction process in Germany.

In the following chapter the basic key principles for installing a functional, transparent, effective and safe real estate transaction system will be introduced and presented. Afterwards with reference to the German real estate transaction system the important criteria are emphasized. After a theoretical observation this should give the reader the opportunity to see behind the curtain.

## 2. BASIC KEY PRINCIPLES

The World Bank defined several “Worldwide Governance Indicators” that aggregated the view on the quality of governance. Research showed that in high developed countries digital land tools contribute to sustainable development (World Bank, 2011). However in developing countries digital land tools might make rule of power and corruption even more efficient. For this reason it should be kept in mind that all land tools can also be misused.

Another example confirms the problem. Transparency International did a survey in 69 countries and interviewed more than 73.000 people: “How serious do you think the problem of grand or political corruption in land matters is in your country?” Solely two percent answered that it is not a problem at all. But more than 50 percent see serious problems in their country (Transparency International, 2009).

Both examples show that even if digital tools are used (e.g. as computerized land registration and credit access) still some basic key principles must be ensured. There is no doubt that features like accountability, accuracy, sustainability and equity are important for running a functional real estate transaction system, but the essential key principles are transparency, efficiency and security.

### 2.1 Transparency

There is a saying: “All business is local”. At first sight this also applies for the real estate market. But things have changed in the past years. Real estate is still location-related but if you have a look to the business section of the newspaper you will see that capital has become more agile (BBSR, 2010). Solely international investments, global working investors or cross-border transactions cause the need of transparency in the real estate market and the transaction process. The reasons are simple. Transparency in general increases the chances of completing a deal. All partners will gain more trust and safety in making their decisions. Digitization supports transparency in a decisive way.

The basis for a high transparency in the real estate market is founded in structured market data. Trends can only be identified if data have been collected systematically over a long period as detailed as possible. Transparency will enhance the whole real estate transaction process. Primarily in saving time and that means in saving money. For example less effort is necessary for searching for property objects and potential business partners. Initiating, negotiation and finishing of deals might become faster and easier. Usually exclusive knowledge is an advantage that gives you a lead towards you opponents. But when it comes to real estate transactions the ability to judge the entire market correctly is essential and the lack of transparency would be a serious disadvantage in competition. Not knowing the risks of an asset might cost the whole deal (Kötter et al., 2010).

When it comes to real estate (transactions) there are two different levels you need to be well informed about. Primarily there is the already mentioned local bounded real estate level. You

need to know the local (sub-) market. That includes specific characteristics like the rent level, vacancy rates or the regional costs for maintenance. On the other hand, especially if you deal with commercial buildings in the higher price segment, knowledge about the dynamics of the market, national and international connections need to be known. In the end combining all available information guarantees a sustainable valuation. Transparency supports this valuation strongly but it also has to be clear that a comprehensive transparent market only exists in theory.

## 2.2 Efficiency

In general efficiency describes the effort that is required to obtain a result. Less effort means higher efficiency. If we take a closer look to the real estate transaction process, effort would be in this special case the “time” that have to be invested to achieve the transaction of property from one owner to another. As usual time can put on a level with money. This statement involves all elements (compare chapter 3) of the real estate transaction process. Efficiency is crucial to the process. Without high efficiency the real estate transaction system will fail in practice. User won't accept it. It is important that efficiency is guaranteed and continually be improved. Following points lead to an increase in efficiency:

- harmonization legislation and judicial practice
- standardization of system components and data
- accuracy is less important than integrity
- installation of automated working processes and indicators that allow analysis by experts (e.g. as monitoring, running simulations or analytic tools)
- provide WEB services for clients

Strategy of data management is also discussed as a factor of increasing efficiency. As applications and experiences in several countries show the question if central or decentralize data management is the better decision cannot be answered that easily. Both systems have their pros and cons. More important for a successful application is what structure (e.g. as administrative or juridical) already exists in situ.

## 2.3 Security

Misuse of power can be seen very often when it comes to land, especially misuse of cadastral data or land registration. Fraud, forgery, multiple allocations, bribery and nepotism were identified as the main problems. The “Working Party for Land Administration” did a survey where member states of UNECE (United Nations Economic Commission for Europe) were questioned with regard to fraud. Among other things three areas were covered: accessibility of systems, experience of fraud and counter measures. Results differ from country to country, but the bottom line is that there is still demand for a higher level of security (WPLA, 2010).

Due to ease of access to online services in the digital age the factor of registration fraud may

increase. Today all authorities in the UNECE region do hold land title registration information in electronic format. Information is accessible to the public in some form. In general a limitation of online access would reduce the amount of available online information. Also a verifiable registration can identify applicants who can prove having a specific interest (e.g. as land owners). These arrangements guarantee a certain level of security.

It is important to detect fraud before it is completed. It should be stopped at the earliest opportunity and referred for criminal prosecution. What is also significant is to understand and manage the risks of fraud. Assessing the scale of potential loss, developing strategic approaches against attacks and focusing on the most effective anti-fraud measures (preventive, direct or deterrent effects) are good practices (Kötter et al., 2010).

The question is what effective safeguards are required for ensuring trust, security, certainty and privacy at any time in a digital real estate transaction process? Following requirements must be fulfilled to detect and prevent abuse of land information systems in the digital age in order to ensure the real estate transaction process:

- accessibility restrictions (verification of applicants and limits to anonymous users)
- procedural checks and controls (in Germany public notary checks the identity of both parties in a property transaction process)
- technological security measures (access control, encrypted communication, electronic signatures, monitoring system)
- training of counter fraud staff and establishing central units responsible for identifying and tackling fraud (provide advice and guidelines)
- national and international cooperation (sharing intelligence between organizations), responsible authorities

## 2.4 Summary

For an efficient working method the national and international real estate market (industry) requires transparent market information that should be provided as safe as possible. Solely full access to the necessary data in high quality guarantees the comparability and a successful business. Without the basic key principles a real estate transaction system will fail in practice. User won't accept it.

### 3. THE REAL ESTATE TRANSACTION PROCESS IN GERMANY AND ITS PARTICIPANTS

The process of purchase or sale of real estate can be demonstrated as a value-added chain. For every element of the chain is a price to pay, which goes by the market development or which is defined administratively. In general every purchase of real estate passes the same processes. Referring globally to the basic principles and the specific elements of the purchase of real estate within the value-added chain will be always the same (BMVBS, 2006). The logical flow, shown in figure 1, illustrates the German system.

ELEMENTS	PARTICIPANTS	MEDIUM
market research ↓	buyer - seller	digital / local (analog) media / in person on site
valuation of the object ↓	real estate appraiser	on site
clarification the finance ↓	buyer - bank	in person / digital
price negotiation ↓	buyer - seller	in person
notary ↓	seller - notary - buyer	in person
payment and execution ↓	buyer - notary - seller / notary – land register	digital
transfer of ownership	land register - buyer	digital / analog

Figure 1 “Real estate transaction process – elements, participants and medium“

As figure 1 shows many people are involved in a real estate transaction. Usually most of them work in the background, collecting, analyzing and interpreting data. To mention are for example employees in the public registers and the notary offices, executives in the municipalities but also the personnel in bank and financial institutes. Their work is significant.

In Germany property is a proprietary fundamental basic right under constitutional law which is linked to the guarantee of personal freedom. Contents and bounds are prescribed by laws. Thus expropriation is only allowed legally if it is required by general good and in that case

only with compensation (Article 14 German constitution). Consequently property has a high significance which is not reached in other countries yet.

Digitization plays an important role by setting high standards. In Germany most of the registers (e.g. as company register, bankruptcy or land register) are already digitized and functional via the Internet. In the following chapters the significant registers and organizations will be introduced briefly. This gives the reader a comprehensive overview about the German real estate transaction system.

### **3.1 Land register and notaries**

Just imagine: you want to buy a house. How can you be sure that you are dealing with the real owner of a real estate property? The legally secured documentation of property is essential for a successful operation of the real estate transaction so it has to be clear to all participants (citizen, legal professionals, authority and private companies) who the owner of property and its rights is. This is controlled by the land register (Grundbuch) in Germany.

The system of the public secured register of real estate – especially the principle of public faith and disclosure – has made good experience in Germany and it is considered to be leading in Europe. Today's standards concerning transparency, efficiency, reliability and security are based on a great cooperation between registrar and notary (Luckow, 2007). Official land register information is available to bank employees, creditors, business partners and consumers in most of the European countries. So transparency and legal security on the markets of the European Union has been improved (EUROPEAN E-JUSTICE, 2011). The lawful situation of property and its rights appears clearly in the land register.

In Germany the land register is kept in the responsibility of the 16 federal states by the regional courts. It used to be in a form of a book in combination with paper folders that contained all deeds. The electronic land registers has replaced the books mostly (Treiber, 2010). The change to an electronic land register was an essential step forward. By providing digital structured data multiple data entries can be avoided and procedures can be speeded up. Thus land register leads to a remarkable reduction of working hours. Entries in the land register last instead of 57 working days in the past today just 15. That includes the cases with callback (EUROPEAN E-JUSTICE, 2011). Also there will be no run to the local land registry and no long research in an archive in the future anymore.

As already mentioned land register provides full public faith. That means that anyone can rely on the entry in it, unless he positively knows it is false. There is no need for further legal investigation or title insurance. Public faith can only be justified by maximum legal quality and certainty. So the foundation of an entry into the register has to be an authentic instrument. In general it is a public document provided by a civil law notary.

Within digitization these (authentic) public documents are transformed into new digital form maintaining their legal status. Especially a qualified electronic signature (confirmed by the

notarial seal) ensures on the one hand public faith but also an effective safeguard.

Regulated by the federal notary act (Bundesnotarordnung) the tasks of the notaries in Germany are very complex. Usually they are fully qualified lawyers and do their work independently. A buyer of real estate will have to deal with a notary in his function as who is purchasing the contract (in Germany all contracts on real estate transactions have to be notarized), investigates existing rights and is offering legal advice. In addition he is arranging the payment and also taking care of reordering or cancellation of real security rights. The notary is the link to the land register who initiates the transfer of ownership (Federal notary act, 2011).

### **3.2 Real estate cadastre**

At the beginning the idea of implementing a real estate cadastre (Liegenschaftskataster) in Germany was to raise taxes. Over time the boundary markings (which are part of the cadastre and do symbolize the property in situ) with a centimeter level accuracy got more and more important for owners.

The connection between real estate and the transaction is the real estate cadastre. By § 2 of the German land registry act (Grundbuchordnung) it is the official register of real estate (Land register act, 2011). The assignment of property rights is essential. In contrast to the land register that is proving the legal situation the real estate cadastre proves the actual situation like the geometric location, size and shape. That allows the clear identification of property. The important characteristics that define the value and the usability are also verified. At the end of the real estate transaction process the actual changes will be registered in the real estate cadastre.

Like the land register law in Germany also the real estate cadastre law is due to the federalism matter of the 16 federal states. So every federal state has its own laws and regulations. These conditions have pros and cons. Today cadastre is more than just a legal-, economic-, tax- and planning-tool for municipalities. By defining standardized contents and processes cadastre is multipurpose and has its own specific role in the public spatial information system.

ALKIS (Authoritative Real Estate Cadastre Information System) is the name of the real estate cadastre system that will be used in Germany in the future. It allows storing the geobasis data redundancy-free, independently of scale and no sheet line. Quality- and metadata help the user to make additional statements about the suitability of the data. By using ALKIS integrated in SDI (Spatial Data Infrastructure) and INSPIRE (GDI-DE, 2011) a new standard shall be implemented that ensures a national uniform management and provision of geobasis data (ADV, 2011).

### **3.3 Committee of valuation experts and BORIS**

There was and still is a great deal of interest in property of land. This applies for all information about land and particularly for data that determine the value of it. The German public institution “committee of valuation experts” (also called public valuation boards, Gutachterausschüsse) makes the local real estate market more transparent for experts and citizens.

The committee of valuation experts collects and analyzes all contracts of sale concerning real estate. All extracted data is kept in the purchase price collection (Kaufpreissammlung) that contains information about location, purchase date, property size, type of use, information about the building and others (BauGB, 2011). From this data land values (guiding prices, Bodenrichtwerte) are derived and published in price contour maps. Another service by the committee of valuation experts is publishing a real estate market report (Grundstücksmarktbericht) and the derivation of other important valuation parameters like the property yield or adjustment factors for valuations on a cost basis (Seidel, 2006).

Since introduction and broad application of the Internet land values system were converted more and more into online systems, what made information gathering for users much easier (Deutschland-Online, 2011). One example for these new online systems is BORIS in the state of North Rhine-Westphalia (BORIS, 2011). The goal of BORIS is to present all official and essential real estate information by just pushing some buttons in the internet.

### **3.4 Critical reflection of the real estate transaction process in Germany**

The real estate transaction process in Germany was introduced in the previous chapters. It was shown that the digital progress got into the transaction process. Today a general access to digital information is available. Digitization process resulted in acceleration processing real estate transaction in Germany. Considering the continuous evolution of a European and international property market this trend is essential and should be continued. Still a great need for improvement exists especially with regards to cross-border transactions. Consequences of a comprehensive digitization can only be assumed. Pros or cons will show up in the practical work.

Even the German transaction system is far from perfect. Despite of all described official and public institutions and regulations with its high demands on themselves and the legal framework the market transparency level is still far from Anglo-Saxon standards. The Jones Lang LaSalle's global real estate transparency index 2010 puts Germany on 10<sup>th</sup> place (Jones Lang LaSalle, 2010). One cause for this relative poor performance might be for example the strictly regulated insight conditions into the land register. Insight is only for those available who have legitimate interest (Land register act, 2011) what has to be justified and proved. In Germany this regulation is interpreted more strictly than in other countries.

Another point of criticism is definitely the federal structure of land register and real estate cadastre. Cross-border investors have increased effort to gain their information. A necessary uniform access or a common electronic platform is difficult to realize and seems to be far in the distance, from to-day's point of view. The European Union Land Information Service

(EULIS) may set an example for the performance. The system combines the land registers of different European states and realizes today the automatically access to five European countries. Further 16 countries represent themselves already on the electronic platform and announced their participation at EULIS. A reference to Germany can unfortunately at the moment not be found (EULIS, 2011).

Taking a further critical look on the processes has shown that digital interfaces between the actors do not exist or are not adequately developed. An exchange of information and data is complicated or even not possible. Necessary procedures run separate one after the other or parallel. Figure 2 shows the versatile linking possibilities between the actors of a real estate transaction. The lack of digital networking of the single components has been identified as main problem within the real estate transaction process in Germany.

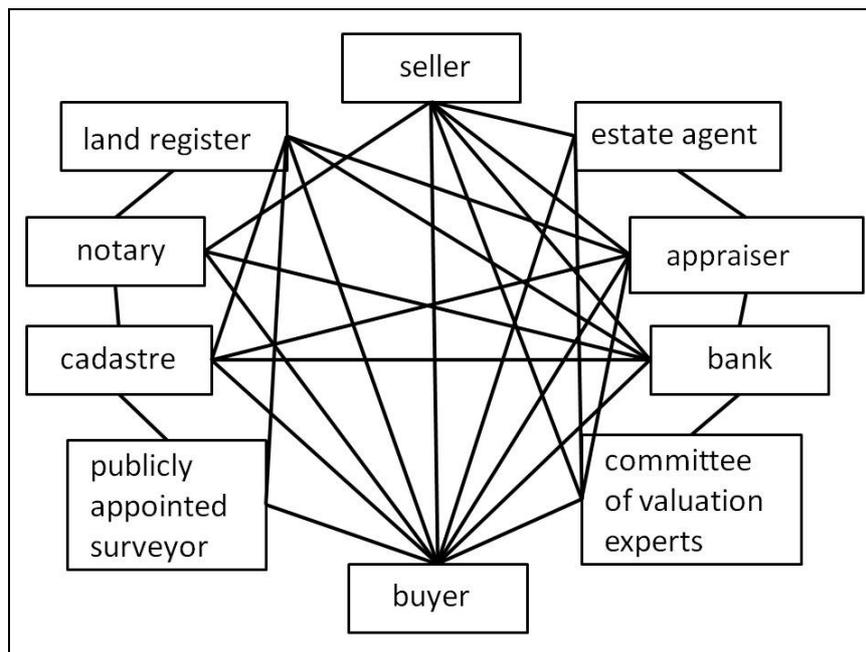


Figure 2 “Linking possibilities in a real estate transaction”

To accelerate a transaction and help to design a more transparent, efficient and safe workflow in the future it will be essential to expand and strengthen existing digital interfaces or create new ones. One concept to realization could be the implementation of a system with a central access node as a part of state-run spatial data infrastructure as shown in Figure 3 below. Not a simple task with regards to the federal structure in Germany and its distributions of competences (Kötter et al., 2010).

The advantages of linking land register, real estate cadastre and other public registers in a standardized system are clear. The principle of public disclosure individual components, the relative integrity and the automated access guarantee a reliable, safe, transparent, fast and cost-effective access to the required data and data within the connect system would be updated permanently.

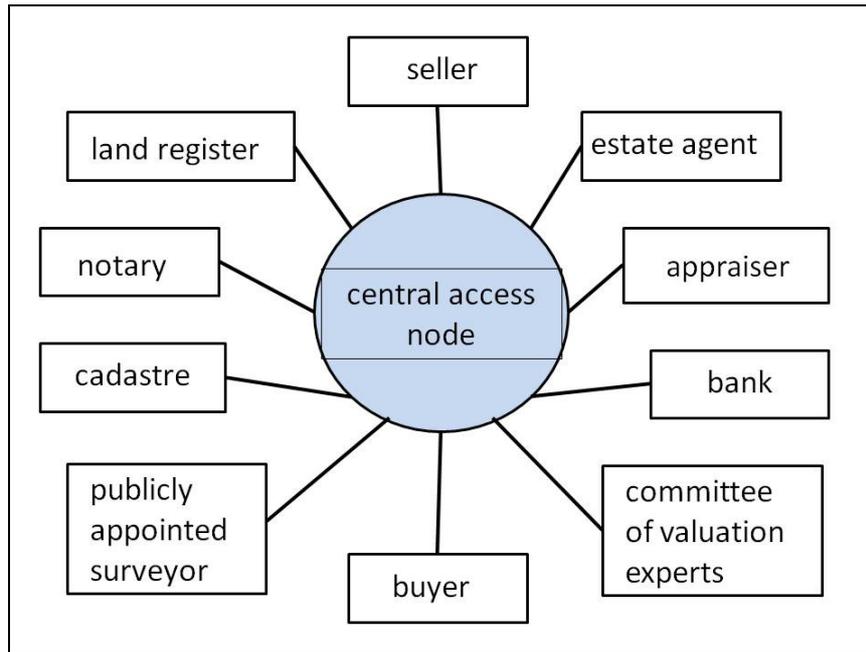


Figure 3 “Concept of an ideal linkage”

Implementation of the conceptual approach in Germany becomes more difficult due to the large number of participants from the private and public sector who are involved. Still the positive effects would also support the process of national and international cross-border transactions sustainable.

#### 4. SUMMARY AND CONCLUSION

The 2009 German real estate market report shows that in 2007 and 2008 around 825.000 property transactions per year were received. In average 1.3 % of the German territory were traded (Immobilienmarktbericht Deutschland, 2009). Particularly the property is economically regarded very important. About 130 bn. Euros per year was the value of the property economy within the value-added chain in 2009 up to the federal association of real estate agents in Germany (IVD, 2011).

Domestic and cross-border transactions of real estate are becoming more and more important. They are complex economic factors. Next to ensuring a balanced land market and a fair system of land taxation it is a kernel task of the government to protect owner’s rights and to install a transparent, efficient and secure framework. The credit crisis has demonstrated the need for a reliable real estate transaction system.

As experiences in countries like Germany show real estate transactions can be accelerated through digital services and thus be made more cost-efficient. They are creating financial resources and leading to progressive process innovations. Demand for information for security

rights over real estate is increasing. Banks, financial institutes, insurance companies and other organization request detailed information.

The real estate transaction process is very complex. Many participants are involved with different intentions what makes procedures not easy. Transparency, efficiency and security are the key principles for establishing and running a real estate transaction system successfully. Investments would be inhibited without it.

The foundation of transparency, efficiency and security in the real estate market lies in a national legal frame and a working government. A political will is a fundamental precondition for building trust and reliability. It must be clear that all commitment of installing a successful real estate transaction system can only survive if legal regulations exist. Through ownership on real estate people's awareness for their rights and responsibility will be strengthened, benefits need to be publicized.

It is very important that country specific characteristics are taken into account. Just adapting a system that works just fine in one country does not mean it will work in another. Organization should always follow the task. The tools (e.g. as cadastre and land register) are available and well known in countries like Germany. But this valuable knowledge needs to be brought on-site. It is essential that the tools flank and if necessary support the system. Different disciplines and participants have to be brought together, form cooperation's and work together successfully hand in hand (Kötter et al., 2010).

The paper pointed out the key principles that are necessary for installing a functional and effective real estate transaction system. With reference to the German system the important criteria were emphasized and presented. Especially for societies who are just about to build up a real estate market information system in their own country this is very interesting. They can learn from Germany's experience.

## REFERENCES

ADV (2011): Arbeitsgemeinschaft der Vermessungsverwaltungen der Länder der Bundesrepublik Deutschland ([www.adv-online.de](http://www.adv-online.de))

BauGB (2011): Baugesetzbuch, Ausfertigungsdatum: 23.06.1960, zuletzt geändert am 31.07.2009

BBSR – Internationale Immobilienmärkte – globale Immobilienwirtschaft (2010): Bundesinstitut für Bau-, Stadt- und Raumforschung, Heft 5/6.2010 ([www.bbsr.bund.de](http://www.bbsr.bund.de))

BORIS (2011): BODenRichtwert Informationssystem ([www.boris.nrw.de](http://www.boris.nrw.de))

BMVBS – BundesMinisterium für Verkehr Bau und Stadtentwicklung (2006): Internationaler Vergleich von Kosten und Dienstleistungseffizienz bei der Transaktion von Wohneigentum – Optionen für Deutschland, Forschungen Heft 120, Selbstverlag des Bundesamtes für Bauwesen und Raumordnung ([www.bmvbs.de](http://www.bmvbs.de))

- Deutschland-Online (2011): Deutschland-Online Geodaten ([www.do-geodaten.nrw.de/](http://www.do-geodaten.nrw.de/))
- EULIS (2011): European Land Information Service ([www.eulis.eu](http://www.eulis.eu))
- EUROPEAN E-JUSTICE (2011): Europäisches Justizportal (<https://e-justice.europa.eu>)
- Federal notary act (2011): Bundesnotarordnung, Ausfertigungsdatum: 03.02.1937, zuletzt geändert am 22.12.2010
- GDI-DE (2011): Geodateninfrastruktur Deutschland ([www.gdi-de.org](http://www.gdi-de.org))
- German constitution (2011): Grundgesetz für die Bundesrepublik Deutschland, Ausfertigungsdatum: 23.05.1949, zuletzt geändert am 21.07.2010
- Immobilienmarktbericht Deutschland (2009): Arbeitskreis der Gutachterausschüsse und der Oberen Gutachterausschüsse in der Bundesrepublik Deutschland ([www.immobilienmarktbericht-deutschland.info](http://www.immobilienmarktbericht-deutschland.info))
- IVD – Immobilienverband Deutschland (2011): Bundesverband der Immobilienberater, Makler, Verwalter und Sachverständigen ([www.ivd.net](http://www.ivd.net))
- Jones Lang LaSalle (2010): Global transparency index 2010 ([www.joneslanglasalle.com/Pages/GlobalTransparencyIndex.aspx](http://www.joneslanglasalle.com/Pages/GlobalTransparencyIndex.aspx))
- Kötter, Theo; Kropp, Sebastian & Rox, Thomas (2010): Property Transaction in the Digital Age, conference volume based on the symposium “Property Transaction in the Digital Age” in Mülheim, Germany from September 30<sup>th</sup> to October 1<sup>st</sup> 2010
- Land register act (2011): Grundbuchordnung, Ausfertigungsdatum: 24.03.1897, zuletzt geändert am 11.08.2009
- LBS – Bausparkasse der Sparkassen (2010): 2010 – Markt für Wohnimmobilien, Bundesgeschäftsstelle Landesbausparkassen ([www.lbs.de](http://www.lbs.de))
- Luckow, Andreas (2007): Grundbuch-Online verspielt seine Vorteile – Nachbarländer überholen Deutschland, Frankfurter Allgemeine Zeitung vom 16.11. 2007, Seite 49 ([www.pfandbrief.de](http://www.pfandbrief.de))
- Seidel, Carla (2006): Valuation of real estates in Germany. Methods, transparency, market development and current aspects of research, Catastro Magazine No. 57, Madrid / Spain, 07/2006 ([www.carlaseidel.eu](http://www.carlaseidel.eu))
- Transparency International (2009): Global Corruption Report 2009 ([www.transparency.org](http://www.transparency.org))
- Treiber, Dietmar (2010): Von der Akte zum digitalen Grundbuch, Berliner Morgenpost vom 14.07.2010 ([www.morgenpost.de](http://www.morgenpost.de))
- World Bank (2011): Worldwide Governance Indicator (<http://info.worldbank.org/governance/wgi/index.asp>)
- WPLA - Working Party on Land Administration (2010) – United Nations Economic Commis-

sion for Europe (UNECE), WPLA study on fraud prevention in online land registers, John Atkey UK, March 2010 ([www.unece.org/hlm/wpla](http://www.unece.org/hlm/wpla))

## **BIOGRAPHICAL NOTES**

**Verm.-Ass. Dipl.-Ing. Sebastian Kropp** graduated in Geodesy at the Dresden University of Technology (Germany) in 2006 with a focus in land and real estate management. After two years in the state of Baden-Württemberg where he achieved the title of assessor he worked for almost two years in a bank dealing mostly with land valuation. Since July 2010 he has been working as a research assistant and PhD student at the Department for Urban Planning and Real Estate Management at University of Bonn. His main research interest focuses on real estate management and valuation.

**Prof. Dr.-Ing. Theo Kötter** studied Geodetic Sciences and Spatial Planning at the University of Bonn. He was assistant at the Institute of Urban Planning and afterwards he was chair of the town planning departments of town development companies in Munich and Bonn. Since 2003 he is Chair of the Department for Urban Planning and Real Estate Management at the University of Bonn. His professional and research interests comprise all aspects of sustainable town and country development, land management, land valuation and CAD/GIS applications in spatial planning. He is co-editor of the magazine “Land management and Land policy”.

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