

# On the Way to a Valuation-GIS / Valuation Information System

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**Key words:** Schedule of purchase prices, land valuation boards, internet, GIS-supported valuation systems.

## ABSTRACT

Since 1960, independent and selfemployed land valuation boards, with their products, have ensured transparency in the property market by recording and evaluating all transactions in the schedules of purchase prices. The results are published in property market reports. General information is available in price contour maps and property market reports, and also object-orientated information in the schedule of purchase prices. The German data protection requirements makes this work particularly difficult.

As the quality of the results and the economic aspects of the workflow are influenced directly by the technical equipment, the history of the past forty years from analogue to digital methods needs to be described. For example since 1984, in Lower Saxony, we have been able to optimize the workflow by using the „automatic schedule of purchase prices“. Since the 1990's we can achieve satisfactory results by using the appropriate information and communication technology. The use of pc-based Geographic Information Systems in particular as well as the networking of all automatic applications has led to today's level of development. It seems justifiable to talk about a Valuation-GIS/Valuation Information System. In addition, the records of past transactions and the reports on the property market are available via the internet (<http://www.gutachterausschuesse-ni.de>).

## ZUSAMMENFASSUNG

Seit 1960 sorgen in Deutschland unabhängige und selbständige Gutachterausschüsse mit ihren Produkten für Transparenz auf dem Grundstücksmarkt. Dazu werden sämtliche Vorgänge auf dem Grundstücksmarkt in Kaufpreissammlungen erfasst und ausgewertet. Die Ergebnisse werden veröffentlicht. Bodenrichtwertkarten und Grundstücksmarktberichte informieren allgemein, Auskünfte aus der Kaufpreissammlung objektorientiert, wobei in Deutschland der „Datenschutz“ die Arbeit diesbezüglich kompliziert gestaltet.

Da die Qualität der Ergebnisse und die Wirtschaftlichkeit der Aufgabenerledigung entscheidend durch die jeweils vorhandenen technischen Hilfsmittel bestimmt werden, ist der 40jährige Weg „von analog zu digital“ anzuzeigen. So konnten beispielsweise seit 1984 mit der AKS-Niedersachsen automationsgesteuerte Arbeitsprozesse gelingen. Doch erst seit den 90er Jahren mit der entsprechenden Informations- und Kommunikationstechnologie können wirtschaftlich qualitativ befriedigende Ergebnisse erzielt werden. Insbesondere der Einsatz von PC-GIS-Systemen sowie die Vernetzung aller automatisierten Anwendungen brachte den heutigen Entwicklungsstand. Es erscheint gerechtfertigt, von einem Wertermittlungsinformationssystem (WIS), zu sprechen. Ebenso stehen Bodenrichtwerte und

Grundstücksmarktberichte für einige Bundesländer flächendeckend im Internet zur Verfügung. (<http://www.gutachterausschuesse-ni.de>).

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## LAND VALUATION BOARDS IN GERMANY WATCH THE PROPERTY MARKET

A functional property market requires an intact system of economy. Therefore, real estate and the valuation of real estate are of great importance. Since 1960 the republic of Germany has had a free property market again, after 1936 prices were set at a certain level. The eastern parts of the former German Democratic Republic followed in 1990 as Germany was reunited. Since that time the property market has reacted again in its normal way of supply and demand.

Because it was clear that the real estate market would develop differently depending on the type of property and on regional and cyclical reasons, the market could function only if it was closely monitored. After the release of the property market, in Germany this assignment was given to the land valuation boards. For that purpose, independent and self-employed authoritative bodies existing of experienced and honorary experts were established in each city or district.

It is their collective task to keep, evaluate, and analyse a schedule of purchase prices of built-up or vacant areas and to publish the results. In other words: the land valuation boards have made the property market as transparent as possible for everybody.

Taking a retrospective view of 40 years of work of the valuation boards in Western Germany and on the 10 years of its contents, identical work in the Eastern parts of Germany show that this project was mostly successful, partly due to the use of modern techniques. The Valuation Office Agencies, which are mostly located at land registry offices, receive about two million contracts of sale from notaries each year. Consequently, almost a 100 million contracts have been registered and analysed since 1960. The analysis in each of the 2000 agencies of land valuation boards in Germany, are based on approximately 1000 contracts of sale per year in smaller districts to 1000-15000 contracts in bigger cities like Berlin, Munich, Düsseldorf, Stuttgart, Hamburg, Cologne, Dresden, and so on.

The following diagram shows how differently the level of land prices (the prices of vacant property in German Mark/m<sup>2</sup> respectively in the new currency of Europe EURO/m<sup>2</sup>) has developed in Germany. Therein the different, actually paid land prices for property with the possible use of a family home is shown three-dimensionally.

Here for example the best location is Stuttgart, where about 1200 Marks/m<sup>2</sup> (600 EURO/m<sup>2</sup>) are paid only for vacant property of land. In Hanover – the city of the World Exhibition of the year 2000 - which has about 600000 inhabitants, the property for a possible use of a one-family-home costs about 250 EURO/m<sup>2</sup>. In a nearby smaller town of 50000 inhabitants, 150 Euro/m<sup>2</sup> are still paid. Naturally, the level of land prices is lower in less inhabited areas.

Commercial property in city centres of course has a much higher price-level. On top is the Marienplatz in Munich with a value of about 45000 Euro/m<sup>2</sup>.

The strong effect that the cyclical and political development has on the level of land prices can be portrayed impressively on the model of the development of prices for residential building plots in Berlin. Each economical trend and each political event leads to reactions in the prices of development sites. Due to Berlin's location as an island within the area of the German Democratic Republic, political developments were of strong importance. For example the fall of Berlin's wall and the German reunification resulted in a rise of prices. Economical recessions and oil crisis have led to a passing loss or stagnation of values.

The ups and downs of Berlin's land prices compared to other economical indexes demonstrate that development site is a very "sensitive" economical good in Germany. The displayed development of apartment rents and building costs for example show a much more moderate and constant progress.

This and a lot of other detailed knowledge about the development of Germany's real estate market becomes more reliable year after year thanks to the observation, analysis, and publishings of the land valuation boards. Each year price contour maps and an increasing number of property market reports are published, which leads to a more transparent market that valuation boards are officially supposed to establish.

Moreover, since 1960 the land valuation boards as well as independent valuers produce expert reports. The complete volume of production that leads to a general and individual market transparency is shown in the following diagram.

## **THE SCHEDULE OF PURCHASE PRICES AS A BASE OF INFORMATION**

The structure and amount of the schedule's data are perfectly suited to be kept and analysed mechanically at first and automatically later. Although the organisation of the schedule of purchase prices is different in some of the states, three steps of development are recognisable: The manual collection of prices has changed step by step to an automatic schedule. Methods changed from analogue to digital. Today, most land valuation boards dispose of networking and GIS-supported valuation-systems.

### **FIRST LEVEL OF DEVELOPMENT: MANUAL COLLECTION AND ANALYSIS**

In the first years of property assessment in the 60's and 70's the valuation boards disposed of few technical means. Typewriters and historical calculators were the only technical help in the beginning. The collection of purchase prices consisted of huge amounts of filing cards and maps, in which the characteristics of each object were described and locally defined. In addition some valuation boards kept a collection of pictures of the sold real estate. All three collections had the disadvantage that they could only be kept and analysed manually.

A first step to run the schedule of purchased prices in a more automatically based way started in the 1960's by using punch cards. These punch cards were available in different versions:

starting with one row of punches at the top of the card, double or triple row punch cards, to punch cards with a slit. While the punch card with just one row of punches only could answer with "Yes" or "No", the others could store much more information and made it possible to use them for different kind of selections.

The next step on the way to a much more economically and technically based schedule of purchased prices was the implementation of programmable pocket calculators. The instruction to derive the parameters, needed for the property assessment, could be done much more efficiently for the first time.

## **SECOND LEVEL OF DEVELOPMENT: DIGITAL MANAGEMENT AND EVALUATION**

An even more noticeable conversion took place in the early 1980's. The switch to digital management and evaluation of the schedule of purchased prices reached a new dimension. The filing cards were not in use any longer and the data capture took place directly on screen. Right now, demanded by the legislative for a long time, you could get records of past transactions, mathematical indexes, comparable rents or properties etc. easier and much quicker than before.

It hasn't been just the speed that has forced a move to a more and more automatic system. More powerful calculators have made it possible to run very extensive analysis. The high value of the big amount of comparable values, collected in the past, was an advantage. Property assessments and multiple regressions as part of the comparable method of valuation, led to a schedule of purchased prices in a more automatically based way and a very efficient database.

Except for the digital schedule of purchased prices the other data and created products were still analogue. This changed with the transition to the third step of development.

## **THIRD LEVEL OF DEVELOPMENT: NETWORK OF GIS-BASED MANAGEMENT AND EVALUATION**

Today the first land valuation boards reach the third level of development. They are on the way to a Property-Valuation-GIS. The essential aspect is the geocoding. By geocoding the results to each property it is possible to add the data from other Geographic Information Systems within your application.

This will be a great advantage concerning data collection, data selection, evaluation and processing. Especially the variety of possibilities, to present the results of different evaluations, become more and more important, for example in a price contour map as part of the annual report of the property market, in a CD-ROM product, in the internet etc.

It is possible to make the schedule of purchased prices accessible for customers with a justifiable interest, supported by the government in 1990, just because of these developments. Today, for example independent experts can apply for details of the schedule of purchased

prices (not free of charge). The information they can access is much more detailed than just the records of past transactions or the report of the property market. We are talking about object-related informations of sold objects.

Though in the German property valuation there is a restriction connected to this information. Because of the German data protection requirements, the information provided is presented in anonymous form. This means, the information collected to each object that has been sold, is not completely given away. So information that is directly related to a comparable object, has to be rounded up or off or deleted. This could be, for example, the number of the parcel, house number or the coordinates of the comparable property, as well as a large scale paper map that shows every single parcel. Small scale plots, however, without property boundaries are fine.

Also the picture of the sold object, made by the Valuation Office Agency, because of data protection requirements, is part of the ban. „What a pity!“ most of the members of the land valuation boards say. Also their colleagues in other European countries are very surprised about these obligations in Germany. On the other hand they envy the German land valuation boards because of the very detailed and technically based schedule of purchased prices which include every single transaction.

Moreover the land valuation boards are able to substitute the disadvantage of "anonymity" by very detailed evaluations of the comparable objects. In many reports on the property market, nearly every value related data is shown, so experts can easily do without a picture of the object or the exact details of the location of every comparable object in their market value reports.

## **EXPERIENCES WITH THE SYSTEM IN LOWER SAXONY**

Against the background of the significantly increasing annual number of sold objects - the total number of contracts of sold properties rose from 50.000 per year in the beginning to 130.000 today - because of the support of the modern IT infrastructure and it's permanent development, the step by step creation of a automatically based schedule of purchased prices was the right thing to do.

Since 1984, thanks to the work of 50 land valuation boards, we have gained a huge amount of experience with the switch to digital management and computer-based evaluations of schedule of purchased prices in Lower Saxony. The Valuation Office Agencies are located at the land registries. In addition there exists a separate land valuation board in Lower Saxony, that combines the regional reports of the property market to a report for the whole state. A report of the property market for Germany is not available yet.

40 years after the official law came into effect, the property valuation has lost nothing of its meaning for the citizens and the different sectors in administration and economy. On the contrary, the land valuation boards are established in the field of property valuation. Because of the wide range of products they ensure a high level of transparency in the property market.

The controlling departments in Lower Saxony and in other states prove, that this level of transparency has its price. The fulfilment of the tasks related to the property valuation is expensive and yet not cost effective everywhere. (E.g. to evaluate the purchase of an undeveloped property costs approximately 25 Euro respectively, 50 Euro for a developed property that includes buildings). It is absolutely necessary, that particularly the human resources are used cost effectively. The digital management of the schedule of purchased prices at the beginning of the 1980's has been a first step into this direction. The new development of the programs in the last couple of years, and in particular the computer-based evaluations of the schedule of purchased prices, give us the opportunity to keep the high quality of the property valuation more economical.

## **DEVELOPMENT OF A PROPERTY-VALUATION-GIS**

The technical development, presented by the project "Property-Valuation-GIS Lower Saxony", including the concept of a digital object documentation and the development of more and better applications of the computer-based schedule of purchased prices is welcome. With the "Property Valuation System Lower Saxony" the land valuation boards and Valuation Office Agencies are in charge of a system that meets the requirements of the future. The core tools of the systems are the schedule of purchased prices including the possibility to present the objects in a map as well as the computer-based evaluation and presentation of the records of past transactions. Considerations to improve the process of generating reports also belong to the concept of a Property-Valuation-GIS that is already completely realised in Lower Saxony.

The aim of the system is to process all jobs and applications that could appear in a Valuation Office Agency and solved by a computer from just one computer.

## **RESULT: THERE IS NO ALTERNATIVE TO A PROPERTY-VALUATION-GIS**

There's no question about the benefits a Property-Valuation-GIS will provide:

- By using the schedule of purchased prices consequently, the transparency of the property market will be ensured
- The results of the property valuation are related closer to the market
- It will be possible to improve the customer service and customer care dramatically
- The workflow will be more efficient and the economic viability will rise

With the Property-Valuation-GIS, designed and developed in Lower Saxony, the employees took up the challenge of a modern and powerful administration successfully. We will consequently carry on this way. Comparing to other ways, for example Berlin or other states in Germany, it turns out that there is no alternative to Property-Valuation-Systems.

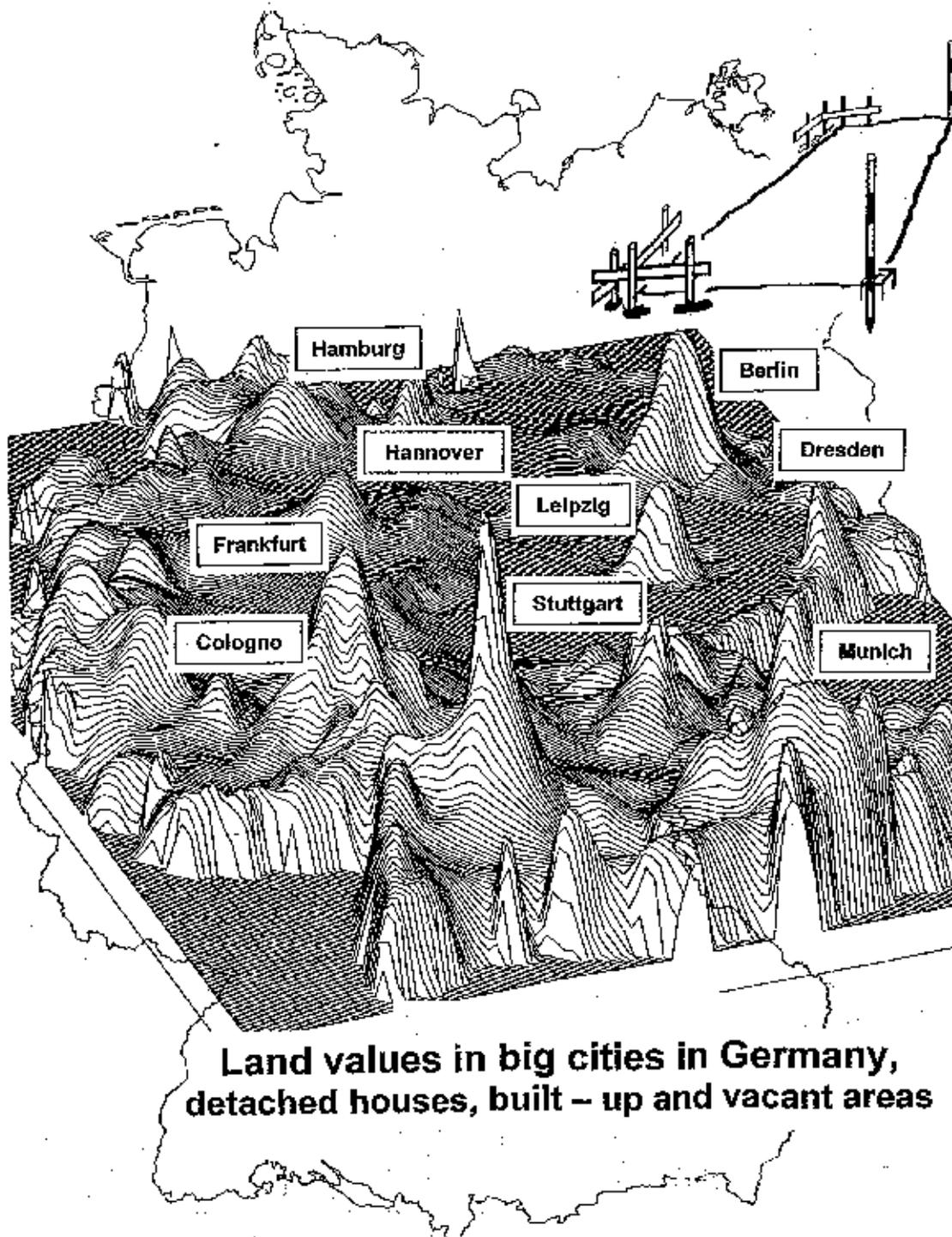
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## BIOGRAPHICAL NOTES

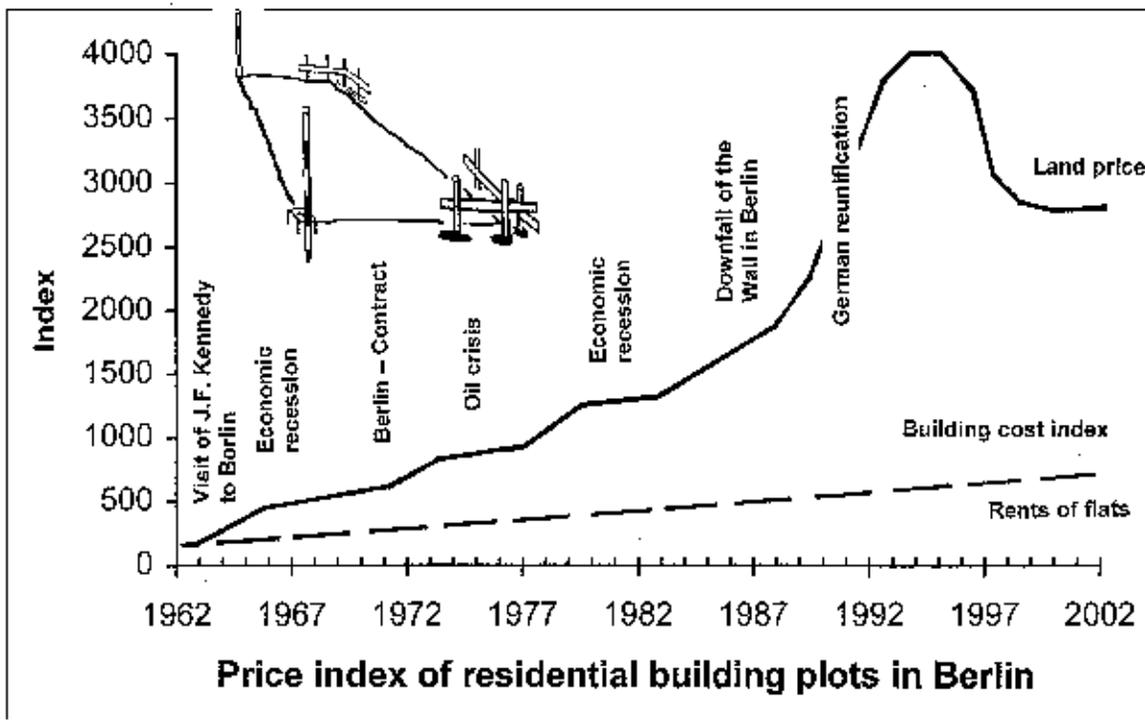
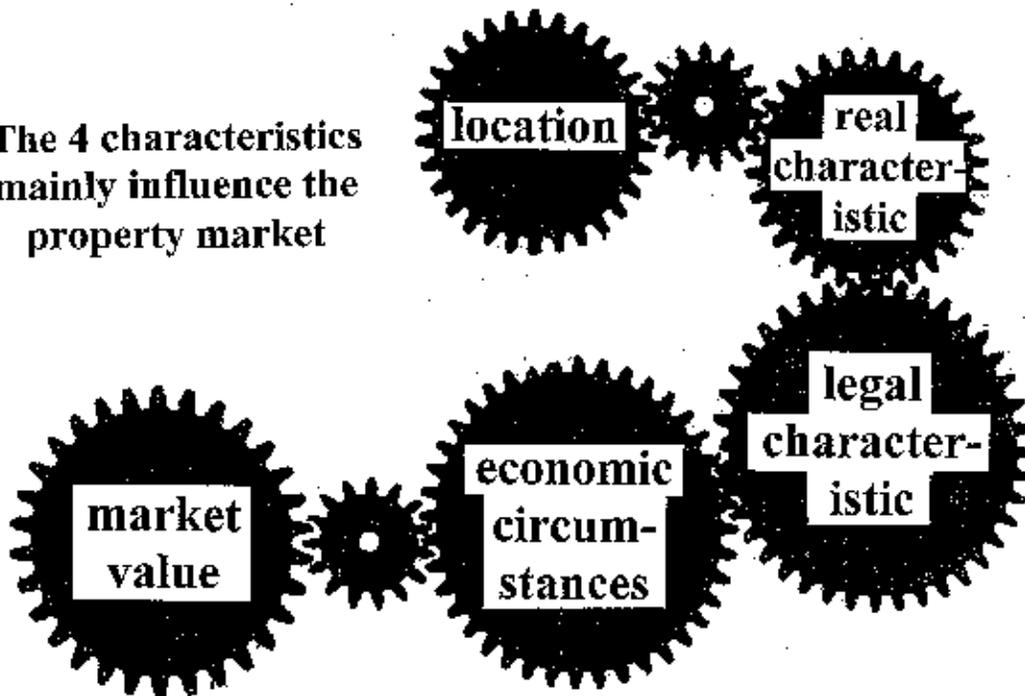
### Dieter Kertscher

- Leader of the Vermessungs- und Katasterbehörde Nienburg (Weser)
- Chairman of the land valuation board Nienburg (Weser), before that in Wolfenbüttel and Göttingen
- Member of the technical commission 9: „Valuation and Management of Real Estate“ of the Deutscher Verein für Vermessungswesen (DVW), and in the same commission in land register administrative authority in Lower Saxony
- Member of the team of authors of the specialist book: Praxis der Grundstücksbewertung von Gerardy/Möckel/Troff, Verlag moderne industrie
- Speaker of the German delegation in 1993 in Riga on the topic: The German valuation and management of real estate, addressed to experts from Estonia, Latvia and Lithuania



# Influential characteristics on market value

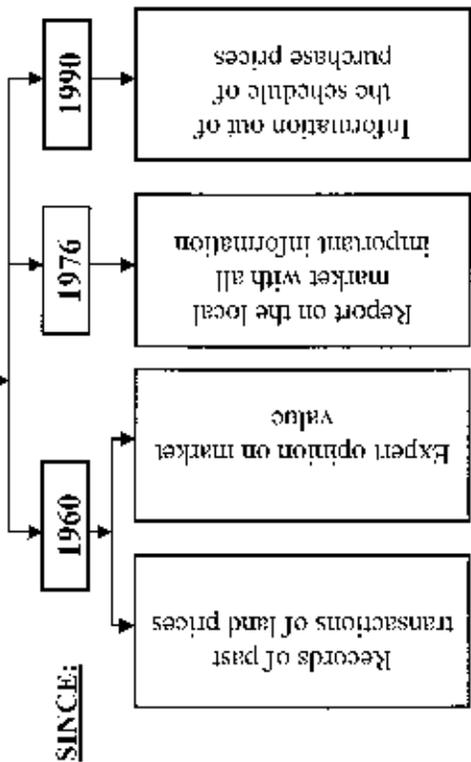
The 4 characteristics mainly influence the property market



**Purpose of all valuations in Germany =  
Establish transparency for everybody  
for each property market**

**Base:**  
All contracts of sale  
In Germany about 2 million contracts per annum  
1.000 to 15.000 per valuation board

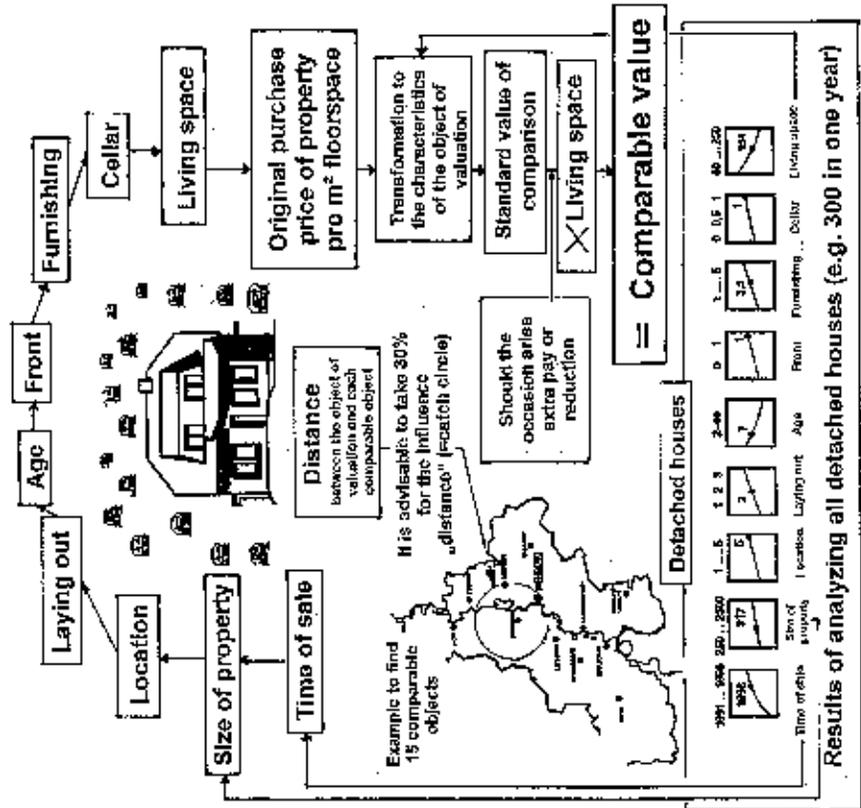
**Products of valuation boards (1)  
and valuation experts (2)**

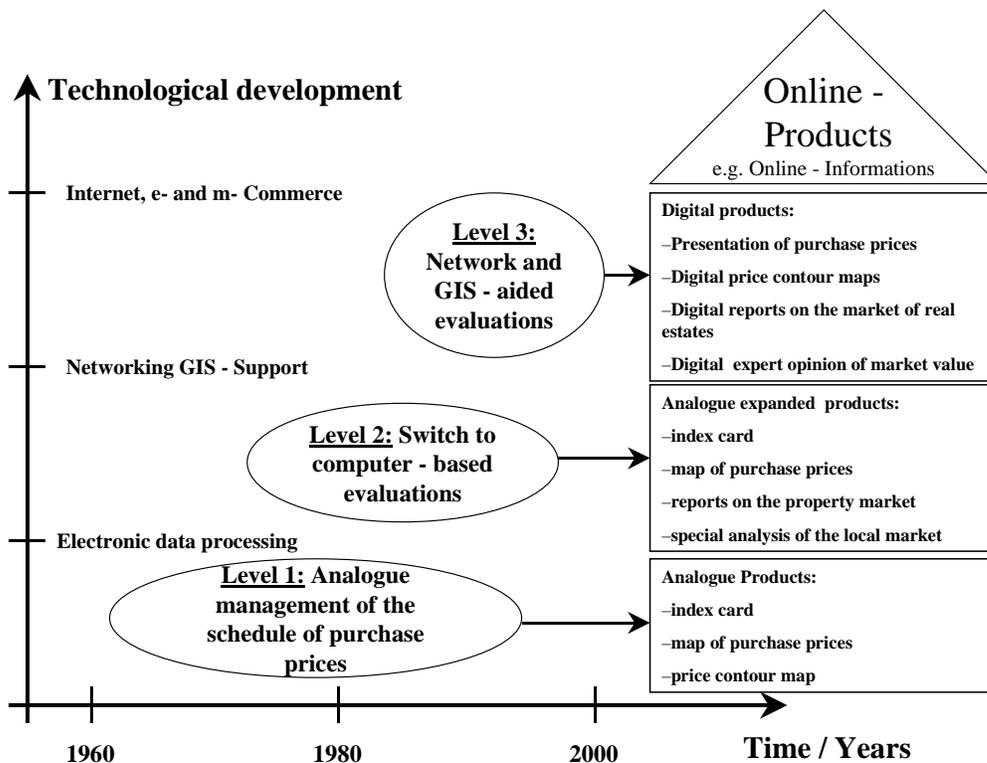
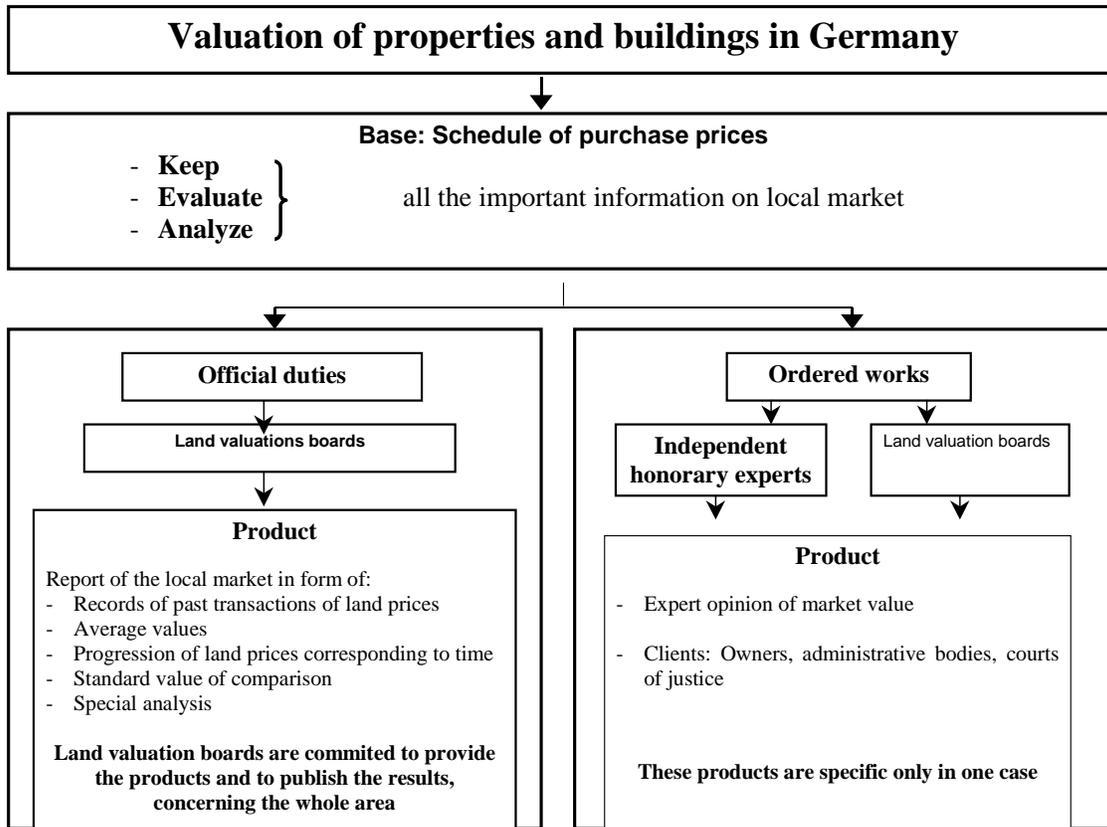


(1) (1)+(2) (1) (1)

**Comparable method of valuation**

Strategy: Searching the best comparable objects, e.g. a number of 15, transform each of them, with help of the results of analyzing all detached houses by multiple regression (e.g. 300 within the last year), and calculates the mean value.





1960                      1980                      2000

**Time / Years**

**Digital products:**

- Presentation of purchase prices
- Digital price contour maps
- Digital reports on the market of real estates
- Digital expert opinion of market value

**Analogue expanded products:**

- index card
- map of purchase prices
- reports on the property market
- special analysis of the local market

**Analogue Products:**

- index card
- map of purchase prices
- price contour map

**Survey of stages of development during the last 40 Years: Valuation of properties**

# The GIS - supported valuation system in Lower Saxony



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