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The Erasmus bridge across the New Meuse in Rotterdam, designed by Ben Van Berkel, connecting the north and south parts of Rotterdam; an example of an object chosen predominantly for its aesthetics rather than its costs.

# Economics, cost and quality from a design perspective

Ruud Binnekamp, Ilir Nase, Philip Koppels and Hilde Remøy

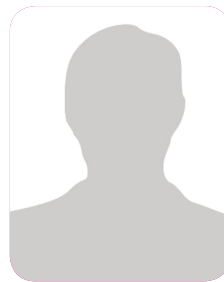
The department of MBE was originally called Real Estate & Project Management (BMVB: 'Bouwmanagement & Vastgoedbeheer') covering the domains of construction management and real estate management. The "raison d'être" for this new department was based on the recognition that a fair amount of architecture graduates were more interested in managing a building's design and construction process than in its actual design. These students, however, were not taught management theories and skills at that time. As a result, they would end up in the construction industry poorly equipped for doing the job they were required to do. This lack in education was addressed by our new department. Our graduates are multi-disciplinary schooled, not only in architectural design, computational design and management theories and skills, but very importantly also in building economics.

The research domain Building Economics comprises research on the market and the value of buildings, and the relationship between quality and revenues, and costs and finance (Soeter et al., 2009). In the real estate market, the space market is interlinked with the asset market and the construction market. The Building Economy research programme analyses the real estate portfolios of investors. In what type of properties do they invest and what are the returns, risk profiles and outcomes?

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***From a decision making perspective quality and cost represent grouping of criteria on which to judge design alternatives.***

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A crucial aspect in this is the expected rental income. To a large extent, the research focuses on the rent level and return on investment, in connection to location and building characteristics (quality) (see for instance Koppels et al., 2009, 2011). A guideline for studies on costs and quality is the consideration that organisations are interlinked with their location and buildings. An optimal solution for accommodation depends on the selected approach. For example, with a lowest cost approach, a minimum of investment costs, running costs and life-cycle costs are sought after, usually resulting in low values as well. Research on the relationship between cost, quality, and willingness-to-pay is important to understand and steer on costs and quality.

## The interface of (building) design and (real estate) economics

**Ilijir Nase**

As one of the recent members to have joined the REM section I was very happy when asked to contribute to this Liber Amicorum for Hans de Jonge. However, I was a bit worried initially about my contribution when compared to other colleagues who have worked alongside Hans for quite a long time. My story outlines what I consider to be a key strength of our department.

The starting point is my job interview day at the department for a position that required expertise in both the built environment and (real estate/urban) economics. Having obtained a PhD on a closely related topic I was very surprised and happy to see a department with a long track record in the interface of design and economics.

At my job interview I met Hans for the first time. The usual 'grilling' of the candidates that commonly takes place in these events had a different dimension and I recall a more casual and friendly feeling during the whole event. Here I got even more in depth knowledge of the extent of the

research and teaching the department undertakes on this topic and the specific Building Economics chair/group with substantial contributions in this area.

Very close to the end of the interview Hans asked my opinion on the profile and quality of the knowledge 'package' that the students are equipped with following graduation from a department that stands at the intersection of various disciplines. The distinction would be between graduates that have general knowledge about different fields as opposed to those who have in-depth knowledge on only one subject. My answer was rather vague and focused particularly on the benefits of interdisciplinary approaches to research but I was not able to elaborate very well on education, the benefits of the 'package' we equip students with. Given his key role as one of the founders of the department, I could understand Hans' point and his emphasis on the quality of education. However, coming from a different system, I was able to fully understand this topic only when I started teaching in the department.

Almost one year after taking up the position I was involved in teaching in the Real Estate Valuation course and thanks to the wide network of the colleagues I was introduced to key players in the Dutch real estate industry. Continuing on the course's tradition some of these key real estate practitioners were invited to discuss and evaluate students' work. During a discussion with one of these practitioners I finally had the answer to Hans' question that has been resonating in my head since I joined the department.

Asking Leopold Willems, director of International Valuations at DTZ Zadelhoff, for a specific contribution on the course related to legal aspects of Dutch valuation practice I got a rather surprising answer. In a joking mode Leopold replies that he was interested in the 'return of his commitment'. More specifically, he wanted to know how many interns would they get from this course. This was pleasantly surprising to me because, if there is one thing I have learned from the real estate field is that the best accreditation you can get is through practice. The answer Leopold gave to my obvious follow up question on the reason why they were after our students was encouraging and, quite interestingly, had a comparative dimension with graduates coming from a single discipline training. While economics graduates are very skilled in modelling and detailed calculations our department graduates have the general knowledge required about economics/management and, what is more important for the profession, they 'know buildings'. Here was the answer to Hans' question...

After almost two years working in the department, I have realised that we occupy a particular place in Dutch real estate education through the unique blend of design and economics which has gradually evolved to larger scales of the built environment disciplines. As one of the key founders of the MBE department Hans deserves the credit for realising this knowledge gap, filling most parts of it through research and education over the past two decades and contributing to the Dutch real estate sector through graduate cohorts with unique blend of knowledge.

## The economic value of image

Philip Koppels and Hilde Remøy

One of the main research topics in Building Economy, related to the Cost and Quality research, is the relationship between quality and the office users' willingness to pay for this quality, measured by the rent price paid for offices characterised by specific location and building characteristics. The results of this research are important for understanding the demand for quality by office users, and which quality aspects should be focused upon in the urban planning and architectural design of offices.

In the field of real estate an often heard statement is that the rent level and the asset price of office properties are determined by "location, location and location". The chosen location is assumed to influence the competitiveness of the office organisation and this should result in increased willingness to pay, expressed in rent levels and asset prices, for locations with preferred characteristics. An important location aspect for office organisations are the opportunities for face-to-face contacts (Coffey and Shearmur, 2002). By congregating in space, office firms facilitate face-to-face contacts and minimise formal and informal transaction costs, which generates production efficiencies. Together with other 'external' efficiencies related to agglomeration effects this explains why office functions still remain among the most centralized of urban activities. In most discussions of agglomeration effects, the term is synonymous with urban economies of scale, referring to a host of potential 'external' efficiencies that result as the number of economic activities increase at a location. In addition to the urban economies of scale Archer (2003) considers presentation or image effects as important location factors. Image is an important signal in product marketing when the price of the service is relatively easily determined while the quality of the service is not, as is the case with many office services. Consequently, office firms engage in a multitude of activities to establish favourable

recognition. Selection of site and building is one dimension of this strategy (Archer and Smith, 2003). A firm may be known by its neighbourhood, "by the company it keeps" or by the building it occupies. In effect the location and building choice might influence the marketing costs of an office firm. The importance of image effects has long been recognised in real estate literature and is often referred to as the 'right address'. Image may also be important for recruiting and retaining employees. Archer (2003) notes that the 'quality' of the location may influence (prospective) employee perception about the company; an important concept in 'employee branding'. While the impact of location choice on productivity has been extensively researched, there has been less attention for efficiency gains related to the building. An office firm searching for office space has not only considered the site, but also the building with its own bundle of attributes.

This study considered Amsterdam, by far the most important office market in The Netherlands, and was conducted with data from the period 1996-2007. A typical feature of the Amsterdam office-market is its dispersed spatial pattern. There is no predominant Central Business District (CBD), but there are quite a number of decentralised office locations and dispersed office buildings. A sample of 172 office buildings was obtained from the DTZ Zadelhoff lease transaction database. Buildings were selected on basis of the availability of lease transaction data in the period 1996-2007. Only buildings that were originally developed for office activities and were developed since 1950 were included in the sample. Supplementary lease transactions for the selected buildings were obtained from additional office lease transaction databases (Strabo and Dynamis). Due to possible data inconsistency between the various databases, a stringent filter was applied to ensure no duplicate lease transactions were added. In total 517 unique transactions, with a minimum lease size of 500 square meters were identified.

This minimum size was used because real estate agents in the Netherlands consider office lease transactions below 500 meters a very distinct segment.

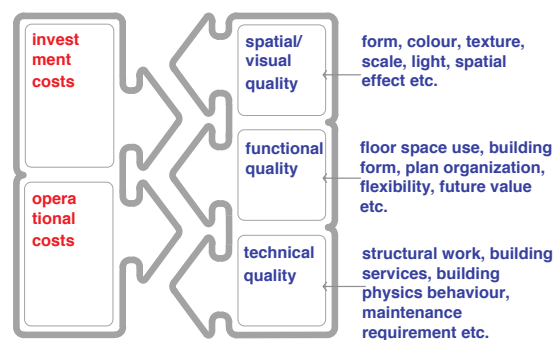
Theory argues that the location and ultimately the office building choice might induce productivity efficiencies. Three aspects were distinguished: urban economies of scale, presentation or image effects and the office environment. Two of these three aspects were incorporated in this study; urban economies of scale and image effects. Variables that are assumed to capture these effects can explain 64 percent in the office rent variations in Amsterdam. Looking at the results from the study, one could conclude that image is considered the most important location criteria as it explains 25 percent. However, this interpretation is too simple. Although the analysis reveals that office firms value presentation and image effects to a large extent, it is difficult to distinguish the separate effects for urban economies of scale and image effects. This is especially true for location variables. For example, the density of financial and business services is thought to capture face-to-face contacts opportunities, but also provides an indication of the kind of neighbours, which relates to image effects. Office users clearly value the “aesthetic” qualities of office buildings and are willing to pay for them. This was also confirmed in a previously performed Delphi-panel study among real estate experts (Koppels, Remøy, Van Oel and de Jonge, 2007). In that study exterior building appearance was ranked as the second most important building characteristic (car parking facilities were considered the most important property characteristic). Furthermore, user recognisability was ranked third and interior appearance was ranked fifth or sixth (depending on the tenants’ profile). These results thus confirmed the importance of image for office users’ willingness to pay, although it is important to also understand the influence of other factors.

## Controlling Cost and Quality: a Preference-Measurement Perspective

Ruud Binnekamp

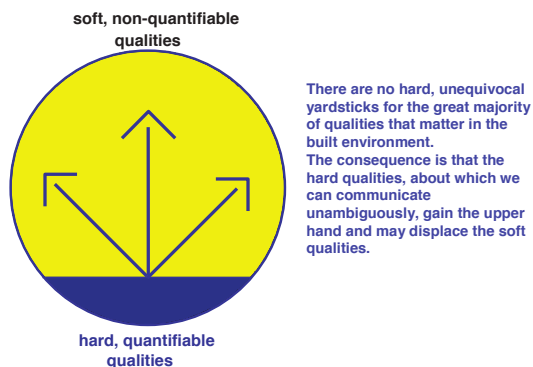
Since the early 1980s, Hans de Jonge pioneered research efforts in the field of the relation between quality and costs. Knowledge about the relation between quality and costs was at that moment not widely spread, so that this subject was poorly represented in the training of designers resulting in missed opportunities.

Kees Gerritse was one of the researchers who played a key role in this field in recent decades, contributing his background as an architect. In his book “Controlling Cost and Quality” (Gerritse, 2004) he introduces the world of cost/quality control in the early phases of the accommodation process, the phases where the most important decisions affecting cost and quality are made. The figure below shows how cost and quality are perceived as opposing entities. The quality aspects are divided in 3 categories according to Vitruvius. Gerritse brings us to the question of the measurability of these qualities.



The relation between costs and quality (source: Gerritse, 2004).

The figure below shows the distinction that is made between hard (quantifiable) and soft (non-quantifiable) qualities. The majority of qualities that matter in the built environment are part of the soft non-quantifiable qualities, communicating about these is perceived to be difficult. As a result the hard qualities which allow unambiguous communication displace the soft qualities. The result is poor decision making as only a minority of qualitative aspects is part of the design decision making process.



The distinction between hard and soft qualities (source: Gerritse, 2004).

The research on the relation between cost and quality is geared towards supporting (an architect's design) decisions which is the domain of decision theory. The scientific foundation of selection (choice) is preference measurement. Preference measurement underpins economic theory, the theory of games and decision theory. Recent research by Jonathan Barzilai (2010) has revealed errors at the foundations of these theories and other disciplines. This, for a large extent, explains the difficulties and confusion in trying to quantify qualitative aspects. Decision theory and proper preference measurement reveals some new insights when applied to the field of controlling cost and quality in the built environment.

From a decision making perspective quality and cost represent grouping of criteria on which to judge design alternatives. The only property of relevance in this context is preference. This means that a design's performance on both costs and quality are judged on preference. The individual preference ratings are then aggregated to determine the overall preference of each design alternative.

Given the above structure of the decision making problem of controlling cost and quality we make a distinction between objective and subjective properties. Objective properties are related to the design object itself (for instance it's geometry which can be quantified and is not a matter of debate). Subjective properties relate to how a decision maker perceives aspects of the design. As preference is subjective by nature, subjective properties are of relevance in making design decisions. The total floor area of different building designs can be measured objectively, however, it is up to the decision maker to attach preferences to each

design on the total floor area (too big, too small, just right).

Experiments by Arkesteijn (2015) show that proper preference measurement, embedded in a iterative learning process, allows the decision makers to explicitly express their preferences and communicate on them. This removes the tendency of 'hard' qualities ousting 'soft' qualities.

Arkesteijn's work aims to support real estate portfolio decision making. Recent graduate work (de Visser, 2016) shows that there is commercial interest in applying this new approach in practice. Also graduate work (van Alphen, 2016) shows that the methodology can also be applied on the building level.

### Concluding remarks

Hans de Jonge's concerns about hard qualities ousting soft qualities in mainstream research, education and practice makes perfect sense in a design environment such as the one that prevails in the Faculty of Architecture at TU Delft. Current developments in decision-making theory and preference measurement should remove some of his concerns as we have shown that it is now possible to quantify/measure soft qualities.

In the work of Building Economy, making soft qualities measurable has been one of the important issues. Discussing quality with investors and commissioners, the expression is often made that it is all about image. In research, we have found a strong link between image and value. In the same way, it is reasonable to say that Hans de Jonge's image has significantly contributed to increase the value of the Building Economy group and the department of MBE as a whole.

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*Hilde Remøy is associate professor of Real Estate Management, focusing her research on adaptive reuse of real estate, market mismatches, sustainable building adaptations and adaptive reuse of heritage*

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