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VALUE-BASED DESIGN AND MANAGEMENT OF HOSPITAL BUILDINGS

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Abstract

The purpose of this paper it to explore the concept of adding value by real estate and related performance indicators, and the way it is or could be applied in value-based design and management of buildings. The concept is being illustrated with research findings on hospital buildings, based on a literature review and ten interviews with CEOs and real estate project managers. The research findings show that different hospitals prioritize different added values, depending on their overall mission and vision, its position in the real estate life cycle, and the local context. On average, stimulating innovation, improving satisfaction of customers and employees, and supporting (change of) culture rank high, whereas risk management and opportunities to get the real estate costs financed are much less prioritized. A number of added values have been concretized in real estate interventions that are supposed to cause a positive effect on organizational performance, e.g. with regard to patient satisfaction, labor productivity, flexibility and cost reduction. The conceptual framework and research data can be used to support complex decision making in briefing, design and management of hospital buildings and other health facilities. The explorations of adding value by real estate might be applicable in other sectors as well.

Keywords: added value; stakeholders; strategy; performance; hospital real estate.

ADDING VALUE BY REAL ESTATE

Corporate or Public Real Estate Management is usually defined as the management of the real estate portfolio of a corporation or public authority by aligning the portfolio and services to the needs of the core business, in order to obtain maximum added value for the business and to contribute optimally to the overall performance of the organization (Dewulf et al. 2000). Several authors have tried to operationalize the concept of added value, starting with a definition. With reference to the well-know VAT-rate – focusing on the economic value added (EVA) – Van Wagenberg (2009) defines value added as: "*the difference between the value of the product/services delivered to a client during a period (value of output(s) in period Δ t1 – t2) and the value of the input(s) in the production function - or functions in the case of a supply chain - in the same period Δ t1 – t2.*"

Per Anker Jensen, Professor in Facility Management at the Technical University of Denmark in Copenhagen, defines added value as the ratio between added use value and costs (Jensen 2009). In a follow-up paper (Jensen et al 2010) this formula is extended to:

User value = Quality & Process / Price & Difficulties.

In the field of relationship marketing, Sarshar and Pitt (2009) present a similar definition for customer value or customer value ratio:

$$\textit{Customer value} = \frac{\textit{Results produced for the customer + service process quality}}{\textit{Price to the customer + cost and effort in acquiring the service}}$$

The definitions so far define added value as a ratio between output and input in connection to the difference between the output and input in a certain period of time Δ t1 – t2.

In the field of corporate and public real estate management the concept of added value is usually linked to the numerator and much less to the denominator. For the study presented here we have build on the work of Nourse and Roulac (1993) De Jonge (2002), Lindholm and Levainen (2006), Lindholm (2008), De Vries et al (2008) and Jensen (2010). All authors use different lists of possible added values. Based on similarities between these references, the added value of real estate can be defined as the contribution of real estate to organizational performance by its contribution to nine fields of performance (Table 1).

1. Reduction of real estate costs during the life cycle (investment costs, operational costs) by steering on efficient space use and smart design.
2. Improvement of (labour) productivity, e.g. by supporting logistics of primary processes and short walking distances between related functions.
3. Improvement of user satisfaction by steering on a functional, comfortable and pleasant working environment, taking into account user needs and preferences
4. Improvement of possibilities to get real estate financed by external parties, e.g. by regarding real estate as an asset to improve the overall finance position of the organization or an assessment of the (future) marketability of the building
5. Improvement of flexibility to enable future spatial, technical, organizational or juridical adaptability, e.g. by standardization, simple opportunities to extend the building or easy adaptability to other functions.
6. Support of a positive corporate image, e.g. by a nice overall building appearance and an appropriate building lay-out
7. Stimulation of innovations in order to improve business processes, e.g. by creating formal and informal meeting space to exchange ideas
8. Supporting (change of) corporate culture, e.g. by sharing work spaces to support social interaction
9. Risk management with regard to time, costs, health and safety, and coping with a changing context, e.g. technically by application of strict safety standards or juridical by short term rent contracts

Table 1: *Nine fields of adding value by real estate defined from literature*

Both from an academic point of view and to be applicable in decision making processes in practice, these nine fields of impact of real estate on organizational performance have to be elaborated in connection to available resources and limiting conditions. An ongoing PhD-research into healthcare real estate strategies in a changing context offered an opportunity to further exploring the concept of adding value by real estate in the health sector (Van der Zwart *et al*. 2009).

HOSPITAL REAL ESTATE IN A CHANGING CONTEXT

Due to the changing juridical and financial context of hospital real estate design and management, adding value management by hospital real estate is an interesting research area. In the last decade the government transformed the old budgetary system into a so-called regulated market system. In the former system the proposal for a new hospital building or renovation of an existing building had to be approved by the government to fit with the planning regulations (number of beds per 10,000 inhabitants), space criteria (maximum number of square meters per bed, functional performance requirements per function), and cost regulations (maximum budget for investment costs per square meter). After approval all building related capital costs and running costs were guaranteed by the government and paid by the insurance companies during the life-time of the building, independent of healthcare production. In the so-called February-letter of 8 March 2005, the Dutch Minister of Health, Welfare and Sports announced the replacement of this budget system by a regulated market system.In the new system not the government but the healthcare organizations themselves will be responsible for a sufficient return on real estate investment – by proceeds from health care delivery - and the consequences of real estate decisions on utility value, investment costs and running costs. “Deregulation” gives healthcare organizations more freedom in briefing, design and management of hospital buildings, but makes them more risk-bearing as well. The main objective of replacing the centrally directed real estate budget system - with governmental ex ante testing of building plans and investment proposals - by a performance driven finance system - with governance on the output - is to stimulating competition and reducing healthcare costs.

As a consequence of their new responsibilities, hospital organizations have to consider more carefully the costs and benefits of different real estate choices and how real estate can add value to organizational performance. Benefits such as creating a healing environment, improving employee satisfaction, or supporting labour productivity and image have to be weighted against the impact of real estate decisions on the costs of health care delivery and real estate life cycle costs. Political decisions, demographical and economical developments, innovations in medical technology and a continuously changing market of demand and supply are all part of a dynamic and unpredictable context, whereas healthcare real estate decisions have a long term impact. The constantly changing context with new opportunities and risks and the involvement of a growing number of stakeholders necessitates to changing traditional hospital real estate management into a more businesslike and integrated approach. Although most healthcare organizations are aware of the necessity to change, many of them lack sufficient knowledge and tools to steer on the added value of corporate real estate in connection to organizational performance.

For this reason a study has been conducted to explore answers on three questions: a) (How) do hospital managers e.g. the CEO or project managers take into account adding value by real estate in hospital real estate design and management; b) What are present priorities in value based real estate design and management? c) Which accommodation choices are guided by (perceived) adding value by real estate?

RESEARCH METHODS

Data have been collected by interviewing CEOs and real estate managers of ten hospitals in the Netherlands. In order to select appropriate respondents, first a list was made of hospitals that recently were or currently are building or designing a new hospital (period 2004 – 2012).

This list has been presented to experts in the field and has been updated when the respondents mentioned other hospitals that are initiating a new building process. This resulted in a list of approximately 20 hospitals. Then a selection of cases has been made in search for heterogeneity on three characteristics: 1) general, top clinical and academic hospitals; 2) size in number of beds and turn-over; 3) position in the building process i.e. initiation, briefing, design, construction, or use (Table 2). This makes it possible to explore if the type of hospital, size and phase in the real estate life cycle affects (priorities in) value added management.

	place	code	category	size	beds	m2	phase	respondent
Gelre Ziekenhuis	Zutphen	GZ	general	S	217	26.500	use	CEO
Gemini Ziekenhuis	Den Helder	GD	general	S	244	25.000	initiation	manager
Vlietland Ziekenhuis	Schiedam	VS	general	M	421	55.000	use	CEO
Deventer Ziekenhuis	Deventer	DD	top clinical	M	390	55.000	use	CEO
Reinier de Graaf Gasthuis	Delft	RD	top clinical	M	397	55.000	initiation	manager
Albert Schweitzer Ziekenhuis	Dordrecht	AD	top clinical	L	475	n.a.	construction	manager
Meander MC	Amersfoort	MA	top clinical	L	600	75.800	construction	manager
Maasstad Ziekenhuis	Rotterdam	MR	top clinical	L	620	84.000	construction	CEO
Erasmus UMC	Rotterdam	ER	UMC	XL	1320	n.a.	construction	manager
UMC Groningen	Groningen	UG	UMC	XL	1097	n.a.	use	CEO

S = small; M = medium; L = large; XL = extra large

Table 2: *Characteristics of the cases*

The selected cases represent approximately 10% of all Dutch hospitals and 50% of all Dutch hospitals that were/are planning or building a new hospital in 2004-2012. The selection includes three general hospitals, five top clinical hospitals and two academic hospitals. With regard to the number of beds, the case selection includes two small size hospitals, three medium size hospitals, three large hospitals, and two extra large academic hospitals due to the integration of research and education facilities in the real estate portfolio. Two hospitals were in the initiation phase and four hospitals were constructing the building at the moment of the interview. Four hospitals concern new buildings-in-use in the exploitation phase. Half of the interviews were conducted with CEOs, and half with the real estate project manager of the hospital. In advance, available information and documents on the internet were studied in order to get a first impression of the hospital, its mission and vision, and main real estate objectives.

The semi structured interviews consisted of two parts: an open interview where respondents were asked which values were or are taken into account in the real estate decision making process, and a structured interview where respondents were asked to prioritize nine added values found in the literature. The values spontaneously mentioned in the first part may be indicators of managers' awareness of possibilities to add value by real estate. In the second part the nine added values derived from literature were presented on little cards in a matrix with 3 rows and 3 columns (see Figure 1). The ranking of added values occurred in three steps. First respondents were asked to prioritize the three added values in each row. Second, respondents were asked to rank the three added values per column on least importance. In these two steps the respondents were made familiar with the added values used in literature in order to be able to prioritize all of them in the third step. After this ranking assignment, the respondents were asked how these added values are visible in the (design of the) hospital building. After the interviews transcripts have been made of the recorded interviews. These transcripts were summarized and sent back to the respondents for feedback.

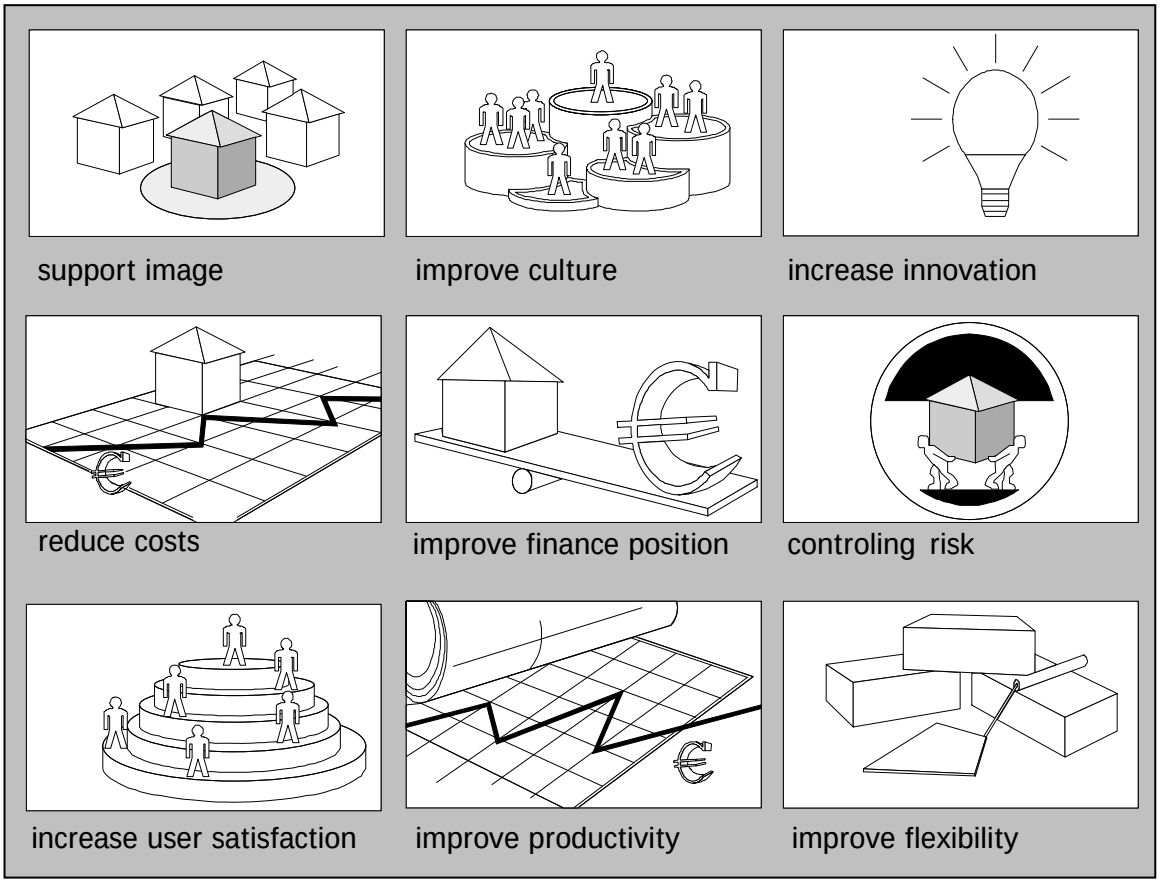

Figure 1: *Nine added values of real estate positioned in a matrix*

RESEARCH FINDINGS

The presentation of the research findings follows the three steps of the interview i.e. a) A summary of the responses to the open question for the main objectives of real estate investment decisions made in the past years, plus textboxes with brief characterizations of specific cases, based on the interviews; b) A cross-case analysis of prioritized values, from 1 (highest) to 9 (lowest); c) Accommodation choices supporting adding value are brought together by decoding the transcripts on the nine previous defined fields of adding value by real estate.

a) Value based hospital real estate management

The first priority of hospitals is to deliver good healthcare in a cost-efficient way. Real estate is secondary but at the same time an important resource to reach the organizational objectives and to optimally facilitate healthcare processes. Being a resource for production, real estate should always be judged upon its contribution to business processes and business economics. Supporting the primary process also means that the building should be comfortable. On the one hand the building should support patient's needs and wellbeing. On the other hand the building should be a pleasant and productive working environment for the healthcare professional.

In most cases, supporting efficient healthcare processes showed to be in the core of real estate design and management on building level. Much attention is being paid to efficient logistics of patients, health care processes and transport of people and goods. In spite of the widely

used motto “the patient is central”, most hospitals focus on efficient healthcare process, because it also benefits the patients if processes are well connected and as such supports both customer satisfaction, labour productivity and employee satisfaction.

Deventer Hospital, Deventer
The building should facilitate the healthcare processes in such a way that the building meets the organization’s objectives on the first day the hospital opens its doors. Besides, the building must be flexible in order to support business processes for a period of 40 years and to be able to cope with changing visions on healthcare delivery. The building concept is based on the vision that healthcare processes include four different patient flows: acute, urgent, elective, and chronicle. This resulted in a process based building with a focus on logical connections between medical healthcare processes.

Furthermore all cases show a connection between the organizational strategy and the real estate strategy. In most cases possibilities of the current real estate portfolio as well as the desired future supply is taken into account in the real estate strategy. Often organizational objectives such as transparency and appropriate healthcare are translated in the architecture of the building. But a strict translation of the organizational mission, vision and ambitions in architecture is also mentioned to be difficult because of the long planning and construction time – often 10 to 15 years - and 40 years of exploitation afterwards. In the mean time the organization will change several times its management structure and style, objectives, vision on optimal organization of healthcare processes etc. Therefore, flexibility is often mentioned as an important criterion of adding value by real estate. Flexibility should enable the hospital building to support the healthcare processes at least 40 years in changing circumstances.

Meander Medical Centre, Amersfoort
First a Long Period Accommodation Plan was made to formulate a real estate strategy. This strategy consisted of a renovation of the existing hospitals to support the use for another 10 to 12 years and in the mean time designing and constructing a new hospital on a central location. All complicated top clinical cure was centralized in the new hospital building. Besides, a regional hospital was renovated and converted into a day care hospital and four policlinics were initiated in the region. The central building is divided into three parts: 1) a hot floor with all high technical functions; 2) nurseries with standard one-person bedrooms, and; 3) multifunctional examination rooms, all with different technical installations and constructions and different access to patients. Flexibility is realized by expandability, adaptability and exchangeability of rooms.

Because of the new financing system that makes payment of investment and running costs dependent of the production in terms of diagnosis-treatment combinations, the usual starting point is very businesslike: no more square meters then necessary and life-cycle-costs as low as possible. The hospitals that initiated a new building after the introduction of the new regulation showed a shift of directing on maximum capacity and quality towards steering on less capital expenses and increasing productivity. These hospitals are designed and constructed on the basis of a business case and pay much attention to create a compact building with a little surplus square meters to enable future production growth, low capital costs and a high level of flexibility. Slim fit buildings are accompanied with extendibility in the future. These extensions are subject of a new business cases to be presented to financiers. The planning and construction period decreased from the usual 10-15 years to 4-5 years.

Gelre Hospital, Zutphen
From the moment of the first initiative, it was known that the building had to be financed on own risk, reimbursed by healthcare production. Therefore, a business plan was presented to financiers. Starting point of this business plan is to steer on as low as possible capital costs in order to gain competitive advantage with regard to the costs of healthcare products and services. This is accomplished with a cheap, functional and lean building with little surplus square meters and a focus on flexibility to anticipate on future alterations. Also typical for this project is the short period of totally 4 years from initiative to design and construction.

Since the introduction of the regulated market system, a growing awareness of the market position of the hospitals becomes visible. Most hospitals are part of a larger network with one central location with all complicated top clinical healthcare combined, and several day care hospitals and policlinics in the region. The peripheral locations demarcate the service area of the hospital and have to ensure that patients chose for this specific hospital and only go to the central hospital if top clinical cure is necessary.

b) Priorities in adding value management

The results of prioritizing nine added values by CEOs and project managers of ten hospitals are presented in figure 2. The horizontal axis is scaled from 1 = highest priority to 9 = lowest priority according to the respondents. The nine added values are presented on the vertical axis of the diagram. Horizontally next to these added values the priority ranks are plotted of all interviewed hospitals with their names abbreviated according to table 2. When two or more added values were given the same priority, these added values received the same average rank. The dashed-lined boxes cluster the most given answers, usually showing a maximum of three exceptional ranks per added value. The vertical lines show the average ranking per added value. The bold abbreviations show the hospitals with a median ranking for that particular added value. The added values on the vertical axis are ordered from the highest median rank (above) till the lowest median rank (below).If two added values share the same median, the average was used to choose the priority rank.

Figure 2 shows that on average supporting innovation, increasing user satisfaction and improving the organization's culture are given highest priority. Cost reduction is highly prioritized by four respondents, but ranked as not that important by five other hospitals. Because of this variety, the average rank is not very representative to express the different thoughts. Increasing productivity, optimizing flexibility and supporting corporate image are prioritized in the middle. Risk control and increasing financing possibilities are usually given low priority.

One hospital (GD) ranked the priorities of the nine added values almost opposite to (clusters of) most other answers. This hospital is currently planning a new hospital according to the so-called living building concept (LBC), a new form of Public Private Initiative.

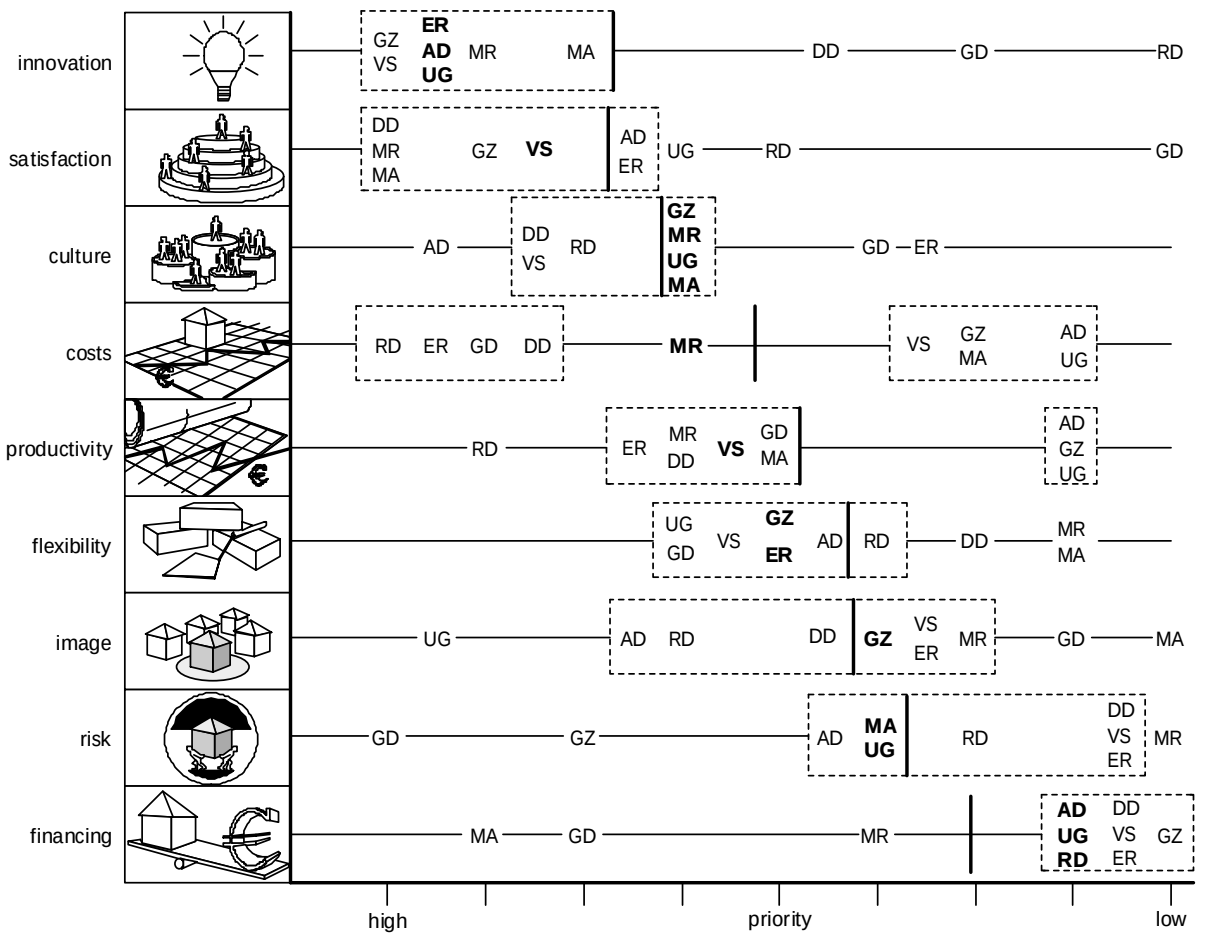

Figure 2: *Plot diagram of ranking prioritized real estate added values*

c) Accommodation choices supporting adding value by real estate

When hospital managers are asked to elaborate on the connections between real estate characteristics and organizational performance, different answers come up. But the responses have also much in common. The overall picture can be summarized as follows.

1. Cost reduction

Due to an ever growing demand for (expensive) health care and a shortage of financial resources, policy makers and hospital managers pay much attention to cost effectiveness and opportunities to reduce real estate costs. Since the introduction of the regulated market system directing on the reduction of life cycle costs and total costs of ownership has become more and more important. Elaborating a business case to make costs and benefits transparent both in the short and long run has become normal practice now. Real estate measures to stimulate cost reduction include co-operation in building, design and management of hospital real estate with other care organizations and commercial parties, new ways of contracting such as Design and Build, or DBFMO (Design-Build-Finance-Maintain-Operate), strict space budgeting, space reduction by shared workplaces and extension of opening hours, and sustainability measures in order to reduce energy consumption. Quite often extra investments are needed to reduce the life cycle costs of the building (e.g. investing in flexibility) or staff costs (e.g. extra lifts to reduce walking distances).

2. Increasing productivity
This added value is usually interpreted as production (output) and less as a ratio between output and input. Real estate choices to support production included:

- Optimally facilitating of medical care processes and supporting activities, e.g. by spatial clustering of top-clinical care processes, urgent care, patients with acute diseases and patients with chronic illnesses, or a thematic clustering of heart diseases and vascular diseases, oncology, mother and child.
- Well considered location of operation theatres.
- Location of units with a high flow rate near the entrance to avoid unnecessary patients flows within the building.
- Sound logistics of transport (beds, bedclothes, food, medical facilities) by a separation of transport of goods and patient flows, use of advanced transport systems, and well considered distribution points.
- Easy and place and time independent access to (digital) data.
- Extension of opening hours and operating time.
- An attractive indoor climate and indoor air quality in order to avoid absence by building related sickness ("sick building syndrome").

The impact of one bed rooms on labour productivity is a little ambivalent. On the one hand one bed rooms evoke fewer infections and speed up the healing process that might shorten the average stay in hospital. It also avoids problems of empty beds due to difficulties in mixing people with different cultural backgrounds or different gender. On the other hand a high percentage of one bed rooms can be counterproductive because of nurses have less overview and because of longer walking distances.

3. User satisfaction
This added value may be split up in satisfaction of consumers (potential customers of the hospital), customers (people that come to the hospital to visit a patient) and patients on one side and staff on the other side. Most respondents emphasize that good staff people with excellent medical skills and a customer-friendly attitude and behaviour are of utmost importance. But well considered real estate decisions can be supportive as well, e.g. by:

- Creating an attractive and functional "healing" environment where people feel at home: easily accessible, with a clear structure so that people can find their way easily, much daylight, a nice outside view, an attractive indoor climate, being able to make use of a one bed room (preferred by most patients but not all of them), and a high quality of semi-public spaces such as entrance halls, waiting areas and patios.
- Optimally facilitating medical care processes by steering on a lay-out that fits with the way cure and care are being organized and short walking distances between related functions.
- ICT-facilities (flat screens for watching TV/ information, internet) and catering services.
- Well organized communication and user participation in decision making processes.

4. Increasing opportunities to get the capital costs and operating costs financed
This added value is being stimulated by the involvement of external parties that rent space in the building or on a so-called health care boulevard or health park, leading to a sound business case. Other options are private public partnerships in owning the building, and steering on future value of the building by adaptability and marketability. Academic hospitals seem to have fewer problems in financing their real estate because they still get a separate budget for real estate investments and they can borrow money at a quite low interest rate.

5. Optimization of flexibility and adaptability
Flexibility is a key issue in hospital design for decades. All respondents include flexibility in their real estate policy and real estate management. Standardization, multifunctional use of space, a clear separation between the supporting structure and fill-in because of their different life cycles, extra power of load-bearing walls and floors in order to cope with future functions, easy-to-adapt bed rooms (from a two bed room in two one bed rooms and vice versa), facilities that make an enlargement of the building easily possible, all kind of measurements are more or less common sense nowadays. A more recent concept is the functional zoning plan. By spatial separation of the hot floor (high tech facilities such as the operation theatres), the fabric (labs), the hotel function (bedrooms) and office activities, hospitals aim to make part of their buildings more courant and as such easier marketable when the hospital want to shrink or to move to another place. One of the hospitals built the hot floor in a special zone and left the adjacent space vacant, so that in case of the hot floor becomes outdated a new one can be added easily while the present keeps going during construction. However, thinking in scenarios in search for spatial and financial implications of future developments is not very common yet.

6. Supporting a positive image
Marketing by real estate is merely managed by steering on a nice and easy to access location in a lively and safe environment, a nice overall appearance, an attractive "healing" environment with a high percentage of one bed rooms, nice colours and materials, light and transparent, and nice facilities, in order to improve patient satisfaction and as a consequence to improve competitive advantage. Attractive and professional staff facilities may help to attract and retain staff people. Quite often semi-public spaces are open for use by people from outside, to reduce the image of an inner directed medical environment. Some respondents emphasize that a hospital should primarily focus on its patients by creating an environment "where it is allowed to be a patient" and not feeling awkward when walking in pyjama wit a drip at hand.

7. Stimulation of innovation
This added value needs a similar real estate policy. Innovation requires individual creativity and team creativity. Creative thinking can be facilitated by opportunities to relax and to concentrate and places that support exchange of knowledge and stimulate new ideas. Most hospitals create meeting places such as a knowledge centre, study centre, or skills lab. Another real estate intervention to stimulate innovations is the spatial integration of different types of cure and care, but the present financing system could with separate money streams is mentioned to be an obstacle here. ICT is also used as a tool to innovating processes, e.g. by the use of information devices or application of a digital system to reduce waiting times. Medical-technical innovations may affect real estate as well, for instance by changing space requirements due to remote care, E-consults and new medical equipment.

8. Supporting (changing) organizational culture
Though culture is merely a matter of shared values and behavioural rules focusing on high quality care, reliability and customer-friendly behaviour, (changing) culture can also be supported by real estate. Most often hospital managers try to do so by creating more openness and informal meeting facilities, facility sharing and hot desking, in order to stimulate communication and to make different ways of behaviour or different attitudes a subject of open discussion. Another option is to create a front-back office with a different atmosphere.

9. *Risk control*
This added value is least discussed and also mainly managed by real estate choices improving flexibility and marketability, a well elaborated business case, outsourcing of maintenance for a long period, and reduction of risks of infections by smart hygiene measures and more one bed rooms.

DISCUSSION

The qualitative approach of this research – using semi-structured interviews with open questions – delivered much information on how real estate added values are perceived by hospital managers and how they are prioritized in hospital real estate decision making. The results contribute to a better understanding of adding value by real estate and the values mentioned in literature, in general and specifically for the healthcare sector. Although quantitative concepts have been used to summarize and interpret the research findings - modus, mean, average, a plot-box - these results should be regarded as qualitative data as well. As the priority diagram (figure 2) is a representation of only ten separate configurations, this diagram is not more then a first exploration of (clusters of) priorities. The validity of the results can be improved by conducting more interviews and organizing expert meetings to discuss and compare individual rankings. The same methods could be applied in other sectors like office organizations or higher education in order to explore similarities and dissimilarities in different fields.

Though hospital real estate is being regarded now more and more as a resource for production, a remarkable difference shows up between the answers on the open question and the prioritizing assignment of added values in the more structured part of the interview. In response to the open question to mention values that are steered on in design and management of hospital real estate, most respondents mentioned facilitating the primary processes and supporting productivity as the main objectives. Confronted with added values of real estate mentioned in the literature, the main real estate objective seems to shift from process oriented priorities towards the contribution of real estate to organizational strategic objectives such as stimulating innovation, improving culture and increasing user satisfaction. Whereas in the open interview flexibility is often mentioned as an important added value, in the ranking assignment this issue is never given a high priority, probably because it is already a common issue in real estate management for decades. Cost reduction shows to split the interviewees in two groups. Part of the respondents ranked cost reduction in the top of highly prioritized values, whereas others give this issue low priority. Although in the open interview most hospital managers call cost reduction a basic issue in most real estate decisions, in particular since the new healthcare real estate regulations, cost reduction gets median priority, just like productivity and flexibility.

The configuration of cards ranked by the CEO of hospital VS (figure 3) represents more or less the average ranking of all respondents. This hospital has been built under the former hospital real estate regulation and is now in the exploitation phase of the building process. This ranking shows stimulating innovation as top priority of adding value. Two other values - improving user satisfaction and improving organizational culture - are ranked second highest priority. Then two columns are recognizable (and also described as such by the CEO while sorting the cards). The three added values at the left were connected to the process: increasing productivity; decreasing real estate costs as a means to decrease the prize of healthcare products and services, and controlling real estate risks related to the production process. The three added values at the right side are more building related values: optimizing flexibility;

supporting corporate image, and increasing finance possibilities. According to this CEO these values were captured in the building design, and as a consequence adding value management with regard to these issues is less possible in the exploitation phase.

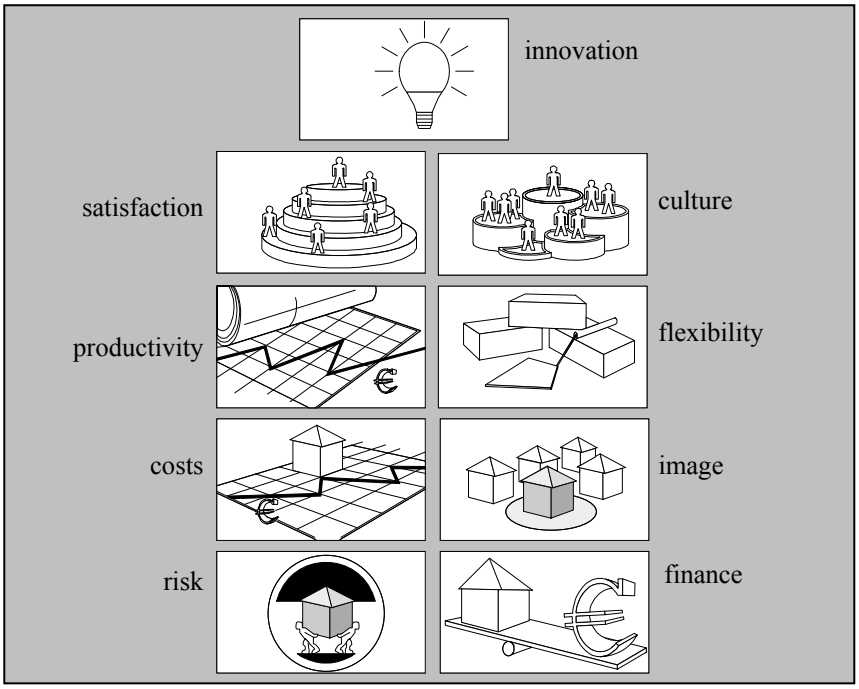

Figure 3: *The most 'representative' result of the ranking assignment*

Both the overall results of the priority ranking assignment (figure 2) and the "representative" configuration (figure 3) show some clusters of prioritized added values that seems to be connected to the widely used triplet of people-process-place (Duffy, 1992). The top three of prioritized added values by the respondents are stimulating innovation, increase user satisfaction and improving corporate culture. These three added values of real estate contribute to organizational performance with regard to '*people working together, in a smart way organizing things efficiently*' as one CEO mentioned in the interview. The second cluster of added values includes cost reduction, increasing productivity and optimizing flexibility. These three added values all contribute to the (production) process of healthcare services and the prizes of these products and services. A flexible hospital building makes it possible to adjust real estate to improve productivity and capital cost reduction reduces prizes of health care products and services. As one CEO mentioned: *'Maybe it is not that surprisingly that improving productivity is in the middle of this configuration, some added values are enablers and contribute to a higher productivity, others are more the result of an increasing productivity (ablers).'* The third cluster of added values - contributing to corporate image, controlling real estate related risks and improving finance possibilities - are more directly related to the real estate portfolio, as it appears in the concept of place. As one CEO mentioned in the interview: '*Contribute to corporate image or finance possibilities are strongly related to the location and appearance of the hospital building. I can imagine that it becomes important that a hospital is located in the city centre, but otherwise it is less important as a real estate objective.*'

In the interviews some other added values of real estate came up, in particular its contribution to a sustainable and healing environment. Usually sustainability is not perceived as a main objective of health care organizations, but as a necessity to cope with societal needs, now and in the future, and as a means to show corporate social responsibility. Most respondents admit that sustainability measures are applied only when the extra costs have a reimbursement period of less than 5-10 years. Of course steering on a healing environment is of utmost importance in health care and cure. Though not explicitly presented as one of the nine added values, it is implicitly included in improving satisfaction and supporting productivity. It seems to be more appropriate to add this value to the list as healthcare specific real estate added value. By adding sustainability as a particular value, as Den Heijer (2011) did in her dissertation on Managing the University campus, rankings in the health care sector may be better comparable with ranking in other fields.

CONCLUDING REMARKS

This research is a first exploration of adding value by real estate in the field of health care. Additional research is needed to improve our understanding of a) which real estate interventions will positively affect organizational performance; b) interrelationships between the performance indicators; c) synergy or conflicts between values; d) clearness and completeness of the list; and e) how does the concept of added value and its different aspects appeal to decision makers. It is well known that managing flexibility and standardization may conflict with other values such as low investment costs and efficient use of space. The need for much daylight may cause high cleaning costs and conflicts with the need for a reduction of CO2 emission. A review of current research in depth with a focus on only one possible added value of real estate - such as labour productivity, employee satisfaction or future marketability – will be one of the next steps. Furthermore the results of interviews will be linked to building assessments in a number of case studies, including floor plan analysis and analysis of documents such as the brief and corporate strategies.

REFERENCES

Dewulf, G. Krumm, P. and de Jonge H. (ed.), *Successful Corporate Real Estate Management.* Nieuwegein: ARKO Publishers, 2000.

Duffy, F., *The Changing Workplace*. Phaidon Press Limited, London 1992.

De Jonge, H., De ontwikkeling van Corporate Real Estate Management, *Real Estate Magazine*, 2002, june, 22, 8-12. [Development of CREM]

De Vries, J.C., de Jonge, H. and van der Voordt, Th.J.M (2008): Impact of Real Estate Interventions on Organisational Performance. *Journal of Corporate Real Estate*, Vol. 10, Issue 4, pp. 208-223.

Den Heijer, A., *Managing the university campus. Information to support real estate decisions*. Eburon academic book publishers, Delft, 2011.

Jensen, P.A., The Facilities Management Value Map: a conceptual framework, *Facilitie*s 2010, Vol. 28 no. 3/, 4, 175-188.

Jensen, P.A., Theoretical Model Demonstrating the Value Adding Contribution of Facilities Management. Conference paper. *European Facility Management Conference*, Amsterdam, May 2009.

Jensen, P.A., van der Voordt, Th., Coenen, C., von Felten, D., Lindholm,A.L., Balslev Nielsen, S., Riratanaphong, C. and Schmid, M., The Added Value of FM: Different Research

Perspectives, Conference paper, *European Facility Management Conference*, Amsterdam, June 2010.
Lindholm, A.-L., *Identifying and Measuring the Success of Corporate Real Estate Management.* Doctoral Thesis. Helsinki University of Technology, 2008.
Lindholm, A-L and Leväinen, K.I., A framework for identifying and measuring value added by corporate real estate, *Journal of Corporate Real Estate*, 2006, Vol. 8, no. 1, 38-46.
Nourse, H.O., Roulac, S.E., Linking real estate decision to corporate strategy, *Journal of Real Estate Research*, 1993, Vol. 8, no. 4, 475-494.
Sarshar, M. and Pitt, M., Adding value to clients: learning from four case-studies, *Facilities*, 2009, Vol. 27, no. 9/10, 399-412.
Van der Zwart, J., Arkesteijn, M.H. and van der Voordt, Th., Ways to study corporate real estate management in healthcare: an analytical framework. Conference paper, *2nd Annual Conference of the Health and Care Infrastructure Research and Innovation Centre*, Brighton, UK, April 2009.
Van Wagenberg, D., *European study on added value for customers in the facility service supply chain.* Paper presented at a EuroFM RNG workshop, Helsinki, 2009.