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Short report on the research project

Project-related models of co-operation for construction and housing companies in the case of refurbishment measures

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1 Reason for and aim of the work

The importance of refurbishment is increasing throughout Germany and Europe. According to figures issued by *Euroconstruct*, as much as 37 %[1] of building production in 2004 in Europe was invested in the maintenance and modernization of existing superstructure buildings. Refurbishment is very important in the German housing construction industry. It currently accounts for approx. 78 %[2] of it. According to the *GdW-Bundesverband deutscher Wohnungs- und Immobilienunternehmen*, refurbishment measures account for over 75% of the approx. 6.2 Mio.[3] managed by *GdW*. According to the *Hauptverband der Deutschen Bauindustrie* housing construction has been the most important sector in Germany for years. It accounts for more than half the construction volume[4]. As a result, refurbishment is an extremely relevant subject area both for housing and for the construction industry in Germany.

If one considers the conventional models of tendering, construction contracts and project management that are basically oriented to new building work, it can be seen that they often have limitations in the area of refurbishment and require adjustment to the general conditions that predominate in the refurbishment of occupied property. These general conditions include, for example, the frequent use of the buildings concerned during the building works and the resulting need to exercise care with respect to all the residents involved. This alone makes the work more complex than would otherwise be required by new buildings and renders the work of refurbishment more liable to interruptions. This increases the financial risks of those involved in the project and conflict potential during the handling of the project.

From the perspective of construction operations theory, the result is the necessity to further develop the existing models of tendering, construction contracts and project management with respect to their application in refurbishment of occupied property. For this latter it is necessary to develop co-operation-oriented procedures.

The goal of research work is the identification and/or development and design of best practice models for co-operation-oriented project handling of comprehensive measures of modernization/renovation occasioned by the refurbishment of occupied property. These models are prepared as concrete recommendations for action, e.g. in the checklist form. The project handling is thus considered by the client (AG) from the point of view of housing and by the contractor (AN) from the point of view of construction. For the development of best practice models and/or recommendations for action ten real construction projects are analyzed as case studies.

The knowledge gained from these studies is intended to show possibilities for improving project organization, i.e. the collaboration between AG and AN at the project level. The practical implementation of this knowledge is intended to help both contracting parties to increase their efficiency and effective use of resources (personnel costs, conflict costs) and thus ultimately to handle building projects more cost-effectively, thought it must be pointed out that in the research work quantitative results will not be generated.

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1 cf. Betriebswirtschaftliches Institut der Bauindustrie (BWI-Bau): „Daten und Fakten zum Baumarkt“, issue 2, Düsseldorf: Fraunhofer IRB Verlag, 2004

2 cf. Bundesministerium für Verkehr, Bau und Stadtentwicklung: „BBSR-Berichte KOMPAKT“, Ausgabe April Nr. 4, Bonn: Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) im Bundesamt für Bauwesen und Raumordnung (BBR), 2009, p. 6

3 cf. GdW-Internetpräsenz, Stand 02.06.2008, URL: www.gdw.de/index.php?mod=article_details&id_art=1607 (data retrieval on 17 May 2011)

4 cf. Hauptverband der Deutschen Bauindustrie: „Die Bauwirtschaft im Zahlenbild 2009“, Berlin: Hauptverband der Deutschen Bauindustrie, 2009, graphics 4

2 Special features of refurbishment of occupied property

In the case of construction works contained in the construction measures considered within the general framework of the research project, it is principally a matter of modernization and renovation works, partly also rebuilding works in the sense of DIN 32736:2000-2008 "Building management - concepts and works".

In the case of the building measures of communal housing under consideration the normal case is that the measures are carried out when the property is occupied. This means that the tenants remain in residence for the period of the building works or move to temporary accommodation elsewhere in the building or the neighborhood.

Observance of the tenancy arrangement often represents one of the standard project goals, from the perspective of the AG, against the background of the demand situation on the local housing market for the housing association concerned. The tenants, in whose interest it is to remain in the social and spatial environment familiar to them, are usually prepared to meet this arrangement halfway.

Occupation of the building during refurbishment works significantly increases the complexity of the modernization process. The tenants are a group of additional participants in the project and become important stakeholders in the project. The tenants' interests connected with the building measures are to be recorded and taken into consideration in a structured way during the planning phase and particularly during the execution phase. The result is a further sub-process of the project management, namely tenant care. This sub-process requires special attention not only from the client as AG but also from the AN. The goal of tenant care is partly to ensure that the tenants continue to remain tenants of the AG after the completion of the project and are satisfied with the individual construction works and partly to be able to carry out these measures smoothly and without disturbance, despite the continued occupation of the building by the tenant. Based on this tenant care will be treated as a special process in the research project.

3 Co-operation-oriented project handling / Partnering

As building practice shows, the following five points represent definitive success factors for a co-operative and efficient project handling:

- Selection of construction contractor not only on the basis of the tender price, but also on the basis of competence criteria;
- Early involvement of the contractor(s) in the planning phase, execution of optimization phases with value engineering and calculation of target costs,[5] creation of an identical interpretation of the contents of contract jointly by AG and AN before the conclusion of the contract;
- Balanced structuring of the contract with transparent payment structures, incentive regulations and gradated extrajudicial conflict resolution systems;[6]

[5] cf. Eschenbruch, K.; Racky P.: „Partnering in der Bau- und Immobilienwirtschaft, Projektmanagement- und Vertragsstandards in Deutschland“, Stuttgart: Kohlhammer Verlag, 2008, p. 40 ff

[6] cf. Eschenbruch, K.: „Partnering in der Immobilien- und Bauwirtschaft“, in Jahrbuch Baurecht 2005, München: Werner Verlag 2005, p. 161

- Active, cross-company team development among those involved in the project, if necessary fixing the co-operation-oriented basic direction of the project handling in a partnering charter[7], transfer of the relevant implementation responsibility to a partnering core team;
- Establishing common procedures for the individual sub-processes of project management, especially with respect to communication and information structures among the project partners.

The concrete measures for the complete or even partial implementation of these points are to be established with reference to the project, taking into account the parameters of project size, complexity and delivery system.

With regard to the above-listed success factors "Establishing common procedures for the individual sub-processes of project management", which is at the heart of the research project, experience shows that the following three criteria are to be implemented in the case of partnering-oriented process organization:

- Transparency
  Both contracting parties should as far as possible have the same information status.
- 'Eye to eye' project handling
  Both contracting parties should as far as possible feel like equals.
- Global view of targeted project success
  Both contracting parties should as far as possible constantly pay attention to the effects on the jointly borne superordinate project goals.

Observance of these criteria is identified by the authors as a standard for working out best practice examples and recommendations for action.

4 Projects and processes analyzed

For the selection of projects serving as case studies the following criteria have been used:

- Buildings were constructed between 1920 and 1970, with the focus on the years from 1949 on (typical property of the housing companies).
- Consideration of the relevant building types (row houses, high-rise, housing estate).
- Multistorey building with at least three full storeys.
- Comprehensive modernization and renovation, i.e. several construction trades indicate simultaneously several areas in the building.
- Building serves, generally speaking, as a residence (in exceptional cases partly as business premises).
- Positive conclusion of the projects in a financial and contractual sense for the AG and the AN.
- Even geographical distribution in Germany.
- Consideration of structurally strong and weak regions.

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[7] cf. Eschenbruch, K.; Racky P.: „Partnering in der Bau- und Immobilienwirtschaft, Projektmanagement- und Vertragsstandards in Deutschland“, Stuttgart: Kohlhammer Verlag, 2008, p. 253 ff

Fig. 1 provides an overview of the analyzed projects.

Running no.	Town/City	Federal state	Typology	Construction year	Moderni-zation year	BiB²	WE	Basic rent [€/m²]
1	Hanover	Lower Saxony	Row houses	1962	2008	yes	30	6.00-7.00
2	Hanover	Lower Saxony	Row houses	1960er	2008	yes	30	6.00-7.00
3	Mainz	Rhineland-Palatinate	Row houses	1921	2009	no	3	12.00
4	Gera	Thuringia	Row houses	1950er	2009	yes	48	4.70
5	Gera	Thuringia	Row houses	1950er	2007	yes	12	4.70
6	Munich	Bavaria	Row houses	1940er	2009	yes	49	7.00 a.12.00
7	Munich	Bavaria	Row houses	1954-1956	2001-2003	no	105	10.50-13.50
8	Wiesbaden	Hesse	Row houses	1956	2009	yes	36	7.50-9.00
9	Karlsruhe	Baden-Württemb.	High rise	1958	2007-2009	yes	55	8.00-9.00
10	Cologne	North Rhine Westphalia	Housing estate	1926-1927	2006-2009	yes	392	7.50

Fig.1: Project overview (BiB² = Occupied refurbishment, WE = housing units)

Fig. 2 provides an overview, in which details of the state of projects in Germany, building types together with construction year and modernization are presented in tabular form. The overview also contains the number of the modernized housing units and the associated basic rents (without heating etc.) related to area.

Running no.	Procurement procedure	Type of work specification	Type of payment	Delivery system	Provider of execution plans
1	Limited tender procedure	General technical specifications	Title - lump sum	General contracting	Contractor
2	Limited tender procedure	General technical specifications	Title - lump sum	General contracting	Contractor
3	No obligation to VOB/A (German Construction Contract Procedures/A)	General technical specifications	Cost-plus-fee	General contracting	Client
4	Public tender procedure	Bill of quantities	Lump sum	General contracting	Client
5	Public tender procedure	Bill of quantities	Lump sum	General contracting	Client
6	No obligation to VOB/A (German Construction Contract Procedures/A)	General technical specifications	Global lump sum contract	General contracting	Client
7	Public tender procedure	Bill of quantities	Unit prices contracts	Multiple trade contracting	Client
8	No obligation to VOB/A (German Construction Contract Procedures/A)	Bill of quantities and general technical specifications	Lump sum	General contracting	Client
9	Limited tender procedure	General technical specifications	Global lump sum contract	General contracting	Contractor
10	No obligation to VOB/A (German Construction Contract Procedures/A)	Bill of quantities	Lump sum	Multiple trade contracting	Client

Fig.2: Overview of the procurement procedures and delivery systems in the case of the projects analyzed

Following the project analysis altogether ten project management processes were identified as particularly relevant with respect to a successful, co-operation-oriented project handling. They are listed in fig. 3 according to their practical importance within the project phases. The organization and sequence of these processes were analyzed in all ten projects studied. The development of the recommendations for action was aligned structurally with the individual processes.

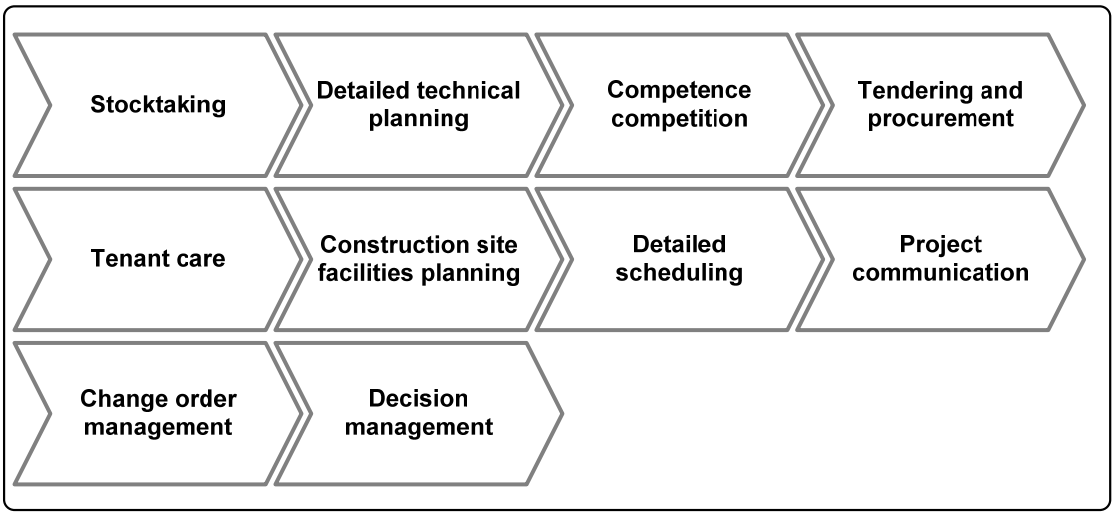

Fig.3: Relevant project management processes in occupied refurbishment

5 Results

In fig. 4 altogether 29 process-related recommendations for action are summarized and appropriately numbered. The resulting list is to be understood as a checklist both for AG internal use and joint AG and AN use.

In the first application stage the AG, after having decided basically on a co-operation-oriented approach regarding the handling of his projects, should gradually implement, in the case of imminent projects, the individual recommendations, from the start of the project preparations and organization. The responsibility for this should be with the project management, which reports the implementation status or degree to the management regularly (e.g. quarterly) within the framework of implementation controlling.

The project-superordinate basic decision making for a co-operation-oriented ap-proach is to be done at the management level and from there transferred within the framework of structured measures of organization or staff development (e.g. in work-shop form) to the project management level. It is not until after the implementation of this approach that a systematic project-related implementation using the checklist is to be recommended.

In the second stage the AG should, following the contract initiation, discuss the individual recommendations for action with the AN regarding their concrete projectspecific implementation and establish and carry out appropriate measures. Here too, in the opinion of the authors, a regular joint checking of the status quo of the implementation at the project manager or construction manager level is recommended.

For a successful implementation of the second stage experience shows that it is very important for the AN management level to agree in principle to a co-operation-oriented approach vis-à-vis the AG.

Overview of recommendations for action. Processes 1 - 10

1. Process 1 - Stocktaking

1.1 Involvement of tenants in the stocktaking by means of questionnaire

1.2 Attachment of stocktaking survey to tender documents

2. Process 2 – Detailed technical planning

2.1 Completion of execution planning before award of contract by the AG in multiple trade contracting

2.2 No 'procrastination' by AG of execution plans after award of contract in the case of general contracting

3. Process 3- Competence competition

3.1 Limited invitation to tender in accordance to VOB /A by VOB-bound AG

3.2 Pre-qualification procedure for refurbishment

3.3 Use of guidelines for execution of competence competition in the case of partnership models by private AG

4. Process 4 – Tendering an procurement

4.1 Permission or request to hand in alternative bids

4.2 Carrying out on-site inspection with the construction companies requested to hand in tender at the beginning of the invitation to tender period

4.3 Hold clarifying talks in accordance with § 15 para. 1 VOB/A

5. Process 5 - Tenant care

5.1 Agreement and provision and task specification of the person responsible for tenant care

5.2 Determining measures on the basis that the tenant will remain in residence during the building period

5.3 Determining measures regarding necessary temporary tenant relocation

6. Process 6 – Construction site facilities planning

6.1 Consideration of tenant concerns in the site facilities planning

6.2 Detailed definition of AG's specifications for the site facilities planning in the tender documents

6.3 Establishing site facilities plans of the bidder as necessary part of the bid and award criterion by the AG

6.4 Detailed personnel planning for staircases and lifts regarding deliveries and material transport

7. Process 7 - Detailed scheduling

7.1 AG's specification of detailed schedule following the tender

7.2 Representation of the important dependency relationships in the contract schedule

7.3 Joint execution of the target-performance comparison schedule

8. Process 8 – Project communication

8.1 Establishing rotational project manager meeting as central communication and decision platform

8.2 Testing the possibility and functionality of setting up a joint building site office by the AG and AN

8.3 Execution of project start workshop

8.4 Joint external presentation of the project

9. Process 9 – Change order management

9.1 Deposit of basic calculation with AG before start of execution

9.2 Agreement on a model for project-internal gradual conflict resolution

9.3 Unequivocal nomination of the authorized representatives of AG and AN

10. Process 10 - Decision management

10.1 Appropriate presence of AG and AN decision makers on building site

10.2 Expert and hierarchical competence symmetry of the AG and AN project or construction manager

Fig. 4: Overview of recommendations for action. Processes 1 - 10

Figs. 5 and 6 show the existing connection in terms of content of the process-related recommendations for action with the other processes. From this it can be concluded that there is a high degree of complexity in the whole system, which consists of the individual recommendations for action and the relationships between them.

It can also be concluded that, relating to a construction measure, the complete implementation of the 29 specified recommendations is always the target. A selection of individual recommendations that ignore existing relationships to other processes would

create a situation where, in these processes too, it would not be possible to completely implement a co-operation-oriented organization. To this extent, in the view of the authors, the question of a prioritization of recommendations for action does not arise. Rather, the 29 recommendations for action are to be regarded as an interwoven whole and implemented project-specifically

Effects of recommendations for action on other processes (Part 1)

Recommendation for action	Effect on process no.	Effect
1.1	2 – Detailed technical planning	Necessary consideration of construction works-related results of the tenants' questionnaire in the technical detailed planning
1.1	5 – Tenant care	Necessary consideration of construction sequence-related results of the tenants' questionnaire in the planning of the measures for tenant care
1.2	4 – Tendering and procurement	Improvement of the information transfer from the survey to the bidders or AN
2.1 + 2.2	9 – Change order management	Reduction of the change potential
3.1 + 3.2 + 3.3	4 – Tendering and procurement	Execution of the invitation to tender as limited tender procedure with preposed pre-qualification procedure in the case of VOB/A-bound AGs or as competence competition in the case of non-VOB/A-bound AGs
4.2	6 – Construction site facilities planning	Possibility to consider the results of on-site inspection in the site facilities planning
4.3	7 – Detailed scheduling	Possibility to consider the tenant-related concerns in the construction sequence planning before conclusion of the contract
5.1 + 5.2 + 5.3	4 – Tendering and procurement	Necessary consideration of measures for tenant care in drawing up work description
5.2	6 – Construction site facilities planning	Necessary consideration of measures for tenant care in site facilities planning
5.3	7 – Detailed scheduling	Necessary consideration of measures regarding temporary tenant relocation in the detailed sequence planning
6.1	5 – Tenant care	BE planning agreement with tenant concerns
6.2 + 6.3	4 – Tendering and procurement	Necessary consideration of AG prescriptions for site facilities planning in drawing up the work description and assessing tenders
6.3	3 – Competence competition	Possibility to consider the content of the bidder's site facilities plan as award criterion

Fig. 5: Effects of recommendations for action on other processes (Part 1)

Effects of recommendations for action on other processes (Part 2)

Recommendation for action	Effect on process no.	Effect
6.4	7 – Detailed scheduling	Necessary consideration of marginal conditions for building site logistics in detailed planning sequence
7.1 + 7.2	4 – Tendering and procurement	Necessary consideration of the AG's specification for the detailed appointment planning in drawing up tender documents
7.3	8 – Project communication	Joint registration and assessment of time status of construction as 'Agenda Point 0'
8.1 + 8.2	6 – Construction site facilities planning	Necessary consideration of appropriate spaces for the project management in the site facilities planning
8.1	9 – Change order management	Expediting of decision processes
8.1	10 – Decision management	Expediting of decision processes
9.1 + 9.2	4 – Tendering and procurement	Necessary consideration of appropriate regulations in the tender documents
9.2 + 9.3	10 – Decision management	Creation of clear and binding sequence procedures
10.1 +10.2	4 – Tendering and procurement	Necessary consideration of appropriate regulations in creating tender documents and tender assessment
10.1 + 10.2	8 – Project communication	Stabilizing and expediting of project-related communication
10.1 + 10.2	9 – Change order management	Expediting of decision process

Fig.6: Effects of recommendations for action on other processes (Part 2)

Fig. 7 shows the assignment of the recommendations for action to the basic success factors defined in para. 3 for a co-operative project handling and to the basic requirements made of partnering-orientation processes in matrix form. The recommendations for action can also be assigned to several matrix cells.

As can be seen in fig. 7 all six success factors are taken into consideration by the recommendations for action, but the focus is on the two factors 'creation of an identical interpretation of the contents of contract jointly by AG and AN before the conclusion of the contract' and 'establishing common procedures for the individual sub-processes of project management'.

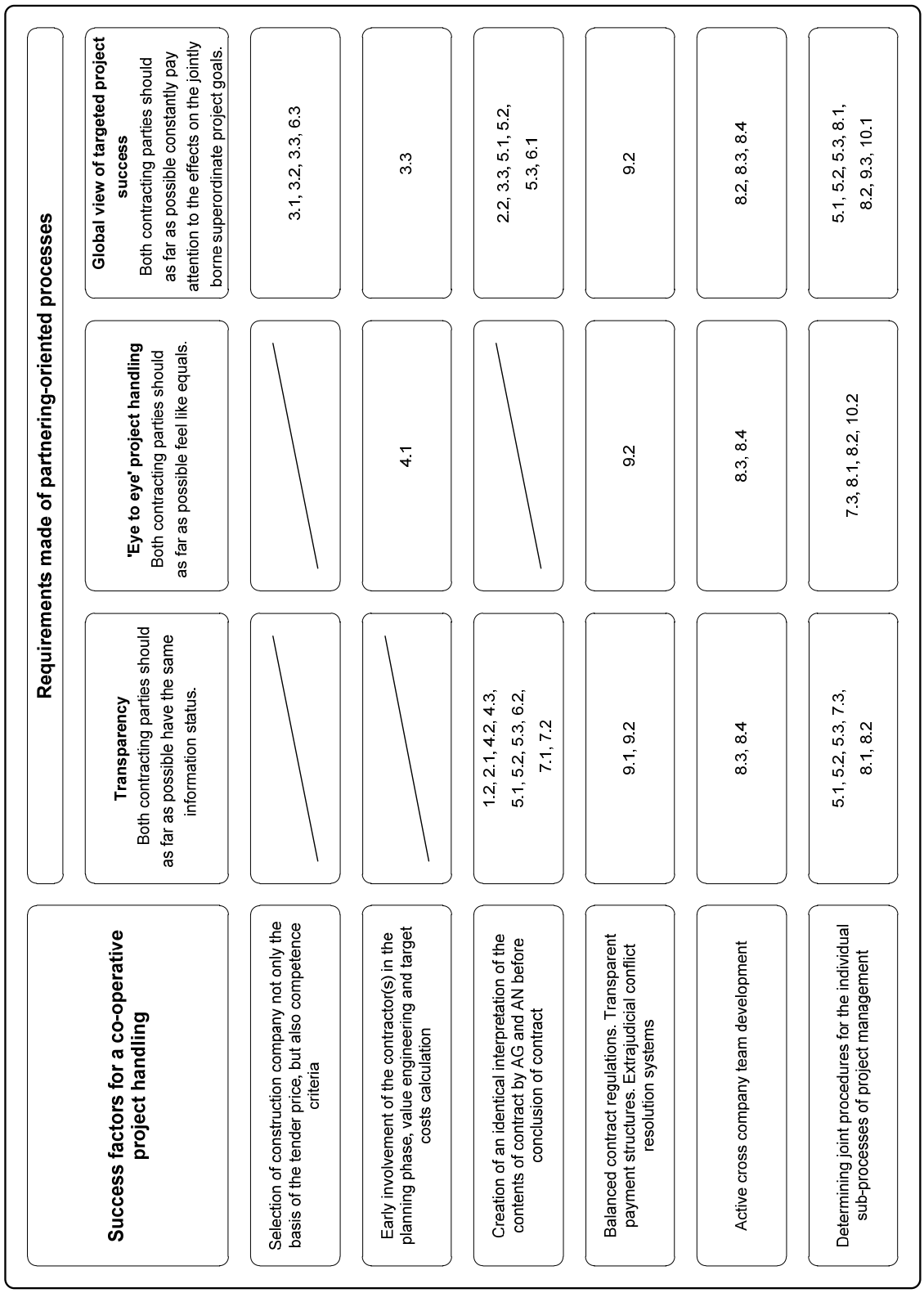

Fig.7: Assignment of recommendations for action to the defined success factors for a co-operative project handling and to the requirements made on partnering-oriented processes

6 Results and prospects

In conclusion it can be stated that co-operation-oriented treatment of each other by the contracting parties cannot be 'prescribed' contractually. The basis for such treatment is and remains rather the personal will to co-operate on the part of the important project partners, which is generated by the conviction that a win-win situation can be achieved for the benefit of both parties. If this precondition is fulfilled, the question arises as to suitable working means and process organization and descriptions for the support of the concrete implementation of the partnering approach by the project partners who share this conviction. In this respect, the recommendations for action developed are intended to contribute a practically useful answer. In the view of the authors additional costs for the relevant building project are not incurred in a global sense by implementing the recommendations for action. Instead, it may be argued that for both the AG and the AN risks can be lowered and savings can be made by reducing conflict potential.

In terms of prospects, special attention may be drawn to the continuing need for research with reference to the project management process of tenant care. It is to be assumed that the special importance of this process, in connection with the importance of the refurbishment of occupied property in general, will continue to increase for housing and construction companies. From the construction management point of view it is necessary to develop a standard process for tenant care that lasts for the duration of the complete planning and execution phases of projects concerned, including the appropriate work equipment for the project partners and a description of the allocation of the tasks and responsibilities between AG and AN. At the same time a distinction should be made with regard to the delivery system selected (multiple trade or general contracting) together with a cost-efficiency calculation.