BORIS GLOGER®

OPM
Otte Projektmanagement

SECTOR Construction

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INITIAL SITUATION
Some construction projects that suffered very public failures in the recent past demonstrate that many individual interests are a hindrance to success in the construction industry. For this reason, Otte Projektmanagement GmbH (OPM) has spent more than 15 years working with modern forms of cooperation in projects - including agile approaches, such as Scrum, Kanban and Design Thinking.

SOLUTION
OPM has developed a five-step process whose specific aim is to bring the construction task at hand into sharp focus by deploying cross-functional teams of users and construction managers to precisely define the requirements. The team spirit that emerges from this has a positive effect throughout the subsequent work phases. Even if agile working is not possible at all times in these work phases, OPM promotes cooperation by means of specially developed tools, prudent project management, and by exemplifying a new error culture. In the commissioning of buildings, OPM also relies on cross-functional teams that control their work with the aid of Kanban techniques.

RESULT
Expensive planning errors are prevented before they can ever occur, thanks to the integration of input from the building users during the early phase of conception, and the persistent collection of all related facts. OPM works continuously to raise awareness of collaborative tools, such as BIM, and supports its clients in the deployment of these tools. Even if agile working is not yet practicable in all phases of construction, its partial application promotes a solution-oriented approach across all involved parties - that saves construction time and costs.

Otte Projektmanagement GmbH: Agility is achievable in construction projects

Whenever conversations turn to construction projects in Germany, it's never long before jokes about the Berlin Airport (BER) development begin to flow. No other construction project demonstrates more clearly how disastrous the outcome can be when the focus is not on solutions but rather on securing one's own position by creating the greatest possible lack of transparency. The construction industry is no different to any other sector, though. Complex structures are to be created within a short timeframe and in top quality; and to do that, a multitude of contractually entangled parties are involved. Long before BER came around, though, many were already asking themselves whether there are more transparent forms of project management - and even agile forms - for major construction projects. Martin Otte and his team at Otte Projektmanagement GmbH (OPM) have found an agile response to the construction of industrial and test facilities for large corporations.

„I've been in the construction business for 25 years. I've worked as a site manager on construction sites; have been a project manager for 18 years and I develop major projects with our customers", says Martin Otte. At some point, it began to torment him that, during the construction phase, the processes themselves were frequently the cause of delays or had been planned without any real consideration of the requirements - this was frustrating for the contractors and extremely costly for the clients. It was then that Martin Otte set out to find ways to put planning and construction on a more solid footing and, in doing so, to accelerate them. During his research, he came across the book, „Problem Seeking: An Architectural Programming Primer", which outlines how projects can be set up in a participatory manner,

with a focus on common objectives. Martin Otte and his team adapted the concept and, in the meantime, have been employing it successfully for some 15 years in the specification of customers' user requirements. Among others, these include leading technology concerns from the aerospace and automotive sectors that are building, expanding or converting production sites, as well as research institutions, such as the German Aerospace Centre (Deutsches Zentrum für Luft- und Raumfahrt e.V., DLR).

First off: A project management company like OPM cannot fully integrate real agile work into all phases of a construction project. This is partly due to the strictly hierarchical structures between the clients and the executing construction companies - in this instance, OPM can often only moderate the processes. However, on each of its projects, OPM sets its sights on three areas that have a significant impact on the course of the project:

1. In the „User Requirements Specification" (URS) phase, the issue is pinpointed by a cross-functional team.
2. During the implementation stage, OPM employs digital tools to create the greatest possible degree of transparency and collaboration.
3. In the commissioning phase of a building, agile, cross-functional teams are deployed once again to manage the completion of final tasks.

THE BIGGEST ERROR IS MADE AT THE OUTSET: THE BUILDING USERS ARE NOT GIVEN A SAY

In the classic approach to the specification of user requirements for production and research buildings, those who will later use the building are generally not given an opportunity to define what the building should be able to do. When planning an institute, for example, one would look at staffing ratios: „70 people are supposed to work in this building". This is used to determine how many managers there will be, for whom more space must be allocated. Concepts such as ‚New Work' are left out the equation completely. However, in this particular case, it is possible that managers do not want 20-square-metre offices or, indeed, that there are no executives at all in the traditional sense. These abstract, outdated specifications therefore lead to a situation in which the actual demand is not properly taken into account.

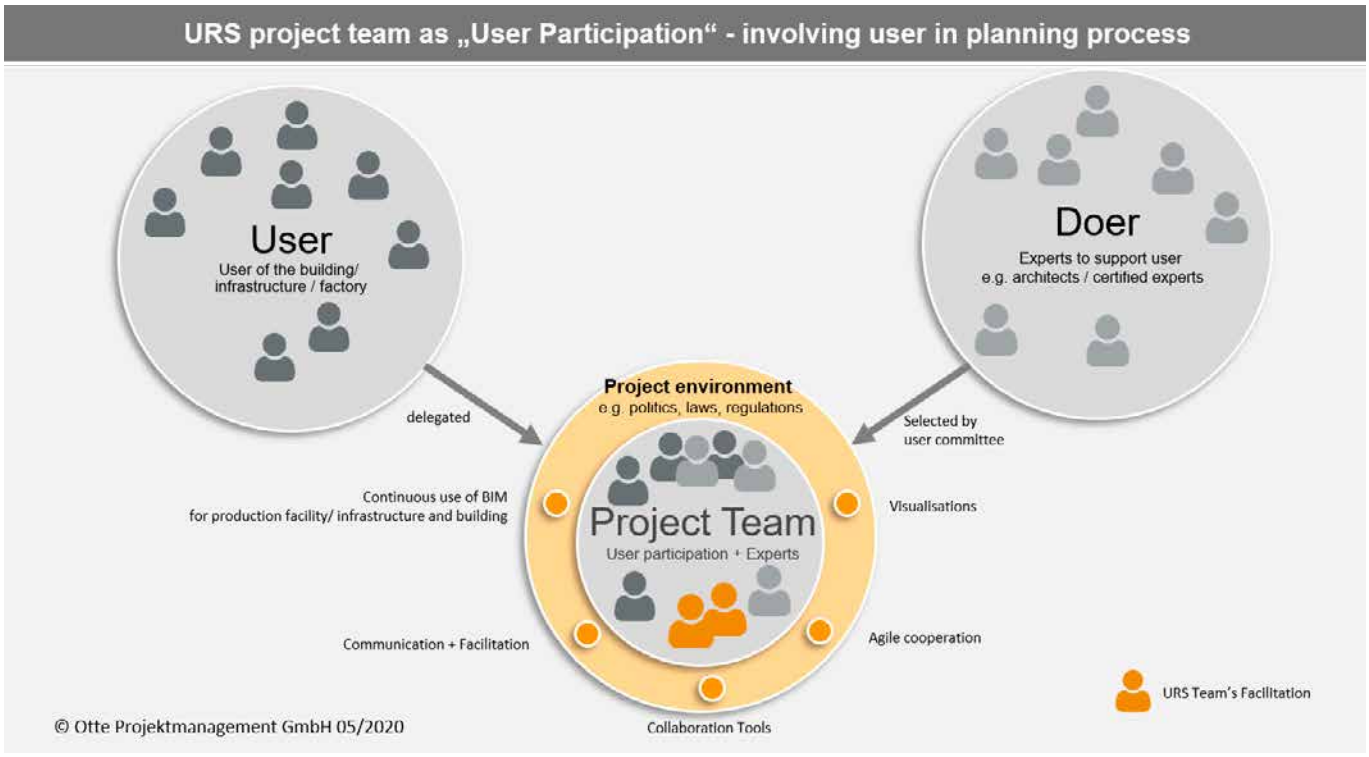
Things do not improve during the later stages of the project: Fundamental communication deficits at the interface between the many involved parties are exacerbated when communications do not follow a common data model (Building Information Modelling - BIM) and essential data is hardly ever exchanged (for example via Common Data Environment - CDE). For Martin Otte, this is where the parallels to old software development approaches become apparent: „Those responsible for construction mull over things for several months at a time; gathering up stacks of requirements and conducting one investigation after the other, with the goal of not making decisions but to put them off until some other time."

The problem is not down to a lack of competence, though, Martin Otte makes clear. In Europe, we are simply used to thinking everything through before we dare to take the next step. „The biggest challenge is not only to know what you want but also to ensure that all those involved on the client's side - and particularly the end users themselves - are on board. Later on, the users should be saying: „This is exactly how we wanted it".

USER REQUIREMENTS SPECIFICATION (URS): THE STARTING POINT FOR SUCCESSFUL PROJECTS

In typical cases, and especially during the tendering process, architects are expected to prepare cost estimates on the basis of vague information, which later becomes a matter of contention. This is because customers have not yet even finally clarified some of the central questions in the early stages of their project, such as whether a factory building should be located in Germany or Asia. Therefore, before any actual building design work commences, OPM invites its customers to an upstream process during which the project needs are screened in detail and the issues to be dealt with are brought into focus. The User Requirements Specification (URS) phase can take anywhere from three to six months, depending on the size and type of the project.

The main difference to the traditional approach is that a cross-divisional, cross-functional team is formed for the URS process. This doesn't just include professionals from the fields of design and construction, but also future building users from the customer's specialist departments - in other words, people who at this stage of the process would normally only exchange basic information such as, „I need XY" and „This costs 12X". Martin Otte draws a comparison with the first principle of the Agile Manifesto: „Individuals and interactions come



before processes and tools“ - this is exactly what will be achieved by dovetailing the involved groups. If these people gather in one room to deliberate over the real needs as a collective, they can easily gauge whether or not they have understood each other. At the end of the URS phase, all participants stand behind the jointly developed concept and represent it in their organisations, regardless of whether the URS Team is dissolved after this phase, or remains in place throughout the project.

HOW THE CROSS-FUNCTIONAL TEAM IS FORMED

Let's say a hall is to be built for a new production line. To determine what the hall needs to provide from the viewpoint of the future users, representatives from the customer's production, maintenance and IT departments will be needed in the URS Team.

The team members are defined either on the principle of voluntary involvement, or are selected directly by the customer's project manager. Specialist planners can also be added to the team where specific requirements must be considered, such as production layouts for Lean Production processes. The architect for the detailed building design can already be on board at this time; however, it is not an absolute necessity. Whether or not the architect joins the process is dependent on the complexity of the project and the willingness, at this phase of the project, to prioritise the intended use and function of the building over its design.

This generally results in a core team comprising 10 to 15 members; however, based on experience, the ideal team has proven to be around 9 members. Where a customer has a large number of involved departments, interviews are conducted with these experts and the results gained are reported to the core team. With the aid of such interviews, OPM has already integrated up to 500 participants in the process in order to gain a clear picture of the needs.
Does the URS Team also have a product owner who makes decisions? OPM has experienced several alternatives for how this role is filled

- The customer's project manager is the product owner (in joint ventures, multiple project managers can also share the role).
- There is a decision-making duo consisting of the user (customer with specialist knowledge) and doer (construction knowledge).
- The duo becomes a decision trio with OPM acting as process companion.

In the meantime, however, the most common set-up deployed by OPM is a

variant in which „the URS Team is the product owner" - decisions are made by the team by a show of hands.

HOW THE URS TEAM WORKS

It is important for the work of the URS Team that it is allocated a space for intensive cooperation - preferably at the customer's premises. This is because the User Requirements Specification is not about looking through existing documents. In a five-step process, which mirrors the traditional phases of design thinking, the team will investigate, develop, draw up concepts, test and reject.

Therefore, just as in normal design thinking processes, the 5 phases that follow here are not necessarily to be seen as a strict sequence. Setbacks can occur where new insights impact on phases that have already been completed.

1. Definition of the objective and mission statement

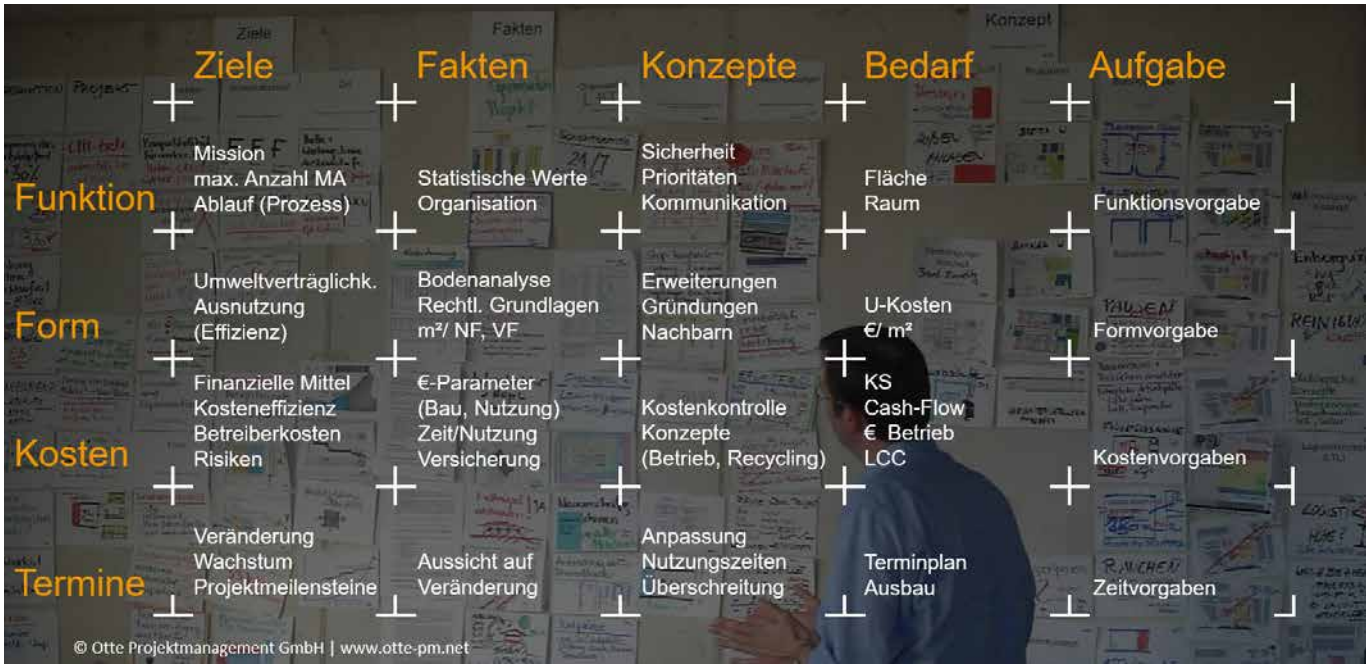
This requires a period of between one and three weeks. The users and building contractors take part in these workshops; however, it is imperative that the project sponsors are also involved: These must confirm to the team that they have understood the specifications correctly; which framework conditions must be observed, and whether decisions - such as the location issue - have already been finalised. This is the only way the URS Team can evaluate different scenarios.

2. Gathering of facts

Once the objectives have been defined, the URS Team will collect and compile as many facts as possible. OPM assists in splitting the project into sub-elements, for which smaller teams gather the required information using jointly developed interview guidelines. The sub-teams agree among themselves on how they proceed. The entire URS Team will meet in its project room on 2 to 4 workshop days per week to discuss the gathered facts and to collate them onto cards for the Agile Visual Board (AVB). The duration of step 2 is dependent on how clear the specifications were when the objectives were defined. For example, if a production process in a new building is to be configured in a completely different way than before, interviews must be conducted with experts, or information obtained, that provides clarity regarding machine dimensions, required materials, targeted turnaround times etc. - in other words, „basic research" is to be carried out.

3. Development of building concepts and presentation to the sponsors

The team only moves onto the development of concepts when



the facts have been established as exhaustively as possible. In a concentrated process, generally spread over three workshops of two to three days each, the entire URS Team works to convert the information gained into spatial profiles. These are cut up like a jigsaw puzzle and, using plans of the sites that are available for selection, laid out in various configurations to be discussed and evaluated. As with the definition of objectives, the end of the concept phase represents another deliberate stopover where the sponsor is brought back on board. Now it must be decided which concept will form the basis for further development.

4. Determination of requirements for the selected concept

The decision made in step 3 forms the basis for determining the requirements: What resources are required and in what timeframe can the concept be implemented?

5. Consolidation of the information into a design assignment

In a joint effort, two sets of documents are created on the basis of the requirements and the information recorded on the task board's analogue and digital cards. On the one hand, these are provided to the architect as an assignment and, on the other, to the internal stakeholders, such as production, facility management etc., as a guideline. In addition, OPM consistently translates the final concepts into BIM models (Building Information Modelling), which are supplied to the architect and the customer.

WORKING WITH THE AVB

Each of the five steps in the User Requirements Specification phase is examined in four dimensions: function, form, economy and time. This creates the matrix of the so-called AVB (Agile Visual Board) which, from one phase to the next, is continually filled with the information that ultimately produces a complete picture of the project. All information was originally recorded onto paper cards but, at some point, this would become too much for even the largest project rooms.

An additional consideration is that the URS Teams are usually scattered groups, not located at the same premises, and that the team members should always be able to access the information. OPM therefore developed the AVB software, which mirrors a physical board on which documents can be stored. All changes are logged here; the cards and documents can be augmented with comments, grouped in topics or sent as tasks via JIRA.

The days on which the URS Team works together in the project room begin with a daily stand-up meeting in front of the physical board and end with feedback on the results. The electronic Agile Visual Board automatically generates all tasks as sticky notes to ease the

assignment of tasks. At the same time, a reading can be taken to show how much of the backlog has been dealt with. Here, Martin Otte emphasises that setting a pace (timebox) is essential for the outcome. In each case, the selected tasks should be completed within a week. Exceptions are only made where completion is dependent on external input.

PERFORMANCE PHASES 1 TO 9: TOOLS FOR ACHIEVING AGILITY IN SMALL STEPS

The URS Team is usually disbanded as soon as the written purchase order and the BIM model are handed over to the design team. From this point, the so-called performance phases 1 to 9 run their course in the traditional way, and the hierarchical structures between the client and the contracting firms often return to the fore. In addition, there are now dozens if not hundreds of people involved and lines of communication begin to suffer from the many points of contact.

Giving his opinion, Martin Otte says, „There is a huge requirement for greater agility to be brought into the implementation process“. One way to achieve this is to create as much transparency as the framework conditions permit. As a project management company, OPM works to achieve this by employing two tools that provide all participants with an identical data basis for communication.

Meeting Minutes Tool

The first tool is the Meeting Minutes Tool that OPM developed 15 years ago. Roughly speaking, this records the content, the attendees and the results of regular meetings in PDF form and links them to tasks. Martin Otte describes the motivation behind the Meeting Minutes Tool as follows: „Many people turn up to regular meetings with their lined notepads and all leave afterwards with a different understanding of the tasks that were discussed. As soon as the construction process is underway and the participants are out and about a lot, you find yourself once again having to establish a common basis in the meeting. We record everything online so that everyone can see - at a scale of 1:1 - exactly what was discussed. We know we have won the day when the participants push their notepads to one side and concentrate on the screen contents, where we summarise the meeting - always in the relevant context.“ Once the minutes are completed, they are transferred to an electronic Kanban board. The individual teams can sort and prioritise their tasks themselves, or combine them to link with other tasks.

Building Information Modelling

The second essential tool is Building Information Modelling (BIM), which is not yet widely used in the German-speaking world. BIM facilitates collaborative and participatory working, beginning at the planning stage. The building is drawn up and built as a digital model and stored with all relevant data: materials, quantities, costs, time schedule milestones etc. If there is a shift in one of the parameters, everything is recalculated and the project parties are able to access updated information in real time. At the same time, the changes that have occurred remain clear. If, for example, the responsible production planner enters the water requirements of a given machine, the other trades such as pipework services or fire protection routes can be adjusted accordingly. In exactly the same way, it is also possible to simulate the impacts any proposed changes would have - an invaluable aid to decision-making on the basis of facts. This prevents the occurrence of situations in which conflicts first become apparent during the construction stage, where they can only be solved with a great deal of effort and expense. In an ideal case, everyone works with the same data model: from the planning stage, through tendering and right up to execution. In order to create greater awareness of this, OPM supports its customers in identifying the right software, and in its deployment: „We want to enable people to use this tool for their own organisation. If we can manage this, we'll be incredibly fast in the implementation phases".

Commissioning - classically agile

Concentrated work with a physical board and clear, direct communication in small teams is possible once again at the commissioning stage of a building. As other functions from other departments are required at this time, there is now need for a commissioning team to ensure a smooth transition. In terms of its team members, this does not have be the same as the URS Team. The commissioning team works with Kanban boards at the construction site location. All tasks - right up to the positioning of coffee machines - are written on cards and run through the illustrated process. In the daily stand-up meeting, the team discusses when each section should, or must, be finished. Any tasks that cannot be performed in one day flow back into a task system and onto a weekly board.

TRANSPARENCY - PREREQUISITE FOR AN AGILE CONSTRUCTION INDUSTRY

Straightforward handling of information has never been a great strength of the construction industry. A marked improvement in the acceptance of collaboration tools such as BIM has, however, been noted by Martin Otte. Those responsible from younger generations no longer want to send information back and forth by e-mail; they would prefer to draw it from a platform that is kept up-to-date. It is very clear that a new error culture must settle in, Otte points out. That is why OPM endeavours to create an atmosphere in which the involved parties do not immediately resort to claims for damages the moment something goes wrong.

As a conflict manager, OPM always tries to focus attention on solutions: What can we do now in order to still achieve our common goal? In this regard, it would be helpful if the building world recognised the value of timely retrospectives: „Typically, two years of disaster would be followed by one ‚lessons learned' meeting. We make every attempt to learn while we work, and to adapt the processes in the team as required. If something doesn't work, it will be changed until it does". During the User Requirements Specification phase, a retrospective meeting is held every week; during the planning and construction phases, OPM strives to ensure the involved parties do likewise at least once a month. This is usually all that is possible at present, as customers consider the effort expended in retrospectives to be greater than their utility. They do say, however, that they're invariably fascinating meetings and universally enjoyed by all. One thing that is also asked is how the contracting firms on the project feel; something which is highly unusual in this industry.

WHAT IS THE VALUE OF AGILE WORKING IN THE CONSTRUCTION INDUSTRY?

„Participatory working is most certainly a method that works", says Martin Otte, „and, at the moment, particularly for user requirements specification". Testing new approaches is received favourably here. There is however often a need to create awareness for the fact that sufficient time must be allowed for the process, as many project managers want to go straight to assigning an architect under the pressure of potential delay. The deceleration does meet with a greater degree of acceptance, though, as soon as correlations become visible on the AVB board. Nevertheless, the URS phase must not take too long, as formal hurdles and silo thinking will then start to regain momentum. In such cases, there is a need for support

from the top level to recover the spirit in implementation. What cannot be prevented are political decisions being made during the implementation phases, such as bypass the project management and hinder the project.

Setting aside sensitivities is also successful in the final phase, where the focus is on finally putting the building into operation. In order to bring a certain degree of agility into the phases in between, Martin Otte feels there is a need for clever, strategic allocation of the responsible roles and the willingness of the management to work differently. Of course, OPM has no influence on which people will be involved in the project; however, in the majority of cases, the opening-up of the process organisation allows a culture to emerge in which everyone makes a positive contribution.

This results in much greater enjoyment of the work and more money for everyone, if thinking is done in terms of solutions, rather than persisting with the assertion of rights and positions. „You meet several times in a project, and at some point everyone will be stuck in a hole“, says Martin Otte, knowing only too well from his 25 years of experience. Orientation towards solutions shortens the construction period and reduces the costs.

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A successful construction project comes about through transparency, trust and a positive error culture. It comes through good moderation, which allows everyone a fair say. And through the self-confidence to let people grow; giving them the opportunity to demonstrate their capabilities in a project.

Martin Otte | Executive Director Otte Projektmanagement GmbH