Potentials and challenges of agile project management in real estate development

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Abstract

Managing changing requirements and complexity is important in enhancing the success of real estate projects. Agile project management provides approaches for adapting processes and working methods accordingly. This study aims to identify the potentials and challenges of agile project management in real estate development. Therefore, a literature analysis placed principles and methods of agile project management in the context of real estate project management. These perceptions were verified with qualitative content analysis based on semi-structured interviews.

The main potentials arise through the integration of the occupier as key customer and the consideration of his or her needs through an iterative approach. In connection, incremental planning has the potential to reduce uncertain requirements and facilitate creative solutions. Self-organised teams offer the possibility to improve cooperation between interdisciplinary teams and the sense of responsibility, even if the lack of hierarchy is considered a challenge by the experts. Due to strong conflicts of interest, regulations and expensive, complex product adjustments, challenges and limitations of the approaches are seen.

These results provide insights on where agile project management can help real estate project management with the current complexities, but also how it needs to be adapted for widespread application in real estate development.

Keywords: agile project management; real estate development; agility; real estate transformation

Table of Contents

Abstract I
Table of Contents II
List of Figures III
List of Abbreviations IV
1 Introduction 1
2 Literature review: Agile project management and real estate development 3
2.1 The origins of agile project management and its core elements 3
2.2 Potentials and challenges in the application of agile project management 4
3 Research design and methodological approach 9
4 Findings 11
5 Discussion 16
6 Conclusion, limitations and further research needs 19
References 21

List of Figures

Figure 1: Identified core elements of APM in real estate development..... 4
Figure 2: Research design and methodological approach..... 9

List of Abbreviations

APM	Agile project management
PM	Project management
BIM	Building Information Modeling
AR	Augmented reality
VR	Virtual reality
IT	Information technology

1 Introduction

Increasingly, dynamic and complex changes pose immediate challenges to management in various domains (Bennett and Lemoine 2014). The possibility to rely on the consistency of planning and the continuity of action declines (Millar *et al.* 2018). Rather, these changes require adjustments in management and in the instruments and methods used (Teece *et al.* 2016). Management is increasingly responding to these changes with the ability to react in a targeted and dynamic manner to rapidly changing requirements (Conforto *et al.* 2016). This organisational, internal responsiveness is referred to as 'agility' (Overby *et al.* 2006). To enhance agility, agile project management (APM) is increasingly being used as a component of agile management. The objective is to involve the customer in order to optimally adapt the activities to their requirements and needs by continuously formulating them and evaluating their implementation (Olsson *et al.* 2015). Originally from software development, where it has already contributed to increasing success (Sheffield and Lemétayer 2013), APM is increasingly being used in other industries, which has made it better known as a project management (PM) approach (Conforto *et al.* 2014, Sommer *et al.* 2015). Studies and previous research show that APM proves useful in dealing with the higher levels of complexity and uncertainty that are apparent within projects (Fernandez and Fernandez 2008, Crisan *et al.* 2015, Serrador and Pinto 2015). Lechler and Yang (2017) expect APM methods to become an important factor in PM across all sectors.

The real estate industry is also affected by the dynamic and complex changes with the associated challenges. Due to the transformation of the real estate industry business models, corporate structures and processes are changing. Pfnür and Wagner (2020) show in their empirical study that project developers in particular expect profound changes in user requirements and increasing cross-company cooperation. It is becoming apparent that it is getting necessary to act flexibly within the real estate development process and in a customer-oriented manner. For real estate development, the importance of adapting traditional PM and the associated methods to the new challenges seems to be coming increasingly important. Especially as construction PM is now one of the original assignments of real estate development (Zulch 2012), alongside financing and marketing.

As a result, new approaches, such as APM, are also becoming increasingly relevant for the real estate industry (Peyinghaus and Zeitner 2019). A study by Zeitner *et al.* (2019) reveals that potential for APM is seen specifically in real estate development. Even though further research approaches exist that discuss the transfer of agile methods to that field (Blokpoel *et al.* 2005, Owen *et al.* 2006, Olsson *et al.* 2015, Arefazar *et al.* 2019), there is a lack of a general consideration of the potentials and challenges of APM in real estate development in the pre-design, design and construction phases.

This research paper aims to examine the potentials and challenges of APM in real estate development. To this end, (1) trends and changes leading to the application of APM are highlighted and (2) the APM approach is placed in the context of real estate development.

Therefore, we provide literature analyses of APM and real estate development. Based on a theoretical-conceptual analysis, in which the core elements and their potentials and challenges of APM in real estate development are worked out, we develop deductive hypotheses on these. For a practice-oriented reflection of the hypotheses, expert interviews were conducted with experienced real estate project developers.

2 Literature review: Agile project management and real estate development

Within the literature review, the origins and context of APM are first briefly described. Based on this, we identify the core elements of APM in the context of real estate development from the values and principles as well as working methods discussed in scientific and practice-oriented literature. In the second section of the literature review, we highlight the current changes and complexities of construction PM in real estate development and discuss whether and how APM offers potentials and challenges here.

2.1 The origins of agile project management and its core elements

APM as it is used in project environments has become increasingly dynamic, complex and uncertain, and traditional methods are no longer successful in such environments (Gustavsson 2016). Due to the dynamics and complexity of projects, changes to project requirements and objectives are increasingly frequent during a project, with negative effects on the project outcome and success (Serrador and Pinto 2015). In consequence, APM was developed in the field of software development to improve project outcomes through agility (Dybå and Dingsøyr 2008). To be agile, a project must be structured to proactively and quickly adapt to changing requirements and seize opportunities to improve value outcomes (Sanchez and Nagi 2001, Owen *et al.* 2006). Due to changes in project environments across industries, as well as increasing uncertainties and changes in the requirements for projects, APM is also receiving more attention beyond software development (Conforto *et al.* 2016).

APM is defined as "[...] an approach based on a set of principles, whose goal is to render the process of PM simpler, more flexible and iterative in order to achieve better performance (cost, time and quality), with less management effort and higher levels of innovation and added value for the customer" (Conforto *et al.* 2014, p. 22). The focus of the APM approach is on the ability to react as quickly as possible to changing environments, to take changes in customer requirements into account dynamically and in real time and, thus, to achieve faster project runtimes and higher project quality (Erickson *et al.* 2005). According to Ciric *et al.* (2018), APM facilitates management to respond to and cope with environmental changes.

Against the background of these changes, increasing complexity and growing requirements of projects, the need for new values, principles and working methods are discussed in the context of APM (Beck *et al.* 2001a, b, Sidky *et al.* 2007). Assuming that real estate projects, especially with regard to construction PM, are also affected by environmental changes, complexities and changing requirements (Arefazar *et al.* 2019), APM can be characterised as an approach for managing projects to achieve customer value through adaptable planning to change, rapid feedback in flexible scope, continuous improvement, and high collaboration and engagement of project members (Chin 2004, Serrador and Pinto 2015). Sohi *et al.* (2016) show that the application of APM can reduce complexity in construction projects, but the individual potentials and challenges of applying it throughout the PM process remain unanswered. In order to analyse the successful application of APM in real estate

development, it should first be considered which elements of the PM process are affected by an implementation. For this, we place the objectives, values, principles and methods of the APM approach in the context of real estate development.

Although there is a broad range of agile methodologies, all APM approaches pursue common objectives: increase the client's involvement, replacing upfront planning with incremental planning that adopts to the most current information available and changing requirements and to address technical risks as early in the process as possible, entrust and empower staff as well as encouraging ongoing communication between the business areas and project team members (Cooke 2012, Johansson 2012) as cited in (Sohi *et al.* 2016). In addition, a lot of emphasis is placed on time management methods as well as cooperative and transparent collaboration (Cockburn 2002). As a result, we identify seven core elements of APM in real estate development, which are shown in **Fehler! Verweisquelle konnte nicht gefunden werden.**.

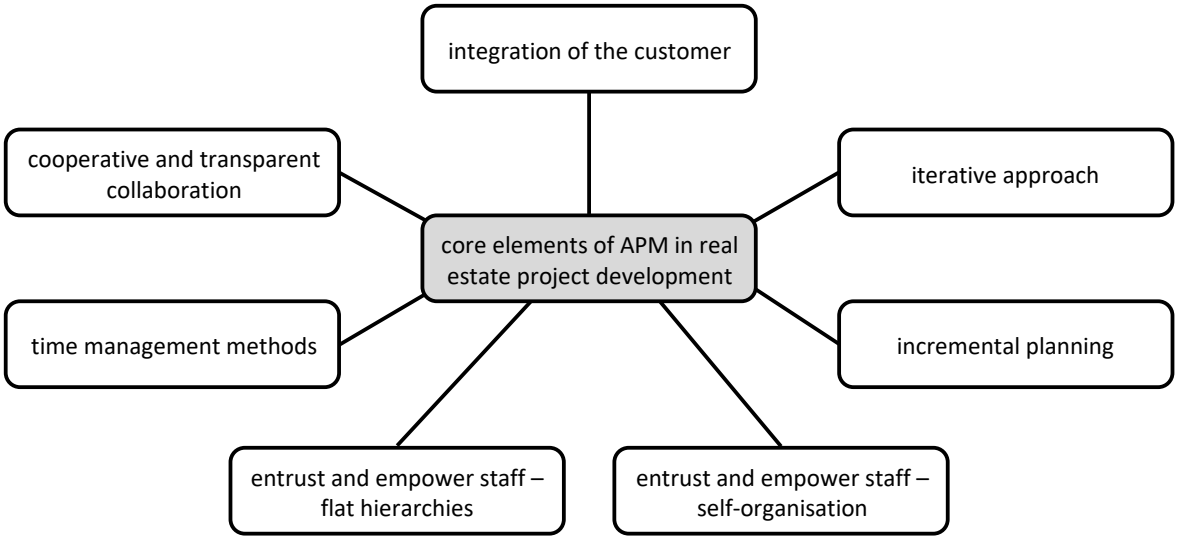

Figure 1: Identified core elements of APM in real estate development.

These seven identified core elements shape the further literature analysis. Here, current changes and complexities of PM in real estate development are highlighted in order to discuss theoretically and conceptually which potentials and challenges are associated with the application of APM.

2.2 Potentials and challenges in the application of agile project management

In this way, we derive a hypothesis for each core element, which in context shows the essential potentials and challenges of APM in real estate development. We assume that these differ in theory and practice. Therefore, we first derive potentially arising advantages and disadvantages theoretically before discussing them with experienced project developers.

Integration of the customer

As old as the discipline of real estate development is, the discussion of whether the investor or the real estate occupier is the key customer of property development continues (Peiser and Frej 1992). The occupiers, as the demanders of the property, exert a strong influence on the real estate development project as their needs and requirements are decisive for the success of the project (Wurtzebach *et al.* 1995). However, Chen *et al.* (2018) argue that real estate development has so far neglected the individual needs of real estate occupiers in particular. Furthermore, these occupier requirements are changing as new conditions of work and production result in changing real estate demand, to which project developers react with stronger occupier orientation (Pfnür and Wagner 2020). Thus, obtaining feedback from the occupier during the real estate development process is important in order to understand and address their requirements (Caputo 2013). As a result, occupiers' integration during a real estate project seems to become more important in order to better take into account their individual requirements and needs for a more successful project outcome and marketing.

Here, the APM approach could be supportive, as APM is centrally focused on the value proposition for customers (Sidky *et al.* 2007). To achieve this, a close partnership with the customer is sought that actively involves the occupiers in the process and focuses on their requirements and needs (Dingsøyr *et al.* 2012). Values and principles provide for accepting and taking into account the customer's change requests within the process. By involving the customer, regular feedback is obtained that can lead to satisfactory results (Chuang *et al.* 2014). Gustavsson (2016) shows in his literature review that integrating the customer in the project is one of the most important potentials of APM beyond software development. Especially in real estate projects, due to their complexity and uniqueness, it can be assumed that the occupier as a customer can only recognise his or her needs and thus the project result in the course of the project.

This leads to the following hypothesis 1:

The application of APM in real estate development leads to a continuous integration of the occupier into the project process, which has the potential of an improved fulfilment of the occupier's requirements in combination with a satisfactory project outcome.

Iterative approach and incremental planning

In order to integrate the occupiers and take their requirements into account, the design of the process of real estate development is gaining importance. Up to now, the process has mostly followed the linear course of traditional PM so that project phases are run through sequentially (Miles *et al.* 2015). This hinders the consideration of a dynamic project environment as well as the integration of continuous feedback and changing user and stakeholder requirements. Accordingly, there is already criticism of the traditional process

of real estate development, for which and above all more flexibility and the possibility to go through phases again is demanded (Olsson *et al.* 2015).

APM does not follow rigid process sequences, but instead obtains and takes into account changing requirements throughout the project by using an iterative approach and incremental planning (Arefazar *et al.* 2019). The aim is to increase the effectiveness and success of the project, in which the customer continuously formulates their requirements and evaluates their implementation (Blokpoel *et al.* 2005). It is therefore crucial that drafts and versions of the project result, e.g. the product, are already created or simulated during the project in order to evaluate functions, features and design together with the customer and to obtain feedback (Highsmith 2004). Thus, the process of APM proceeds in several iterations in order to run project phases several times, which makes it possible to react to changing requirements in an unpredictable environment and to integrate them into the project.

This leads to the following hypothesis 2:

The iterative approach of APM in real estate development enables phases to be run through several times. This has the potential to integrate changing requirements into the project and improve the outcome.

Furthermore, through the iterative approach of APM, the project is decomposed and partial results are generated at the same time. The partial results, also called 'increments', enable feedback from the occupier during the project and increases the amount and level of communication (Sohi *et al.* 2016). In this way, the increments can reduce the complexity of the project as the project is divided into smaller sections (Orlowski *et al.* 2017).

This leads to the following hypothesis 3:

The incremental planning of a real estate development project and the creation of partial outcomes by the APM in real estate development offers the potential to reduce the complexity of the project.

Entrust and empower staff – self-organisation and flat hierarchies

An essential task of construction PM is to bring together numerous actors at different levels with different professional backgrounds for project success. This means that teamwork makes a key contribution to the success of the project. The real estate development process in particular is characterised by many different interest groups and interdisciplinary actors with existing conflicts of objectives (Vandell 1990, van Marrewijk *et al.* 2008). Often, each team member has his or her own specialised role in the real estate development process (Bulloch and Sullivan 2010). The team is led by the project manager, usually a project developer, although in traditional real estate development there is often a clear hierarchy in the team. Due to many increasing professional and technical requirements and the associated need to involve more different experts in the project, the size of the teams in real estate

development is increasing (Miles *et al.* 2015), which does not facilitate successful cooperation. This growing involvement of different actors drives complexity that is not sufficiently taken into account in the traditional PM of real estate development (Blokpoel *et al.* 2005).

Within APM, this change and the growing complexity are countered by self-organised teams with flat hierarchies (Dingsøyr *et al.* 2012). In order to respond to changes quickly, work teams should get full authority to enhance the pace of their decision-making processes (Arefazar *et al.* 2019). Theoretically, it is assumed that in a self-organised way of working, the different resources and skills of the team members can be better utilised, thereby increasing the ability to solve problems (Sohi *et al.* 2016). Therefore, a higher level of commitment is required from team members as they have a more important role in the project than in traditional PM, which increases the sense of responsibility (Wysocki 2006). This is expected to lead to a more innovative and productive way of working (Anderson and McMillan 2003). Gustavsson (2016) identifies collaborative and improved teamwork as a major potential of APM beyond software development.

This leads to the following hypothesis 4:

Self-organised teams of APM in real estate development offer the potential to improve collaboration and increase team members' sense of responsibility.

Sohi *et al.* (2016) assume that working together in a team with flat hierarchies leads to a better understanding of the overall goals of the project. However, a classic hierarchy in the team helps to ensure that there is a clear distribution of tasks. Thus, self-organisation in the team can lead to problems in prioritising tasks, which results in the risk of ineffective PM (Ciric *et al.* 2018).

This leads to the following hypothesis 5:

Self-organised teams in real estate development poses a challenge in prioritising tasks due to the lack of hierarchy.

Time management methods and open transparent collaboration

A general difficulty in real estate development is to estimate the time needed for the development project (Olsson *et al.* 2015). At the same time, the exchange of information within the real estate development process is of great importance. The interdependencies in the process require an efficient exchange of information and communication between the participants in conjunction with transparency (Bulloch and Sullivan 2010).

The APM provides clear guidelines for the duration of meetings and information exchange through the time management method 'time-boxing', which defines a maximum duration for each event. This limits the time needed for processes and is expected to lead to more efficient project execution (Kriegisch 2016, Sutherland and Schwaber 2017).

This leads to the following hypothesis 6:

The application of the time management method time-boxing from APM in real estate development offers the potential of a more efficient project implementation.

As explained above, real estate development is an interdisciplinary process that requires the cooperation of different actors with heterogeneous interests. In particular, the interests of external actors pose risks for conflicts (Caputo 2013).

In APM, cooperative and transparent collaboration is another essential principle. This should reduce the number of formal agreements and contracts (Cockburn 2002, Highsmith 2004). However, due to conflicts of interest, this can be a challenge in real estate development because among other things, actors from different companies work together.

This leads to the following hypothesis 7:

Open and transparent collaboration between actors in a real estate development is a challenge due to conflicts of interest.

These theoretical considerations lack a critical reflection with experiences and expertise from practice. Previous surveys tend to refer to construction PM (e.g. Sohi *et al.* 2016, Arefazar *et al.* 2019). There are individual case studies on the application of APM in real estate development that are more focused on benefits and neglecting challenges (e.g. Olsson *et al.* 2015). Therefore, these seven deductively derived hypotheses will be critically reflected in the following on the basis of expert interviews. First, the research design and the methodological approach are described.

3 Research design and methodological approach

In the real estate industry, and especially in real estate development, APM approaches have hardly been used so far (Sohi *et al.* 2016, Albuquerque *et al.* 2020). Due to the associated low level of experience of decision-makers in corporate practice and the complexity of the topic, no broad empirical survey is conducted. Instead, we chose a qualitative research design of personal interviews with experts in order to verify the results of the theoretical-conceptual analysis with the help of experiences and assessments from practice (Creswell 2014). The main objective of these interviews was (1) to gain an overview of the knowledge and application of the APM approach and (2) to explore potentials, challenges and limitations of the APM approach in real estate development. Here, qualitative approach of personal interviews offer scope for the interviewees' own experiences and assessments and are therefore suitable for generating knowledge and for further sharpening scientific problem awareness (Seymour *et al.* 1997).

The data in this study are primarily gathered in face-to-face expert interviews, an adequate technique for qualitative research because it allows expansive discussions of various assessments (Yin 2017). An expert is basically a person who has specific expertise on the topic, whereby the expertise results from a professional field of activity (Meuser and Nagel 2009). We interviewed decision-makers from companies whose core activity is real estate development or who operate it as a specialist area. They can therefore be considered experts in the given context due to their experience, knowledge background and specific expertise (Flick *et al.* 2004). Because APM methods have hardly been used in real estate development so far, the experts' specialised knowledge of APM was less important. More decisive was each expert experience and insight into practice in order to be able to assess and classify the derived potentials and challenges of APM in real estate development. In total we interviewed seven experts. **Fehler! Verweisquelle konnte nicht gefunden werden.** shows the entire research design.

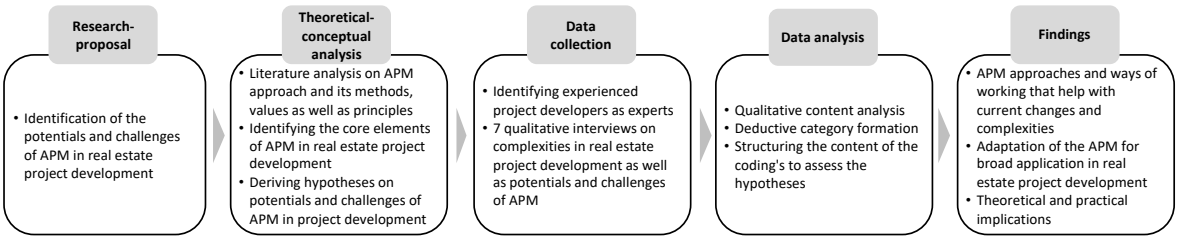

Figure 2: Research design and methodological approach.

We conducted semi-structured interviews using an interview guide that we developed based on prior theoretical knowledge (Wengraf 2001). The interview guide was developed according to Kallio *et al.* (2016). The questions were initially generated from the literature review. After an introductory remark, two general blocks of questions followed. The first block of questions included general questions about changes in the real estate industry and the resulting complexity for real estate development. General questions on the experts' points

of contact with APM were also included in order to filter out the extent to which the expert already had prior knowledge of the topic. The questions in the main section (second block) each dealt with an identified core element of APM: integration of the customer, the iterations, the increments, the team, time management as well as the open and transparent collaboration between the actors were addressed. To ensure that these questions can be sufficiently discussed with the experts, we briefly presented the essential features of these core elements. The respective questions served as a basis for the subsequent verification of the hypotheses that had been derived. For this purpose, we asked whether any of these core elements would be applicable based on the expert's assessments and experiences. Moreover, we asked them to assess the expected challenges involved in the implementation of APM. In addition, open-ended questions (please explain..., when do you recommend..., how do you assess..., where do you see approaches...) were asked. The duration of the interviews averaged 50 minutes. All interviews were audio-recorded and transcribed.

We analysed the expert interviews using the qualitative content analysis approach according to Mayring (2014). The aim of the qualitative content analysis was to extract content from the material to discuss the hypotheses. In this way, the theoretical considerations are combined with the practical perceptions and experiences of the experts. The transcripts of the conducted expert interviews served as material for the qualitative content analysis. The categories used for structuring the content were formed on the basis of the deductive hypotheses developed and were oriented towards the core elements of the APM. Subsequently, the respective expert statements were coded and assigned to one of the seven categories. In order to objectify the results, the qualitative content analysis was carried out by two independent persons. The intercoder reliability was chosen as the quality criterion, which indicates the degree of agreement between codings. We surpassed the commonly accepted threshold above .70 (Krippendorff 2004) so that the following results can be classified as robust.

The results of the qualitative content analysis are presented in the following section.

4 Findings

The results are presented according to the relevance of the identified core elements of APM for real estate development. Before that, the overarching assessments of the current developments and complexities of the practice are pointed out.

The interview results show that dynamic and complex changes in the business environment also affect real estate development. A growing uncertainty due to the overall economic situation, combined with increased real estate prices due to low interest rates, is mentioned by the experts. This increases risks for real estate development, as prices might change during projects. At the same time, the experts perceive increasing complexity of real estate development due to higher requirements for real estate and the PM process. There is also a growing number of stakeholders who influence the project. Due to rapid changes and uncertainty, a quick ability to response is becoming necessary. From the interviewees' perspective, the traditional PM process in real estate development does not allow for sufficiently dynamic responses. The interviewees agree that an adaptation of existing PM process and ways of working is necessary in order to remain successful.

Perceived challenges of customer involvement outweigh the potentials of improved project outcome

In the discussion about the key customer of real estate development, the experts name both the occupier and the investor as well as the public sector. Some experts argue that it is the rent paid by the occupier that determines the income value of the property. Thus, the investor's investment decision is often dependent on the existence of leases. Only in the case of particularly large projects with rapid marketing and if no occupier has yet been determined during the development phase is the investor considered a key customer. Following this, properties are often designed to be flexible and scalable so that they can be adapted to different occupiers and usage concepts. This is due to these properties also having to meet subsequent occupier requirements in order to be marketed, which highlights the importance of the occupier as the key customer.

An early involvement of the occupier as a customer in real estate development is seen as necessary by the experts. Nowadays, the customer is involved much earlier in the real estate development than in the past; however, some experts see challenges in this regard. With respect to the implementation of changes in the project by the client, some experts consider it crucial that contractual agreements are in place. Due to the existing dependencies of the developer on other actors, the customer must be prepared to bear the consequences of his change request in monetary and also time terms. Thus, change requests are a formal process in real estate development that take a long time and are not always satisfactory. Due to the complex nature of real estate products with a long-term production period, it might not be conducive to always taking into account the customer's changed requirements. Instead, the customer should clearly formulate their requirements at the beginning of the project.

Indeed, the experts consider close cooperation and continuous exchange with the user as necessary to achieve project goals. The involvement of the customer requested in APM is nevertheless viewed differently. If the customer can formulate clear requirements and has a certain expertise, then the involvement is seen as purposeful. Otherwise, its integration means additional work for the project developer. These limits, depending on the occupier, determine whether closer cooperation and continuous exchange with her or him can improve project outcomes. Furthermore, it is necessary that the customer is willing to cooperate, which according to the experts is not the case for all.

Iterative approach finds broad acceptance to enable integration of changed requirements

The interviewees consider an interactive approach to real estate development to be necessary and see it as widespread. The approach of theoretically dividing real estate development into different phases reveals less evidence in practice: *"I actually think the mental approach of describing the process in different stages is wrong. [...] In fact, it is not like that in practice. I may also have to jump back again in the last stage if the framework conditions have changed."* Iterations in real estate development occur as decisions are questioned and issues are considered repeatedly. According to the experts, iterations allow for a more up-to-date response to client and market needs and for integrating knowledge gains into the project, which can result in faster delivery of the developed property and improve outcomes.

Especially in the utilisation analysis within the feasibility study, potential is seen through an iterative approach. Because many influences for the project can be identified at this early stage, cost savings could be realised. The interviewees emphasise that it is important to involve many stakeholders. Another observed potential is increased user satisfaction. Iterations in the utilisation analysis could also improve marketing and utilisation in the long-term by not taking into account only current market trends that could change again during the project's duration of several years.

The building regulations and cost-intensive adjustments in construction are named as a major challenge with regard to iterations. This results in discrete steps in the real estate development plan that cannot be adapted afterwards, such as approval planning. Thus, an iterative approach in real estate development can only take place in certain sections, but not – as the project developers consider promising – across the entire project.

The potential to reduce project complexity through increments

To the experts' perception, real estate projects are already decomposed to generate partial results. However, these experts point out that projects have already failed in real estate development because the overall view of the project was missing. Thus, the division into increments should be viewed in a differentiated way. Some experts emphasise that it helps reduce complexity and enables greater control through transparency. The overall project

must always be kept in focus as well as the dependencies between the increments. One interviewee explains that decomposing the project could increase the effort, which in turn may also lead to a better project outcome.

With regard to incremental planning, the experts clarify that the planning horizon should be kept as short as possible. A long planning horizon is associated with the risks of changing business conditions and changing market demand. Monetary factors also speak in favour of a short planning horizon due to the capital tied up. In real estate development, however, there is a dependency on third parties in this respect, so that the planning authority about the time does not always lie with the developer. According to the experts, the length of the planning process is mainly due to legislation and public authorities. According to their assessments, this hinders incremental planning because the project team cannot sufficiently control the necessary processes itself.

The potential of working in majoritarian self-organised teams

Self-organised teams in real estate development are viewed very divergently by the experts. On the one hand, there is scepticism as a higher-level decision-maker is seen as necessary to achieve results in a timely manner. On the other hand, self-organised teams are regarded as essential for a flexible way of working. In practice, however, project teams are still usually accompanied by a project manager that intervenes in case of problems.

From the interviewees' perspective, real estate development requires a high level of team orientation on the one hand due to its interdisciplinary nature. On the other hand, interdisciplinarity also means that the PM must balance conflicting interests when necessary. An argument against self-organised teams is that one person should make decisions; otherwise, the decision-making process can become too time-consuming if there is a conflict between team members. Another difficulty of self-organised teams in real estate development is seen in the prioritisation of tasks.

However, the majority of experts see potentials of self-organised teams in real estate development. One potential mentioned is that when team members are aware of the background of a project, they can work in a more goal-oriented manner. For interviewees, this goes hand in hand with an increased performance of team members. According to the experts, real estate development is suitable as a self-fulfilling activity that employees demand nowadays because the result of the work can be made visible. The success of a self-organised team in real estate development is also based on the fact that each team member can use his or her competences in a targeted manner if tasks are distributed independently. However, for the experts, an overview of the entire project by team members is indispensable in this context. The prioritisation of tasks must be discussed within the team so that tasks with a high priority are carried out first. Internal communication plays a crucial role in this. This also requires a manageable team to ensure sufficient internal communication.

A decisive factor for cooperation in a self-organised team is that the team members must have the appropriate competences for self-organised work. As long as each team member is aware of his or her responsibility to contribute to the success of the project and each team member has the willingness to do so, self-organisation in the team does not lead to problems according to most interviewees.

Conflicts of interest challenging open and transparent collaboration

The interviewees state that the interests of all relevant actors in the project must be taken into account in order to promote open and transparent cooperation. They emphasise that the willingness to cooperate transparently is significantly influenced by monetary aspects. However, they fear that transparent cooperation is accompanied by the challenge that transparency can be exploited by individual actors for their own advantage in the case of divergent goals. For this, the experts see the need for contracts so that one actor cannot use mistakes to his advantage and the disadvantage of others.

Furthermore, in real estate development, the actors usually only react to a problem if they are affected monetarily. According to the experts, external stakeholders in particular often focus on their own interests and less on the overall success of the project. The project developer must understand this and filter the relevant information. To provide the external actors with all the information of the project would lead to an excessive demand. Thus, the project needs to validate exactly which information is transmitted to which actor so that the focus is not lost.

A majority of the experts nevertheless see potential for project improvement through transparent cooperation among the relevant actors. Decision-making backgrounds are understood and better performance results are expected because there is higher motivation among the participants. However, this cooperation also requires good interface management and appropriate contracts between stakeholders. Cooperative behaviour and transparency are also strengthened by repeated and long-term cooperation. However, conflicts of interest can only be resolved if a lack of transparency is the cause. To avoid general conflicts of interest, stakeholders should instead define their requirements very early in the project.

Time management methods can enhance efficiency: experts regard time-boxing critically

Regular meetings are scheduled in real estate development, which are supplemented by additional meetings due to current events. In some cases, time management methods are used in these meetings while in some the time is exceeded due to current problems in the project.

Some experts consider a fixed time schedule for meetings, such as time-boxing, to be useful and necessary in real estate development as meetings are otherwise inefficient. Potential is

seen above all in time savings. According to experts, efficiency is promoted because meeting participants are forced to keep their content short. On the other hand, the experts consider the implementation of time-boxing in real estate development to be difficult. This is related to the prevailing dynamics, which require being able to act. Time management is strongly determined by external influences in real estate development, with interviewees fearing that time-boxing limits too much the necessary ability to act. Complex issues require sufficient discussion for the project to be successful. A time constraint or postponing decisions to another meeting is not conducive here because timely clarification is imperative. Explicit time constraints in this case do not necessarily contribute to the efficiency of a meeting as important information may not be exchanged. One expert makes clear: "*Too much restriction in the internal coordination processes is difficult*". Furthermore, in real estate development, relationships between actors are seen as essential for project success. According to the experts, time-boxing could have a negative effect here as there may not be enough time to build and maintain relationships during appointments.

5 Discussion

In the following, we critically discuss the results of the theoretical-conceptual analysis and the expert interviews. This provides insights into which core elements of the APM approach help real estate development to cope with current changes and complexities. Beyond that, it can be shown in which aspects the APM would have to be adapted for a broad real estate business application.

Basically, the results show that the interviewed experts confirm the hitherto often theoretically argued necessities for adapting traditional working methods in construction PM and real estate development. Due to dynamic changes and growing complexities, the need for closer cooperation and integration of the real estate occupier as well as adaptations of the PM process is increasing. This is where the APM approach shows potential for a successful project outcome; at the same time, there are challenges to its implementation in real estate development as the benefits and values of this approach have not been solidly proved in the industry.

Accompanying the theoretical findings, the experts increasingly see the occupier as the key customer. However, not all experts agree. This may be related to different orientations of the business model (trader, investor or service developer), but could also be an expression of existing and traditional views (Pfnür and Wagner 2020). However, a partial lack of key customer focus makes the application of the APM approach difficult, perhaps even successful project outcome in general. Even though the interviewees see the early integration of the real estate occupier as a potential to better take into account their requirements and, thus, improve the project outcome (hypothesis 1), they discuss the challenges related to it. In contrast to the APM, for some experts, real estate development requires that the occupier clearly formulates the requirements at an early stage and commits to them.

In order to incorporate the requirements and needs of the occupier, the iterative approach is seen as a potential (hypothesis 2). According to the experts, this approach is already being used even without consistent application of APM. In line with Owen *et al.* (2006), especially in the pre-design and design phases, positive effects on project success are expected. However, the experts claim for adjustments in the building regulations in order to be able to actually use the potential of the interactive approach. This is in line with a concern that APM would be unsuitable for highly regulated environments where their culture is based on hierarchy (Stracusser 2015). Moreover, it is probably necessary to take into account that construction has its rigid assembly sequence where operations are not interchangeable. Therefore, changes and rework force complexity and are expensive and cause project delays that limit the iterative approach, at least for the construction phase, due to the complex physical real estate product.

The iterative approach is accompanied by the creation of partial results or incremental planning. These lead—after the theoretical-conceptual analysis—to a reduction in overall complexity (hypothesis 3) and, thus, facilitate the realisation of projects. In practice, however, a decomposition of the project is viewed critically. Projects have already failed

because the overall view was missing. Even though the interviewees agreed a reduction in complexity, doubts are expressed as to whether incremental planning also leads to the necessary short planning horizon.

With regard to self-organised teams, the literature show that the team is an important factor for project success, whereby self-organisation can improve cooperation and sense of responsibility (hypothesis 4). This assessment is confirmed by the expert interviews. At the same time, the practice calls for a person who makes decisions in order to save time and reduce the potential for conflict. Nevertheless, self-organised teams are seen as having the potential to ensure a flexible project process and increase team performance. However, the flat hierarchy associated with self-organised teams is perceived as a challenge as sufficient prioritisation of tasks cannot be ensured (hypothesis 5). Here, the independent prioritisation of tasks and the perception of responsibility in the team is not (yet) given sufficient trust. In addition to the aforementioned insufficient internal communication, the feared lack of experience could also be a factor. Furthermore, in construction management, complex relationships among developers, designers, owners, users, builders, etc. have to be well planned and managed within the team to be successful. However, this is not efficient from an APM perspective. The agile approach relies on small, interactive, multidisciplinary teams and effective communication.

The theoretically argued need for efficient information exchange with communication between the participants is confirmed by the interviews. A time schedule for meetings is generally considered useful in order to make meetings more efficient. However, time-boxing itself is not considered helpful (hypothesis 6) as it limits the ability to act on short-term topics that require a lot of meeting time. The experts described the negative effect of time-boxing on the relationship building that is essential in real estate development.

The principle of open transparent collaboration in APM is seen as a challenge in real estate development (hypothesis 7) due to various conflicts of interest between the participants as well as the fact that actors from different companies come together. Even though the interviewees see that transparent collaboration helps avoid conflicts and offers the potential of a long-term cooperation based on trust, they cannot imagine doing without agreements and contracts. Moreover, they believe that not every stakeholder should have access to all information. However, the question remains open whether there is a lack of willingness and trust for open and transparent collaboration as well as considerable resistance to changes in the current process (Albuquerque *et al.* 2020), or whether the disclosure of all relevant information and transparent cooperation without contracts actually has a detrimental effect on business.

In addition to the potentials and challenges of APM in real estate development, the results provide clues as to which aspects of APM need to be adapted for broad application in real estate development. Thus, in contrast to the theoretical-conceptual analysis, the expert interviews show that the APM approach assumes and presupposes values and principles for the promotion of cooperation and partnership between the actors, whereas in real estate

development many different actors with different interests are involved. Within the real estate industry, the breaking down of conventional ways of thinking and behaving to improve agility (Teece *et al.* 2016) appears to be further along than in the IT industry (Albuquerque *et al.* 2020). Furthermore, the real estate industry produces a physical product which, in addition to developers' working hours, also involves a high level of material and personnel costs as well as capital. Lengthy decision-making processes, coordination rounds or constantly reformulated customer requirements therefore have a different financial impact on the overall project and individual actors. In addition, the creation of a prototype, which is common in many product developments, is not physically possible. Perhaps, the digital building twin with the BIM method or augmented reality (AR) and virtual reality (VR) could provide potential here (Arefazar *et al.* 2019) to map development processes and customer requirements with the later building user digitally first and thus in a much more cost-reduced way. However, this would initially require a longer planning process, which may then be offset by fewer adjustments in the realisation phase. Furthermore, in the perception of real estate developers, a key customer still exists only to a limited extent. It is not always possible to work together with the customer and final user of the product either because the final user is not known or because other interests have to be taken into account due to the high capital investment, long-term life cycle or public regulations.

Moreover, the results also show that existing APM approaches from software development cannot be directly transferred to the PM of real estate development. Rather, these approaches need to be adapted and further developed for the special PM and development process with interdisciplinary teams, divergent perspectives and interests, lengthy planning and construction phases, and a complex physical product. It can be assumed that, similar to general product development, hybrid models that integrate agile values and principles into conventional PM standards and processes (Conforto *et al.* 2014, Sommer *et al.* 2015, Lechler and Yang 2017), are also gaining in importance for real estate development. Building on the results, it could be discussed how agile methods and principles could complement and be integrated into existing PM methods in real estate development. It is assumed that adaptation of promising APM principles and methods can also help reduce scepticism and reservations among actors and thus challenges of implementation.

6 Conclusion, limitations and further research needs

In a wide range of industries, there is discussion about the extent to which the APM approach is helpful in managing complexities and requirements and achieving project success. Managing changing requirements and complexity is particularly important to increase the success of real estate projects. In the lack of studies analysing the application of APM in construction PM and real estate development, and especially due to the low level of practical usage, this study aimed to identify the potentials and challenges of APM in real estate projects. After identifying the core elements of APM in real estate development, the theoretically derived potentials and challenges are discussed based on expert interviews in order to supplement them with assessments and experiences from practice. Due to the practical high relevance of APM for the current situation of real estate development and, at the same time, low practical distribution, the research design chosen here is the best alternative. A more quantitative and data-based validation would require a large number of evaluable projects applying APM approaches. However, the need for flexibility and agility in real estate development exists now during real estate transformation; the obtained results based on assessments by the interview partners can provide contributions here.

The findings demonstrate that the APM approach provides promising methods and principles for successfully responding to the changes, increasing complexities and dynamic requirements in real estate development. These are seen in both theory and practice, even if the approach cannot be directly transferred to the real estate project process with a complex physical product. The main potentials consist in the improvement of the project outcome through the integration of the occupier as key customer as well as the integration of changed requirements through an iterative approach. In connection with the iterations, incremental planning also has the potential to reduce uncertain requirements and facilitate creative solutions, at least in the pre-conception and design phase.

APM's self-organised teams offer both a potential and a challenge. The potential is seen in an improved team's cooperation and increased team members' sense of responsibility. However, according to the experts, the lack of hierarchy in self-organised teams leads to a challenge in prioritising tasks. Moreover, the theoretical potentials of an efficient implementation of the project through the time management method of time-boxing are not seen in practice. Strict time management methods could contribute to time savings, but it limits the ability to act within real estate development, which is highly dependent on external influences and sometimes requires extensive meetings. There are also apprehensions about a negative impact on interpersonal relationships in real estate development. Finally, the open and transparent collaboration of the APM approach proves to be a challenge due to the many interdisciplinary actors with various conflicts of interest.

The qualitative research design chosen here entails limitations (Silverman 2013). Due to the limited application of APM in the practice of real estate development, not all interviewed experts had a broad experience with or a scientific understanding of APM. We countered this circumstance by prefacing the question blocks with explanatory remarks. Even though the

qualitative expert interviews were able to generate knowledge through different experiences and assessments from practice, the results cannot be generalised to a large extent due to the qualitative research approach and the number of interviews (Choy 2014). The qualitative results obtained could be further validated with investigations in more depth how APM and/or hybrid management approaches can actually be implemented in real estate development. Project-accompanying research with the application of APM is also likely to promise exciting theoretical insights. Nevertheless, due to the novelty and hardly practical usage, the qualitative research approach was useful to highlight potentials and challenges of APM in real estate development.

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