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ABSTRACT

Assessing risks of projects is difficult from a practical as well as from a theoretical point of view but valuable in both dimensions. Project management and risks in projects can be discussed from a systems theory perspective that focuses on how systems develop and stay stable in spite of change. This approach is refined and applied to in three phases of a project-life-cycle (decisions made before a project starts which include substantial parts of the problem definition; the actual project phase; the ending of and the time after the project). The theoretical framing within systems theory allows for a detailed discussion of the project design. Finally, the approach leads to a concise list of questions that may be used to design projects as systems and/or to assess risks.

Keywords

Project design, project management, project controlling, systems theory, consulting, participatory design, risk assessment in projects

QUITE A BIT OF AN INTRODUCTION

Reading participatory-design (PD) conference proceedings, a mixed picture regarding the success of PD-projects evolves. Many articles end with positive descriptions of what has been achieved and learned. Other voices are more critical. Van den Besselaar [1] reviews the effects of several strategies to steer the process of technological change. In general and with respect to PD, he draws a less optimistic picture: results of PD projects were mostly fragile, most

of the projects were small stand-alone projects; and the focus of PD-projects has shifted from emancipation and democracy to “improving systems for users”.

In this paper, the focus is turned to the better understanding of reasons for possible failure of PD-projects. Avoiding failure of projects is critical, from a personal as well as from the participant's/company's point of view. Assessing possible risks may allow for more informed decisions on the project design and for focusing attention to critical factors or critical developments.

The theoretical background of this analysis is systems theory [2], [3], [4], and [5]. ‘Systems theory’ is used in rather different discourse-contexts (e.g. socio-technical approach, technical systems theory, and constructivism). These authors use the notion ‘system’ primarily to denote social systems. While part of this work is criticised due to its relativism, other parts had an important influence on consulting [6] and evaluation [7]. This focus on systems and their behaviour comes with costs; i.e. other concepts (e.g. the role of the subject, political interests’ [8]) are difficult to discuss in this theoretical framework. A further drawback of systems theory in the way it was done for example by Luhmann and Willke, is its little awareness of technical issues and especially infrastructure issues and their complex role in shaping further development of organisations (compare [9], [10]). The strength of the approach is its attention on how systems reproduce themselves and stay stable in spite of change.

With this background of systems theory, organisations are understood as highly complex and self-reproducing systems that interact with their environment primarily in economic terms. As systems organisations constantly have to make selections on which environmental information to consider relevant and which actions to take. These systems have a history, may reflect their behaviour, and change themselves intentionally.

Willke states ([11]-p.215), that organisations are increasingly forced to abandon central hierarchical structures in

favour of a new form of steering. The new mechanisms of steering rely on contextual interventions and the development of preconditions for a reflexive self-steering of each part of an organisation to consider mutual dependencies (within the system and to its environment). It is not enough that systems steer their own complexity. They also have to manage their relations to other systems in their environment. He extensively uses these concepts in [12], where he analyses how steering in highly functionally differentiated societies can work.

Following Willke's perspective on organisational needs, this paper considers a project to be **successful** if it improves the preconditions for a reflexive self-steering of an organisation that considers the mutual dependencies to its parts or to other systems. Correspondingly, **failure** is one of two things to happen. First, the project is stopped (e.g. due to internal difficulties or by either the consulting or the customer organisation). Second, it does not meet the success criterion mentioned above. The latter is difficult to decide. However, in order to avoid relativistic uncertainty, a reasonable evaluation seems to be the approach to choose (e.g. [7]).

This definition of success is different from definitions of success in PD-projects, but there are two lines that bring participation into systems theory. The first is the utilitarian argument, that participatory design may improve the quality of e.g. a software solution to be developed. The second argument states participation as a possible external request to be considered by the organisation. In the understanding of PD, the criterion of success developed above should overlap with these two arguments. Still, there may be differences.

'**Risk**' within this article is used, if an observer considers a failure to be likely or plausible to happen up to a relevant degree. This is a difficult concept. Risks are strongly related to the specific contents of a project undertaken. At the same time assessment of risks may focus on different aims (e.g. a project manager needs a comprehensive tool; researchers may be interested in a more extensive description). Making things even more difficult, assessment of risks relies on categories used by observers, again nothing easily build upon. Bowker and Star [10] describe difficulties, interests, and settings that shape the broad range of approaches to classification, the process of classification and at the same time its relevance for visibility and further work building on it. Correspondingly, assessment of risks reflects experiences, political decisions, awareness of possible shortcomings and therefore, discourse and changes in the course of time [13], [14]. Besides theoretical reasons, practical reasons make assessing risks difficult. Given the limits of time, knowledge, and communication in practical situations [15], lists of potentially relevant risk factors have to be short to be applicable. Given these difficulties and - at first glance - starting to collect a list of potentially relevant

risk factors resembles good old encyclopaedia building in the 18th and 19th century with (not enough) fear of all the complexity of language and the sorting out of things.

In spite of all these difficulties, lack of techniques for such an assessment of risks has severe drawbacks too. From a practical point of view, if one relies on regular income as project-manager, or supervises a group of project-managers, such tools are useful in order to think over the risks within projects. From a theoretical point of view, the difficulties make it even more challenging.

Participatory design techniques are characteristically used in projects. **Projects** are a well-established way of dealing with complex, unusual, and temporarily limited problems or tasks. While one could think of virtually every work as a project, we reserve this notion here (in accordance with most of the literature) to projects of some size that involve people to a relevant degree. Several perspectives on projects can be developed. E.g. projects in opposition and conflict to hierarchy, projects as fields of learning, projects as new organisational paradigm. In a systems theory reading, projects can be understood as time limited systems. Correspondingly, they are considered to meet the minimum standards of a system (a border to demarcate it from its environment, internal dynamics, self-steering - [2]). The internal structure may develop a degree of functional differentiation such as quality management, risk management, or project controlling. Even for small projects the perspective of projects as systems can be applied, if a border is defined (part of "standard"-project-procedures) and if there is internal dynamics and self-steering (which is necessary if the task is unusual and complex and if the project has to overcome all arising difficulties).

Building upon this systems theory understanding of projects, refining the theoretical framework in the next section shall prepare the following analysis: The preconditions and facilitating factors of a project to become and act as a system (for an observer who applies these concepts of systems theory) are introduced. The further analysis is then covered in three steps.

In the first step the analysis deals with issues before the project starts. This is done out of the perspective of the customer organisation and includes the definition of the problem and the selection of the consultant which shape the future project to a high degree (e.g. questions of membership and structure). The customer organisation may or may not include all project members and possible users of the system under development. Although it would be worthwhile to discuss the relation and interactions of the customer organisation, the consulting organisation, and their environment, this is beyond the scope of this article. Aspects of the political and legal framework are discussed for example in [16], [17]. Aspects of the interaction with the consulting organisation, e.g. how does the consulting organisation make sure that consultants do not switch to the

customer organisation are discussed in [18]. Responsibility and qualification are analysed in [19].

In the second step the article analyses the project phase, i.e., preconditions and facilitating factors for a project to become a temporarily stable system, its internal structure, and steering of the project.

The last step of the analyses is the ending of the project and the time after the project, i.e., how are the results of the project used in the customer's organisation. If the project has not been stopped by then, this is the time, when success or failure actually happens (e.g. whether and how the software is used).

Even though the paper is mostly a theoretical paper, it has an empirical background too. Elements of this background are courses and literature that I visited to learn and reflect the author's activity as consultant. These activities were strongly inspired by systems theory. Other elements of the background of this paper are a high number (>100) of consulting projects. Several of which in the field of software development, some in the field of designing collective agreements on pay; most of the projects were undertaken in the field of redesigning working time arrangements (e.g. for shift workers in various industries such as heavy industry, health industry, call centre). All projects had working groups (ranging from a few persons to over 25); bigger projects typically also had a steering committee. Project duration varied from a few days to over 1-½ years. Some of these projects are described more detailed in [19], [16], [20]. Projects were designed tasks and customer specific. Nevertheless facilitation always played an important role (e.g. [21], [22]).

CONTINUING THE INTRODUCTION: AREAS OF ACTIVITY OF A PROJECT

In the understanding of systems theory, systems develop themselves. I.e. systems have their internal dynamics and their behaviour can not be described by external influences only, but has autonomous elements. Therefore, only preconditions for the successful building of systems can be prepared and not the system itself.

Willke [11] p.206-211 applies general concepts of systems theory and distinguishes five areas of organisational activities:

- I. *The construction of a border that allows for specific dynamics of interaction between members of an organisation, as well as between members and non-members is crucial. Thereby an observer can distinguish actions of the organisation from other actions.*
- II. *An organisation gets the resources it needs by developing and deploying its core-competencies. These competencies allow for delivering products or services.*

III. *After some time and in varying degree, organisations develop structures that define divisions of labour, roles and rules.*

IV. *Organisations may develop processes to structure the temporal complexity, to co-ordinate and synchronise their activities.*

V. *Organisations may reflect their own behaviour and do revise aims, priorities etc. and thereby indirectly change themselves. It is not only the internal complexity of the system but also the relation to its environment, other systems, employees, customers, etc. that has to be considered.*

Depending on the situation at hand and on the history of the system, these five areas may be developed to a different degree.

The following analysis concentrates on these areas of activities. Preconditions as well as facilitating factors are looked for that may make actions (of a project as a system) easier or more difficult to pursue.

Most of the analysis focuses on the project seen as a new system (step 2 of the future analysis). The already existing systems have to be considered too, i.e., what do the customer's organisation and the consulting organisation have to do to be able to prepare preconditions for a future project and facilitate its development (step 1 of analysis)? Furthermore, what is necessary to do once the project has finished (step 3 of analysis)?

The criteria developed by Willke are not directly applicable. Criteria I, II, V are easy to distinguish. Still, criteria III, IV are highly related to each other by Willke already. He considers them as first and second level of stability regarding decision-making processes. This does make sense for highly stable organisations. It makes less sense for extremely dynamic environments and especially for projects. Therefore these two criteria are combined and discussed together as questions of structure and steering.

An additional difficulty appears from the fact that several aspects of project management pop up in different perspectives. E.g. the resources assigned to a project are to be discussed from the perspective of the project (e.g. is it enough) but also out of the perspective of the customer's organisation (e.g. is it possible to invest that much). Such "nodal points" of discussions are resources, steering, autonomy, and connections of a project to its environment.

BEFORE THE PROJECT STARTS...

Projects do not start in empty space. Projects involve people and organisations with experiences. Experiences can be understood as resources that allow for better decision-making process in some areas. There are numerous ways to classify experience. Within this article, I only look at two categories of experiences: Experiences regarding the spe-

cific content of a project (e.g. design of a database) and experiences regarding the size of project (with respect to the number of persons involved, the resources applied, and the time). Experiences with content and size are of a high practical relevance. I.e., each of these experiences makes it easier to define roles and processes to get and keep a project running.

Besides experiences, building up projects is influenced by the communication infrastructure. The term infrastructure is used with a twofold meaning. First, the technical infrastructure that makes it easier to communicate on some matters and more difficult to communicate on others. Second, the established ways of the use of this infrastructure. The way projects are build is thereby strongly influenced from this infrastructure-background. This allows for the first list of critical factors:

1. *To what extent are experiences with projects of that size and with similar contents available by members and/or the organisation?*
2. *How well established are communication channels and co-ordination instruments for matters of the project from a technical point of view and with respect to the actual use by the persons involved? (E.g. is the communication between actors difficult?).*

Typically, the customer organisation defines the problem - sometimes influenced by consultants. This is an extremely risky issue. The problem definition strongly influences which persons and systems will be involved in the course of the project as well as the resources and the attention a problem gets. This is how the problem definition influences the capability of a project to reflect its own development and usefulness. E.g. if it is a 'pure' technical problem it is probable that consultants with a high technical expertise are involved and a multidisciplinary approach is less likely.

One dimension of risk is that the problem definition is of little use to solve the underlying problems. To take an example from private life: the discussion of legal issues can cost a fortune, but usually this is not the core problem of a divorce. Problems can be described in several ways, respectively have several dimensions (e.g. as a legal problem, as a technical problem, as a social problem, a question of management style). The use of these categories leads to a different sensibility and a differing collection of experiences. This ends up in a difficult balance to find for consultants. On the one hand, they should have a broad understanding of possible approaches to be able to tests several problem definitions. On the other hand, consultants should specialise in order to work efficiently and on a high level.

An additional dimension of risk is that the problem definition and the corresponding approach may amplify or stabilise the problem. In consulting, (as in other fields) there is always the danger of becoming part of a problem by helping to solve it. E.g. a manager doesn't feel strong enough

and fears confrontations. If a consultant joins in to discuss instead of him/her, this doesn't necessarily help, but might weaken the manager's position even more.

To make things yet more difficult, not all-suitable problem definitions can be discussed in each customer organisation. E.g. if a technical problem could be read as a management problem, the latter view sometimes is very difficult to work on.

Summing up, problem definition is extremely critical and should be reflected as good as possible. This includes the testing of alternative problem definitions as well as a re-check from time to time:

3. *Have other readings of the problem definition been seriously developed and tested for a reasonable time compared to the expected project size? Has it been reflected whether the proposed approach does not stabilise the problem?*

The customer organisation and the consulting organisation (maybe even additional systems) have to prepare the pre-conditions for the future project. In a systems theory understanding, a project needs relevant autonomy to be able to survive as a system. At the same time projects need substantial connections to the customer organisation, both during the project and afterwards.

Possible failures in this area are manifold. E.g. support of management does not necessarily mean support of the customer system. Autonomy can be too high (i.e., nobody really cares) or too low (e.g. project steps can not be influenced and shaped by the project). The most difficult balance to find is when representatives of other systems or sub-systems are to be included in the project team. E.g. if a shop steward (as a person) is delegated into a project team several dangers have to be considered. First, the shop steward (as a person) becomes too strong a member of the project ("forgets" his task as a representative). Then the shop stewards (as a system) are either hindered in their autonomy ("your representative already agreed") or to autonomous, i.e., the project loses too much connection to the shop stewards (as a system) and therefore can not anticipate its behaviour. Another danger is that the representative can not become member of the project enough, i.e. he/she is 'only' representative and does not care enough for the needs of the project. Both dangers are critical and may arise with sub-systems in the customer or the consultant organisation, but also in connections to other systems (e.g. a user group).

This management of autonomy is difficult and depends strongly on the resources of the project-members (e.g. how much experience do they and/or the organisation have in managing such balances) and the strength of potential conflicts. If the danger of too loose or too tight connection is high, the **layering of representation** is a possible approach. E.g. a few shop stewards are in the project-group. Others are in a steering committee. Even a third layer could

be considered.

Correspondingly, the questions of autonomy are:

4. *Is the customer organisation (and the consultant organisation) willing to grant the autonomy (and the resources) to a project it needs while at the same time maintaining relevant connections that ensure feedback?*
5. *Do the intended delegations and the eventual numbers of layers reflect the need for autonomy and the potential of conflict well enough?*

PROJECT PHASE

Starting with the first of Willke's criteria mentioned above, a border that distinguishes members from non-members is crucial. Such a distinction may take place in various ways, e.g. by designing full-time work to a project, or by communicating clearly (e.g. by using different letterheads) which activity is part of the project work and which is not. To develop a successful distinction, this designation has to be communicated successfully to all members and non-members in the environment of the project. This attribution of membership (or activity within the project) has to be sustained over the time of the project and to be accepted by all persons involved.

Membership has different aspects. One is the designation mentioned above. Another one is the acceptance of central aims, orientations, etc. by the members of a system. Applying this to projects, it is the question of whether designated project members accept central project-aims and project membership. Accepting project membership does not mean that members of the project can not be members of other systems at the same time. Still membership means that in contexts central to the project persons act and communicate strongly related to project issues. E.g. such a membership is not developed if old quarrels between departments, personal conflicts etc. dominate communication of project-members. This leads to further critical factors:

6. *Is it clear who is in the project and who is not, or which activities are to be considered part of the projects?*
7. *Do project members accept central project aims and are they part of the internal dynamics?*

The question of membership to a project directly leads to the question of getting resources. In systems theory conception, the critical factor is whether the organisations stay 'in a good enough mood' during the whole project to supply the resources needed. One might even speculate whether the successful management of the relationship to its funding organisation could be seen as a core-competence of a project.

8. *Does the project spend enough resources on the relationship to its funding organisation?*

This question is strongly related to power and the connections to centres of power that may influence the survival of the project.

9. *How complex is the project environment with respect to political changes and power (e.g. are the relevant systems – from the perspective of power - directly involved in the project)?*

Projects have little time to develop core-competencies. Therefore, they either have to be in the project by corresponding assignment or there has to be enough time and money to buy them. Competencies refer to a broad area of qualifications. In [23] several types of knowledge are distinguished – abstract knowledge as well as concrete experience in the domains of user's present work, the new system, technological options. These areas of knowledge represent areas of work- and system design. There are other areas to be considered too. Given that each project is embedded in an environment, access to other (sub-) systems can be considered as critical, to allow for communication. Thereby the areas of knowledge of the organisation and its environment, of the communication channels, etc. come to the fore. Finally, project expertise of persons has to be added to the list of relevant resources. Summing up, the critical questions are:

10. *Given the temporal restrictions, do the competencies of members (and the time they can devote) already meet the requirements or can they be developed to a sufficient degree regarding abstract knowledge, concrete work experiences, access to relevant other systems, and project know-how?*

In general, after some time and to a varying degree, systems organisations develop structures that define divisions of labour, roles and rules [24]. Defining the structure, the roles, and the rules has several effects. It pre-structures to a certain extent how and by whom the actual work is done. It defines communication channels and thereby influences the collection and condensation of experiences. Furthermore, by defining different areas where communication happens, it also influences the reflection and decision-making processes.

Structure thereby is strongly connected to **steering of projects**. Unfortunately, steering is insufficiently defined in project-management. Many books on project management consist of hardly more than listings of To-dos and Not-to-dos. In classical project theory, there are well-defined lines of how each group can influence decision-making. Typically [25] there is a strong focus on clear lines of decision making, while at the same time trying hard to consider as

much information as possible¹. Taking up the concept of a dichotomy of democracy and hierarchy [24], elements of hierarchy do dominate strongly. Project-managers self-restrict themselves often to a high degree to behave democratically and to involve people, otherwise they face the risk of losing project members or of hampering project spirit. However this can change if managers or other groups consider persons or developments to endanger the project or the customer system. This is the point, where sudden backlashes occur.

The “single line of decision making” (emphasised by project management) may not be the only road to go. When looking for alternatives, there are a high number of organisations that pursue a different way. An interesting approach to look at these organisations – inspired by systems theory – is to look at their **processing of differences**. One good example is science, as it spends much of its energy on looking for differences, assessing and checking statements of other actors, elaborating differences and only punctually develops consensus. Thereby, it is able to manage a substantially higher level of complexity than a homogeneous organisation of science could have. Even in extremely time-critical areas, e.g. pilots of aeroplanes, other elements than single lines of decision making occur. In the case of pilots: there often are two pilots – hierarchy is mediated by social conventions and procedures to a relevant degree; there are handbooks with detailed procedures that - try to - collect experiences made; there is detailed assessment of mistakes after accidents and thereby a detailed processing of different views.

Processing of differences allows for higher complexity but takes time, uses up resources and may lead to deadlocks. Considering the definition of success, a deadlock has to be seen as failure. Following the line of considering the way differences are processed as a crucial element of steering, an additional approach to steering takes shape in the course of decision making. It is an approach of bargaining and at the same time using mechanisms to reach a consensus. Therefore, corresponding mechanisms to enforce the consensus building process are needed. Several lines of consensus building are in use by other systems.

- In the jurisdiction, there is a sequence of how to appeal, and how early decisions influence future decisions. A varying number of judges or jurors further differentiates these processes.
- In business (even on an international level) mechanisms for mediation and arbitration (e.g. via chambers

¹ An interesting line of thought evolves here that can only be sketched out but not developed in detail. PD-projects typically are organized as projects. It would be interesting to analyze whether, where and how PD projects differ in their actual steering mechanisms from ‘normal’ projects.

of commerce) exist.

The best balance between enough differentiation to best represent different environments and their needs on one hand, and consensus building on the other, may even change over the course of the project. Sometimes however, consensus building may be an aim too high to achieve. It could be enough that differentiating opinions can be developed in detail and that the corresponding voices enter the communication process at relevant times and arenas.

Summing up, several corresponding questions in the design of a project arise.

11. *Which differences in the environment of the project should be represented in the project?*
12. *How strong should the processing of differences, the elaboration of positions be supported and is this differentiation met by a corresponding consensus building or decision making structure?*

Going on to the Vth criterion of Willke: reflections of a system over its own behaviour, two issues stand out. The first is the connection to the environment of the project (e.g. other projects in the organisation, changes in the persons involved, changes in the environment of the organisation). Even stronger there should be at least one review, whether the chosen project structure – designed before the project started – is adequate.

13. *How does the project learn of changes in its environment and which mechanisms make adaptations more likely?*
14. *Are reviews systematically done to make sure that the chosen project aims, the project structure, still meet the needs?*

ONCE THE PROJECT IS COMPLETED

When the project gets to its end, from the systems theory perspective, the question of ending the project as a system and the further development of the customer organisation come to the fore. The first question is then whether and how the project as a system ends and what happens with the persons and resources that were in the project. The second question is whether the results of the projects lead to the intended results or use in the customer organisation.

Projects may last for too long. Either due to an insufficiently defined end or due to a development of the project that stabilises it beyond its initial aims. While it may be useful to keep successful project teams together, the danger remains that a project fights for further survival for its own sake.

The question of the perspective of members strongly influences the ending of a project by its influence of the members’ behaviour. Persons have to have a perspective that is

compatible with their membership in the project. E.g. if no occupational perspective is visible, projects are endangered to disintegrate.

With respect to project-success as defined in the introduction, the use of the results in the customer organisation decides upon the success of the project. Given the difficulties and risks of implementation, there seems to be little choice, but to once more consider implementation as a project in itself. This however might well be a different project. The resources needed, autonomy, communication and steering will be different in many cases. It might even be that systems or results of the original team are substantially altered in the course of the implementation.

Concluding the project opens a broad range of possibilities to alter the interpretation of results and achievements. The corresponding question is, how the results are embodied in the customer organisation (compare [23]), to better resist changes. A broad range of possible actions or artefacts can help (project documentation, software, presentations, etc.).

Summing up, critical questions are:

15. *Is there enough preparation to avoid early disintegration of the project and is a definite end (or transformation) defined?*
16. *Is the implementation thought through as a project on its own and not just as another phase?*
17. *Are the project results communicated and embodied strongly enough?*

REFLECTIONS AND RESULTS

The analysis of projects out of the systems theory perspective mentioned above brought up a list of issues relevant to a broad range of projects. Some of them are of particularly high relevance to PD-projects:

- The concepts of border and of internal dynamics help to discuss how many layers of representation are reasonable besides the project team (e.g. a sounding group, a steering committee). Central to this is the question whether and how persons become part of the project team, i.e., are involved in the internal dynamics of the project while at the same stay connected to the systems they should represent. The necessary degree of autonomy, communications, and possible conflicts in being involved in several systems (e.g. in the project team and in the shop steward) can be addressed.
- The concept of complexity and the concept of ability of a system to process differences help when discussing the design of decision-making processes with respect to the time and the resources needed.
- A further concept – not elaborated on above - is “Anschlußfähigkeit” (roughly translated as connectivity).

The meaning is whether an act of communication from one system can be interpreted in a reasonable way by another system. If internal dynamics of systems are too different (in content, speed, etc.) this becomes an increasingly difficult issue. Thereby this category helps to analyse the design of communication structures within a project and to its environment

In the application of systems theory mentioned above, the perspective on tools and technology was mostly limited to infrastructure issues. Further questions would be: When and why does an organisation ‘decide’ to become aware of technology in its environment? How do tools influence the development and maintenance of borders?

A weakness of the systems theory approach is its little regard of dynamics in the course of the project. Here, other theories like e.g. psychodynamics' of change provide an interesting framing (e.g. [26]).

Summing up, the approach of analysing projects as systems brought the development and self-reproduction of the project, as well as its start and ending into the fore. At the same time other aspects remain in the background, e.g. democracy at the work place.

Using the success criteria of projects developed in the introduction, the systems theory approach used here leads to involvement of persons. However, this involvement is still limited by the needs of the organisation or the project. This allows for different readings. In a pessimistic reading, democracy in projects and companies is therefore possible on a temporary and unstable basis only. In an optimistic reading, companies are forced into more democracy to be able to survive. In both readings, democracy is blended with non-democratic elements as soon as the organisation or the project fears to be endangered. If companies should democratise beyond this border, a difficult balance between expanding democracy and finding ways that are compatible with self-reproduction requirements of companies and projects has to be achieved on a higher level.

From a theoretical point of view the article shows that it is possible to discuss risks of PD-projects in a meaningful way, based on the theoretical framework of systems theory. The understanding of projects as systems, including thinking and talking of projects as subjects (e.g. “the history of the project”; “a system rejects a specific approach”) eases the discussion on several developments. It is possible to frame a number of difficult design questions in theoretical terms (e.g. to relate to the question how to delegate into a steering committee and the number of reflexive layers on the one hand with questions of qualification, autonomy and risk on the other hand). At the same time it is difficult to discuss persons and their interactions in their complexity. Therefore systems theory ‘only’ gives an additional perspective on these questions.

From a practical point of view, the analysis of projects as

systems helped to develop a list of questions that may inform project design and steering when projects are to be built as systems. Complementary to 'typical' lists of risks that focus on e.g. technical and legal issues and complementary to analysis of interests and power, these aspects focus on preconditions for building and maintaining a successful project as a system.

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