Failure in Teams: Why Successful Teams Do Not Fail (So Often)

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Introduction

In our social reality, there is almost no task or process conceivable which would not require teams working together. People are supposed to cope with increasing complexity in their environment; the competencies needed are claimed to be 'new thinking', 'critical thinking' or 'design thinking'. In times of globalization the relevance of interdisciplinary and intercultural cooperation in teams is often expressed but without an underlying framework which would integrate the different phenomena and allow to derive further support in these situations. Even though these demands are anything but new or surprising, we do not know in how far the uncountable amount of research projects help to their specific impact on team performance on different levels for over a century, teamwork is still endowed with many question marks. In fact, research interest in teamwork is quite high in different fields of science. This also means, a comprehensive literature overview is hardly possible.

At the same time, we have to state that there is quite few scientific literature, which describes processes of failure or success in teams in detail and on different levels. Why do we need these detailed analyses? The main reason is the need to find out more about underlying cognitive, motivational and emotional processes in teams which lead to successful or unsuccessful outcomes. This is hardly surprising, because failure in teamwork is often a slowmoving process and only 'weak signals' indicate (Ansoff, 1980) the small step between success and failure. Such key moments are often simply not noticed by the participants. In retrospect, when the

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failure is obvious, these indicators are hardly comprehensible. Whoever reports on team failures primarily describes the events, especially if the reporting person is involved in the process himself (e.g. Krakauer, 1997).

Especially in the last two decades, research reinforced the view on high reliability teams, high reliability organizations (Baker, Day, & Salas, 2006; Weick & Sutcliffe, 2007) and high performance teams (Pawlowsky & Steigenberger, 2012), so teams that are very successful in very difficult environments. However, it is not necessarily possible to generate "instructions for failure" for teams from the reversal of these findings. High performance teams are successful in regard to both, process and result. There are also teams, however, that have succeeded in the task and nevertheless failed as a group. On the other hand, difficult processes can lead to success, as studies show. For example, groups with a certain kind of conflicts, so-called cognitive conflicts in teams, create more innovative problem solving compared to harmonic conflict-free teams.

In the following, we will present the features of successful and less successful teamwork. Furthermore, we will outline typical weaknesses of teams during the processing of complex situations that can lead to failure (prototypical phases of problem solving processes). We distinguish between the critical situations of goal definition and situation analysis, information management, planning and decision making, as well as reflection and learning in the team. Critical situations of the communication, coordination and cooperation of teams are also to be added, for example the allocation of tasks and responsibilities in the context of teamwork.

Requirements for Successful Teamwork: What Makes a Successful Team Different?

As shown in Fig. 1, teamwork is dependent on a variety of factors such as a specific context and a culture (that can be the culture of a country, an organization, or a professional group), the scope of the problem, and critical situations that can be
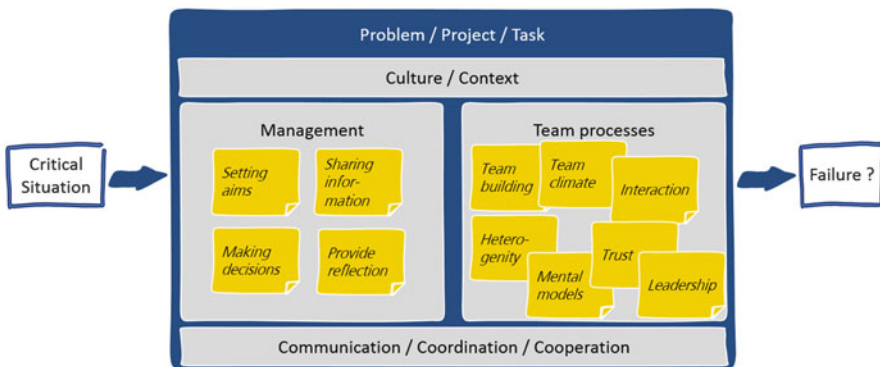

Fig. 1 Teams dealing with complexity: doomed to failure?

described as steps in the problem-solving process. These situations are 'critical' because their processing influences the outcomes in a positive or negative way. That means, it is necessary to successfully process these situations and, above all, to realize and adapt deviating or unexpected developments in time. In addition, those situations are also to be considered as critical, which control and coordinate team processes. This includes role and task assignment including all associated requirements, such as the planning of processes or the definition of responsibilities.

Factors of Successful Teamwork

Based on a wide range of research results (Salas, Burke, & Cannon-Bowers, 2000; Salas, Sims, & Klein, 2004), the following characteristics of successful teams can be stated: successful teams work on and due to common goals, they communicate precisely with each other, they define roles and information paths, they follow the given rules, they create a good team climate by motivational and emotional mutual support, the team leader steers the direction but provides individual freedom, and conflicts are solved constructively. Ultimately, a common mental model is generated during the teamwork. It contains shared knowledge about the situation, the team members, the previous process, the goal orientation, and the expectation of the future situation. There might be many coincidences as well as discrepancies with the mental models of the other team members. Therefore, a good match between the knowledge of the team members is helpful for effective action. These shared mental models are partly static and permanent, but they are also flexible, because relevant changes in the environment are integrated into the individual mental model. Adaptations of mental models usually go both sides, from the sender to the recipient and vice versa and are only adapted if the team members have agreed upon the common goal orientation.

Salas, Sims, and Burke (1997) mention five core elements coming from an analysis of the literature on teamwork, which the authors call the "big five" of successful teamwork: team leadership, team orientation, mutual performance monitoring and adaptability. These components are positively influenced by mutual trust, the formation and reassurance of common mental models, and by closed-loop communication.

Factors of Successful Team Processes

Is a good process a prerequisite for a good result? Is a good result an indicator for a good process?

Case Study

In the race for the conquest of the South Pole the team of the Norwegian Ronald Amundsen reached the South Pole on 14 December 1911, 5 weeks before the

British Sir Robert Falcon Scott arrived. Not only this defeat marks the failure of the British expedition. Unlike Amundsen, who safely led his team back to the starting point of the trip, Scott's men cannot escape the ice, all died from physical exhaustion on their way home.

This tragic outcome is, in a macabre way, a good example of different strategies in the planning of a complex project that is characterized by great uncertainty. Both teams are different relating to many of the above features, however, one central factor can be named as reason for the different outcome of the two expeditions. This is the different mental approach of both teams steered by totally different leaders. Planning, design, adaptation and modification is what Amundsen requires from himself and his team. He makes clear that every single detail is important or can become crucial in an environment that does not forgive any errors. Amundsen always tries to improve—clothing, means of transport (horses, dogs, motor/sleds, skis), selection of food as well as planning of depots on the way home. While Amundsen was the more experienced pole driver and accordingly accepted by his team as expedition leader Scott's decisions, in contrast, often seemed to be mainly determined by his current dominant motivation what then led to quick changes of his decisions while the consequences not being thought of.

One example makes Scott's ad hoc decision making very clear: the selection of the four persons chosen as members of the pole team, meaning the four persons would together with the leader go for the pole. The whole conceptualization of the tour had been targeted at four persons plus leader altogether, the entire planning, including the depot for food and petrol was targeted at four people, Scott decided at the last moment to take off with five people to the South Pole, which resulted in a series of short- and long-term effects that Scott did not consider when making the decision. The consequences happened as everybody would have foreseen: on the way back Scott's team ran out of petrol and food, no ice for water could be prepared for drinking, a fact that caused further dehydration of Scott's men.

In conclusion, the same goal was planned and reached with very different means and different success. Team performance was mainly determined by the personality of the leader. However, many questions remain still open: To what extend were the teams different? How was the communication? Who was the socio-emotional leader in the team? How were decisions made? What kind of person was Amundsen/Scott?

Many authors tried to answer these and further questions with different focus but quite similar results (see, for example, Gurney, 1997; Höfer, 2011; Huntford, 1985; MacPhee, 2010; Scott & Bartsch, 2011; Venzke, 2011). What do we learn from this example? Strictly speaking, it illustrates the definition of team performance as "potential performance minus loss of coordination and motivation" (Stroebe, Diehl, & Abakoumkin, 1992). In addition, it is also apparent that even an extremely high motivation of the team cannot compensate for a lack of coordination.

Routine Processes: The Enemy of Innovation

Many parts of the daily work, even in creative domains, contain a large part of actions, which are recurrently very similar. Only a few partial aspects then change the current problem or task so that they require a different solution. In such situations, people tend to prefer to decide for the solution they already know, because they believe—apart from the time savings—to handle weaknesses easier with and to use strengths better. This also means: "routine tasks generate routine responses". If a standard solution exists which solves the current task, it is chosen first, even though it is not necessarily the best solution. In addition, a solution known to the team or in the organization is easier to implement, according to the motto "we have always done it this way."

However, new developments, innovations or new processes cannot be gained by rules such as "never change a running system"—this approach can only lead to incremental innovations. Aiming for revolutionary developments, routinization must give way.

Apart from the preference of the known, the avoidance of detailed analyzes can be observed in many teams. (Subjective) time pressure, which is generally a permanent restriction for any project, does not allow long-term analyzes. Thus, highly creative solutions are avoided and important new developments are not perceived or ignored. Even in the case of new problems, the absence of analyzes, especially in combination with routine-generated safety, can be fatal, as the following example shows:

Case Study

On 3-8-1999 the Boeing 737-204 crashed at the start in Buenos Aires: 67 people died. The pilots had ignored an alarm signal. After the start, a warning indicated that the landing flaps were not (correctly) extended. The cockpit voice recorder transmits quiet voices of the crew ("it is all right!"): The alarm signals were known to be corrupted in old machines. Pilot and co-pilot had not mentioned the landing flaps during the routine check before the start.

As an explanatory model, the concept of 'situation awareness' can be useful. Endsley (1995) describes three processes in the interaction between the person and the environment that precede each decision: perception, understanding and prediction.

In the case outlined above, the perception is obviously limited by the influence of experience because it prevents a further analysis of the causes of the alarm signal. Thus, the understanding of the concrete problem situation is not given, and the prognosis is correspondingly wrong. This can be seen as a faulty "shared situation awareness", because the pilot and co-pilot interpret the situation in the same way without any further communication and act accordingly.

Action Regulation of Teams in Critical Situations

As described above (see also Fig. 1), the behaviour of human beings can be described as an action regulation process (Hacker, 1973/2005; Oesterreich, 1981; Volpert, 1974) or action organization (Dörner, 1976, 1989). In this case, steps of the organization of actions or problem-solving steps are distinguished, which describe the specific requirements more precisely based on a descriptive model. A representation of teamwork thus requires a transformation of individual action regulation on groups and describing additional requirements for the activities of teams. This is illustrated below in selected case studies.

Case Study

"Heads of government of the euro zone should resolve the debt dispute on Monday at a special summit just a week before the possible bankruptcy of Greece" (Die Zeit, 2015). But on Monday there is no solution in sight, even a week later no solution. While the one side has asserted that everything has contributed to a solution, the other side complains that too few convincing proposals have been put on the table for measures which are reliable and serious enough. This process is going on for weeks without any visible progress—even though all member states of the Euro Group actually pursue this goal. Although the overarching goal is accepted on all sides, the suggestions for solutions look very different, and it is obvious that an agreement always entails winners and losers. Especially when target formulations are too abstract, an agreement about adequate measures is highly difficult.

While the question of whether EU member states can be described as a team can be questioned here, the group of heads as well as the euro finance ministers should act as a team. Thus, they are supposed to balance their own country-specific targets with the goals of the other members of the community. In this case predominantly a motivational alignment would be necessary to scope for further activities.

Information Search, Analysis and Transfer

It does not seem to be important in which context failures occur, the answer of why they happened is almost always the same as: If we had to name a factor as the main cause of failure in teams, it would be communication (Badke-Schaub, 2012; Hofinger, 2012). Despite of overwhelming technical advancements regarding all kinds of communication support, in each situation communication has to ensure a valid, and useable situation picture: Which information is important? Which information must be passed onto whom and when? Which information cannot be passed on at all? Which information is reliable?

Even in highly standardized situations such as in professional communication in aviation research revealed that communication was involved in 47% of all recorded critical events among cockpit crews (Kemmler, 2000).

Case Study

In a crisis squad a large-scale exercise took place, which was conceptualized as training for professional crisis managers, a decision had to be made on the classification of injured persons. This discussion came up because the control center had asked about the rules, what should happen after an explosion with about 30 people category-1 injured. In the staff, nobody knew exactly what this classification meant. The red folders with the relevant information were on the shelf in the room, there was also a working telephone and internet access installed. What did the participants the practicing staff do? It took them about 10 min of discussion until they agreed on category 1 as the slightly injured patients. They ordered a bus to bring the injured persons to the medical center. The control room clarified the error and the staff could finally take care of the (only in the exercise) severely injured. This result caused amusement after the training session, but impressively shows how teams prefer "information generation" rather than information search.

Researcher, who look closely on the course of thought and action processes in teams often work with video protocols from laboratory investigations or exercises based on simulations or case studies, which are then evaluated using predefined categories (protocol analysis). Stempfle and Badke-Schaub (2002), for example, gave student groups of mechanical engineering a complex design problem, which the teams had to solve within 3 h. The video protocols were investigated regarding communication patterns, which were based on the phases of the problem solution process. In addition, interaction sequences were recorded and analysed at a micro-analytical level (Stempfle & Badke-Schaub, 2002). An interesting result of this study is the identification of two fundamentally different ways of dealing with solution proposals in the team: (1). Proposed solutions are first analyzed and then evaluated. (2). Proposed solutions are immediately evaluated without further analysis. Negative evaluation such as: 'this cannot be done', 'the boss will never approve it' etc. This approach is problematic: Immediate assessments disrupt the flow of thought and can also significantly reduce the motivation of the respective team member so that this person will not contribute further in the discussion.

Historically, in 1957 Osborn already mentioned such effects when he proposed 'brainstorming' as a method of generating new, unusual ideas in a group of people. After analyzing and clarifying the problem, the idea finding in phase 1 takes place in 4 steps, whereby the non-evaluation of solution ideas is considered one of the four classical basic rules. Only in Phase 2 analysis and evaluation of the listed ideas is allowed.

Although brainstorming is the most widely used method, the deployment does not deliver the promised performance advantage of teams in contrast to individuals

who individually brainstorm (and share their results as a nominal group). They produce numerical more and more creative ideas than a real team (See, for example, Taylor, Berry, & Block, 1958). Nevertheless, the common activity of a brainstorming session can contribute positively to the team climate, which is sometimes more important than the production of another two ideas.

Planning and Decision Making

In the context of decision-making processes, a conflict between two different cognitive mechanisms are supposed to exist. On the one hand, the intuitive approach mostly reaches quick but sometimes wrong decisions, while the rational approach allows us to make successful decisions that take longer, on the other hand. However, research of neuroscience can show that the brain works with much more colors than black or white.

Case Study

"The new A-Class is more than an important component of the successful Mercedes product offensive. It is a milestone in the history of our company and a trendsetter for the entire development of passenger cars." (1997, Jürgen Hubbert, Member of the Management Board of Daimler-Benz AG, Passenger Car Business Unit). With this goal, the development of a product started, which should play a central role in the portfolio of Mercedes Motor Company. It was decided at the end of the last century. Management decided to enter the compact car class with a car of compact size but crash safety of a limousine. Table 1 shows some stages of this development, which can be described as initially failed.

This case is an example, which shows that a team—successful or unsuccessful—is always involved in a context that also contributes to failure. The target date was set by the managing board, what led to 3 years of development, a reduction of at least 25% compared to previous projects, a fact that even increased the time pressure on the project team. Many things should be changed at once with the aim of developing something 'revolutionary new'. However, excessive time pressure can have undesirable consequences for the overall process of the team. Deficit patterns of action under stress are, for example, the reduction of information collection and solution searches. That means the information search is interrupted too early and essentially confirmatory information is sought.

Reflection and Learning

Reflection can be done in various ways. An important approach is the reflection on one's own thinking, to derive changes from this information (Tisdale, 1998). Can teams reflect and learn by reflection to eliminate failure or at least prevent themselves

Table 1 Chronology of some stages in the development of the Mercedes A-Class

Spring 1993	Start of the development of the new A-Class passenger car
Summer 1996	Start of the advertising campaign for the new A-Class
June 1997	Product presentation: positive reviews from the professionals; 100,000 pre-orders
September 1997	A-Class gets out of control during the elk -test in the competition of the "car of the year in Tännishus/Denmark"
18 October 1997	Launch of the A-Class
21 October 1997	3 days later: A-class overturns with an evasion maneuver carried out by test driver Robert Collin, the famous "elk test"
1 week later	At first, any responsibility was rejected, and the Goodyear tires were blamed for the problems: "We have some weaknesses. . ."
Early November 1997	Decision that all vehicles of the A-Class are upgraded with the Electronic Stability Program (costs of about DM 100 million a year)
End of November 1997	Start of a basic rework of the chassis
December 1997	New advertising campaign from Mercedes-Benz
February 1998	After technical modifications of the chassis, wheels and driving dynamics programs, resume production.

Source: SPIEGEL (1999)

from repeating the same failures? In a joint research project conducted by psychologists and product developers, the question was how a training concept could be designed for promoting technical and non-technical competences (Bierhals, Weixelbaum, & Badke-Schaub, 2010). In an integrated overall model, the areas of method competency, communication and reflection were taught in a coaching-based training approach. The aim was to achieve a flexible managed style of individual and joint action within the team. The research revealed the remarkable result that the student teams with training were able to work with a more structured approach, gathered more information and spent more time on the situation analysis and did a more effective shared reflection in the team. In addition, the team should also have a certain amount of time to develop common routines and common mental models to minimize coordination losses. Naturally, motivation losses should not be overlooked either.

The analysis of failed situations is intended to understand the development of the dynamics of influencing factors and detect sources where critical situations turn into classify mistakes. As stated by other authors (Bedenk & Mieg, 2018; Kauffeld & Massenberg, 2018; Kunert & von der Weth, 2018), such an approach is highly recommendable. However, only if the organization maintains a trust culture that does not penalize the mistakes but rather sees failure as a starting point for learning and thus increases the motivation of the team members to improve their knowledge.

Can Successful Teams be Formed from Unsuccessful Teams?

The distinction of 'successful' and 'unsuccessful' teams is often based on the arbitrary assumption that there is a clear difference between success and failure. Furthermore, teams that are successful in terms of performance are supposed to work together in a positive way. However, a successful team is not necessarily a good team in every respect—the objective success could be clouded by a failed cooperation. In contrast, teams can fail in spite of good processes due to external influences or professional mistakes (see Triebel, Schikora, Graske, & Sopper, 2018). But have they failed as a team?

According to Tuckman (1965), team development is an important component of success. And although this approach has now been 50 years old, it can be cited as one of the few universally secured findings of small group research. In his model, Tuckman describes four successive stages, which must be processed by a team in order to work successfully together. At the beginning of the co-operation ("Forming") there is still uncertainty among the group members whether they are accepted in the team. A response to this initial insecurity takes place in the second phase ("Storming"), in which everyone is taking over tasks. In addition, roles are individually defined and defended against other team members. Later on, people start to clarify these roles, create a common set of rules and values ("Norming"). This reduces coordination and motivation losses in the team and opens the upcoming working phase ("Performing"). This stage model was supplemented by a fifth part ("Adjourning") by Tuckman and Jensen (1977), which can be regarded as a reflection phase. After a team has completed its task, a joint final discussion should take place, which can help to make experiences more aware and to be applied to the next projects. The most important message of this model is that a team not only has to schedule time for the task to be processed, but also needs time for the managing team processes.

Consequently, it seems compelling to consider and understand the respective team processes for the evaluation of team performance. Supportive and obstructive strategies can be described and analyzed, for example under which conditions teams often reduce the analysis, stop to share different mental models or only communicate them in a restricted manner, or dispute conflicts in a dysfunctional way. From such analyzes, a recipe for success cannot be deduced directly. But together with insights from high-performance teams that are able to combine successful outcomes and good processes, suggestions for successful teamwork can also be derived for "normal" teams.

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