

A Roadmap to Get Full Benefit of Teams

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Abstract

During recent years it has become increasingly popular to work in teams, but most organizations do not use the full potential of the team concept. Many organizations claim they already have implemented teams but usually they have only put people together, without training or guidance on how to work as a team. Groups of individuals will not develop into self-managed, high-performance teams without active support from their organization.

Based on experience, this paper describes a roadmap guiding an organization to:

- *Characterize the maturity of the teams*
- *Plan and give priority to activities that need to be improved to increase performance of existing teams*

1. Introduction

During recent years it has become popular to work in teams. This is understandable since a high-performance team can outperform a larger number of people working individually. Many software organizations today claim they use “teams” in their development. This is often true to a certain extent, but more often there is a group of people working together without explicit common goals and without joint responsibility.

A team-based organization can improve [1]:

- **Quality:** Up to 50% reduction of number of defects. This through shared responsibility in the teams and through frequent team reviews performed on all deliverables.
- **Lead-time:** Higher productivity by creating high performing teams.
- **Competence:** An increase of the ability of the team members. This is done through individual competence development of team members and the creation of a culture enabling constructive feedback.
- **Delivery Precision:** 100% delivery precision by better time-estimation and higher commitment.
- **Motivation:** Empowering the teams to enable them to feel ownership of their work. Other factors like job satisfaction, team spirit and higher commitment are also drivers for the motivation.

It is important to remember that there is a major difference between working in a group and working

together as a team. This difference is described by Katzenbach [2] as:

GROUP: A set of people who interact primarily to share information, best practices or perspectives and to make decisions to help each individual perform within his or her area of responsibility.

TEAM: A small number of people with complementary skills who are equally committed to a common purpose, goals and working approach for which they hold themselves mutually accountable. Real teams are a basic unit of performance.

The support the organization gives to its teams is a key issue for attaining high-performance teams. This paper suggests a structured way to characterize the maturity of existing teams. It also indicates which activities that need to be prioritized and improved to establish the right conditions for good team performance.

The Team Roadmap defines four steps of team maturity and includes three different paths. The steps define the team aspects and their order of implementation (e.g. *information flow* before *joint responsibility*) and the paths describes three different concepts an organization should establish to attain full benefit of teams. Experience shows that attempts to go directly to higher steps (e.g. cross-functional teams) usually fail since the underlying structure is not adequate.

2. Problems

Many software organizations of today already use teams within the organization and they think that there is not more to do in the implementation of high performance teams. Frequently the responsibility of attaining high-performance is left to the teams themselves without any support from the organization. If problems occur it is often explained as "poor mix of people" and the real problems are seldom identified. It is not realized that working with teams is long term continuous journey for the organization.

The following are the symptoms of presence of low maturity teams, usually seen in today's industry:

- Management often changes decisions made by the teams.
- Overran deadlines, which often is realized very late.
- Mistakes are repeated within the same project.
- Too large teams, e.i. calling a project a "team"
- Team members neither know the goals of the project nor of the organization where they work.
- People transfer between teams in an ad hoc manner.
- No training regarding teamwork is performed.

3. Structure of the Roadmap

The roadmap is based upon a combination of a staged and a continuous architecture. Four different steps and their corresponding key areas are defined. Since the key areas are related across the different steps, three different paths have been defined. These paths express different domains that require special concern when an organization wants to better utilize its teams. The Organization path defines how the organization is to establish and maintain a framework that supports its teams. In the Team Process path the work processes that a team needs are defined. The Team Dynamics path describes how the organization can give resources to provide teams the opportunity to evolve dynamics within the team. Together, the paths establish the prerequisites for high-performance teams.

Several models addressing internal team development exist, for example the Fundamental Interpersonal Relationship Orientation (FIRO) model [3]. The team roadmap does not directly address the internal development of a team but focuses on what an organization should do to facilitate and support the work of its teams. However, with support from the organization and the different paths the individual teams will be able to establish effective internal dynamics faster and easier.

The different steps should be seen as indicators, not as limiting categories. An organization can achieve different maturity in the different paths. It is not so interesting which step an organization has achieved. The steps should instead be seen as indicators of the areas where an organization must concentrate its resources to improve its teams. Nevertheless, an organization should strive to attain an even level of maturity between the paths. Additionally, the steps themselves can be seen as an indication of what type of teams one can expect to find in the organization.

Each step consists of a number of key areas (KA). The key areas indicate areas that need to be implemented in order to achieve the step. Each key area contains a purpose and a number of characteristics that specify the capability issues that the key area addresses. These characteristics indicate the activities that must be

performed to fulfill the purpose of the key area. Fourteen Key Areas numbered KA1 to KA14 are identified by the roadmap.

Paths

The relationships between the different key areas are highlighted in three different themes. The paths correspond to the essential prerequisites that must be established to form a team; see Figure 1.

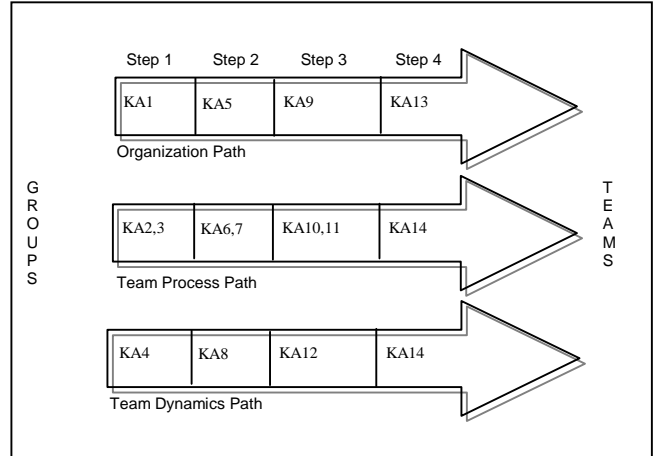


Figure 1: The three Paths with their Key Areas

Organization

It is the responsibility of the organization to provide the team with a framework of software processes. The team members also need education and training in team working and learn how to work together in an effective way. Without the management's commitment towards the usage of teams, it is impossible to successfully implement teams within the organization. Initially the management must take control of the team and support it with directions, goals and the required training. However, as the maturity of the team increase the organization will gradually loosen the control and the team will evolve into a self-managed team.

Team Process

The team process considers *what* the team should do. This includes a defined team process that specifies the daily work, which documents to produce and which tasks to execute. The team process allows the team to work together towards the common team goal. An example of a team process is the Team Assignment Life Cycle (TALC) [4] developed by Ericsson and Q-Labs, that describes the different phases, documents and activities the team needs to go through.

Team Dynamics

The team dynamics includes *how* the team members should interact when working in a team. The team must establish common norms, respect and accountability for

each other in order to become a high performance team. Basic knowledge of group psychology is therefore important. Training in team dynamics will make the team members aware of the problems it can encounter and give them a better understanding of why people act as they do. When the team works together as a whole, the synergism between the team member will enable the team to perform more than they would have done as individuals.

4. The Roadmap

Prior to the first step there is no structure to support teams. Occasionally, teams with high performance can appear to exist because of individual initiatives. These teams can for example arise from smaller groups that have been working together for some time. However, any success the teams may enjoy is not a result of support from the organization.

4.1 Step 1

In the first step the organization must commit to the usage of teams. An overall knowledge of teams in general and the benefits that can be drawn from teamwork are presented to the staff. The organization urges the projects to perform their work in teams when applicable, but does not define how the work should be done. It is up to each project to define its own team process, but the organization recommends a team process to be used.

The team processes at the first step are focused on the introduction of basic team procedures and the establishment of good information flows to and from the team. The project determines which team process to use. The team process should include team member procedures like planning, follow up, and estimations.

The key areas in team dynamics concern knowledge in basic human interaction. This includes issues like communication, active listening, openness and perception but also social activities outside work. These activities aim to ensure that people get to know each other in non-professional situations.

KA1 Organizational Commitment

The purpose of the Organizational Commitment is to establish the basic organizational prerequisites for the introduction and use of teams in the organization. The Organizational Commitment involves commitment of the organization to teams and information about visions and values that can be derived from using teams.

Characteristics:

- Commitment to Teams: The organization is committed to using teams when appropriate.

- Project-Based Teams: The project manages and defines the teams itself.
- Vision and Values: The organization informs the staff about the benefits that can be drawn from teams and the major reasons why teams should be applied within the organization.
- Support: The organization provides the team with basic support and the right working conditions, such as meeting places and private workspace.
- Group Composition: The composition of the group is based upon the availability of staff in the project.

KA2 Communication

The purpose of Communication is to ensure that the teams have all necessary information available at the right moment. Communication involves the establishment of effective communication channels, both within the team and with other parts of the project and organization. It also includes how meetings and disagreements are handled.

Characteristics:

- Internal Communication: Good communication is established within the team.
- External Communication: The team has good communication channels and information exchange with other parts of the project and organization.
- Meeting Management: The team possesses basic knowledge in how effective meetings should be conducted.

KA3 Team Process

The purpose of Team Process is to ensure that the team follows a process and works in a managed way. The project and not the organization define the team process. Team processes typically involve a routine that includes establishment of the team, ongoing teamwork, and improvement within the team.

Characteristics:

- Team Management: A suitable team management process must be established by the project/team and used by the team. The process typically include issues like:
 - Planning: The work of the teams should be planned according to a documented procedure to ensure the participation of the whole team.
 - Estimations: The team should estimate the time and work efforts required to complete a task.
 - Follow Up: The planning of activities and especially the estimations must be followed up to allow the team to take corrective actions and make better estimations and plans.

KA4 Interpersonal Skills

The purpose of Interpersonal Skills is to give the team members knowledge in basic human interaction. The Interpersonal Skills involves the creation of common understanding and common values among the team members.

Characteristics:

- **Group Skills:** The teams have theoretical knowledge in basic group psychology. This includes knowledge in issues like communication, negotiation, basic group norms, and conflict handling.
- **Team Building:** The teams obtain practical knowledge in group dynamics through different types of team-building activities. These social activities aim to help the team create a common history.
- **Personal Engagement:** The team members show personal commitment towards the team and the fulfillment of the team tasks.

4.2 Step 2

The organization now supports the teams with processes that must be used by all teams. The organization can be seen as a team facilitator that makes it easier for the team to work in a managed and productive manner. It is also important that experiences and feedback are exchanged between the different teams.

The team process is defined and maintained by the organization and followed by all teams. The team members are encouraged to take part in decisions and negotiations made both by the organization and within the team.

The knowledge of and insights into how people work together has increased. The team members are familiar with basic group psychology and how cultural differences can affect the interaction between people.

KA5 Organizational Support

The purpose of Organizational Support is to support the teams with all basic requirements for teamwork. Organizational Support involves activities such as an adaptable team process, team coaching for the team members and financial support for teamwork.

Characteristics:

- **Teamwork Ownership:** The organization is responsible for the maintenance and improvement of the team processes.
- **Team Coaching:** Coaching in the teamwork aspect is available for all teams.
- **Organizational Leadership:** The managers act as role models for the teams.
- **Funding:** The organization includes teamwork activities in its financial budget.
- **Team Experiences:** The experiences and knowledge achieved by a team is communicated to other teams.

- **Team Composition:** The composition of the team can be based upon the technical skills, experience, and the overall know-how of the subject, among the staff; additionally, teams should possess a good balance in terms of gender and age.

KA6 Decision Making

The purpose of Decision Making is to ensure team members feel they are part of one team and organization. Decision Making involves how plans and decisions are made as well as the delegation of tasks to team members. This includes decisions and negotiations both within the team and the organization.

Characteristics:

- **Involvement:** All team members are involved and contribute to the decisions and negotiations made within the organization.
- **Decision-Making Process:** All team members participate in the decision making process within the team.

KA7 Defined Team Process

The purpose of Defined Team Process is to establish the team process defined and maintained by the organization within the team. Defined Team Process involves the establishment of a defined team process and training in this process. This team process typically includes issues like reviews of the work and attaining a higher quality in the work.

Characteristics:

- **Planned Process:** The team works in a managed way with documented team and software development processes.
- **Team Reviews:** The work produced by the team is inspected through team reviews to check completion and correctness. The purpose is to attain higher quality and help the team to establish mutual accountability for the work it produces.

KA8 Team Skills

The purpose of Team Skills is to improve the knowledge in group psychology among the team members.

Team Skills involves knowledge and training in group psychology, such as team norms and roles, as well as different team-building activities that reinforce the team spirit.

Characteristics:

- **Team skills:** The team members have knowledge in how teams and individuals interact. This includes for example how cultural differences and personalities affect the team and how to give and take feedback to/from other team members.
- **Mutual Respect and Commitment:** Team members have mutual respect for each other and a commitment towards the team.

- Common Purpose and Team Goal: The team works for a common purpose and team goal.
- Ego-less Programming: All team members are equally responsible for all products developed by the team.

4.3 Step 3

When an organization has reached this step it has become a team-based organization and uses teams whenever appropriate. The organization uses quantitative controls to measure and ensure achievement of business goals. These goals are converted into team goals that the teams strive to fulfill. This implies that teams are created and used to focus on the business.

The organization provides the teams with a set of team processes that can be tailored to different situations and environments. The teams are empowered to make their own decisions, plans, and budget and are responsible for the fulfillment of their tasks.

Upon reaching this step, the team is able to efficiently operate and cooperate with other teams. The interaction with other teams establishes a foundation for networks and information exchange between different teams.

KA9 Team-Based Organization

The purpose of Team-based Organization is to ensure that the organization acts as a team-based organization. This implies that all suitable work is performed in teams. Team-based Organization involves that teams use measurements to plan and control their work. It also involves coaching of the teams, and results achieved by the team are considered when rewards and promotions are given.

Characteristics:

- Performance Criteria: The business goals of the organization are known and converted into team goals.
- Work Processes: The organization is responsible for the team processes defined in KA10.
- Measurement: The organization supplies the team with measurement that helps the team to plan and control its work.
- Team Coaching: Coaching in teamwork aspects is available for all teams.
- Team-Based Organization: The parts of the organization that are suited for teamwork are now based upon the team.
- Team Rewards: As an incentive for the team members the results, produced by the teams are taken into account when promotions and rewards are given.
- Team Composition II: When the composition of a team is determined, the interpersonal skills and team

roles are taken into consideration. When appropriate, cross-functional teams are used.

KA10 Team Process Library

The purpose of Team Process Library is to ensure team access to several different team processes with necessary assets for the different tasks and environments in the organization. Team Process Library involves analysis and adjustment of current team processes to different types of requirements, as well as measurements and estimations of the produced results. The experiences of different teams are collected and used by other teams to prevent repeating past mistakes.

Characteristics:

- Different Team Processes: The organization provides the team with a set of team processes that are tailored for different types of situations.
- Estimation of Results: The estimation of the results and productivity are more accurate as a result of the tailored processes and measurements made.
- Measurements: Continuous measurements on performance and productivity of the team process are made.

KA11 Self-Managed Teams

The purpose of Self-Managed Teams is to empower the teams to run their own business. Team goals are derived from the business goals of the organization and the actions of the team are directed towards these team goals. Self-Managed Teams involves that teams make their own budget and have control of their own activities and plans. These plans are based upon measurements provided by the organization and the teams are responsible for their own results.

Characteristics:

- Team Goals: Each team has their own team goals that are related to the overall business goals.
- Team planning: The teams are responsible for their budget, planning and fulfillment of goals and tasks.

KA12 Team Interaction

The purpose of Team Interaction is to make the teamwork as a unit with respect to the rest of the organization and other units. The teams are able to work as virtual teams and networks can be founded upon them. Team Interaction involves a systematically shared leadership and responsibility within the team. The teams' ability to operate in a team-based environment is also enhanced.

Characteristics:

- Systematically Shared Leadership: Leadership and responsibility are systematically shared within the team.
- Mutual Accountability: Team members have established a sense of mutual accountability for each others work.

- Individual Respect: The team members respect the different individual aspects of each other.
- Integration Process: Processes to facilitate interaction between different teams are defined.

4.4 Step 4

The organization is striving to be a learning organization and can control the development and use of teams in a systematic way. When the environment and conditions change, the organization can be redesigned to adapt to the new conditions. The organization tries to learn from the experiences already made and follow up the work of the teams.

The competence and knowledge of teams and individuals are continuously evaluated and improved. Experiences and knowledge are exchanged both within the team and between different teams and corrective actions are made to eliminate problems.

KA13 Learning Organization

The purpose of the Learning Organization is to give the organization the ability to adapt to environmental changes and to learn from both mistakes and successes. Learning Organization involves the managed exchange of experiences made by different teams. The organization pays attention to both mistakes and progress and tries to learn from them.

Characteristics:

- Knowledge Bank: The experiences made by the organization and its teams are collected and used as an experience bank to solve similar issues and avoid making the same mistakes.

KA14 Continuous Improvement

The purpose of Continuous Improvement is to continuously improve and evaluate the team processes and team dynamics. Continuous Improvement involves the identification of possible opportunities and problems before they occur and to systematically eliminate the problems. This also includes improvement of team processes and individual competence within the organization.

Characteristics:

- Individual Improvement: The capacity and knowledge of each team member are continuously improved.
- Team learning: A learning process exists both within the team and between different teams.
- High-Performance: The organization continuously strives to increase the team performance. This is mainly achieved by improving the team members' personal skills and capabilities.

5 How to use the Team Roadmap

The Team Roadmap should be used mainly by organizations that want to improve their capabilities in applying teams in their organization. The main application fields for the roadmap are as a:

- Motivation and a guideline by organizations that want to introduce teams within the organization.
- Roadmap that can guide and help organizations plan and give priority to activities that need to be improved to increase performance of existing teams.
- Standard for assessing strengths and weakness of how the organization applies the team roadmap.

When the Team Roadmap is used in an assessment, the assessment team looks at the current working process of the teams and what the organization is doing to facilitate their work. On the basis of this input the assessment team determines to which degree the purpose of each key area is fulfilled. A profile of the strengths and weaknesses of the team is then compiled. With the roadmap and the profile as a starting point the organization can find the most important areas of improvement.

When an organization is about to introduce teams, the Team Roadmap can be used as a guide when planning and giving priority to different activities. Since the roadmap identifies the characteristics for each step, but not exactly how to introduce them, the organization must consider its own situation and tailor the practices to its specific circumstances.

It is important to recognize that the Team Roadmap cannot be used directly to conduct an improvement program for teams. The model should be seen as a guide that can facilitate the process of introducing teams in an organization. The Team Roadmap assists organizations that want to create opportunities for high-performance teams and implement them during a relatively short period of time.

6. Experience

To give feedback on the model we have looked back on a few cases where teamwork has been introduced and related strength and weaknesses with the roadmap.

6.1 Company X

Our first example is from a large organization where teams were introduced broadly for a large development project. High-level management was committed and pointed out the reasons for using teams. A team process was introduced and all team members were trained in the team process. To get more synergy from the teams and to give the teams more control over their assignments, cross-

functional teams were formed with testers and developers in the same teams.

Unfortunately middle management was not committed which resulted in that the team concept was not institutionalized properly. Team dynamics was not prioritized. Some project kick-offs were performed but no training in interpersonal skills or time for building teams was provided. The organization was not adapted to cross-functional teams. The team members belonged to different units, which hindered good communication between the units and the different teams. After the particular project the team concept needed to be revitalized and this time focus was put on the problems, middle management, organizational support and team dynamics. The improvements were successful and today this organization considers teamwork as one of their core competencies.

Comparing with the Team Roadmap, Step 1 was not fully established since interpersonal skills (KA4) was neglected and good communications (KA3) not established. Aspects of Step 3 were aimed at without ensuring Organizational Support (KA5) or Team Skills (KA8). This prevented the organization to successfully implement cross-functional team due too lack of joint responsibility between the team members and ineffective coordination. After the revitalization step 1 is place and step 2 and step 3 is somewhat covered. Training in both team process and team dynamics is now part of each new member's basic training.

6.2 Company Y

Our second example is from an older organization still working with new technology. Teams were first introduced in the final phases of a project. In the next project the team concept was taken a step further. This time cross-functional coordination teams were added for all side activities (from requirements and system design work, to solving outstanding technical problems). The team concept was introduced for the coordination team with focus on both team dynamics and processes, but it was the team process used in the old project and not a tailored team process.

The experiences, regarding development teams, gained in the first introduction was not followed up in the new project. The new development teams were left to themselves to establish what was gained through focused efforts. The development teams were not provided with goals for the usage of teams or a description of what parts of the team process to use. The focus was only on the new coordination teams.

Even though the coordination teams were trained, they were not successful. One of the reasons was that the coordination team members where not involved in the team activities in the old project. The teams were supposed to evolve directly into cross-functional teams although they only spent about 20% of their time in the project.

Company Y tried to take a step towards a team-based organization (KA9) at step 3 without establishing processes that suited their situation. As mentioned in section 6.1 there are several aspects that must be in place before cross-functional teams can be expected to pay off. If the first process had been tailored the organization would have taken the first step to create a team library (KA10).

More severe was the absence of goals and scope (KA1) that made it up to each development teams to do what they wanted, which soon faded out.

6.3 Company Z

Our final example is from a young and rather small organization. Management wanted to introduce teams in their key project to improve cooperation and competence transfer. The latter was the most important one since there where a number of people with no or little experience needing a lot of support. Company Z focused on teambuilding activities involving soft skill training covering: communication, team development, team roles, feedback, conflict handling, etc. Several team events like white water rafting were performed to allow time for the teams to really get to know each other.

The problem was that no team process was provided so when the teams came back to real life they did not know how to take on their new won skills. The team leader planned the work without involving the rest of the team. When the project got into time pressure due to the planning, some new requirements where needed to be included, re-planning was done and the teams worked more like groups of people taking orders from their team leader.

Considering the Team Roadmap the organization started of fine in the Team dynamics path focusing on interpersonal as well as team skills (KA4, KA8). The absence of a team process (KA3) made it difficult to ensure the main goal competence transfer since no one knew how the work was to be carried out in a team format.

7. Conclusion

The performance of a team depends on the support the team gets from the organization. Several benefits can be achieved when high-performance teams do the work within an organization. The question is how to acquire them. In order to help organizations to introduce and successfully implement high-performance teams, a roadmap for attaining high-performance teams has been developed.

Even though several organizations claim they use teams as a way to organize various activities, most are struggling with parts of Step 1. Very few organizations - to our knowledge - cover the whole picture, including the different paths *Organization*, *Team Process* or *Team Dynamics*.

The main benefit we have seen so far of the Team Roadmap, is that describe for organizations that the use of teams is not a short-term but a long-term commitment and that most of these organizations have more aspects to cover in order to ensure the establishment of high-performance teams.

8. Further work

We have identified the following as possibilities for further work:

- Definition of a team introduction process, like IDEAL [5] or as proposed in [1], ensuring fulfillment of the Team Roadmap.
- Enhancement of the Team Roadmap to a Team CMM as proposed in a Q-Labs internal report [6]. This report gives a more detailed description of the ideas of this paper.

9. References

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