MANAGEMENT AND LEADERSHIP IN TECHNOLOGY TEAMS – EMPIRICAL RESEARCH

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Abstract: The research goal was to analyse an employee's position from the top management's point of view, defined in two dimensions: employees' potential and their effectiveness. The article uses a brief literature review and qualitative research based on interviews with management. The interviews were conducted in two time intervals – the first part in 2018 and the second part in 2019. In the research, top management consisted of a Chief Executive Officer, an Agile Coach and a Human Resources Business Partner. The people in the above positions were responsible for retaining employees, creating possible development paths, and the utilization of human potential. Additional research purposes were to find out how the employee's position has changed over the years, and how much the leader's position in the team has influenced the changes. The study covered the situation of 34 programmers and IT analysts who worked in 8 technology teams. The assessment of the situation before and after twelve months showed real consequences of the management's decision-making process and provided recommendations for future research.

Keywords: career management, leadership, effectiveness, technology.

1. Introduction

In spite of a better understanding of leadership and effective people management, the issue is still a common goal of leadership and human resources management studies, two independent fields of study. Therefore, researchers (Leroy, et al., 2018) have recommended to integrate them to demonstrate how human resources management and leadership co-determine employees' motivation and performance. Also, employee retention is currently a huge challenge for management, especially in IT companies (Pflügler, et al., 2018). Given the importance of IT professionals in today's high-technology-driven business environment, it is essential to retain and fully utilize employees' performance potential, simultaneously empowering their engagement and increasing their effectiveness (Erturk, and Vurgun, 2015).

Organizational management practices have been recognized as crucial variables for employees' effectiveness and success. According to Bagdadli and Gianecchini (2019), the relationship between organizational investments and career development remains

underdeveloped. Empirical studies of the connection have provided inconsistent results. Based on a systematic review of three empirical practices, relational, developmental and informational, the following mechanisms have been identified: assessment and development centre, performance appraisal, training, career paths, mentoring, studies, external seminars, lateral moves, job rotation, job enrichment and succession planning. In the latest directions for human resources management, it has been highlighted how important it is to create internal leadership pipelines that span entry-level employees to executives, rather than consider succession planning and leadership development as distinctly different initiatives (Griffith, et al., 2019). Goal orientation and leaders` style of working can influence trust and outcomes of results (Chen, Lin, 2018).

It is worth noting that employees' effectiveness and efficient utilization of their potential does not depend only on employees themselves, but more on management. Management practices have been proved to have an impact on employees' effectiveness (Rani, and Kumar, 2018). Top management has an influence on successful leadership behaviours (Bildat, Schmidt, 2016). Therefore, to provide a satisfying level of effectiveness of high-potential employees, top management should create an adequate work environment.

2. Research methodology

According to De Vos and Cambre (2017), career models often omit the role of the organization. Therefore, this empirical research has filled the research gap and shown the employees' effectiveness and potential from the top management's point of view, as shown in Table 1, where the research questions and hypotheses have been identified.

Table 1.
Research questions and hypotheses for management and leadership in technology teams

Research questions	Hypothesis
How will the employees' effectiveness and potential levels change in twelve months?	H1: From top management's point of view, twelve months is enough time to change the employees' effectiveness and potential levels in teams.
What will top management do, based on the research results?	H2: Based on the research results, top management will prepare employee development plans.
What kind of changes will take place? Will the situation change or improve?	H3: In the case of the implemented employee development plans, the employees' positions will change.
To what extent is it possible to predict employee retention, based on the employees' performance marked on the effectiveness and potential matrix?	H4: Based on the employees' performance marked on the effectiveness and potential matrix, it is possible to predict employee retention.
To what extent is a leader's position related to a team member's position?	H5: A leader's position is related to a team member's position.

An essential part of the research was related to team leaders and top management's perception of their positions in the group. Moreover, the assessment of the situation, before and after twelve months, has highlighted the consequences of the management's decision-making processes.

All the management activities should lead to an increase in employees' engagement, motivation and utilization of their potential, where employees' potential, defined as knowledge, skills, and competencies, is a stem of human capital (Spurk, et al., 2019). Leveraging human capital and management team development issues, according to O`Neill and Salas (2018), are pathways for achieving the full potential of teams and creating high-performance organizations.

Job performance has been defined as the extent to which employees meet their job requirements according to their manager's instructions (Groen, at al., 2017). The performance can be measured at individual, team and organizational levels (Zorinsky, 2014). Researchers (Salas, et al., 2015) have demonstrated how essential understanding and improving teamwork is. Therefore, this empirical research was conducted in two ways: for every worker individually and from the team's perspective.

The research was conducted as group interviews with the biaxial matrix as an auxiliary tool. The interviews were divided into a few stages. In every stage, groups of the same three people were directly involved: Chief Executive Officer, Agile Coach and Human Resources Business Partner. The aim was to reflect the real environmental conditions. For the purpose of the research, only top managements having daily contact with team members were selected. Thanks to that criterion, the top management teams were able to observe samples of the employees' behaviours during the interviews.

Indirect research groups consisted of employees who worked in technology teams. The study covered 34 workers in 8 teams (marked A-H), which meant 3 to 7 members per group. The team members consisted of 32 males and 2 females employed as programmers or IT analysts, responsible for the creation, development and implementation of IT software. The workers did not participate in the interviews because the research goal was to analyze the employees' status from top management's point of view. During the interviews the Chief Executive Officer, Agile Coach and Human Resources Business Partner used the employees' names. After completing the results matrix, the data were anonymized.

The research procedure and schedule were followed. Quality researches were conducted in two parts. The first part was implemented in 2018 and the second one in 2019, after twelve months. Each time, the same procedure was implemented with the same people in the posts: Chief Executive Officer, Agile Coach and Human Resources Business Partner. The research procedure was as follows:

– Chief Executive Officer, Agile Coach and Human Resources Business Partner worked with the biaxial matrix (horizontal axis – the level of potential, vertical axis – the level of performance). Each of them had their own matrix.

- Together they constructed and agreed on the definition of variables to achieve a common reference which included: timely task completion, quality of work, problem-solving. The employee's potential was defined as the individual's knowledge, skills and competencies (including education, general mental ability, and the ability to cooperate).

- Each of them independently placed the names of team members on the matrix, in places which fit best according to them. This part was done in silence, without any consultation.

- When everyone had finished completing the matrix, they showed the results and the interview started.

- Every team member's position was analyzed on three matrices. The Chief Executive Officer, Agile Coach and Human Resources Business Partner exchanged opinions, gave examples of behaviours and made decisions. At this stage, the fourth matrix was made.

- The analysis of the particular employee's position was conducted until the moment management agreed on the position. After management came to a joint decision, the employee's name was placed on the fourth matrix.

- The procedure was conducted for every team member to complete the fourth agreed matrix of the team.

- For every employee, possible development paths and management activities to boost their potential were defined.

- The above research procedure was repeated by the Chief Executive Officer, Agile Coach and Human Resources Business Partner for every technology team.

- The interviews, carried out in 2018, focused on the employees' development plans. The interviews in 2019 also included questions about the changes which had taken place over the past twelve months.

Every organization has employees with potential, but matching them to the right post is a huge challenge. This potential should be used at team and organization levels. From the business point of view, performance and results are crucial. Therefore, those two perspectives were taken into account in these researches. Moreover, repeating research after twenty months enabled us to enclose time perspective and long-term outcomes.

3. Results

The results are illustrated in Figure 1. The information about Team A to Team H is shown together in order to compare the trends. Formal team leaders are marked with filled circles. Black circles present the employee's current position (2019), and grey circles demonstrate the employee's former position (2018).
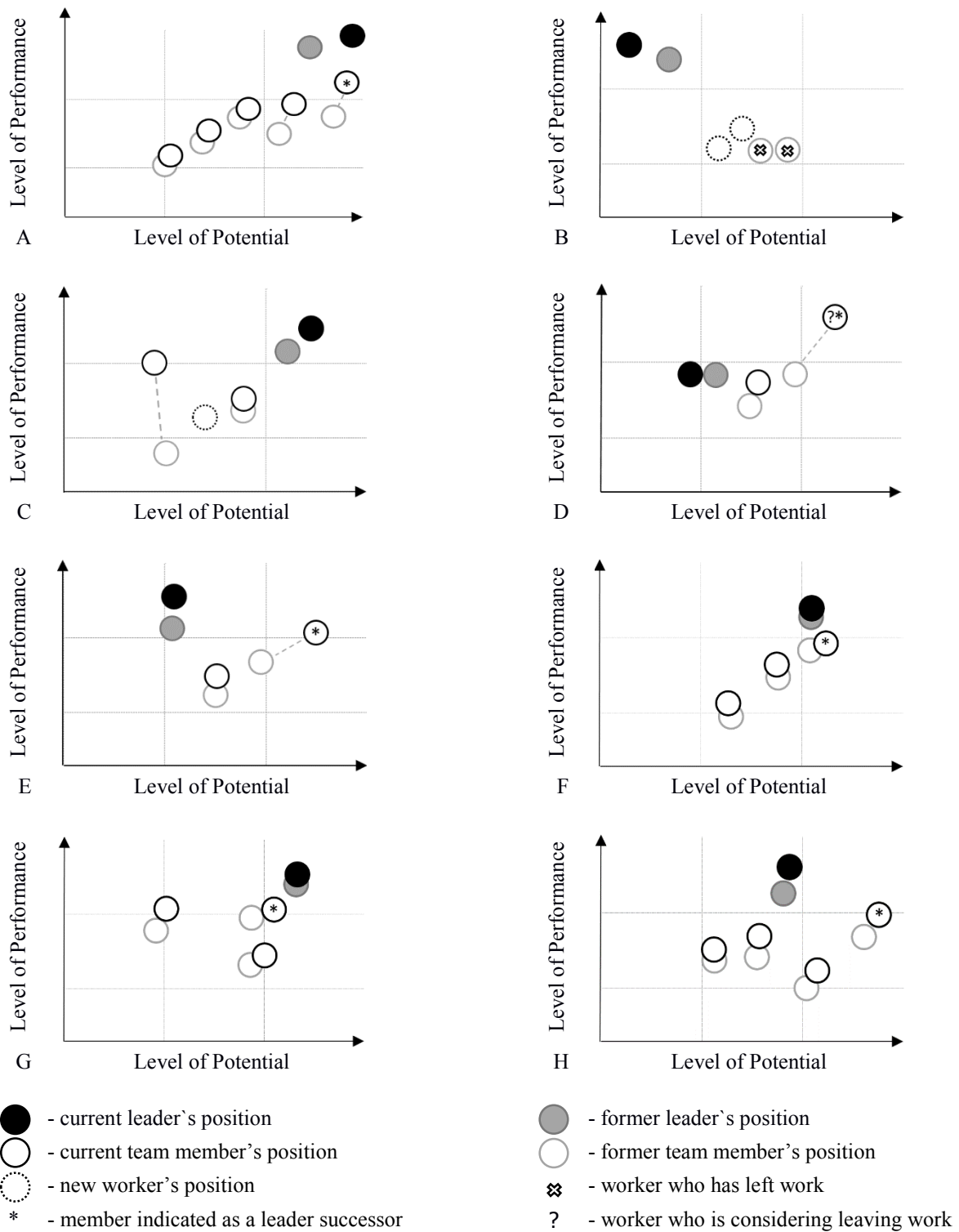
Figure 1. The employee's position from top management's point of view (before and after 12 months).

Based on the discussions conducted during the respondents completing the matrix, and according to the information presented in Figure 1. The employee's position from top management's point of view. Five hypotheses have been found:

− H1 – partly supported

   The research confirmed that twelve months was enough time for management to change employees' effectiveness and potential levels, which was clearly visible in A-H teams. However, it is surprising that without looking at the first matrix, the respondents indicated quite similar employees' positions. Only a few workers were placed differently than was done earlier. The reasons for this situation, identified during the interviews in 2019, were the following: the teams focusing on the products, not projects, tasks requiring substantive knowledge; team members taking part in the training activities; a relatively stable situation according to top management; small staff changes initiated by management.

− H2 – partly supported

   Based on the conclusions made from the employees' effectiveness and potential matrix, top management designed employees' development plans for a few leaders, high-potential employees and workers with the lowest level of effectiveness. They last ones were also provided with additional support of one-on-one meetings and training.

− H3 – supported

   The third hypothesis, i.e. in the case of the implemented employee development plans, and the employees' positions change, has been supported. The development plan included the following activities: providing mentoring, changing tasks and duties, giving more autonomy, and cooperation with younger employees to share knowledge. Additional activities were accelerated through internal and external training. The positions of the employees with the implemented development plans have apparently changed. Management recognized those activities as very positive. New development plans have been constructed on the basis of the matrix done in 2019.

− H4 – supported

   Based on the employees' positions on the effectiveness and potential matrix, the hypothesis that it is possible to predict employee retention has been supported. In Team B, people with lower effectiveness levels felt uncomfortable in their teams. They did not have any reinforcement from their leader. The conclusion is that workers with lower effectiveness levels should take on additional activities.

− H5 – strongly supported

   The strongest evidence has confirmed that the leader's position is related to a team member's position. In teams where low-potential employees were recognized, different kinds of difficulties appeared. In Team B, the workers left the team. In Team D, the most valuable high-performing programmer was considering leaving the organization. The team members have not only followed the high-potential leaders, but also increased their performance under effective guidance.

4. Discussion

The research results have led to particular and general conclusions. It is possible to highlight challenges in the management of technology teams. In Team A, the members have followed their leader, the person with the best performance and high potential. Every team member has been positively recognized by the management. Moreover, the member who presented high potential levels during the interviews has been indicated as a possible successor for the leader's role in the future. Over a period of twelve months this person got additional development tasks, e.g. decision making, mentoring junior team members, and guidance of students during their training. The most difficult challenge for management in Team A was to provide the current leader, who was considering changing organization, with new tasks and development paths to ensure positive changes in his professional development. This has been seen as vital because leaders' high effectiveness levels can bring them greater professional freedom and ensure them greater mobility in the labour market. This can be both a challenge and a risk, as high team performance cannot be built without a good leader. During top management's discussions, it turned out that the leader had soft skills, technological knowledge, and strong social influence on other team members, which meant a great potential to be used at higher organizational levels.

A different situation was observed in Team B, where the leader had a lower potential level. Moreover, two team members decided to leave the team between the first and the second parts of the research. They made a joint decision to leave at the same time. The management decided to rebuild the team temporarily and hired two new programmers. The fact of two employees quitting their jobs induced a higher demand for increased team monitoring. Perhaps, a formal leader in this case should be more of an independent consultant rather than a team leader. Top management considered a consultant post for the current leader, expanded the team, and a new leader emerged from the team members and supported the current and future leader with coaching and other development tools, also recommended in the research literature (Ladegard, and Gjerde, 2014).

In Team C, the leader accelerated the employees' results. Management decided to introduce a new employee to the team. The team member, recognized as not efficient enough, was given new tasks and duties, which meant more autonomy and independence in the new position as a consultant. As a result of the change, after twelve months significant changes had been noticed in the perception of this person, which resulted in his career advancement.

A difficult situation was observed in Team D, where the leader did not present enough potential. The high-potential programmer with a promising effectiveness level informed management about their intention to leave the organization, which would be a total loss to the team. The person had all the necessary advanced technical and soft skills. To avoid conflict in the team, the management decided to create new opportunities for this programmer to lead

a new project, planned to be run in the following two months. According to management, it was the only way to prevent the worker from leaving the organization.

In Team E, the leader had a stable potential level and high effectiveness. The leader has strongly accelerated his successor's development, more than had originally been planned. In Teams F, G and H a similar situation has been observed. The leaders, who had satisfactory potential and effectiveness levels, were sharing their responsibilities and duties with other team members who were more eager to follow them. This is an important observation which should be developed in the future. Large-scale researches are related to leaders, but it has also been recommended to do research devoted to team members who can be the most valuable followers to leaders (Epitropaki, et al., 2017). It has also been proved that they can influence one another's behaviours, which can result in the increased effectiveness of both groups (Oc, and Bashshur, 2013).

In the research the leader had a significant role. The research investing leadership development suggests it is necessary to relate to the leaders' performance and their social capital (Subramony, et al., 2018). However, management should also create development paths for other team members, especially for successors, to prepare them for team leading roles. In many literature reviews, it is emphasized that team members can become informal or formal leaders when the organizational structure changes or when a shared leadership style is introduced (Qiong, and Cormican, 2016). Also, putting Implicit Leadership Theories or Leader-Member Exchange into practice can help to predict job performance (Khorakian, and Sharifirad, 2019).

At the time of the interviews in 2019, additional arguments were raised which focused on the question why a particular person is chosen for the leadership role. It turned out that earlier, the employee's potential had not been included in the criterion of promotion. Knowledge, experience and technical skills were essential. Moreover, seniority was one of the main advantages that can bring higher status, rank and precedence in the promotion process. Admittedly, knowledge about the organization is valuable, but it is definitely not enough to lead a team successfully. Also, talent management and career development paths can be different in different countries (Latukha, and Selivanovskikh, 2016), e.g. because of cultural dimensions (Feitosa, at al., 2018).

As a major conclusion, it is essential to highlight that leaders' positions are crucial to provide development opportunities for team members. A low potential leader may cause decreasing satisfaction, low morale, and eventually make employees' leave the organization. On the other hand, a leader with high potential and effectiveness levels accounts for team members' personal growth and professional development.

Based on the results, the following general conclusions have been formulated:

- Accelerated performance and development of team members is evident in teams where a leader is viewed as the most valuable person (teams: A, C, F, G, H). In that situation team members follow their leader.

- A person without a high potential level should not be a leader as it increases the risk of employees' leaving the team.
- A team member with higher potential and effectiveness levels than a leader increases the risk of conflict.
- Successors have been revealed – the insight discovered during the research.

This research has many limitations. The first and the most obvious limitation is the size of the sample research group. Secondly, it is necessary to state that effectiveness and potential cannot be objectively measured, but examined on the basis of the respondents' own perceptions. Eventually, leadership styles might have a mediating effect on the results. As has been emphasized (Fischer, et al., 2017), leadership might be analyzed at individual, team, organizational or even external levels. Communicating shared vision and implementing leadership styles might enhance performance at a completely different level (Adnan, and Valliappan, 2019).

Furthermore, the effectiveness and utilization of human potential are related to job engagement, intention to change the team, or even leave the organization. It is recommended to conduct additional research on the issues. As researchers (Yu, and Wu, 2017) have claimed, the reality is more complex, and this research has deepened our knowledge only in some of the aspects of the work environment.

5. Summary

Substantiation of using the qualitative research has had both scientific and business objectives. The major value of this research has been the exposition of the employees' performance and potential from the management's point of view, especially that top management usually have the power to decide about staff transfers and promotions. The major purpose of the interviews was not to assess the employees. Top management have also not intended to rate workers. The most significant value has been to discover and analyse employees' predispositions based on specific situations. As a result, top management have been able to create possible development paths, notice changes, and become more aware of the consequences of the decisions they have made.

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