



DISTRIBUTED TEAM MANAGEMENT: A STUDY OF IMPACTS AND INDICATORS THAT HELP IN BETTER PERFORMANCE MANAGEMENT

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Abstract. Technological evolution has made it possible for software companies to adopt the work model of distributed teams. With this in perspective, the trend of physically dispersed workgroups requires a new investigation into the role of team management in virtual environments. Performance evaluation has become a fundamental tool in team management, especially in the competitive and dynamic environment in which organizations are inserted. To this end, the use of indicators aims to measure performance that help teams to align with their organization's strategy. In this sense, the objective of this work is to provide an empirical study of the existing impacts on the performance management of distributed teams. The study also sought to formalize the performance indicators based on the Agile Model, selecting the best metrics that effectively help in software development productivity management. A Systematic Literature Review was carried out, using the intervention instrument Proknow-C (Knowledge Development Process - Constructivist), in addition to the application of an interview with a specialist in the area of software development and also with the managers of the teams for the validation of the performance sheets. From the research, we seek to identify indicators that contribute positively to the performance of these teams.

Keywords: Distributed Teams; Performance Management; Software Development.

1 Introduction

Please Technological advances, especially in recent years, have changed the way individuals socialize, communicate and work. As a consequence of these globalization processes, there has been an increase in the quantity and quality of technology for various online resources, communication and digital culture, which direct organizations to implement the distributed team work model (Abarca, Palos-Sanchez, & Rus-Arias, 2020).

Given the growing use of distributed teams, which was catalyzed during the Covid-19 pandemic, understanding the factors that affect your performance is becoming



increasingly important. From Information Systems (IS) it is possible to identify a variety of measures of virtual team performance, including decisions effectiveness of action, effectiveness of leadership and team performance. This is one of the areas of investigation that can provide additional insights into the performance of the distributed team. Through it, management that involves the beliefs of collective effectiveness of team members is identified, thus, there are different factors that can influence team performance (Montoya-Weiss, Massey, & Song, 2001; Sarker & Sahay, 2003; Johnson & Marakas, 2000).

Performance evaluation has become a key issue in organizations, which are challenged to achieve effective and efficient results. When applying performance measurement models, alignment with a business strategy is sought, which implies that the choice of performance indicators is dependent on the organization (Neely et al., 1997).

Key Performance Indicators (KPIs) help teams align with your organization's strategy, being used across the organization as a whole, divisions, departments, and team scorecards. They are good for getting an overview of how teams are working together. The difference between a key outcome indicator and an indicator outcome is simply that the key outcome indicator is more general and a more important summary of the activities performed (Van Looy & Shafagatova, 2016).

In order to contribute to the context of the management of distributed teams, the positioning in the face of science, and how much the performance measurement has an impact for a more effective management directed to decision making, implying better performance of the distributed teams, the question is of research: "What impacts exist in the management of distributed teams and how to monitor the performance of these teams?"

To answer the proposed question, the study had the general objective to provide an empirical study of the existing impacts on the performance management of distributed teams. From the study, it is intended to offer indicators that contribute positively to the performance of these teams.

2 Research Methodology

In the present scientific investigation refers to a research of nature with subjective views of qualitative data (Miguel et al., 2012). Due to the fact that the empirical character of the work in question corresponds, the process used is semi-structured interviews which, according to Manzini (1991) Focus on a topic that you are creating a script with main questions, complemented by other questions inherent to the momentary circumstances of the interview. In order to respond, this type of interview can bring out information in a way and as answers are not conditioned to an answer by the author more than alternatives.

In this context, best exemplifying semi-structured interviews combine open and closed questions where the informant has the possibility to disagree on the proposed topic. The researcher must follow a set of previously defined questions, but he does so in a context very similar to that of an informal conversation. The interviewer should



be careful to direct, at the moment he thinks, the discussion to the subject that is asking him additional questions to elucidate questions that were not clear. This type of interview is widely used when it is desired to delimit the volume of information, thus obtaining a greater direction of the theme, intervening so that the objectives are generated (Boni; Quaresma, 2005).

With the understanding and export to develop a methodological section, the execution was the research of a systematic review of the literature for the selection of the bibliographic portfolio, which also included the preparation of indicator sheets with a focus on agile metrics, for a second moment, the interview with experts in methodologies was applied, and finally, the interview with managers of the teams distributed to validate the content provided in the indicator sheets.

3 Research Development

In this section, the procedures for carrying out the research and their respective results will be discussed in the context of Distributed Teams within the scope of Software Development. In view of the character of the proposed objective, the research is characterized as being of a qualitative nature (analyzing the subjective views of the data), using semi-structured interviews (Miguel et al., 2012).

With the aim of understanding and exposing the research developed, the methodological section was divided into three categories: the execution of a Systematic Literature Review to select the bibliographic portfolio that also contributed to the elaboration of the indicator sheets with a focus on agile metrics; secondly, interviews with experts in agile methodologies were applied; and finally, an interview was carried out with managers of the teams distributed to validate the content provided in the indicator sheets.

3.1 Bibliographic Portfolio

Systematic review is a scientific process in which an established research sample and defined evaluation axes (observation, focus, problem) allow: (i) to identify concepts used in connection with performance evaluation and the research object (environmental dissemination); (ii) identify relevant aspects; (ii) measure relevant aspects; (iv) integrate data; (v) assess the current diagnosis; and (vi) improve the situation (Da Rosa, 2012).

In this sense, a Systematic Review of the Literature was carried out, using the intervention instrument Proknow-C (Knowledge Development Process - Constructivist), consisting of a sequence of procedures ranging from the definition of the research axes, through a series of pre-established, for filtering and final selection of the relevant bibliographic portfolio (BP) on a topic. The choice of Proknow-C is justified by the simplicity and systematization of the activity for the construction of the necessary knowledge to start a research (Afonso et al., 2011).

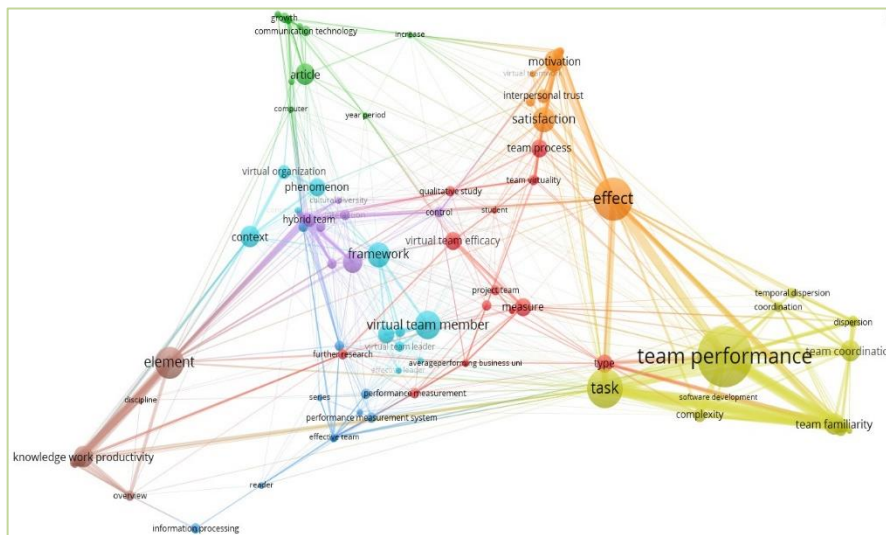
Classifying a part of the research on identifying existing impacts on the management of distributed teams, the definition of research axes and keywords took place. In

order to maximize searches, the databases SCOPUS, Web of Science, IEEE Xplore and Taylor and Francis were used. In Table 1, the research axes related to the topic are represented.

Table 1. Research axes used in the research

Distributed Teams	Software	Development	Assessment
<i>Distributed Teams</i>	<i>Software</i>	<i>Development</i>	<i>Performance</i>
<i>Virtual Teams</i>	<i>System</i>	<i>Deployment</i>	<i>Evaluation</i>
<i>Remote Work</i>	<i>Program</i>	<i>Growth</i>	<i>Assessment</i>
<i>Distributed Work</i>	<i>Application</i>	<i>Process</i>	<i>Measurement</i>

For the combination and application, the Boolean operators AND and OR were used. The application of combinations in the databases resulted in 2,953 raw articles in the portfolio. It was possible to identify that the words 'Distributed Teams, Performance, Measurement, Software, Development' have a great impact on search results. Then, duplicate articles were excluded, using the Mendeley tool for bibliographic management, resulting in 2,601 articles for conference. A reading of the titles began, using selection criteria and eliminating 2,240 files, leaving 361 articles for analysis of scientific validation. Following the Proknow-C proposal, the representativeness of citations of articles was established at 94.36% of the total citations. Reading the abstracts resulted in 56 studies for full reading. The final portfolio consisted of 28 articles. In the final portfolio, clusters of keywords were identified, as shown in Image 1.



Img. 1. Keywords identified in the Bibliographic Portfolio of the research



It is important to analyze the connectivity of the keywords, realizing that performance is aligned with one of the coordination factors, which reinforces the importance of the role of managers in the co-participation of the performance of distributed teams. Some other words related to management, such as motivation, satisfaction, effectiveness, relationship, are considered points that must have a critical view on the part of the leadership to contribute to the growth of the team.

3.2 Impacts on Distributed Team Management

The trend towards physically dispersed workgroups has required a new investigation into the role and nature of team management in virtual environments (Kayworth & Leidner, 2002). Understanding the factors that affect performance is becoming increasingly important (Schmidt, Montoya-Weiss, & Massey, 2001). In view of the aforementioned facts, the authors believe that, for a more efficient management of distributed teams, it is essential to monitor performance.

For this study, the concept of distributed teams is considered based on the understanding cited by Poehler et al. (2007), that the growth in the use of virtual teams in organizations has encouraged researchers to investigate different aspects, factors and challenges of these teams. In view of several aspects, it is identified that virtual work settings can cause some organizational challenges, such as maintaining remote leadership, managing different cultures, trust and communication between members (Gheni et al., 2016). In the present study it is proposed to adapt from this understanding mentioned above, because, in addition to having a view on the growth of the use of virtuality in teams, there are some impacts that need to be studied, among them, the management that becomes a great factor in the performance of distributed teams.

Ever since work teams were established, managers have struggled with the difficulties inherent in bringing a group of people together to work towards a common goal and objective. However, the challenges multiply when these people are not located in the same place and do not meet physically (Monalisa et al. 2008). Challenges arise from how to manage a scatter set and problem solving, how to establish and maintain trust between members, ensure team diversity if it is understood, appreciated and leveraged, manage the virtual work cycle, monitor team progress, team (Malhotra, Majchirzak, & Rosen, 2007). Among the key variables observed to influence the effectiveness of decision making in small groups is the role of managers in boarding and structuring the group process (Kayworth & Leidner; 2002).

Focusing on the productivity of distributed teams, it follows that a good manager monitors the performance of the system for which he is responsible by means of performance measurement. Your team is responsible for certain activities within the system, which need performance measurement to see how well they are performing their tasks. Therefore, performance indicators are important for everyone within an organization, as they tell what should be measured and what are the real performance control limits that should be within time (Neely et al., 1997).

In distributed software development teams, it is important to monitor performance through the application of metrics to measure performance. Therefore, measurement is intended to quantify attributes of entities and their relationships and then manipu-

late them in a formal way. An entity can be a person, an object related to software development or an event (Kitchenham, Pfleeger & Fenton, 1995). A metric is a mapping of attributes from real world entities to formal entities (measurement values) in order to describe it according to clearly defined rules (Briand et al., 1996).

By collecting measures and developing metrics it is possible to obtain indicators. An indicator is a metric or combination of metrics that provides information that the project manager or software engineers use to adjust the process, project or product to include improvements (Pressman, 2011). KPIs indicate the level of performance a system is achieving through attributes such as the amount of energy or time consumed in a process. KPIs are key to addressing strategic objectives and continuous improvement processes (Brundage et al., 2017). Performance evaluation has become a fundamental instrument in the management of organizations, overlapping in the dynamic competitiveness environment in which companies are inserted.

Grove (2016) demonstrates that 94% (ninety-four percent) of organizations practice some form of agile software development. In the agile approach, each team member is expected to be able to design, develop, integrate and test the given set of requirements and deliver a working component (Srivastava & Jain, 2017).

In software development projects that involve people and processes, breaking the entire project into smaller pieces helps to minimize project risk and reduce overall project lead time requirements. Each iteration involves a team working through a complete software development lifecycle, including planning, requirements analysis, design, coding, and testing before a working product is demonstrated to the customer (Aoyama, 1997).

Considering that agile methods contribute to the productivity and quality of software development, the metrics mechanisms provided by them also become applicable for monitoring the performance of teams.

For the structuring of indicator sheets, proposed in this article, emphasis was given to the main points of software development involving team members, such as requirements analysis, design, coding and testing, guiding in agile methodologies.

3.3 Indicator Sheets

According to Neely et al. (2000), the process of deciding which performance measures the business will adopt is valuable, as it forces management teams. This process should be explicit about your performance priorities and the relationship between them, thereby exposing, and providing an opportunity to resolve, any hidden differences.

Management is about meeting the team's needs, which can imply, motivate and monitor team processes, with the ultimate goal of improving team effectiveness (Nordbäck & Espinosa, 2019).

The research was submitted to formalize indicators for the validation of applicability in the day-to-day of the distributed teams. For the formalization of the indicators, a form model proposed by Bourne et al (2000) was used, which understands that a performance measurement system must include an effective mechanism for reviewing goals and standards. Also needing to include a process to periodically review the

complete set of measures in use. It is understood that continuous improvement is totally related to performance measurement systems, therefore, the sheets help in the view of the efficiency of each indicator to assist in data analysis.

Indicators are great allies for management, being able to monitor performance leading to better decision making. The indicator sheets are composed of certain attributes that must be identified on the performance measurement, namely: Measure (Main Name); Purpose (What to observe); Related (Business Object); Target (Performance Levels); Formula (Measure Calculation); Measurement Frequency (Available Data); Measure Review Frequency; Responsible for Measuring; Action on the Data Obtained; What Efficiency Measures Bring to the Scenario (Bourne et al., 2000).

Clark and Marnewick (2019) categorized the results of virtual teams into three classes when they performed a meta-analysis of team functioning:

- Performance: task of a team, such as efficiency, duration and quality.
- Affective Relationships: emotional of the teams, mental states such as commitment and satisfaction;
- Behaviors: Team interactions and actions such as turnover and conflict.

The research was directed to the performance measures of distributed software development teams, in order to collaborate in the management of these teams, providing efficient metrics to help in various aspects of projects, processes and people. The result was the identification of 28 agile metrics in the literature to formalize the indicators, presented in Table 2.

Table 2. Metrics for Performance Measurement Found in Literature

Metrics
Return on investment
Team speed
<i>Iteration burndown</i>
Automated testing coverage
Cycle Time
Cumulative flow diagram
Flow of tasks on the Kanban board / queue
Tested and Delivered Features (Running testing features-RTF)
Lead time
Defects found in the testing phase
Number of integrations per day
Costs
Defects found by the customer
Total hours consumed in the project
Activities that generated rework
Technical debt
Open defects
Frequency of releases

Degree of compliance with requirements
 Task flow bottlenecks
 Impediments removed
 Number of test cases
 Number of stories not completed in the iteration
 Customer satisfaction survey
 Rate of stories per iteration
 Throughput
 Total estimated effort
 Work in Progress

For a more precise foundation, interviews were carried out in order to analyze the viability and content of the indicators. The following describes how the interviews were applied.

3.4 Interview with Distributed Team Managers

Given the need to obtain better management for distributed teams, we sought to identify more concepts regarding agile management in distributed teams. To this end, a quick four-question questionnaire was developed, which was sent to team managers. This questionnaire aimed to analyze points of view regarding agile management and tips on indicators used in the process of monitoring the performance of teams.

When starting the questionnaire, the first question sought to identify the time of experience in management, the second was already directed to observe the view on which way of management recognized as efficient in the scenario that was acting, being, "Agile Management" or "Traditional Management". Continuing, the next question investigated the opinion on the possibility of using indicators to monitor the performance of distributed teams, and to end the questionnaire the last question was left open for managers to leave a comment regarding agile management and indicators in the scenario of distributed teams.

17 responses were obtained, verifying that 100% of the results chose "Agile Management" as efficient for distributed teams, 88.9% say that the use of agile metrics to monitor the performance of distributed teams is effective, while 11, 1% do not consider it possible to track performance through agile metrics teams.

The last question was left open, directing managers to comment on agile management and some indicators used on a daily basis. Table 3 presents the results of the comments.

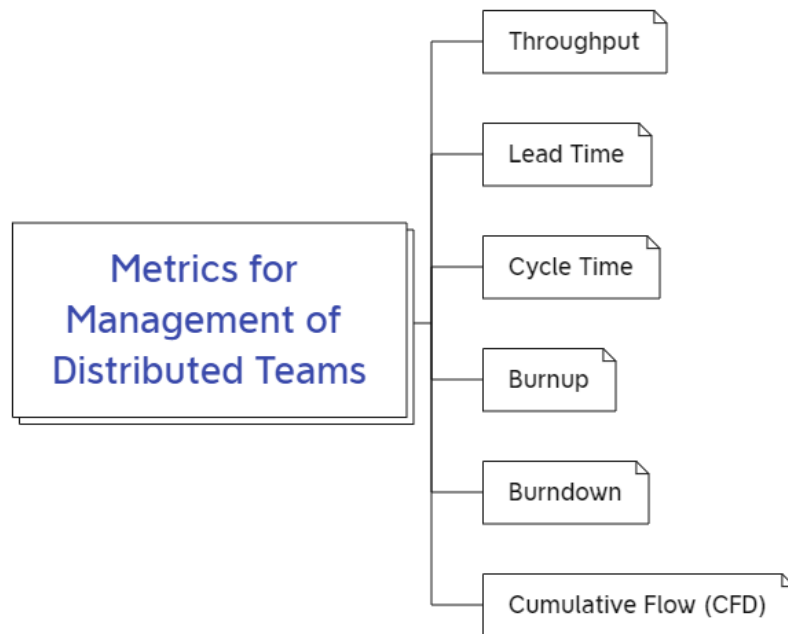
Table 3. Distribuíd Comments regarding Agile Management in Distributed Teams.

- Agile management, in my opinion, must provide clarity and objectivity to the teams, and consequently to the company and customers, it is a management focused on constant adaptation in chaotic scenarios that are not well defined, for this type of management to happen we need monitor several indicators because they are the ones that will show us if the path followed until a certain moment is the correct one and if we should or should not change our strategies in order to meet changes in the scenario.

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- Team performance indicators can be lead time, cycle time related to efficiency. About effectiveness: User satisfaction, Fit for purpose score, NPS, Business Value.*Business*.
 - I didn't see any impediment related to extracting metrics and indicators of any kind, the work works equally, if not better.
 - Today I work entirely from home with two teams, we don't miss any of the team's monitoring, the team itself created a room in Teams where we were connected all the time, we performed the ceremonies, we answered questions with the PO, we used the Scrum framework together with the Kanban methodology.
 - I follow the performance of my virtual team through Lead TIME, Throughput, CFD, Velocity, BUGs, BurnDown, BurnUP.
 - KPI's are related to my management work, with the indicators I can make decisions to improve processes, projects and analyze the performance of the members involved. Agile Management, provides efficient metrics for data demonstration.
 - Since the beginning of the pandemic, I have worked with a few dozen teams and distributed projects, we use agile metrics in this scenario and I have not observed any impediment.
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From the investigation regarding agile management, the next step was to identify the viability of the content of the formalized indicator sheets. In this way, there was an interview with 7 team managers, each of whom had, on average, 5 to 7 teams for management. When starting the interviews, the first step was to identify the level of experience and the processes followed for management in the current scenario.

Analyzing that they were semi-structured interviews, an important focus was to identify the processes followed by the teams and which indicators were used to supervise performance. With the answers obtained, it was possible to map the most cited metrics among the 7 interviews. Image 3 presents the main indicators used.



Img. 2. Main Metrics used in the Management of Distributed Teams



Still in relation to the identification of indicators, it was possible to verify the presence of new indicators for the formalization of the measurement sheets. Following from this point, in the interview the list of indicators was demonstrated and the viability of the content proposed in it was analyzed. It was possible to collect feedback in relation to each formalized indicator.

In this sense, the general feedback from managers regarding the files was positive. Managers commented on the importance of measuring and that the records were consistent with what they followed. They also identified new metrics that can be adhered to help collect metrics from distributed teams. The sheets prepared were shared with the participating managers, in order to collaborate for a better management of the distributed teams.

4 Results and Discussion

This section exposes the results obtained through the analysis of agile metrics in the literature and the collection of data through interviews. The research focused on studying the performance of software development distributed teams. In order to collaborate in the management of these teams, providing efficient metrics to help in various aspects of projects, processes and people. Finally, it resulted in twenty-eight metrics in the literature to formalize the indicators. The next step investigated the opinions of different experts on the agile management of distributed teams.

Given the need to obtain better management for distributed teams, we sought to study agility in the real scenario. However, an interview was carried out with five experts in the area of agile methodologies. It was found that management differed convictions regarding possible agility. Assuming that experts already have experience with agile management and confirm that it is possible to monitor the performance of teams through agile measurements. Other points of view, related to two specialists, argue that agile management is not possible, considering that one of the factors of agility is the self-manageable teams and responsible for the performance are the team members themselves.

To identify concepts related to agile management in distributed teams, a questionnaire was prepared and sent to the managers of the distributed teams. This questionnaire aimed to collect points of view and tips on indicators used in the process, and eighteen participants responded to the questionnaire. However, with this first part of interviews, validation in distributed teams was directed. It was possible to collect different opinions from both experts and managers, the results obtained led to the fact that it is possible to obtain agile management in teams and even measurements used to monitor performance and there was also an analysis of the relevance of the indicator sheets for the management. From this initial validation, we went through yet another application of interviews aimed exactly at the managers of the teams.

Still in the identification of indicators, it was considered important to be new indicators for the formalization of measurement sheets. In this sense, the general feedback from managers on the indicator sheets was positive. They commented on the importance of measurement and that the indicators were in line with what they followed,



also, it was possible to identify new measures that can be adhered to assist in the collection of indicators from the distributed teams. The sheets prepared were shared with managers in order to collaborate for a better management of the distributed team.

5 Conclusion

This research aimed to identify the existing impacts on the management of distributed teams and study performance indicators that can contribute to the current scenario. Based on the results obtained, it is concluded that management is responsible for developing trust, capacity, communication, among other points related to team members. Therefore, it is possible to see that management has a great impact on the performance of distributed teams. One way that can contribute to a more effective management is to monitor the indicators of the teams for better decision making.

Regarding management, the study involved agile methodologies, where there are different metrics for monitoring the team's performance. In order to do so, interviews with agility specialists were used, as well as questionnaires sent to some Scrum Master level managers. At this stage it was found that most responses were favorable to the use of Agile Management in distributed teams, including some already using agile metrics to monitor performance.

In addition to this stage, the content of the indicator sheets for performance measurement was validated. In this phase, a study was carried out in the literature on agile metrics, categorizing possible indicators that collaborate for the management of distributed teams. Through the interviews, different management scenarios were observed, with a view to the application of indicators to monitor the performance of the teams. This step became very productive as there were exchanges of information on the most used indicators and provide new metrics for measuring performance. In the evaluation of the content of the forms, it was found that they were coherent, making their application possible. There was also the suggestion of new indicator sheets contributing to the research. Finally, this interview contributed to both the researcher and the managers, making it possible to exchange experiences and tips to contribute to a more effective management.

Therefore, it is concluded that Agile Management is successful in distributed teams. Considering that indicators are great allies for better management and can impact team performance. Indicators provide information for decision making, with the aim of improving productivity. Therefore, management is one of the most important factors to help the performance of distributed teams. As suggestions for future investments, the importance of identifying indicators for individual analysis of the members of the distributed teams is highlighted, since, currently, most indicators are focused on the general team, tasks and other processes.

The study contributed to the field of agile management in the scenario of distributed teams, and with the evolution of distributed work, management is a crucial point to help in the performance of teams. It is proposed that future research focus on structuring a management model to assist managers in observing, identifying points of im-



provement and directing for better decision making that positively influence the performance of distributed teams.

References

1. Abarca, V.M.G., Palos-Sanchez, P.R., Rus-Arias, E.: Working in Virtual Teams: A Systematic Literature Review and a Bibliometric Analysis. *IEEE Access*, v. 8, 168923-168940 (2020).
2. Aoyama, M.: Agile software process model. *Proceedings Twenty-First Annual International Computer Software and Applications Conference (COMPSAC'97)*. IEEE (1997).
3. Afonso, M.H.F. et al.: Como construir conhecimento sobre o tema de pesquisa? Aplicação do processo Proknow-C na busca de literatura sobre avaliação do desenvolvimento sustentável. *Revista de Gestão Social e Ambiental*, v. 5(2), 47-62 (2011).
4. Bourne, M. et al.: Designing, implementing and updating performance measurement systems. *International journal of operations & production management*, v. 20(7), 754-771 (2000).
5. Clark, D.A.G., Marnewick, A.L., Marnewick, C.: Virtual team performance factors: A systematic literature review. In: *2019 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)*. 40-44, IEEE, 2019.
6. Dorairaj, S., Noble, J., Malik, P.: Understanding lack of trust in distributed agile teams: A grounded theory study. In *16th International Conference on Evaluation & Assessment in Software Engineering (EASE 2012)* 81-90. IET (2012).
7. Gheni, A.Y. et al. Factors affecting global virtual teams' performance in software projects. *Journal of Theoretical and Applied Information Technology*, v. 92(1), 90 (2016).
8. Hartmann, D., Dymond, R.: Appropriate agile measurement: using metrics and diagnostics to deliver business value. In: *AGILE 2006 (AGILE'06)* (2006).
9. Johnson, R.D., Marakas, G.M.: The role of behavioral modeling in computer skills acquisition: Toward refinement of the model. *Information Systems Research*, v. 11(4), 402-417 (2000).
10. Kayworth, T.R., Leidner, D.E.: Leadership effectiveness in global virtual teams. *Journal of management information systems*, v. 18(3), 7-40, (2002).
11. Majchrzak, A. et al.: Technology adaptation: The case of a computer-supported inter-organizational virtual team. *MIS quarterly*, 569-600, (2000).
12. Malhotra, A., Majchrzak, A., Rosen, B.: Leading virtual teams. *Academy of Management perspectives*, v. 21(1), 60-70, (2007).
13. Massey, A.P., Montoya-Weiss, M.M., Hung, Y.T.: Because time matters: Temporal coordination in global virtual project teams. *Journal of management information systems*, v. 19(4) 129-155, (2003).
14. Montoya-Weiss, M.M., Massey, AP., Song, M.: Getting it together: Temporal coordination and conflict management in global virtual teams. *Academy of management Journal*, v. 44(6), 1251-1262, (2001).
15. Monalisa, M. et al. Managing global design teams. *Research-Technology Management*, v. 51(4), 48-59, (2008).
16. Moe, N.B., Dingsøy, T., Dybå, T.: Overcoming barriers to self-management in software teams. *IEEE software*, v. 26(6), 20-26, (2009).
17. Neely, A. et al. Designing performance measures: a structured approach. *International journal of operations & Production management*, v. 17(11), 1131-1152 (1997).



18. Neely, A. et al. Performance measurement system design: developing and testing a process-based approach. *International journal of operations & production management*, v. 20(10), 1119-1145 (2000).
19. Pegoraro, R.A.: Métricas de avaliação para abordagens ágeis em projetos de software. 2014.
20. Poehler, L., Schumacher, T.: The virtual team challenge: Is it time for training?. In: PICMET'07-2007 Portland International Conference on Management of Engineering & Technology. p. 2205-2211, IEEE (2007).
21. Srivastava, P., Jain, S.: A leadership framework for distributed self-organized scrum teams. *Team performance management: An international journal*, v. 23(5/6), 293-314 (2017).