An Application of OSSpal for the Assessment of Open Source Project Management Tools

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Abstract: Projects are a necessity within any competitive business, and as the execution of complex projects becomes the norm, so grows the need for advances in project management. The use of project management tools is key towards taming said complexity. There are many such tools available; the current challenge resides in picking the right one. In this paper, we evaluate three different tools - OpenProject, dotProject, and Odoo - using the OSSpal methodology.

1 INTRODUCTION

Project management (PM) is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements (Project Management Institute, 2017, p. 10). One of the activities in a project is PM itself; therefore, a tool must be applied to PM.

A natural question is how to properly determine which tool to use. First, we recognize that PM is a complex task, and that various kinds of software are well-suited for specific subtasks in PM. We would like to evaluate, then, *general* software; that is, tools that assist PM throughout the whole project lifecycle. Second, we prefer *open-source* software. The debate between open-source and proprietary is beyond this paper's scope, but interested readers might want to read papers like (Wheeler, 2015) or (Boulanger, 2005) for more general research, and (Abramova, Pires, & Bernardino, 2016) for research that's also related to PM tools.

To answer the question, we turn to the field of Open Source Software Assessment. It is a field that has sprung up in response to the several challenges brought by the increasing adoption of Open Source in various enterprise projects. Practitioners in this field have developed Open Source Software Assessment Methodologies (OSSAMs, or just OSSAM in the singular), well-organized collections of methods, suitable for the complete task of assessment.

We apply a well-known OSSAM, the OSSpal methodology (Wasserman, et al., 2017). The OSSpal methodology is the successor project to the Business Readiness Rating (BRR) (OpenBRR, 2005). OSSpal methodology combines quantitative and qualitative measures for evaluating software in several categories, resulting in a quantitative value that allows the comparison between tools (Wasserman, et al., 2017).

In the OSSpal website (OSSpal software list, 2019), one can find several evaluations published. In addition to those, we cite (Pereira, Sousa, Santos, & Bernardino, 2018) and (Ferreira, Pedrosa, & Bernardino, 2018) as related work, as they use OSSpal to evaluate software in areas such as Data Mining and e-Commerce.

We apply OSSpal to assess the area of project management tools, focusing on three different tools for PM: OpenProject (OpenProject main page, 2019), dotProject (dotProject main page, 2019) and Odoo (Odoo main page, 2019). This paper presents the results of this evaluation.

The paper is organized as follows. Section 2 presents the three PM tools that will be evaluated. Section 3 describes the OSSpal methodology. Section 4 presents the results of the evaluation. Finally, section 5 presents the conclusions.

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2 OPEN SOURCE PROJECT MANAGEMENT TOOLS

Project management tools assist the manager in estimating, controlling, and tracking projects. Such tools can have a profound impact on the quality of project management and, consequently, on the quality of the project itself. These tools can provide several features that assist the manager with vital project decisions, such as reporting, scheduling control, and automating some day-to-day activities.

Even within the open-source and general tools, there are still many choices for the practitioner. Thus, we only present here the specific software that was studied in detail: OpenProject, dotProject and Odoo.

2.1 OpenProject

OpenProject is a web-based project management system for location-independent team collaboration. It is an Open Source software registered under the GNU General Public Version 3 License and is continuously developed by an open source community.

Some of its features are:

- Milestones management;
- Issue and bug tracking;
- Wiki;
- Document management;
- Forum.
- Time tracking;
- Project newsfeed.

OpenProject supports both traditional and agile processes. Its agile support includes the usage of taskboards to break releases into individual tasks and perform status updates with “drag’n’drop” actions. In Figure 1, we can see a screenshot of OpenProject in action.

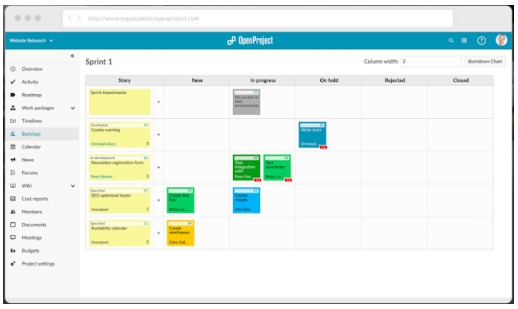

Figure 1: OpenProject interface.

2.2 dotProject

dotProject is an Open Source project management tool distributed under the GNU General Public Version 2 License. It is a web tool, written in PHP, that uses a MySQL database. The goal of dotProject as a tool is to unify the important information of the project, presenting an overview of the tasks and responsibilities.

There is no business behind the project, it is managed, maintained, and developed by a group of volunteers and by the users themselves who furthermore provide software support.

The current version of the software is available on GitHub, with the documentation and guidelines on the proper use of the resources still in the process of being moved to a newer page. Figure 2 presents the interface of the tool in action.

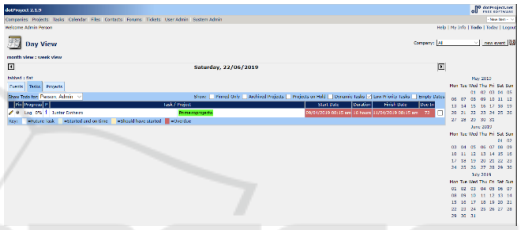

Figure 2: dotProject interface.

2.3 Odoo

Odoo is an integrated ERP system, whose main characteristics are: it is an open source system; it is cross-platform, since through any web browser you can access its interface; it is easy to handle; it interacts with other applications, with PDF viewing, import and export of Microsoft Office documents, and also compatibility, for example, with Google Maps.

Odoo is not only a simple management platform, it encompasses sales and project management in one tool, and enriches it with a variety of functions, such as MRP, Point of Sale, and e-commerce applications, in order to provide a universal solution that can help companies manage all kinds of operations.

Figure 3 showcases Odoo, as it is used for project management.

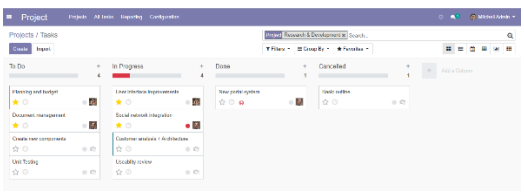

Figure 3: Odoo interface.

3 OSSpal METHODOLOGY

Based on the knowledge acquired through the study of the tools previously explained, we now turn to the OSSpal methodology explanation.

OSSpal has emerged as a successor to Business Readiness Rating (OpenBRR), to provide a reliable and unbiased source for evaluating open source software (Marinheiro et al., 2015). The goal is to be an open, comprehensive and standard evaluation model that is reliable, widely used and adjustable. OSSpal combines quantitative and qualitative assessment measures that allow to identify which software has the best score. It can help companies, government agencies and other organizations find high quality open source software (Wasserman, et al., 2017).

The OSSpal methodology works by scoring software across seven different categories, and then computing a total score for each software, based on the individual category scores and previously determined weights.

The categories of OSSpal methodology are the following:

- Functionality: How well will the software meet the average user's requirements?
- Operational Software Characteristics: How secure is the software? How well does the software perform? How well does the software scale to a large environment? How good is the UI? How easy to use is the software for end-users? How easy is the software to install, configure, deploy, and maintain?
- Support and Service: How well is the software component supported? Is there commercial and/or community support? Are there people and organizations that can provide training and consulting services?
- Documentation: Is there adequate tutorial and reference documentation for the software?
- Software Technology Attributes: How well is the software architected? How modular, portable, flexible, extensible, open, and easy to integrate is it? Are the design, the code, and the tests of high quality? How complete and error-free are they?
- Community and Adoption: How well is the component adopted by community, market, and industry? How active and lively is the community for the software?
- Development Process: What is the level of the professionalism of the development process and of the project organization as a whole?

The OSSpal uses a very similar calculation as the BRR. We can exemplify the OSSpal methodology calculation with an image from that method (see Figure 4):

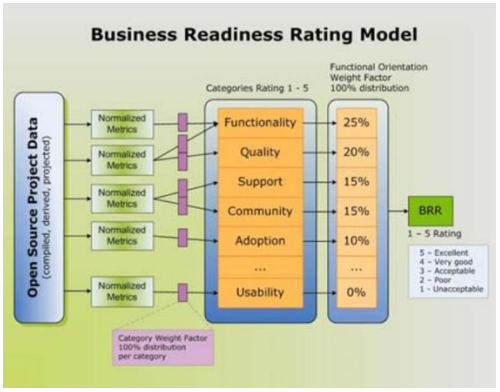

Figure 4: BRR score calculation (OpenBRR, 2005).

This methodology is composed of four phases:

1. First Phase: it is necessary to identify a software component list to be analyzed, to measure each component in relation to the evaluation criteria and removing from the analysis any software component that does not satisfy the user requirements;
2. Second Phase: it should be attributed weights for the categories and for the measures:
    a. Assign a percentage of importance to each category, totaling 100%;
    b. For each measure within a category, it is necessary to rank the measure in accordance with its importance;
    c. Foreach measure within a category assign the importance by percentage, totaling all the measures 100% of the category.
3. Third Phase: gather data for each measure used in each category and calculate its weighting in a range between 1 to 5 (1 - Unacceptable; 2 - Poor; 3 – Acceptable; 4 -Very Good; and, 5 - Excellent);
4. Fourth Phase: the qualification of the category and the weighting factors should be used to calculate the OSSpal final score.

The category 'Functionality' is calculated differently from the others. In this category is

intended to analyze and evaluate the characteristics which the tools have or should have. The method to assess this category is as follows:

A. Set down the characteristics to analyze, scoring them from 1 to 3 (less important to very important);
B. Classify the characteristics in a cumulative sum (from 1 to 3);
C. Standardize the prior result to a scale from 1 to 5.

Therefore, the Functionality category will have the following scale:

- Under 65%, Score = 1 (Unacceptable)
- 65% -80%, Score = 2 (Poor)
- 80% -90%, Score = 3 (Acceptable)
- 90% -96%, Score = 4 (Good)
- Over 96%, Score = 5 (Excellent).

4 EVALUATION

To follow up and start the evaluation following the OSSpal methodology, we carried out research, installed the tools, and proceeded to the basic use, from a user's perspective. From this process, we obtain several results, to be detailed in the remainder of this section.

For the first phase, after the initial research, we separated the tools we found into three groups, based on the following requirements:

- Good integration with external software. First, we determine the validity of this requirement from (Akita, 2015). Then we decided to use Microsoft Excel as a baseline, given its ubiquity in the corporate world. Based on this, the software with the best integration was OpenProject, due to its custom synchronization feature (Lindenthal, 2019);
- Good integration with internal software. This requirement appears as a counterpart to the first, in such a way that we represent all the tools that stand out for the good integration. Odoo stood out among the others, as it is actually an entire ERP, which happens to include a project management tool.
- PMBOK (PMI, 2017) compliance. The PMBOK is one of the leading guides in the world of project management, so it is only natural to require software that incorporates its lessons directly. We found dotProject as the highlight here, due to the research found in (Gonçalves R. Q., 2018).

The result of the first phase is, therefore, the three tools that we will evaluate in more detail; OpenProject, dotProject, and Odoo.

As part of the result corresponding to the second phase of the methodology, we list in Table 1 the weights of the criteria to be evaluated.

Table 1: Weights of each OSSpal evaluation category.

Category	Weight
Functionality	30%
Operational Software Characteristics	30%
Software Technology Attributes	10%
Documentation	10%
Community and Adoption	5%
Support and Service	10%
Development Process	5%
Total	100%

This determination of weights primarily reflects the purpose of the evaluation, which is the use of the tool in the business context.

The "Functionality" and "Operational Software Characteristics" categories, which are of major importance, since they provide the greatest support to information technology users and professionals of areas related to PM, have a 30% weight.

The "Software Technology Attributes" category was weighed with a focus on architecture and design, which rendered a weight of 10%.

For the "Documentation" category, we noticed many tutorials and reference documentation for all the software we analyzed. Therefore, we attribute 10% as a weight.

In the "Support and Service" category, we have a weight of 10% because there are a large number of people and organizations that can offer training and consulting services.

At the lower end of the weights table, the categories "Community and Adoption" and "Development Processes" were assigned equal weights of 5%, since it is very difficult for users to analyse the level of professionalism of the development process and organization of the project as a whole, and since the typical enterprise user has less of a need for a community.

The other part of the second phase result is the determination of metrics for the categories, and the associated weights. In this work, we did not consider necessary to have any metrics, other than the special case of the "Functionality" category. The next step, therefore, is the determination of the specific functionalities that interest the project management, together with their weights. Such functionalities have

been derived from the reading of (Davis, 2004), and are listed in Table 2.

Table 2: Weights for the characteristics of the functionality category.

Characteristic	Weight
Task Scheduling	3
Resource Management	3
Collaboration	2
Time Tracking	3
Estimating	2
Risk Assessment/Management	1
Issue/Change Management	2
Reporting/Charts	2
File Attachments	1
E-mail Notification	1
Process/Methodology	2
Portfolio Management	1

For the third phase, since the only metric used was that of the functionalities, we had to collect information in order to determine two sets of values: of that metric, and of the other categories directly. We now present first the results of tool analysis with respect to the metric in Table 3.

Table 3: Score of each specific functionality.

Characteristics	Open Project	dot Project	Odoo
Task Scheduling	3	3	3
Resource Management	3	3	3
Collaboration	2	2	2
Time Tracking	3	3	3
Estimating	2	2	2
Risk Assessment/ Management	0	1	0
Issue/Change Management	0	0	2
Reporting/Charts	2	2	2
File Attachments	1	1	1
E-mail Notification	1	1	1
Process/Methodology	2	0	0
Portfolio Management	0	0	0
Cumulative Sum	19	18	19
Percentage compared to maximum (23)	82,6%	78,2%	82,6%
Normalization to 1-5 scale	3	2	3

As we can observe, the scores are mostly the same, although dotProject's is a bit lower. Most features are available on all tools, except the following:

- Risk Assessment / Management: Only dotProject has this functionality, through an additional module (Gonçalves, Kühlkamp, & Gresse von Wangenheim, 2015)
- Issue / Change Management: This feature is only available on Odoo, through a paid application.
- Process / Methodology: Only OpenProject allows the choice of management in a traditional or agile way.
- Portfolio Management: None of the tools have good portfolio management.

From the above data, through the calculation indicated by the methodology, we have the value assigned to the category "Functionality" for each tool. Below, we present Table 4, with the values assigned to that and the other categories.

Table 4: OSSpal score by category.

Category		Score	
	OpenProject	dotProject	Odoo
Functionality	3	2	3
Operational Software Characteristics	4	2	4
Software Technology Attributes	3	3	4
Documentation	4	2	3
Community and Adoption	3	2	4
Support and Service	3	2	3
Development Process	4	2	4

The determination of each value in this table was based on the following information:

- Functionality: Determined from the calculation described in at the end of section 3.
- Operational Software Characteristics: Both OpenProject and Odoo meet nonfunctional requirements well, but dotProject has issues with usability, installation, and a few others.
- Software Technology Attributes: Odoo stands out as an ERP.
- Documentation: OpenProject has the highest score because we observe both quality and quantity of documentation. dotProject appears with lower score; this is mostly due to the age of the tool, but what little there is has quality.

- Community and Adoption: Odoo is the most popular, followed by OpenProject, and finally dotProject.
- Support and Service: Both Odoo and OpenProject have corporations that provide support, but they are small. dotProject still has some support, but it's not much.
- Development Process: dotProject is currently developed by few people, without much organization. The other tools are products of a company, so it has a high value in this criterion.

Following the methodology, we then proceed to phase 4, where we calculate the final score of each tool, applying the weights previously defined.

OpenProject = 3 x 0.3 + 4 x 0.3 + 3 x 0.1 + 4 x 0.1 + 3 x 0.05 + 3 x 0.1 + 4 x 0.05 = 3.45
dotProject = 2 x 0.3 + 2 x 0.3 + 3 x 0.1 + 2 x 0.1 + 2 x 0.05 + 2 x 0.1 + 2 x 0.05 = 2.1
Odoo = 3 x 0.3 + 4 x 0.3 + 4 x 0.1 + 3 x 0.1 + 4 x 0.05 + 3 x 0.1 + 4 x 0.05 = 3.5

	Score		
	OpenProject	**dotProject**	**Odoo**
TOTAL	3.45	2.1	3.5

Therefore, we obtained, that the best tool is Odoo, with a score of 3.5. OpenProject has a very close score of 3.45, and dotProject ranked last, with 2.1.

5 CONCLUSIONS AND FUTURE WORK

Project management is a fundamental requirement in any software competitive business. The use of project management tools is a key to overcoming the management complexity. However, there are many project management tools available and the current challenge resides in picking the right one. This work aimed to compare three project management tools, namely OpenProject, dotProject and Odoo, using the OSSpal methodology. To perform this analysis, we carried out several tasks, from the study of the method, to its practical application, in order to obtain results. The use and application of this methodology allowed a broad and clear, weighted, scientifically based view, demonstrating that the best tool is Odoo. The perceived advantages were clearly evidenced, allowing a better perception of the use of this tool in project management.

Odoo has proved to be an easy-to-use tool, centralizing deadlines, costs and teams, thus performing good project management, which is vital in a company, organizing information and automating actions, providing good execution and monitoring of projects, in the aspects that are most important. In general, the other tools analysed were very good, but some characteristics of Odoo differentiated it, ensuring, based on the parameters, that companies have a good tool at hand.

Although OpenProject and dotProject fulfill the objectives that are proposed, we see that in the categories “Software Technology Attributes” and “Community and Adoption” Odoo proved to be more capable.

As future work, we intend to include more metrics in order to refine the evaluation, and compare more tools, paying special attention to emerging technologies.

REFERENCES

Abramova, V., Pires, F., & Bernardino, J. (2016). Open Source vs Proprietary Project Management Tools. (Á. Rocha, A. M. Correia, H. Adeli, L. P. Reis, & M. Mendonça Teixeira, Eds.) *New Advances in Information Systems and Technologies*, pp. 331-340.

Akita, F. (2015, 10 28). *Answer to the Quora question "What is the best software based in the PMBOK 5th edition?"*. Retrieved 06 25, 2019, from Quora: https://www.quora.com/What-is-the-best-software-based-in-the-PMBOK-5th-edition/answer/Fabio-Akita

Boulanger, A. (2005). Open-source versus proprietary software: Is one more reliable and secure than the other? *IBM Systems Journal, 44*(2), 239-248.

Davis, D. (2004, 9 1). *The PM Prescription*. Retrieved 06 25, 2019, from Dr. Dobb's, web page: http://www.drdobbs.com/the-pm-prescription/184415189

dotProject main page. (2019). Retrieved 06 25, 2019, from https://dotproject.net/

Ferreira, T., Pedrosa, I., & Bernardino, J. (2018). Evaluating Open Source E-commerce Tools using OSSpal Methodology. *Proceedings of the 20th International Conference on Enterprise Information Systems - Volume 1: ICEIS*, pp. 213-220. doi:10.5220/0006790902130220

Gonçalves, ,. R., Kühlkamp, E., & Gresse von Wangenheim, C. (2015). Enhancing DotProject to Support Risk Management Aligned with PMBOK in the Context of SMEs. *International Journal of Information Technology Project Management (IJITPM) 6(2)* .

Gonçalves, R. Q. (2018). *Evolution of dotProject*. Retrieved 06 25, 2019, from GQS - Software Quality Group,

home page: http://www.gqs.ufsc.br/evolution-of-dotproject/

Lindenthal, B. (2019, 1 23). *Step by step guide to synchronize your Excel Sheet with OpenProject*. Retrieved 06 25, 2019, from OpenProject web site: https://www.openproject.org/synchronize-excel-openproject/

Marinheiro, A., Bernardino, J. (2015). Experimental evaluation of open source business intelligence suites using OpenBRR. IEEE Latin America Transactions 13(3), 810–817.

Odoo main page. (2019). Retrieved 06 25, 2019, from https://www.odoo.com

OpenBRR. (2005). OpenBRR White paper. Retrieved 06 25, 2019, from https://web.archive.org/web/20050803022846/http://www.openbrr.org/docs/BRR_whitepaper_2005RFC1.pdf

OpenProject main page. (2019). Retrieved 06 25, 2019, from https://www.openproject.org/

OSSpal software list. (2019). Retrieved 06 25, 2019, from OSSpal web page: http://osspal.org/

Pereira, A. K., Sousa, A. P., Santos, J. R., & Bernardino, J. (2018). Open Source Data Mining Tools Evaluation using OSSpal Methodology. *International Conference on Software Technologies* (pp. 672-678). SciTePress.

PMI. (2017). *A guide to the project management body of knowledge (PMBOK guide)* (6th ed.). Newtown Square, Pennsylvania, United States of America: Project Management Institute, Inc.

Wasserman, A. I., Guo, X., McMillian, B., Qian, K., Wei, M.-Y., & Xu, Q. (2017). OSSpal: Finding and Evaluating Open Source Software. In F. Balaguer, R. Di Cosmo, A. Garrido, F. Kon, G. Robles, & S. Zacchiroli (Eds.), *Open Source Systems: Towards Robust Practices* (pp. 193-203). Springer International Publishing.

Wheeler, D. A. (2015). *Why Free-Libre/Open Source Software (FLOSS)? Look at the Numbers!* From https://dwheeler.com/oss_fs_why.html