



D5.5 Validation Report

(on results of WATSON platform)



This project has received funding from the European Union's Horizon 2020 research & innovation programme under grant agreement No. 777439

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|------------|------------|---------------------------------------------|
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Executive Summary

In this deliverable we describe the validation methodology, process and results used to evaluate the project results. An original scientific methodology typical for development of user questionnaires in the field of IS was used along with the well-known DeLone & McLean's IS Success Model as the baseline for the research. The WATSON team employed a small questionnaire which helped to evaluate and validate the prototype of the platform created during the project. With this questionnaire we made several conclusions in regards the experience related to the use of the WATSON platform from different aspects. This feedback will enable us to analyse and define best practice examples in using such systems and foster future development of similar systems.



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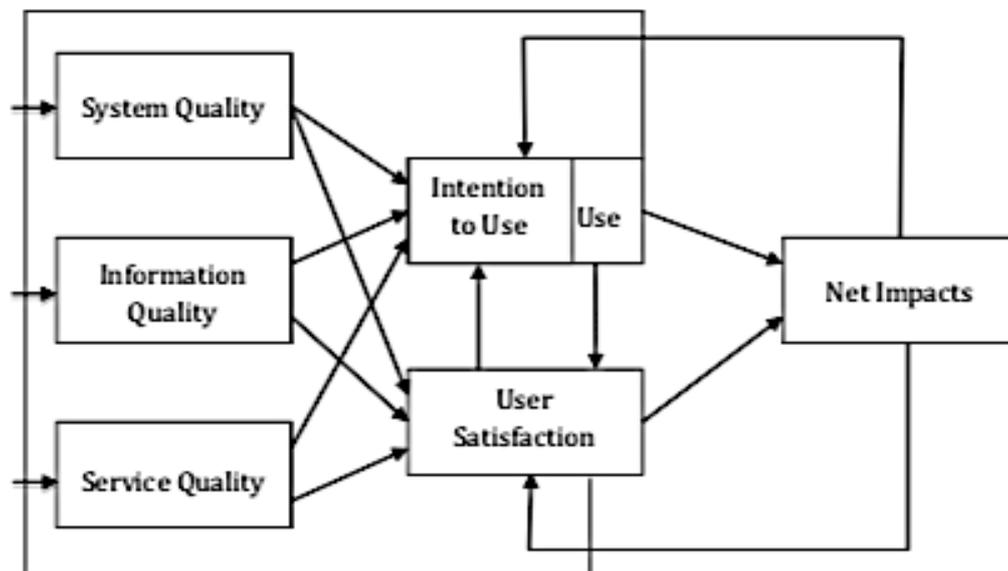
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1 Research methodology

This research aims to develop a questionnaire and assess a successful deployment of WATSON scalable and cost-effective cloud-based prototype of a platform based on well-known Updated DeLone & McLean's IS success model (see DeLone & McLean, 2003), hereafter referred to as D&M Model. The main aim of this questionnaire was to serve as the basis to frame and homogenize the discussion/interviews with the users who tested the prototype platform.

1.1 D&M IS Success Model

To date, the D&M IS Success Model (1992) has been one of the most cited models (as shown in Petter, DeLone, & McLean (2008) and has served as a reference point for many other models that try to encompass IS success. The model was so well accepted that the authors proceeded to update it in 2003 (DeLone & McLean, 2003) and then again in 2016 (DeLone & McLean, 2016) (see Figure below) taking into consideration the results of research that had been based on the D&M Model. The updated model was even more successful than its predecessor. This was confirmed by Petter et al. (2008) as well as by the authors of the model themselves in their research in which they analyzed over 80 scientific papers¹ that used the D&M Model to assess IS success (DeLone & McLean, 2003).



Updated D&M IS Success Model (DeLone & McLean, 2003)

¹Most of the papers were published in *MIS Quarterly*, *Journal of Management Information Systems*, *Information & Management*, and *Information Systems Research*.



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Based on their research results, DeLone & McLean (1992) suggested that IS success should be defined as a complex variable composed of several interdependent constructs based on the multi-dimensional nature of IS. In accordance with that, they identified six variables they called components of IS success. In their Updated IS Success Model they classified those variables as: System Quality, Information Quality, Service Quality, Use, User Satisfaction and Net Impact. They also suggested that in order to develop a comprehensive measurement model and instrument for a particular context, the constructs and measures should be systematically selected considering contextual contingencies, such as the organization's size or structure, or the technology and the individual characteristics of the system. Hereafter, the Updated D&M IS Success Model will be referred to as the D&M Model and will be used in this research.

2 Testing and administration

Since it was required that the questionnaire could be filled-in by experts outside the project, before its administration, we employed pre-testing with users from the consortium. Furthermore, it was also important to know whether the online system for filling-in the surveys worked as expected. Therefore, each partner engaged to test it. All of these actions helped to check whether the questionnaire was clear and consistent, so that the respondents could fill it in without any issues. During the adaptation phase, it was also noticed that it is necessary to limit the amount of questions and time required to reply in order to avoid respondents skipping too many questions or quitting the questionnaire.

The final version of the questionnaire was designed to last no longer than 15 minutes and included 6 sections with multiple choice questions: Demographic, System quality, Information quality, Platform use, User satisfaction and General Opinion. Moreover, the User Guide that was developed to be used alongside the testing of the platform was further extended as an output of this pre-testing phase to make sure that it can serve as the sole source of information on the platform use.

Finally, collected feedback was shortly analyzed and taken into consideration for the short interviews that followed with several respondents. The elaborate responses were interpreted at a group level with the aim to accomplish WATSON project objectives and lay the ground for future developments and recommendations.

In section 3 we summarise the results. The complete list of questions and answers given is provided in the ANNEX of this deliverable.

2.1 Stakeholders list for validation activities



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The following 8 project stakeholders were invited to evaluate the tool. Some of them are members of the Project's Stakeholder Panel and some other were invited as experts in the area. As a result, we received 6 responses, which we also had the opportunity to discuss with the responders who were willing to do so in person to get more details.

| Date | Tue 11/6 | Tue 11/6 | Wed 12/6 |
|--------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| Contact | Enrico Ciavolino enrico.ciavolino@unisalento.it | Luke Hamm luke.hamm@govgrant.co.uk | |
| User profile | Public authority | Private investor | |
| Contact | Suzanne Hamilton Suzanne.Hamilton@Frontlinemc.com | Rasa Gofman rasa.gofman@vitp.lt | James McMahon James.McMahon@ie.gt.com |
| User profile | Private investor | Public authority | Private investor |
| Date | Thu 13/6 | Fri 14/6 | Fri 14/6 |
| Contact | Catherine Thomas C.M.Thomas@lse.ac.uk | Antoine Abbatucci antoine.abbatucci@f-initiatives.co.uk | Pierre Mohnen p.mohnen@maastrichtuniversity.nl |
| User profile | Public authority | Private investor | Public authority |

3 Summary of Results and conclusions

The complete list of questions and answers given is provided in the ANNEX of this deliverable.

Overall the feedback of the users from within the project and the external stakeholders indicates that as a proof of concept the WATSON platform prototype was successful. There is a lot of interest in the platform and the users indicate in their answers that they would like to follow up further developments, see more functionalities and that they would recommend its use to fellow users.

There is a lot of potential in improving current services/functionality and adding new services. Possibly it would be interesting to offer two separate tools, one for Researchers and another for Public Authorities and Private investors (a less complicated version). Another approach and opinion expressed is that the inFlow Configurator and R&D configurator could be further merged to produce an even more intelligent tool.



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The respondents also indicated that there is a lot of potential for adding more data to the system, possibly a direction worth investigating would be adding to the platform secondary data (i.e. collected by professional data collection sources such as Eurostat or even private collections) as primary data collection requires a lot of effort.

With regard to usability, the conclusion was that the platform prototype overall is reasonably user friendly. Most comments we received aimed at improving usability and making information portrayed more self-explanatory. This comment was especially prominent in the answers of users who reviewed the Inflow app. Since this tool and concepts in its background come from research, they are complex and usually addressed to people with expertise in the domain. This tool would be more suited for use by researchers or public administration experts.

What users found very useful were the supportive material provided alongside the platform such as manuals and in system tips/notifications, which were characterized as very important to understand how the platform works. Suggestions were made to further extended the user guide with theory behind the tools. Other users would welcome even more in system tips.

Performance-wise, users reported that the platform responds quickly while the users were using their usual computer settings and browsers.



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4 References

- DeLone, W. H., & McLean, E. R. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, 3(1), 60-95.
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: a ten-year update. *Journal of Management Information Systems*, 19(4), 9-30.
- DeLone, W. H., & McLean, E. R. (2016). Information Systems Success Measurement. In *Foundations and Trends® in Information Systems* (Vol. 2, pp. 1-116).
- Petter, S., DeLone, W., & McLean, E. (2008). Measuring information system success: models, dimensions, measures, and interrelationships. *European Journal of Information Systems*, 17, 236-263.





5 ANNEX

Here we cite all the Validation Questionnaire Responses received.

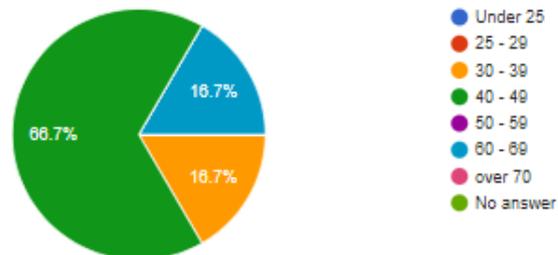


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Demographic

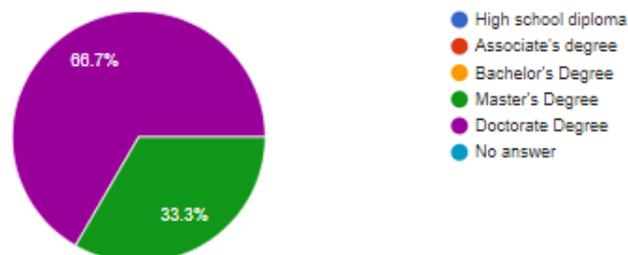
How old are you?

6 responses



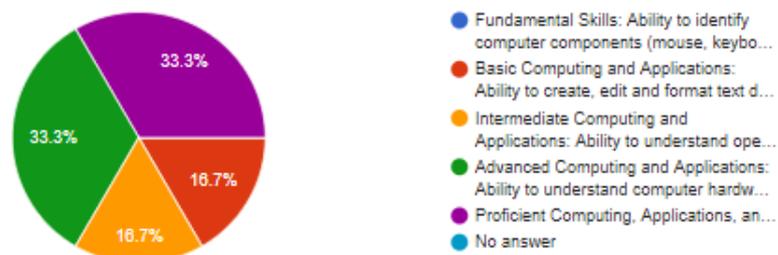
What is the highest level of education you have completed?

6 responses



What is your level of computer skill?

6 responses

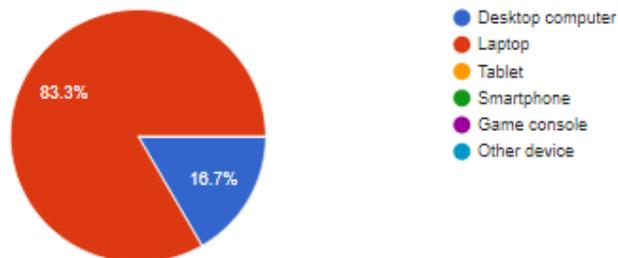


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WATSON platform General

Which of these devices are you using to access the WATSON platform?

6 responses



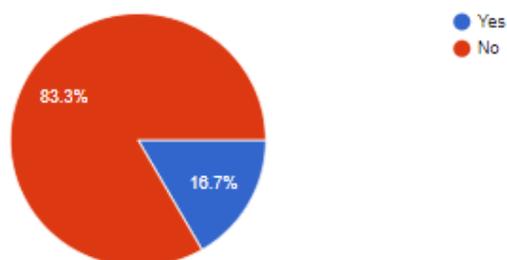
Did you read the WATSON manual on how to use the platform?

6 responses



Did you receive any other kind of help on how to use the WATSON platform (except the user manual)?

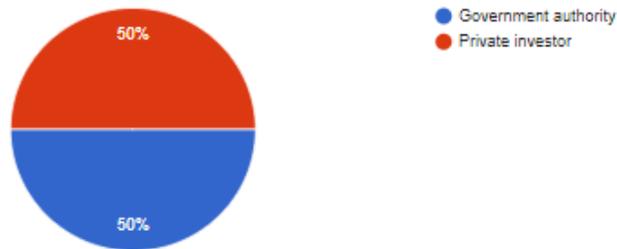
6 responses



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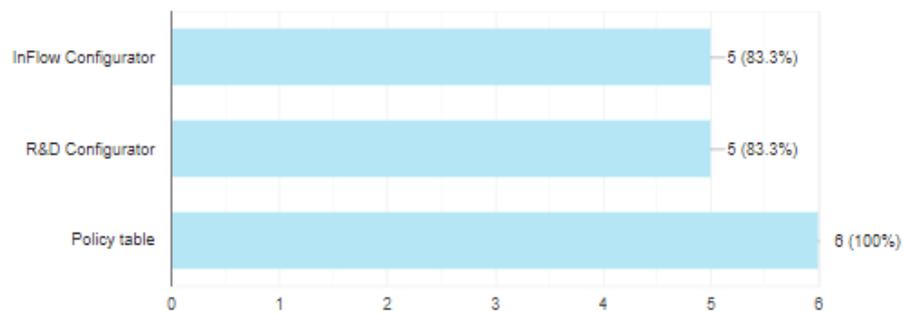
Which type of WATSON platform user did you represent?

6 responses



Which WATSON tools did you use to obtain the information you needed?

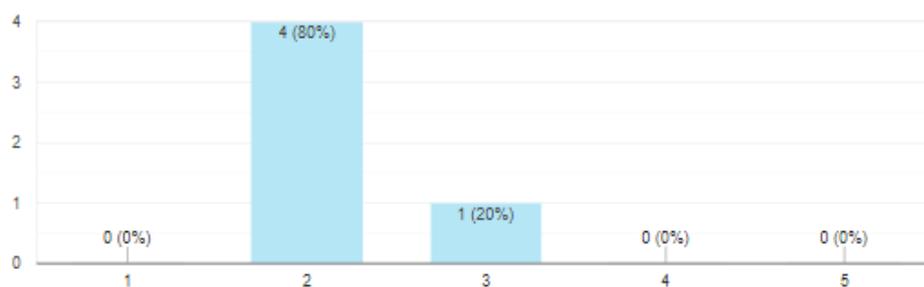
6 responses



System Quality

The WATSON platform is easy to use.

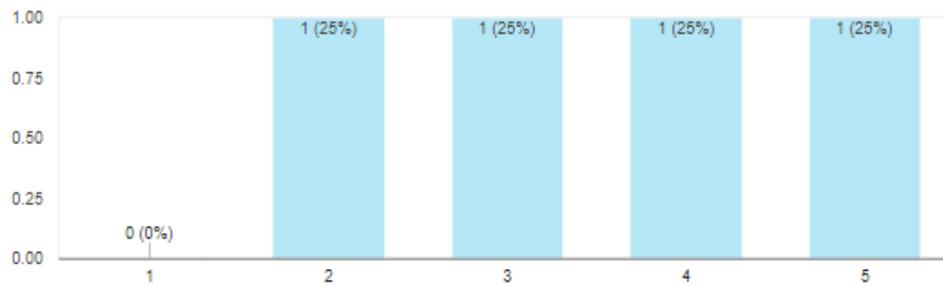
5 responses



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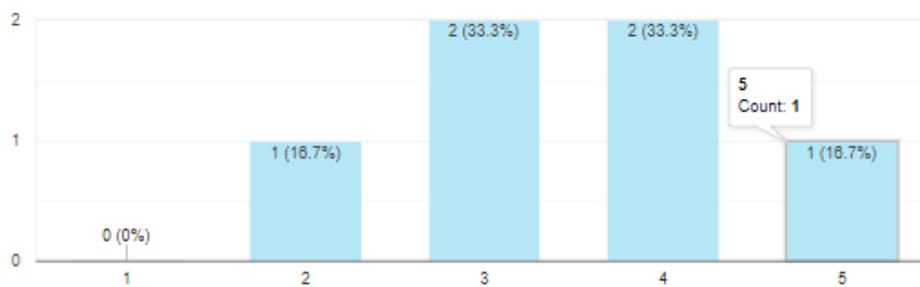
The WATSON platform is available whenever I need to use it.

4 responses



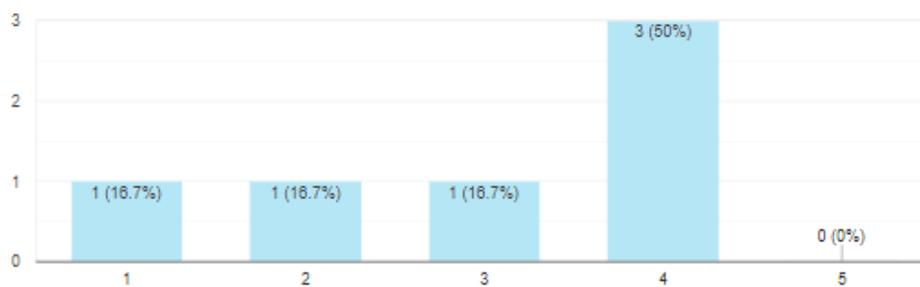
The WATSON platform runs fast.

6 responses



I understand the information within the tooltips/notifications/pop-ups.

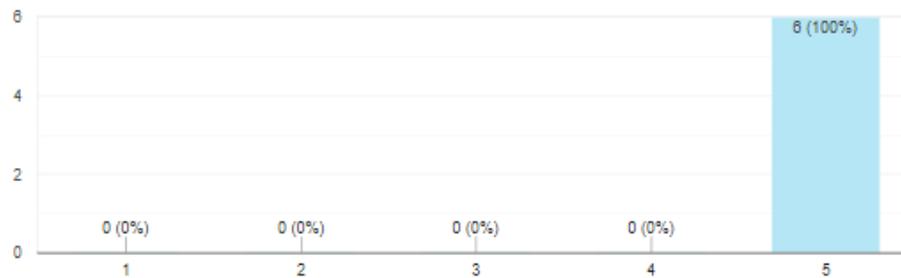
6 responses



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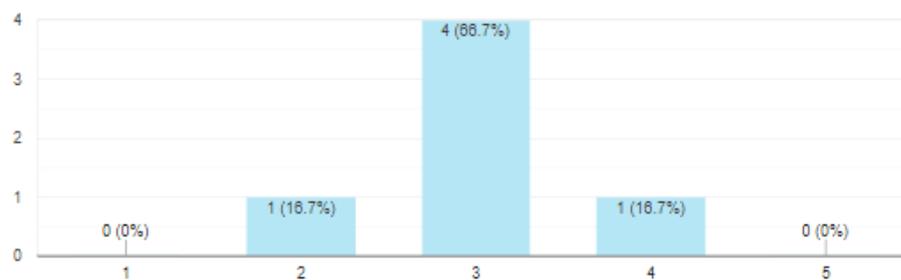
I use my usual Web browser (Firefox, Chrome, Safari, Opera, etc.) to access the WATSON platform.

6 responses



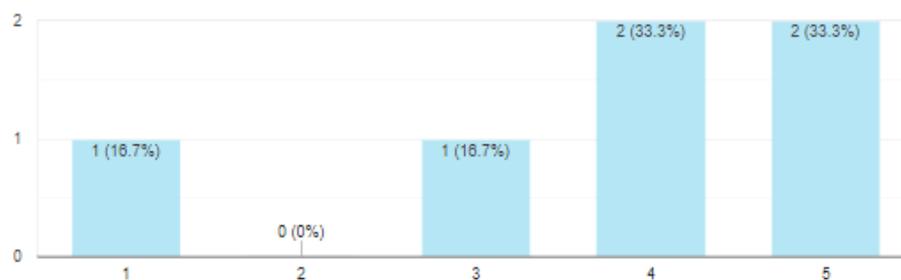
The WATSON platform has all the features necessary to accomplish my tasks.

6 responses



The WATSON platform does not modify/delete any data without asking for my confirmation.

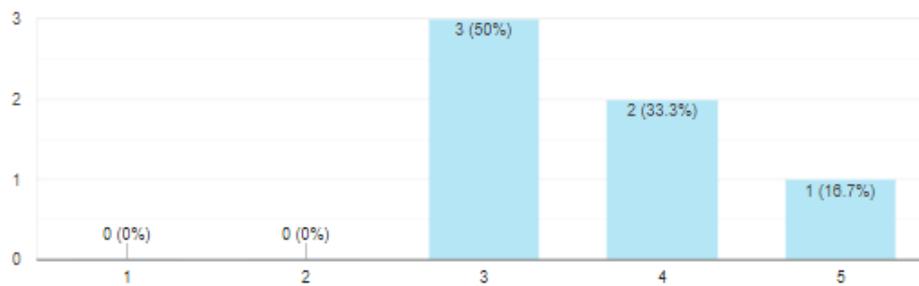
6 responses



Information quality

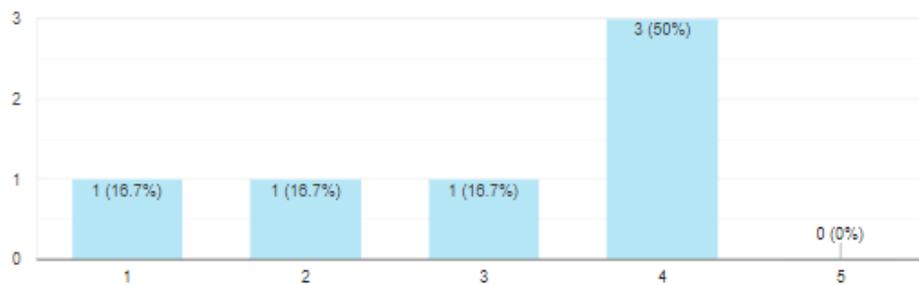
The information I find on the WATSON platform is useful to perform my activities.

6 responses



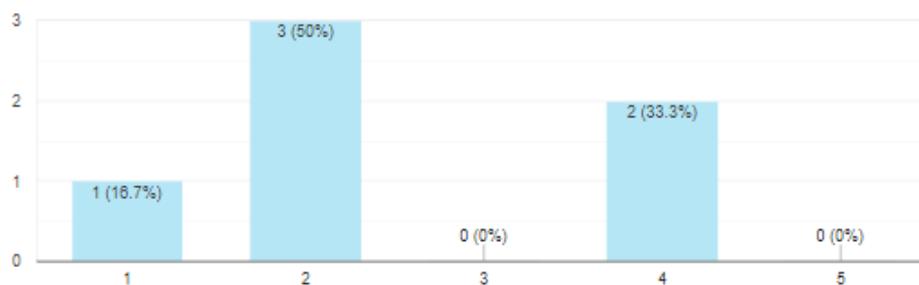
It is easy for me to understand the information I find on the WATSON platform.

6 responses



I can easily find the information I need on the WATSON platform.

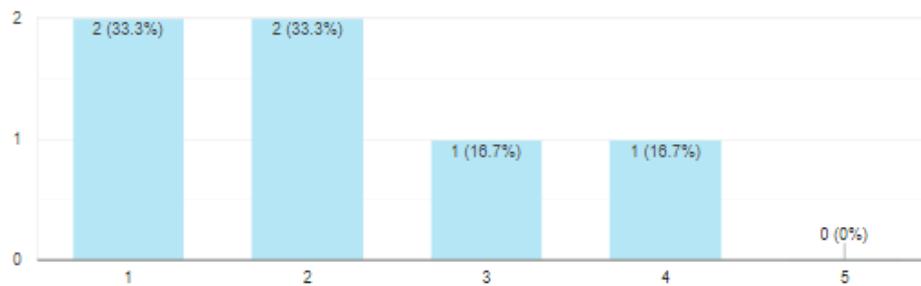
6 responses



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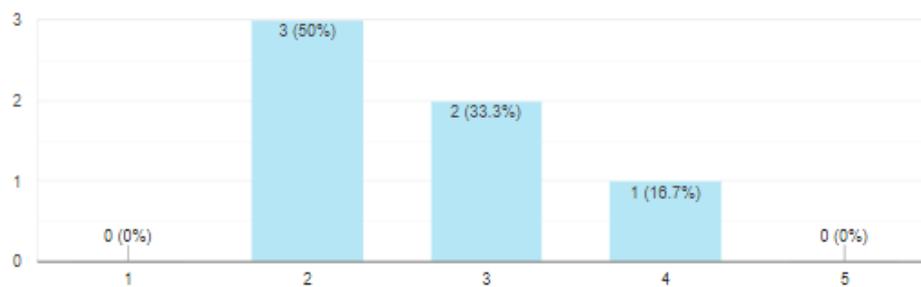
The information I find on the WATSON platform is complete.

6 responses



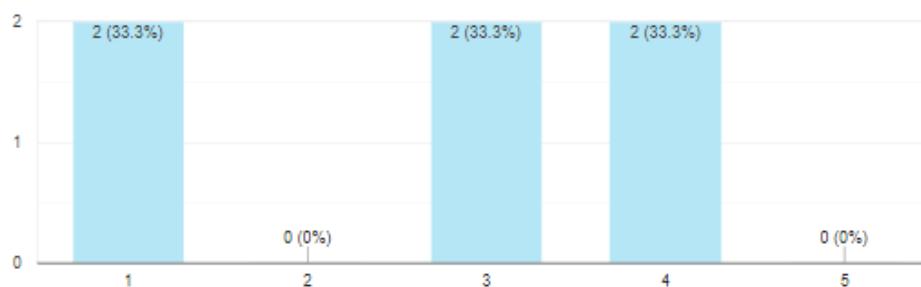
The information I find on the WATSON platform is accurate.

6 responses



The presentation of the results is easy to understand.

6 responses

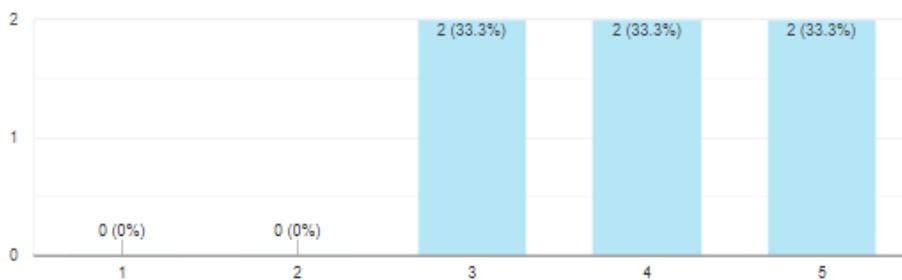


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Platform use

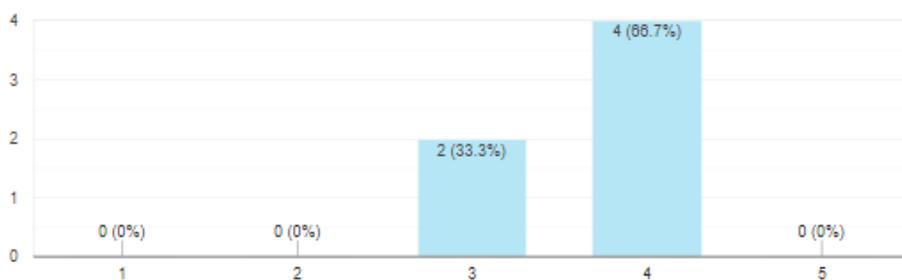
I have the skills necessary to use the WATSON platform

6 responses



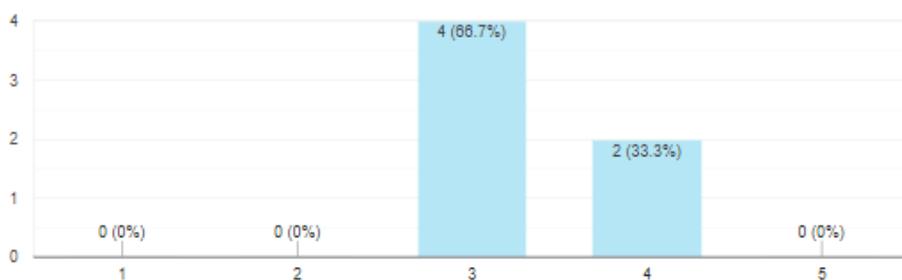
I would like to use the WATSON platform again in the future.

6 responses



I use the WATSON platform to have a better understanding of the innovation flows between countries.

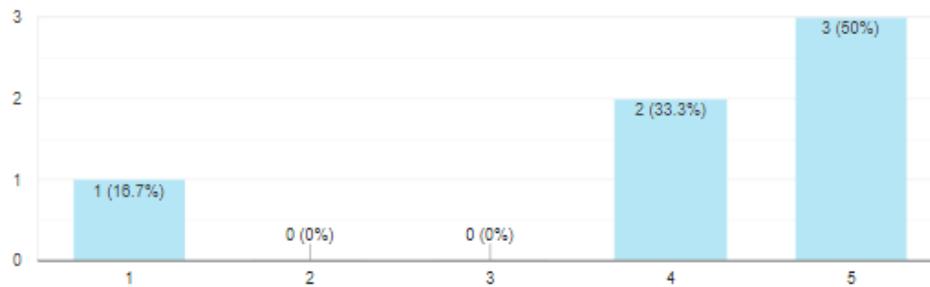
6 responses



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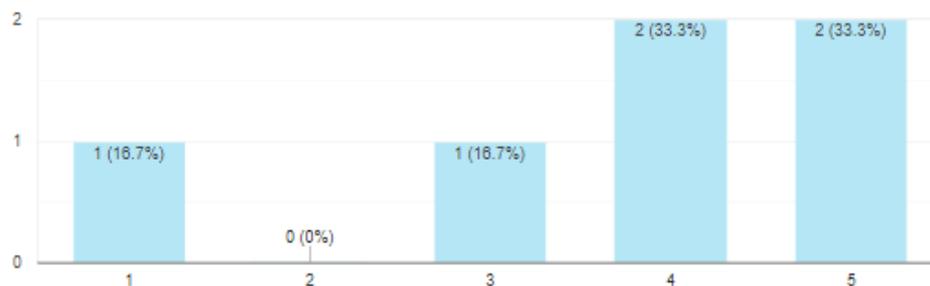
I use the WATSON platform to compare RnD policies and tax relief of SME's on different countries.

6 responses



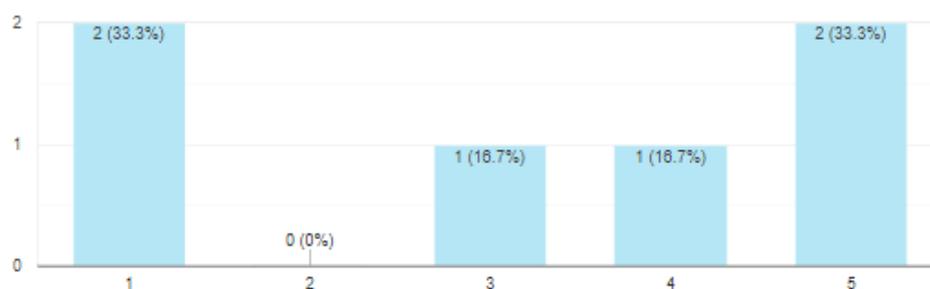
I use the WATSON platform to find how many companies benefited from RnD tax relief.

6 responses



I use the WATSON platform to find how many companies that commercialized an innovation.

6 responses

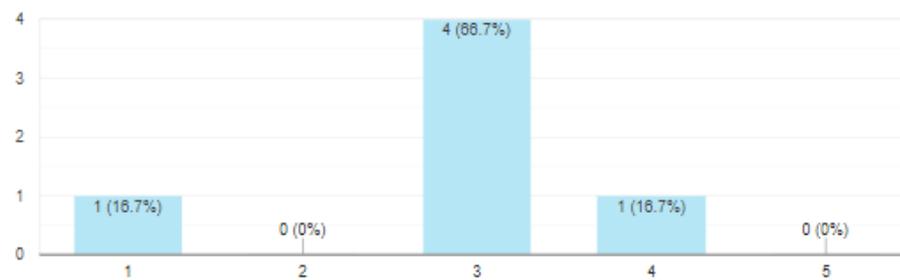


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User satisfaction

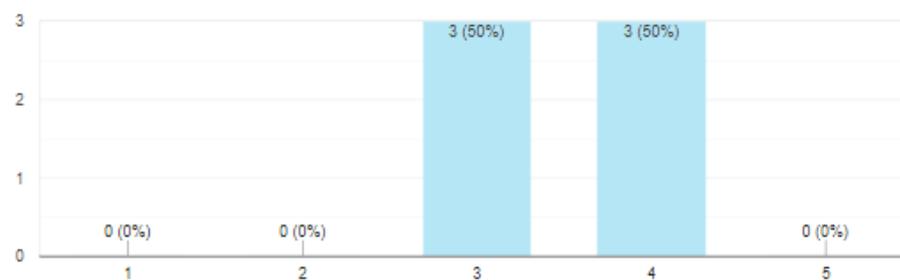
I feel comfortable using the WATSON platform.

6 responses



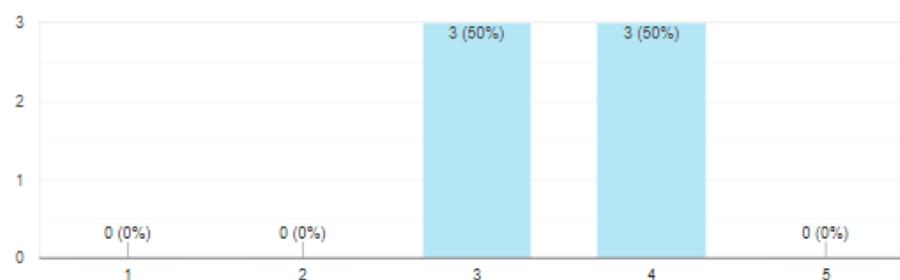
I find the WATSON platform useful for my work.

6 responses



I think it is worthwhile to use the WATSON platform.

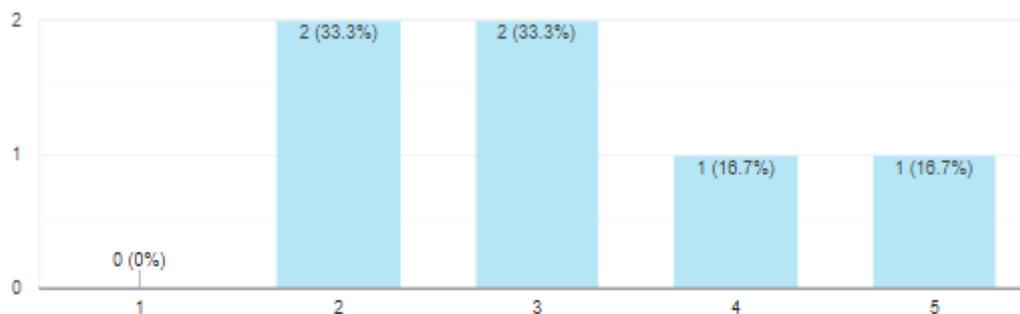
6 responses



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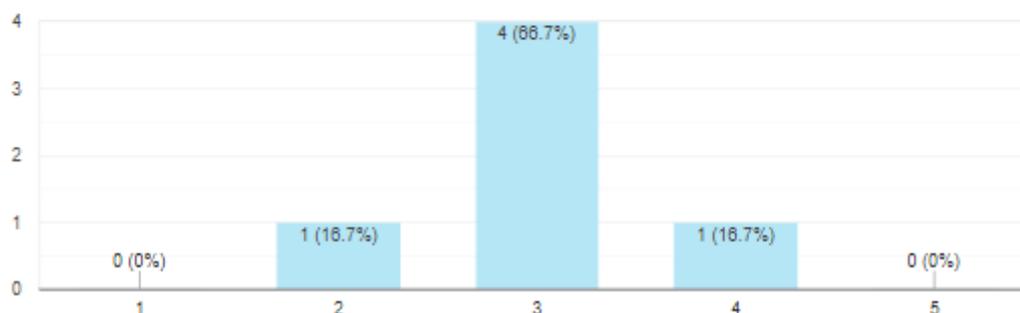
I am satisfied with the WATSON platform possibilities.

6 responses



I would recommend WATSON platform to other users

6 responses



General opinion

Please provide your general impression of the platform or any other comment/recommendation.

6 responses

- Please, use Multiple Selection Button in the Policy table Section - Please, add text to explain each Section of Navigation Menu. This could be reported on the top of each Section - R&D Configuration Doesn't work properly



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I don't understand the spillovers graph. How should I interpret it? Why are global spillovers lower than national spillovers? It took me some time to understand that I had to click to submit without bothering about the load id

An overview of data - selected color dotted map style presentation suggests a second layer (with details - what does the indicated number consist of), but it is not available. In Flow Configurator - the table and graph data are separate, graph has no Y axis values indicated, only the X axis values. R&D Configurator - after data input and visualization, return brings user to the filled table, there is no "clear form" button, and pressing the "refresh" button puts the system into "renewing" stage. "Clear form" button is needed (as in In Flow Configurator). Policy table - every click on a country creates an additional information line, and clicking again creates a duplicate-line. No "shown no certain country data" feature is foreseen.

Comments from Suzanne Hamilton: Note i answered the questionnaire as well as i could. The platform overall it reasonably user friendly having read the manual - you need to do this in advance! The policy table could do with more countries, the info is good on these and the ability to compare. I was also able to print out which was good - would have been beneficial to have a button for this. R&D configurator - why only these 10 countries? seem to have some sectors missing...eg life sciences, chemicals, pharma, engineering...quick evidence following submit, however I couldn't get it to provide me any responses/there was no data found for R&D relief and companies producing innovation...I know this is a prototype so maybe there is still info to be added in. Also, in the pie chart for commercialisation innovation per company when you hover over it says 'received tax relief'. I was confused on the inflow configurator - but i think it was just too technical for me to understand; was good to be able to download the figures in Excel, would have been good to have the graph too. the outputs come back quickly which is also good. happy to have a further chat and hope this is useful Suzanne 07788871996

As it stands, the inflow config can be a turn-off for less tech savvy users. The quickest fix is to move it in the bottom position so new users can play around with the r&d config and policy



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data first, which are much easier to play with. For the questionnaire, please provide a "N/A" option, particularly because there is no data it is hard to comment on the quality of it. Thanks!

Some problems I had were (i) I couldn't tell how the information in the inFlow Configurator and R&D configurator related to each other, or how I could relate them to each other, (ii) I didn't get any output from the R&D configurator, (iii) the innovation map on the home page shrunk to one dot when I put my mouse on the map and I couldn't restore it, (iv) would it be possible to number the input fields in the inFlow Configurator? I didn't know what order to do things and which fields were necessary and which were optional and just filtered the data further, (v) looking at the inputs in the R&D configurator, what does it mean to have an age of -2 or -1? (vi) In the policy table, I couldn't choose to see more than one country, but when I toggled between countries, the previous searches remained on the screen, (vii) I didn't understand the axes on the inFlow Configurator output graphs.



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