Innovation Laboratories Worldwide

Insights gathered through the analysis of the representation in the World Wide Web

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The Department of Business Information Systems at the University of Leipzig conducted a web based study on innovation laboratories worldwide. About 190 innovation laboratory websites could get identified. The innovation laboratories were evaluated and categorized according to the descriptions on the websites.

1 Introduction

The path to successful innovation is rocky and paved with obstacles and risks. The adherence to outdated sales channels or lack of adaptation to customer needs led to bankruptcy for a great number of companies. However, there are companies which realized in time that adaptation to constantly changing markets or the creation of new markets is inevitable for being successful. A prominent example is Apple. This company was nearly bankrupt and ranks nowadays among the most valuable companies in the world because new innovative products were developed and, consequently, new markets were created. The software company SAP benefits from innovations as well and, therefore, experienced a real burst of growth.

For several decades systematic research on Innovation Management and possible tools and methods is subject of science like summarized by Tidd and Bessant [2009] or Hauschildt and Salomon [2011]. Since about the 90s or even the 80s this knowledge gets used in dedicated innovation laboratories and their number seems to be growing. This laboratories can focus their expertise on the process of innovation. They can provide an ideal environment through tools and methods as well as their knowledge and experience. And as our analysis showed, similar to the big diversity of innovation approaches and fields there is a big diversity between the existing innovation laboratories.

Scientific literature is dealing with innovation laboratories since about a decade. Important Articles in this field can be found in the references section, a current summary was given by Gey et al. [2013]. Up till now there is no study on the innovation laboratories as a whole available. The existing literature deals just with a limited amount of example laboratories. This report is first of a kind to supply a broad view, based on an analysis of the available web representations of innovation laboratories.

This short introduction is followed by section 2 which gives an explanation of the approach used. Section 3 contains the results before section 4 gives a short conclusion.

2 Clarification of terms and approach of the study

2.1 Concerning the term 'innovation lab'

Just like the word innovation per se, the expression innovation lab is a multi-faceted term and is used particularly in everyday language differently and frequently in key words. For that reason, it is important to define this term in advance. In this study, we see an innovation lab as a place where companies can develop, test and enhance innovations in an ideal physical or virtual collaborative work environment.

2.2 Approach

For this study, a systematic web-based research was conducted. To gain an overview of locations and range of service of innovation labs was the goal of the research. Particular emphasis was placed on the methods and support tools used during the innovation projects. First, a list with the URL addresses of the labs was generated for this purpose with the help of search engines. Subsequently, the identified websites were examined more intensively and, in a second step, available information was extracted by means of a list of criteria. Figure 1 illustrates the procedure.
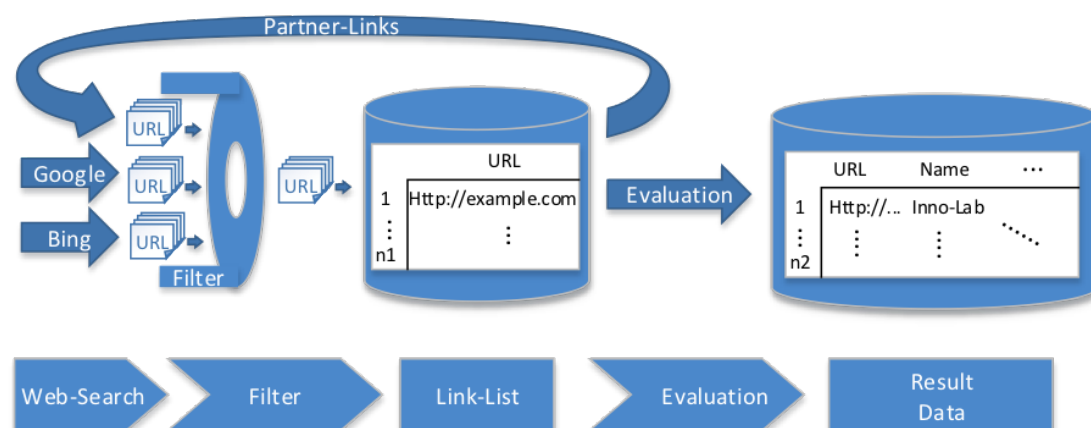

Figure 1: Schematic depiction of the research procedure

2.3 Generation of the URL list

The generation of the URL list of innovation labs was based on a web research. For this purpose, the search engines Google.com and Bing.com as well as linked websites were used. As a first step, the terms „Innovation Lab" and „Innovation Laboratory" were keyed in for the search via Google and Bing (see Table 1). All scored hits were manually prefiltered to avoid duplicate entries and to eliminate irrelevant hits. Further search terms ("Laboratory of Innovation", "Open Innovation Lab", "Lab of Innovations", "Lab for Innovations" and "Laboratory for Innovation") were evaluated with a test search via Google but it turned out to be no significant extension to the result list. In order to avoid a focus on English-speaking countries in the search due to the choice of search items, additional research runs were conducted in Spanish (see Table 2). Here, only Google.com was used as the usage of Bing in the previous search did not reveal additional, relevant results. Furthermore, the websites of the extracted results were analyzed for links to partner sites and recursively included in the list of results according to suitability. Thus the partner links of the newly included sites were again examined.

For eluding the regional preselection of German-language results by the search engines, the browser setup „English language" was activated for the research.

Table 1: Used search terms and number of considered results. All of the approx. 2250 hits were considered and prefiltered for the generation of the result list.

Search term	Search engine	Indicated score	Number of result pages	Considered results
"Innovation Lab"	Google	1.050.000	76 pages	approx. 760
"Innovation Laboratory"	Google	77,800	75 pages	approx. 750
"Innovation Lab"	Bing	345,00	50 pages	approx. 500
"Innovation Laboratory"	Bing	26.000	25 pages	approx. 250

Table 2: Used search terms in Spanish for the extension of the result list.

Search term	Search engine	Considered result
Laboratorios de Innovación	Google	The first 50 results
Laboratorio de Innovación Tecnológica	Google	The first 50 results
Laboratorios practicos de innovación	Google	The first 10 results
Labores de Innovación y desarollo	Google	The first 10 results

Table 3: Overview of the acquired attributes for every offer. A detailed explanation can be found in the respective sections.

Attribute	Further description
Internal ID	Internal unique ID. This attribute serves the internal and unambiguous addressability of websites because several offers have the same name and several can be found under different URLs.
Name	The name of the offer
URL	One or several URLs to the offer
Country	The country of the offer's headquarters
City	The city of the offer's headquarters
Number of employees	Number of employees concerned with the offer
Google Pagerank	Pagerank of the Google toolbar
References	Are reference projects or reference customers indicated?
Connection to university	Strength of connection to a university
Financing	Type of financing, rather privately or publicly funded
Service focus	Does the offer deal with service innovation in particular?
Regional orientation	Scope of addressed region ranges from local to global
Thematic orientation (area)	Which area of application is addressed?
Type of offer	Main type of offer
Similarity to innovation lab	How similar is the offer to our understanding of innovation labs?
Amount of information on applied methodology	How detailed is the methodology used to encourage innovation outlined?
Amount of information on the technology supporting the methodology	How detailed is the technology for the support of methodology outlined?
Contact options	Is the contact via email or via Web form possible?

2.4 Categories for the data assessment

For the presented study, the available information concerning individual service offers was systematically acquired by means of criteria listed in Table 3. In the process, both objective and subjective criteria were considered. A detailed explanation of the used categories can be found in the following sections.

3 The categories and the results

Altogether, 195 offers were identified out of over 2500 search engine hits and further linked offers. Only offers were enlisted that have a similar understanding of innovation labs as described on page 2.

3.1 Internal ID, name and URL

For every offer, a name was recorded, one or several URLs and an internally unique ID assigned. Attention was paid to the occurrence of the same name for several offers.

3.2 Country and city

As far as practicable, the offers were associated with a country and a city. In the case of multiple locations, it was individually decided whether the headquarters or other locations were recorded. Figure 2 offers an overview of the worldwide distribution of the considered innovation labs. The strong focus on Europe and North America is clearly noticeable.
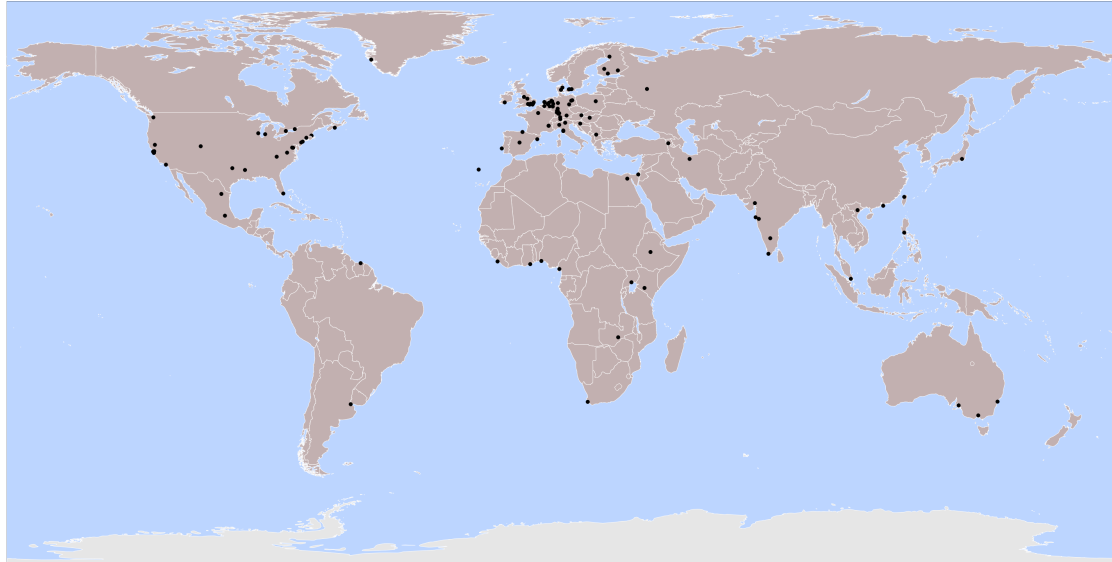

Figure 2: Spatial distribution of the extracted innovation labs. The coordinates of the points were entered based on the city names and cities with several offers (e.g., London, New York and Berlin) were not specially marked. Furthermore, not all offers could be associated with a place.

3.3 Number of employees

The number of employees of an innovation lab was registered as well. Overall, nearly half of the offers displayed a number of employees whereas no number could be derived from the remaining websites.
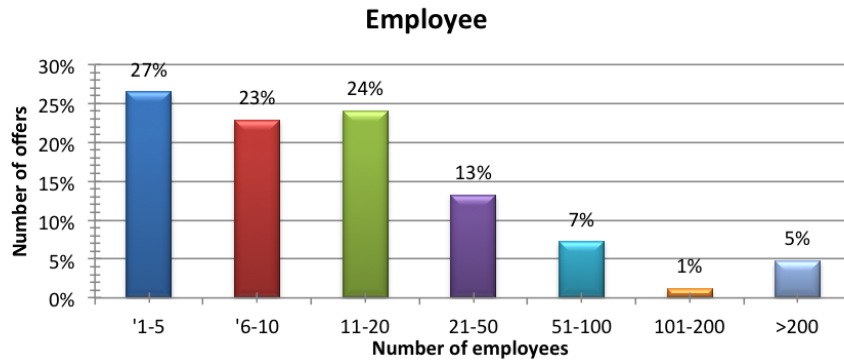
Employee

Figure 3: Diagram concerning the number of employees of the considered innovation labs

In Figure 3, a strong accumulation in the range of up to 20 employees can be seen. Values of more than 50 employees are mainly attributed to big development departments, not clearly indicating which proportion of employees is concerned with the innovation lab.

3.4 Google Pagerank

For the websites of the innovation labs, Google Pagerank values were recorded via a browser plug-in in accordance to the values of the Google Toolbar. The Google Pagerank is based on the Pagerank algorithm and is an integer in the interval [0..10]. One meaning of this number constitutes that pages with a high score are more likely to be listed by Google in the first places of a search request than pages with lower scores. Furthermore, it is a first indication for the presence of a page in the internet.

Within the framework of this study, no discussion on the distribution as illustrated in Figure 4 will take place. However, it is remarkable that 3% of the sites were rated by Google with the unfavorable rank of 0 by Google itself and that no offer obtained the value of 10.

3.5 References

The websites were categorized as to whether reference projects or reference customers were indicated. As shown in Figure 5, only about half of the websites (54%) advertise with successful projects or customer relations while the rest of the websites dispense with this means of advertising.
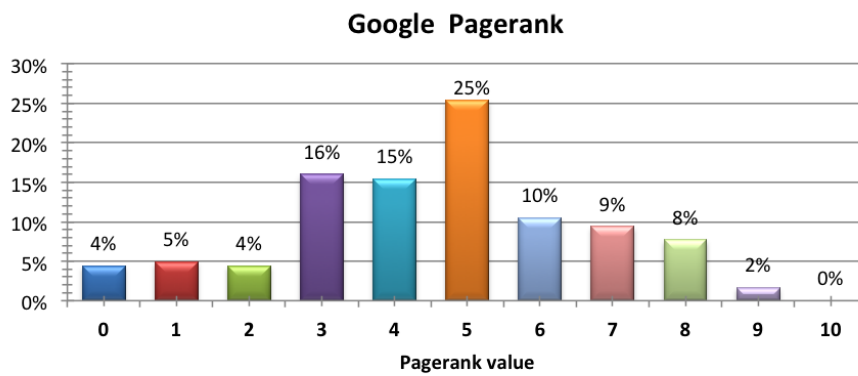
Google Pagerank

Figure 4: Statistic on the Google Pagerank values of offers. Values in the interval [0..10] are possible whereby small values reflect a lower rating by Google.

References
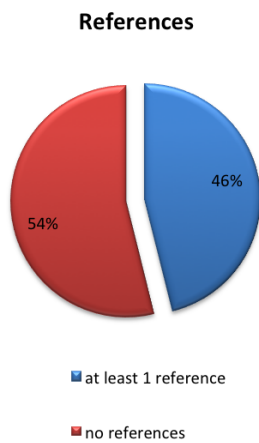

Link to the university

Figure 5: Evaluation for the indication of reference projects or reference customers on the websites of innovation labs.
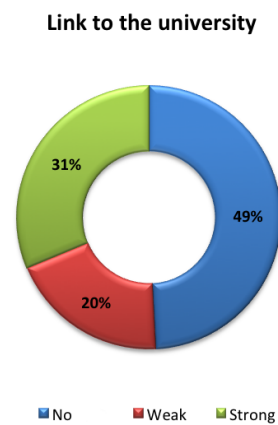
Figure 6: Statistic on the integration of innovation labs with university institutions.

3.6 Connection to university

On the basis of the website information, the proximity to an university research institute was evaluated. Here, a distinction was made between the categories listed in Table 4.

As shown in Figure 6, over half of the offers did not mention an university connection. This also correlates with the high proportion of privately financed offers in Figure 7.

Table 4: Description of the connection types and indication of percentage values.

Strong connection	The offer is part of an university or at least very close to it.	28%
Weak connection	The offer has an university partner.	20%
No connection	There is no (mentioned) university partner.	52%

3.7 Financing

In this category, the basic financing is evaluated. Thereby, a distinction is made between the three following categories:

- Mainly private financing (56%)

- Mainly **public** funding (16%)

- A **mixture** of both, so mainly private financing with additional public funding (28%)

The result is illustrated as a ring diagram in Figure 7. Only a third of the examined offers revealed public funding.
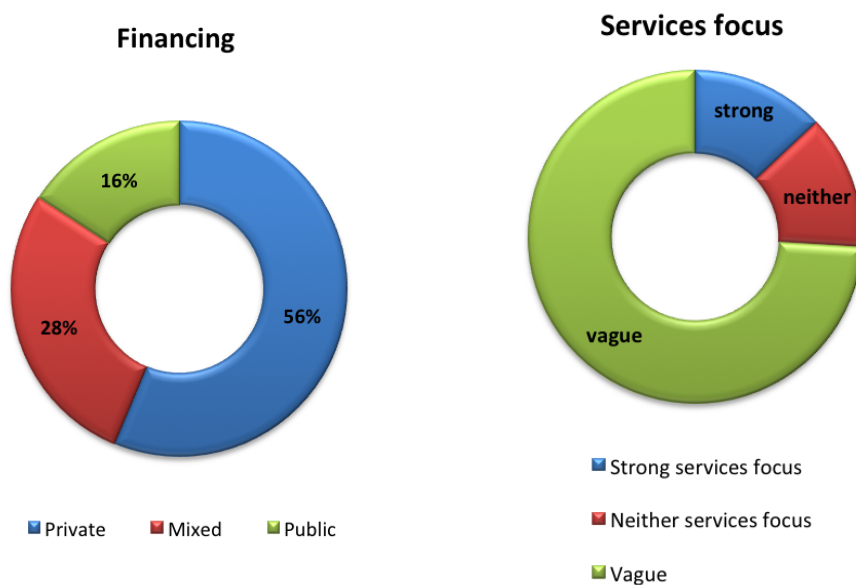

Figure 7: Illustration concerning the type of financing of the considered innovation labs.

Figure 8: Ring diagram concerning the service focus of innovation labs. Based on the website, it was examined whether a strong service focus is noticeable.

3.8 Service focus

Based on the website, it was evaluated if the offer deals with service innovation in particular. For this purpose, the offers were differentiated in three categories as shown in Table 5. The according ring diagram can be found in Figure 8.

In this evaluation, a statement concerning the service focus could be made for only a quarter (27%) of the offers, and about the same proportion of offers put clear emphasis on services (13%) or respectively not (14%).

Table 5: Listing of the used categories for the determination of the service focus with information on percentage values.

Strong service focus	The offer is explicitly concerned with service innovation.	13%
No services focus	The offer is not explicitly concerned with service innovation but with real products.	14%
Undetermined	No clear statement is noticeable.	73%

3.9 Regional orientation

Based on the available information, it was evaluated which regions or respectively regional expansion are addressed by the offer. In the process, the four classes depicted in Table 6 were generated.

Figure 9 demonstrates the offer distribution according to the four created classes in the form of a ring diagram. All generated classes were assigned to innovation labs. Nevertheless, an emphasis can be identified concerning spacious orientation with little or no restrictions.

Table 6: Categories for the regional expansion along with frequency values.

Local	The offer addresses at most one city and its proximity.	4%
Regional	The offer addresses a wider region than only a city but at most one country.	18%
International	The offer addresses more than a country.	20%
Global	No regional restrictions are obvious.	58%

3.10 Thematic orientation

The offers were examined with regard to the thematic scope they address. In the process, the following four categories, which were almost equally often represented, were generated: **IT, Business Services, Social Services or General**. In this subdivision, offers could be assigned to several categories. Accordingly, the amount of the percentage does not have to be 100%. See also in Figure 10.
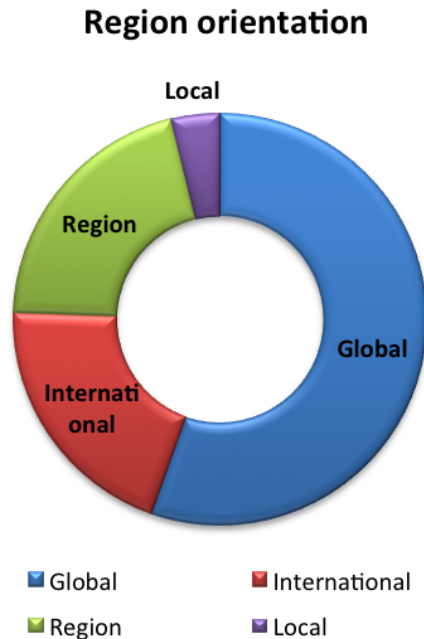
Region orientation

Figure 9: Illustration of the results concerning regional orientation of offers. Local offers focus on cities and their proximity. The offers of the next category address a wider region up to an entire country. International offers address more than a country and global offers reveal no restrictions.

- Every third offer (33%) is concerned with IT, multimedia and telecommunication issues.

- Almost every fourth option (23%) offers commercial services and belongs to the category Business Services. This area includes offers to improve the course of businesses and to assist with company foundation.

- Another quarter of offers (25%) is concerned with the area of Social Services . These include offers supporting citizens and health issues. .

- Finally, a quarter (25%) was not associated with a further focus.

3.11 Type of offer

In the evaluation of this study, it became clear that about one third of the offers have to be assigned to another type of fundamental nature despite the adequate resemblance to an innovation lab. This is due to the fuzzy dissemination of neighbouring concepts, so some laboratories can fit to several types. The about 190 identified laboratories all fit to the definition for innovation laboratories, and 73% were put in this category alone. The remaining 27% can be assigned to a second category. Here, particularly business incubator (12%), development labs (7%), and consulting companies (5%) are more frequently represented, which can be seen in Figure 11.
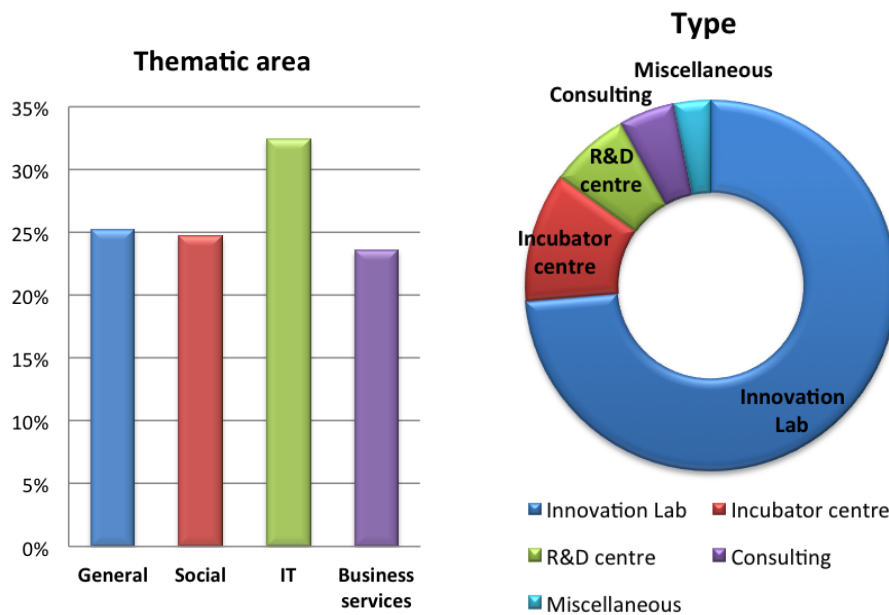
Figure 10: Thematic orientation of the offer. All innovation labs were assigned to the thematic areas, which they address.

Figure 11: Main type of the offer. Although all recorded offers display a great similarity to an innovation lab, almost a quarter can be assigned to another main type.

In Africa, for example, a large proportion of the recorded offers are business incubators with a strong focus on promoting innovation due to the provision of technological infrastructure, approved procedures and support.

3.12 Similarity to innovation lab

As mentioned before, we focused on laboratories as a place where companies can develop, test and enhance innovations in an ideal physical or virtual collaborative work environment. On a scale from 1 to 4, the similarity of the offer to our understanding of an innovation lab was evaluated. Thereby, marks 1 and 2 were assigned to a very strong (13%) and strong (40%) similarity and the marks 3 and 4 to sufficient (36%) or little (10%) similarity. This results are shown in Figure 12, too.

Overall, 90% of the identified innovation labs show a sufficient or closer similarity to the definition mentioned above.

3.13 Amount of information on the applied methodology

The broad diversity of innovation laboratories shows in the information quantity in the Internet presence as well. As one of two examples we rated the elaborateness on, is the
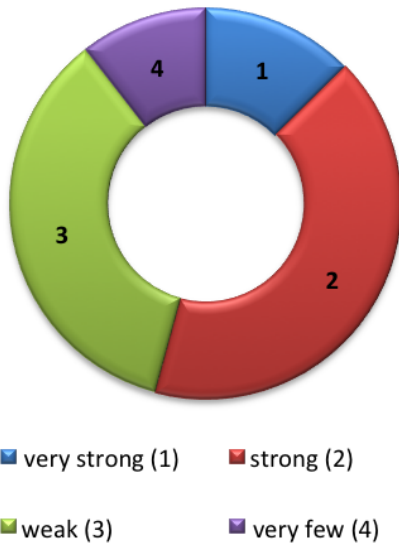
Figure 12: Similarity to our understanding of an innovation lab.

amount of information on the methodology applied by the innovation laboratory. This was done as shown in Table 7 on a scale from 0(none) to 5(thorough).

As one can see in Figure 13, about a third of the innovation laboratories offered no information and another third only very few information in the Internet. Possible reasons for this lack of information could be the fear of helping competitors, a lack of resources or no seen need.

Table 7: Ranking system for the evaluation of the amount of information on the methodology with corresponding percentages.

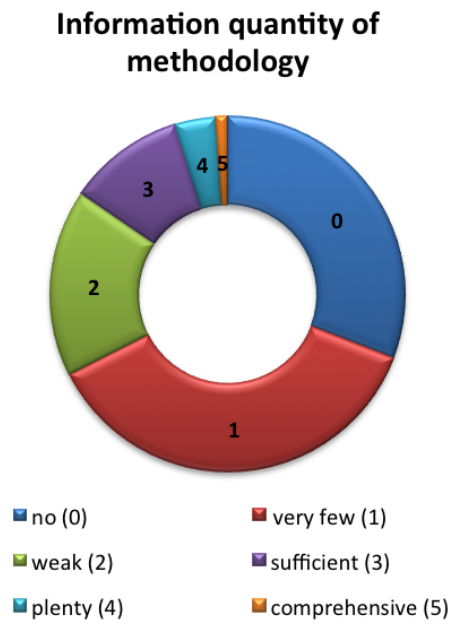| 0	None	No information found	32%
1	Very little	One method mentioned	36%
2	Little	Several keywords on the methods appear	16%
3	Adequate	Short description of the methods	11%
4	Much	Methods are illustrated	3%
5	Extensive	Thorough information on the methods used	1%

Figure 13: Statistic on the amount of information on the methodology based on the presence in the internet.
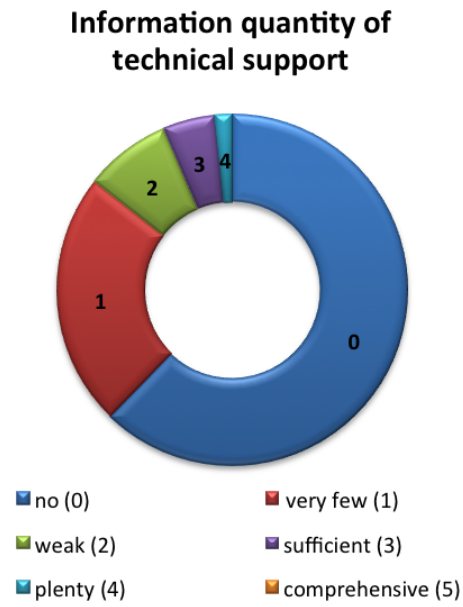

Figure 14: Statistic on the amount of information on the technology supporting the methods based on the presence in the internet.

3.14 Amount of information on the technology supporting the methods

Analogously to the amount of information on the methodology, information on the technical equipment to support the methodology was searched for. The elaborateness of this information was rated on a scale from 0 to 5 as described in Table 8. As shown in Figure 14, for about two thirds of the innovation laboratories we were unable to find information on the technology supporting the methods. And for only 7% of the innovation laboratories we found more than several keywords.

Table 8: Ranking system on the evaluation of the amount of information on the methodology supporting technology with corresponding percentages.

0	None	No information found	63%
1	Very little	Technical support mentioned	22%
2	Little	Several keywords on technical support appear	8%
3	Adequate	Short description of the technical support	5%
4	Much	Technical support is illustrated	2%
5	Extensive	Thorough information on the technical support	0%

3.15 Contact options

For every website, contact possibilities via email or web-contact-form were searched for. Three categories are differentiated here:

- Contact-email-address found (80%)

- No contact-email-address but contact-form found (14%)

- Neither contact-email-address nor contact-form found (6%)

Whereas all offers allow for some way of contacting, the contact via email is especially relevant within the frame of this study. However, no email-address could be extracted from the website for one fifth of the innovation labs.

4 Conclusion and prospect

The most important result of this report is the big number of innovation laboratories in the world. With the web research alone we were able to identify more than 190 laboratories of which more than 170 have a sufficient similarity with our understanding of innovation laboratories. And there seem to be several additional laboratories existing without a presence in the internet. This is one of the main limitations of the web based approach. Some big companies for example can have very good innovation laboratories but no need for advertising them on the internet. Another drawback is the limited amount of information one can get from internet sites. This shows especially in the low results on information quantity. So more detailed research is definitely needed in the promising field of innovation laboratories.

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