

Kampal Research: Getting Started

Index

Index.....	2
What is Kampal Research?	2
Demo	2
Differences between institutions	2
User interface	3
Reflecting the structure of the Institution	4
First example: A research Institute.....	5
Step 1: Selection.....	5
Step 2: Network.....	5
Step 3: Viewer	5
Step 4: Modifiers.....	6
Verification	6
Inside the Data: Side menu.....	6
Second example: A Department.....	8
Select Researchers:.....	8
Viewfinder.....	8
Side Menu	9
Third Example: a Researcher.....	10
Individual Activity.....	10
Collaborators	10
Individual Report.....	11
Fourth Example: All.....	11
Gender Treatment.....	12
Fifth Example: Set of Institutes	12
Map of items by JCR impact.....	12
Map of projects.....	13
Aggregated information	13
Sixth Example: An in-depth study of an Institute.....	14
Abstract	14
Publications	14
Proyects	15
Comparative	15
Alerts	15

Index

From the main page <http://www.kampal.com> you can access the different products of the Kampal Data Solutions Company. Here we will make a practical introduction to the use of Kampal Research, which is accessed by clicking on the *Kampal Research* icon on this page.

To follow this tutorial it *is highly recommended to do it with the Kampal page open* and browsing as indicated in each section. That is why we do not include screenshots here except an initial one to start correctly.

What is Kampal Research?

This tool performs an analysis of the R + D activity of Centers or Institutions based on scientific publications, research projects and other related activities.

To access, click on the "*Kampal Research*" Icon

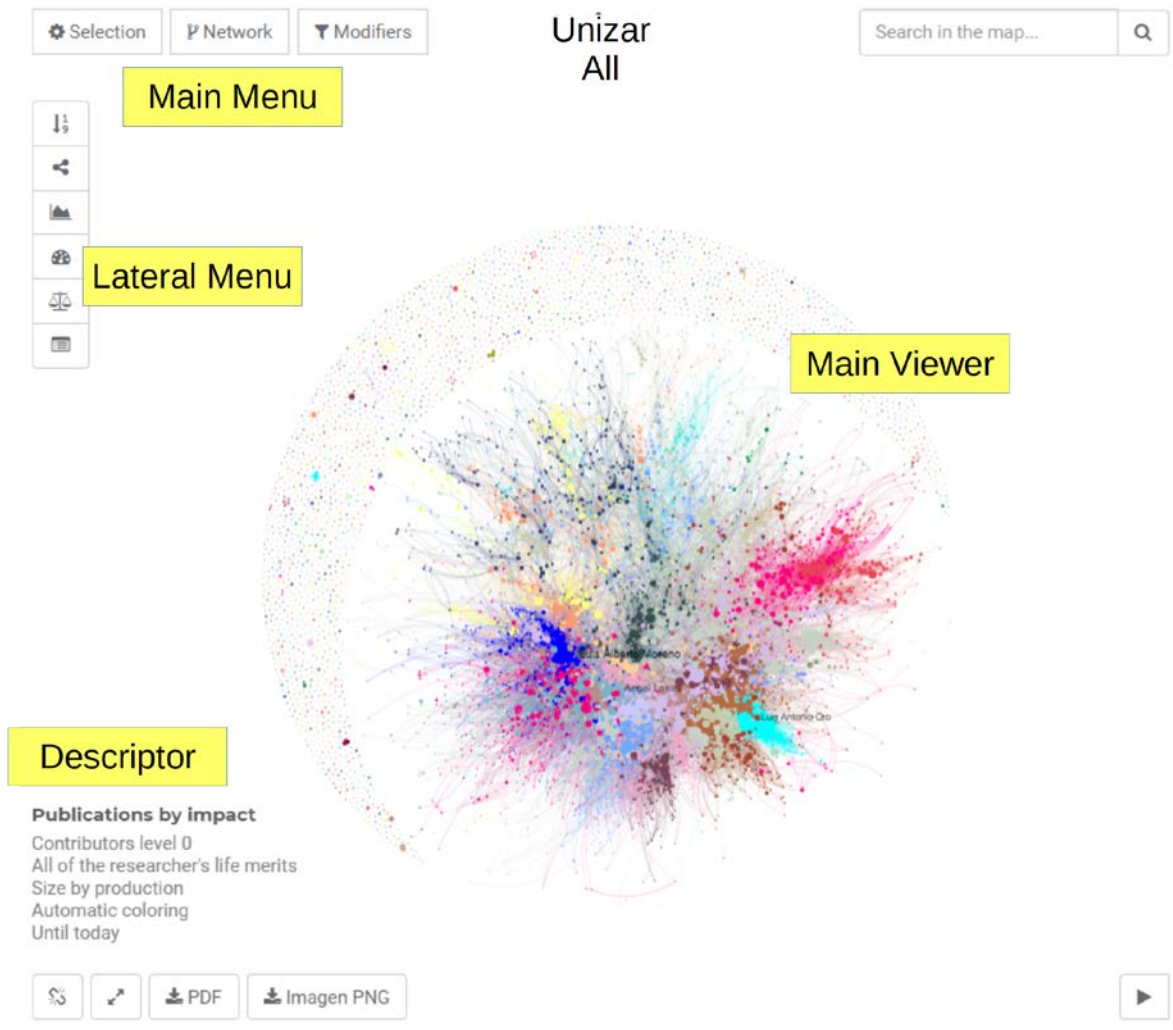
Demo

We have created a project to illustrate the product, which can be freely accessed and used as a public project, called "Demo Institution", where we have assigned researchers, papers, projects and fictitious organization charts.

Differences between Institutions

Since different institutions have different types of data, categories, organizational structure, etc. some menus depend on the Institution. For example, if you have patent data, you have a specific tab for your study. If publications from both indexed journals (in JCR for example) and non-indexed publications are analyzed, the JCR papers and All papers tabs are available for analysis of each set, etc.

User Interface



When we enter a specific project, we access a default view, which contains essentially three parts:

Selector: It is used to select the group of people on whom the study is carried out.

Data: To the right of the viewer, it allows to select the type of Data used for the analysis in progress.

Viewfinder: Central part where the results of our selections are shown. Inside the viewer we will see several options for visualization and analysis.

In this default view, the total Institution is loaded. For this tutorial we will initially move on to something smaller.

Reflecting the Institution structure

For each institution a study of its structure is carried out (Departments, Faculties, Institutes, Groups, etc.) and the analyses based on what is indicated in the Selector, can be carried out for each of these structures, in addition to for individuals or groups , mixtures of people and institutions, etc. This organization chart is reflected in the different searches that can be made to carry out the analyses. For this Institution, we have assumed that it has the following structures:

- **Research Institutes**
- **Areas**
- **Centres**
- **Departments**
- **Groups**
- **Macro areas**

First Example: A Research Institute

Step 1: Selection

Here we define the set of people we want to study.

- *Selection* → *List* → *Institute* → *Institute_3*

We select the set of people to analyse. For this we have the *List* button, which helps us to see all the selection possibilities, by people, and by all the Institution's structures (Institutes, departments, etc.) and which autocompletes our searches. We make a specific selection. (Let's start with a Research Institute, for example *Institute3*). Note that concatenated selections can be made: for example, a person and a department, or two people, etc.

Note: Previously selected items are not deleted when generating new ones. In this case, all must be deleted in order to see only the selected Institute.

After selecting, we press the *Generate* button, which after a few seconds of calculation, shows us the default view (that is, with some initially chosen options, which the user can then interactively change). The current analysis options are shown in the lower left part of the screen (*Parameter Descriptor*), in this case we see

JCR impact publications, size per production, automatic coloring, up to 2021

Step 2: Network

Now we define the data set and relationships to use for our analysis.

By default, we can see in the *Parameter Descriptor* that we are on "*JCR Impact Publications*", which corresponds to the default. The type of Network can be modified between the following types:

Publications: Scientific publications are studied. To build the Network we will say that two nodes are related if they have signed a common paper. The strength of the relationship can be fixed in different ways. By default, we have chosen that the strength of the connection corresponds to the JCR Impact of the Journal in the year of publication of the publication.

Projects: We study the Institution's R + D projects. Relationships are established when you have collaborated on a project. The relationships go from the Principal Investigator to the signers.

Collaborations: We simultaneously study Publications and Projects or other types of relationships. In *Publications + Projects*, a union is established when there is a paper or a project in common. It's about seeing the global collaborative aspect, beyond the details. Here other types of merits may appear, depending on the Institution.

We will come back to this later. Let us now focus on the analysis *Publications* → *JCR*.

Now click on *Generate* to build the Network, do the analysis and show the results.

Step 3: Viewer

After clicking *Generate*, the graph is generated in the Viewer and all tables, analyzes, data, etc. become accessible.

We see **Nodes** (researchers) and **Links** (relationships) distributed with specific positions.

Navigating in the Viewer

In the viewer, we can zoom with the mouse wheel and move the Map by dragging. We can perform searches of the displayed nodes. In addition, pressing on a node shows basic information about it. At the bottom of the viewer, we can request the generation of a PDF file with the map currently displayed. We can also see the viewer in full screen (On / Off) or a small animation. We also have, in the lower left, the option to make the links visible (On / Off), which in the case of very large maps, can be used for easier viewing.

Relative to the Map

The Map now shows the collaborative structure in the production of JCR Publications of the selected nodes, positioned according to their collaborations, the clusters that are formed naturally, interaction between them, isolated nodes, etc. The size corresponds in this case, according to the selected parameters, with the JCR impact added to all the author's papers within the selected group.

Colors and Communities

For each Map, the system identifies the groups made up of people who collaborate with each other more actively than with the rest. We call this group "Community". On the Map, researchers are colored by default according to the community in which they have been identified (*Color* → *automatic*). Here the like-minded people (i.e. from the same community) appear close and of the same color.

Step 4: Modifiers

From here we can modify the criteria used to view the results, colors, sizes, etc..

Visualization:

Size: We define it based on which property the size of each node is set.

Color: We define it based on which property the color of each node is set.

Filters

From-To: Time of the analysis

Top: Allows you to view only a part of the selected nodes

Grouping:

It allows grouping several nodes into one according to some common property.

Verification:

In the Map that we see in the Viewer that the Size of each node is proportional to its production, in this case to the JCR Impact of its publications. We can change this.

In *Modifiers* → *Size*, we select *Centrality*. Now the size of each node is proportional to its Centrality, that is, to the cohesion capacity of that node in the Network, or equivalent to its importance for the information or collaboration to spread over the network. We see that nodes that were previously a good size but were not collaborative, now have a much smaller size.

Inside the Data: Side Menu

So far we have seen graphically the analysed Network, its structure, relationships, denser and more isolated areas, etc; all in graphic form. To quantify all this, in the vertical menu we can access a large number of functionalities that give us a broad and precise analysis.

The results shown are always those relative to the selected group. If a Department has been selected, the listings, productions, comparisons, etc. are always relative to the department in question. If you

want to see absolute data within the Institution, it is necessary to start in the *Selection* with *All*. In this example, the data is relative to Institute3. Individual statistical data and data referring to the Network and its structure are displayed. Let's look at each of them.

Production

A table is displayed with the following columns,

Name	Internal Production	Total Production	Centrality	Relevance	Colaborators
------	---------------------	------------------	------------	-----------	--------------

The columns can be ordered by each field directly or inversely. The default is alphabetical order (by name).

- **Internal Production:** The merits of all researchers on the Map are counted, but those merits acquired with the participation of researchers not present on the Map are proportionally discounted. (A publication signed by 4 people, three inside the Map and one outside, is counted with a factor $\frac{3}{4}$ for each of the members of the current Map)
- **Total Production:** All individual merits, whether they have been made with current Map personnel or not.
- **Centrality:** Importance of the Researcher to favour collaborations and information flow. Between 0 and 1.
- **Relevance:** The researcher's relationship capacity with other important researchers.
- **Collaborators:** Number of Collaborators (co-authors in this case) of each researcher within the current selection.

Note:

We see that there are researchers whose Internal and Total Production is similar: in this case, most of the activity occurs within the current Selection: there are no significant collaborations with external researchers. Others, however, present a great difference, indicating a good number of collaborations with researchers from outside the selection.

There is the possibility of downloading all the data in editable format, by clicking on the download button at the bottom right. Anyone can also be searched in the box at the top.

Comunities

Given the Communities detected by the system, we identify each community with the name of its member with the highest productivity. The total productivity of each community is calculated as the sum of the productivity of the members. The internal productivity corresponds to the productivity of the Community carried out within the current Selection. For each community we can also see the number of members that compose it. The colour of each community is the same as the colour of its members on the corresponding Map.

If we click on a community, on the right we see the list of its members, with the total productivity of each one.

Evolution

We see the productivity history of the National Team, both cumulatively and annually. Up to 3 curves can be seen:

- **Internal Production:** Activity developed within the Selection.
- **Total Production:** Total activity of the Community, both with internal and external members.
- **Institution:** Total Production of the Reference Institution (*Demo in this case*)

In general, we are interested not only in the comparison of productions but also in *per capita* production. For this the, *Normalize* option is enabled, which allows dividing total productivity by the number of people in the Selection.

Network properties

They are numerical indicators of the results related to the structure of the network. It tells us what collaboration between people is like, if there are well-defined subclusters, if they collaborate with the same or different people, how dense it is, etc. A succinct explanation can be accessed on each property.

Selection Report

We will see it later.

List

It allows seeing all the merits of the members of the Selection: It will be a list of all the papers or all the projects, with additional information for each entry.

Second example: A Departament

Let us now consider the study of a Department, for example Department_20.

To do this, we carry out the following steps

Select Researchers:

- *Selection* → *List* → *Departament* → *Departament_20*

The selection menu is displayed. We write “*Depart*” and the system shows us the matches below. We select the one that interests us. Do not forget to delete other previous selections if there are any.

Next, we click on Generate, and the system proceeds to perform the calculations, which takes a few seconds.

Viewer

Network → **Publications** → **JCR** (Default): We now see all the members in a circle: this is because no member has any papers in JCR. The system positions them symmetrically, all the same. All properties are trivial as well as communities. With this data, since there are no merits, the results only show trivial things. Let's move on to Projects to see something more interesting ...

Network → **Projects** → **Fundings**: Projects are heavy on fundings. Relations are *directed*: They go from the PI to each CI signatory of the Project. A crown indicates that the person is the PI of at least one project, and its thickness proportional to the Funds.

Modifiers → **Size**: The default is “*Production*” which is what we have seen so far. We can change by selecting “*Centrality*”,

- *Size* → *Centrality*

What tells us how important a node is to mediate collaborations, which nodes are important in terms of bridging other researchers. Click on *Apply*. We see that researchers in the central part of large clusters and that mediate between communities have great centrality. Nodes with high production but isolated, have very low centrality. Nodes on the periphery of communities also have low centrality.

Modifiers → **Color**: By effect, the nodes are colored according to the community (automatic) to

which they belong. We can choose another criterion, for example coloring according to the Institute of affiliation. For this we select

- *Color*→*Institute*→*All*.

Those without ascription are colored in gray.

Side Menu

Production:

It shows us for each person the sum of funding of the projects (Since in the Network we have previously selected *Projects* → *Funding*) of which it is PI. Let's see the difference from *Internal Production* to *Total Production*.

For each project, we create a link that goes from the PI to each CI that is worth the project funding divided by the number of signatories.

The internal production is calculated by adding the links that leave the PI *remaining within* the studied Map. Links with people not present are lost in the sum, and therefore the internal production is generally less than the total. The difference between these quantities indicates how much activity takes place within the Selection and how much with external members.

Evolution

It shows the evolution of accumulated production over the years. The Institution curve is shown for reference. It may or may not be normalized to the number of members.

Network Properties

Displays a summary of the Collaborative Network properties. A help can be accessed on each one. We highlight here two of them to give an idea of the global content:

- **Do we all have the same number of collaborators? (Associativeness):** This quantity measures whether a researcher tends to collaborate with his peers or with those of different rank in the Network. In other words: in a network of "everyone with everyone", each one has the same number of collaborators. In a star network, the researcher at the centre has many collaborators (all) but the others only have one: the one in the centre; therefore, there is a big difference between nodes. In general, in publications networks, collaborations are symmetrical and people are not distinguished, except by greater or lesser activity. This is Positive Associativeness. In European project networks for example, the PIs are usually the same and the CIs as well; moreover, a regular PI is practically never listed as a CI in other projects. That is to say that there are two categories: Those that are habitual PI and those that are habitual CI and always the collaboration is PI-CI, never PI-PI. This is a Network with negative associativity. Indeed, the structure of the Network is such that large nodes are surrounded by small nodes: important nodes tend to collaborate with less important nodes; collaboration is between *unequals*.
- **How many nodes are part of the central core? (Giant Cluster)?:** We call a cluster a group of researchers between whom there are direct or indirect relationships: that is, we can travel from one to another through collaborations. The largest of these clusters is the so-called Giant Cluster. It gives us an idea of how big the central nucleus of the Group is.

Third example: A researcher

We want to do an individual analysis. You have select an arbitrary user.
Let's go to the Selector first.

- *Selection* → *List* → (*select a name*)

Individual Activity

We see that under the selection-writing box, in Add Collaborators, “Level 1” has been automatically selected

Add Collaborators → *Level 1*

For now, let's put Level 0, to better understand the system.

Add Collaborators → *Level 0*

Let's press *Generate*.

Now we see only one researcher, and we can see his statistical data, all his publications and projects, etc. It is all the information related to that person.

For example, in the *Side Menu* → *List* we can see all the projects in which he participates, or by changing to the publications map, all of his papers.

Collaborator environment

In addition, and perhaps more interesting, we can see the activity of this person within the environment of his collaborators. In other words, a map where he and those who have signed publications or projects with him appear. To select his collaborators we select

Selection → *Add Collaborators* → *Level 1*

(The system does it automatically when we only select one person)

Map by default:

We can see the activity map for the selected user. If we want, we can see details of the Communities in *Side Menu* → *Communities*.

Grouping option:

From Map, we can make the communities explicit by selecting

- *Modifiers* → *Grouping* → *Automatic*.

After clicking on *Apply*, each community becomes a node, with the relationships between communities indicated by a link between them.

We could also group by Department to see how the departments represented in this selection are.

- *Modifiers* → *Grouping* → *By assignment* → (*left box*) *By Department*

We see the map, and now in *Side Menu* → *Production*, we have the data grouped by Departments.

To return to the default view, press the Reset button.

Network → *Reset* → *Generate*

Modifiers → *Reset* → *Apply*

The individual nodes appear again on the map.

Individual Report

We located the desired user. By clicking on it, a popup appears, where we can click on View Report. We thus access a complete analysis of that researcher. The analysis is divided into three parts:

Summary:

A Global analysis is shown, integrating all the merits of the researcher, articles, projects and transfer activity, if any.

- Activity Percentile: Here the activity is defined as the average of the position in Publications and Projects, calculating the percentile it occupies within the current Selection.
- Relevance Percentile: The Centrality and Relevance are averaged in the current Selection.

Heat Map:

We consider the selected researchers, and on some axes of activity in (Publications-Projects) we place each one of them: the mean is located in the centre of the two perpendicular lines. The further to the right someone is placed, the greater his activity in articles in relative terms. How much higher, the same in projects.

The red colours indicate that there are many researchers in that area. Blue colour, the absence of people with those values.

A yellow dot on the Map indicates the position of the researcher analysed.

Alerts:

Special situations are highlighted in terms of separation from the mean, either on the positive side (notifications in green) or on the negative side (in red)

Publications

A more specific analysis of the published publication is carried out and you can see the indexed papers and the rest of publications. Observations regarding activity appear which are remarkable for being well above (Green items) or well below (Red items) the average activity in the current selection.

Projects

The projects are analysed as a whole. We see the number of projects and the funding obtained as PI.

Transfer

It is only active in the case of having data. The activity of projects with companies, Patents, participation in Spin-Offs, Start-Ups and Chairs is analyzed.

Fourth example: All

Let's see some properties of "All"

- *Selection* → *List*→*All*

The view is the default, that is, the view visible when starting the page.

JCR impact items, production size, automatic coloring, up to 2021

Let's change options by accessing **Modifiers**:

- **Size by Centrality:** Peripheral researchers (in the crown) decrease in size and increase the contrasts also in the centre.
- **We color** by Department, by Macroarea, by Institute, Gender, etc.
- **Group:** Important concept (and somewhat complex ...): We can group, for example, by Department. : *Modifiers* → *Group* → *Assignment* → *Department* → *Apply*. The graph now shows each department as a ball, and the links between departments indicate scientific collaborations between researchers from different departments. We can now go deeper by looking at the Side Menu:
 - In the Production section, the Departments now appear as **elementary nodes**, and the statistics and relative positions refer to the Departments as a whole.
 - Communities are no longer of people, they are communities of departments.

To return to the default view, *Modifiers* → *Reset* → *Apply*.

Gender Treatment

We can carry out a study of the presence of Men and Women in the Centre, of their distribution, collaborations and comparative activity. For this option to be operational, in the registry of people we must know the Gender of each one. In this example, this field is not filled.

In general, the way to see it would be: *Modifiers* → *Color* → *Gender*, and we will see the Map colored according to sex.

If we now access Statistics, we will see an analysis of the centre's production grouped by sex.

We can also see **Only** those of a given gender, for this we go to *Filter* → *Women*, and only woman researchers of the Centre will appear.

Fifth Example: Set of Institutes

Let's select the 4 Institutes

- *Select* → *List* → *Institute* → *Institute1*
- *Select* → *List* → *Institute* → *Institute2*
- *Select* → *List* → *Institute* → *Institute3*
- *Select* → *List* → *Institute* → *Institute4*

We can also do it suddenly

- *Select* → *List* → *Institute* → *All*

Click on *Generate* to perform the calculations.

JCR Impact Publications Map

We have to make sure that in the descriptor we have the defect, that is, *Articles by Impact JCR, Automatic Coloring, Up to 2015*.

If not, we must modify the parameters in *Network* and *Modifiers*, resetting them. In this way, we will see the data as described below.

We see the default map. The network is relatively light with few links.

Projects Map

We click

Network→*Projects*

Let's see a Map with a clearly different structure.

On the one hand, the number of people will not be the same in general, since here appear those who have participated in a project, which are not necessarily the same as those with JCR publications (in this example they coincide, but it is a coincidence).

On the other hand, the relationships are different now, with links between the principal investigators and the collaborating investigators.

Side Menu→*Evolution*

We see that productivity is high, and *per capita* productivity is much higher than average.

Now we color everyone according to their Institute of membership.

- *Modifiers* → *Colour* → *By Assignment* → *Institute* → *All* → *Apply*

We now see the global structure, with clearly differentiated communities, others mixed and isolated nodes and small, clearly identifiable groups. We can see that the institutes have a more or less large central nucleus, and then several isolated satellites.

Network: Collaborations

The same can be repeated from the point of view of Collaborations.

- *Network*→*Collaborations* → *Publications+Projects*

Here we consider a relationship when there is a common publication or project. Both publications and projects are weighed now all the same: we establish a Link of weight 1 for each publication or project, and we add all of them between every two researchers. The attraction is therefore proportional to the total number of Collaborations, in this case the contact being more important than their quality. In this case, in Collaborations the underlying structure of Institutes is clearer, although there are still isolated people and certain collaborative anomalies.

Added Information

We can see data aggregated by institute. To do it:

Modifiers → *Group* → *By assignment* → *Institute* → *Generate*

Now a graph is shown with as many balls as Institutes.

If we look at *Side Menu* → *Production*, we will see the production of each institute, for Project Funds in this case, which is where we started from.

Sixth Example: In-depth study of an institute

Let's select a single Institute

- *Select* → *List* → *Institute* → *Institute0* → *Generate*

Note:

It is convenient to review if we are in the default options. To make sure, we can go to each of the *Selection*, *Network*, *Modifiers* menus and click on Reset.

In the Side Menu we can access an in-depth analysis of the current Selection, both as a whole and individually, and a comparison with similar assignments if possible. To do this, click on Selection Report.

Side Menu → *Selection Report*

The information appears to us through several tabs.

Summary

Data is displayed including both publications and transfer projects and activities. First, three graphs with the evolution of the number of members and PIs, the temporal evolution of the number of publications and the funding captured by PIs in the Selection.

The top 10 researchers of the selection are shown, where to calculate the position, the position in Publications, Projects and Transfer is averaged.

It can also be seen, which people of the current selection are in the top10 of the Institution.

Finally, the position of the selected researchers is shown on a Heat Map of the Institution. This Heat Map is calculated as follows: We take all the Institution's researchers and calculate their activity in Publications and in Projects. We place the activity in publications on the horizontal axis and the activity in Project Funding on the vertical axis. Now we count how many people fall in each zone, and we color the zone where there is no one blue, and with warmer colours the zones where more people fall. The reddest Zone, in this case in the lower left, is the zone of low activity in Publications and Projects.

We see that the points are grouped in the Upper Right part of the Map, even more than the background colors of the Institution, indicating that the members of this Institute occupy very relevant positions in the Institution.

Now we place on this Heat Map the people of the current Selection, indicating their activity in the global context.

Publications

We now focus on the activity in Indexed Publications. The information is similar to that shown in the Summary, but only considering Publications. We can see the evolution of the activity of both Number and Impact, as well as the publications of Excellence (First Decile).

Now the Heat Map shows (Activity in Publications - Relevance in the Publications Network).

Projects

Now we consider the activity in Projects.

Comparative analysis

Here we can compare the activity of this Selection with the other related structures. As we have selected an Institute, we compare it with the rest of Institutes. If we had selected a Department, it would be compared with other departments. That is why this option is only active when we select a pure affiliation, without mixing or adding.

In the first graph (JCR impact of publications), we see a bar graph with the productivity of each Institute. We can see a graph of individual activity, clicking on Normalize: now we see the previous graph, but divided by the number of members of each Institute.

On the right, we have a similar chart for Project Funding.

We can see many other graphics. Just below one with the Evolution of Publications. We can select that only Excellence items are shown in the graph. Other options give a lot of information in this graph, such as the one about projects on the right.

Below we have other relevant information. The last graph on the right, for example, gives us the percentage of women-men signing publications in each Institute; to the right, the percentage of women-men as Principal Investigators of the projects of each Institute.

Friendly reminder that all the lists, graphs, etc. can be downloaded for later use.

Alerts

They are a set of warnings about situations that are far from the average, or that have a special behaviour. Positive ads are marked in green, negatives in red.

It also notifies if there are people who, without being in the top10 of the Institution, are close to it.