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Modeling the Scientific Dimension of Academic Conferences

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Abstract

The rapid spread of the Internet and the growing trend towards research are the leading factors and strong springboards, for the Industry of conference organizations, to proceed with further development. With the increase of shareholding in organizing events, the environment has become very complex. The Conference Organizing Committee is challenged to define a wide range of factors, in order to better serve the needs and objectives of the Conference.

The main topic of this research is the study and modeling of the scientific dimension of Academic Conferences. We studied and recorded the basic procedures that govern the organization of scientific conferences. These are the procedures that affect the way that scientific conferences are conducted and eventually of course, the success or failure of those. Our research is engaged in the scientific aspect of these conferences, as the majority of the participants are scientifically renowned academics.

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1. Factors of the conference field

Based on scientifically documented studies (D.G. Brian Jones, Eric H. Shaw, Deborah Goldring, 2009), the components of the conference sector could be summarized as follows:

- Spatial dimension: At this point, we refer to the local characteristics of the country, city or area where the congress is to be held. This factor is associated with the geographic position and infrastructure that characterize this region (Clifford W. Sell, 2005).
- Time dimension: Depending on the kind of the conference, the duration, the season and the frequency of the event could vary. Usually, for academic conferences is chosen medium and low season, as well as repeated events of short duration (Julie T. Johnson, James W. Busbin, 2000).

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- **Target Market:** This factor varies, depending on the nature and the subject matter of the event. It depends, therefore, on the particular characteristics of the interested public. Age, social and other features can also play a significant role (Somjit Barat, 2010).
- **Travel expenses:** This includes the expenses for participation / registration to the conference (registration fees), unless, of course, these are covered by the organizers. It also includes the costs of transportation, accommodation, food and recreation.

2. Variables of scientific dimension

The variables that affect scientific conferences are composed by specific characteristics, due to the nature of these organizations. The main success factors of the scientific conferences have now been documented through time and through their own evolution. These variables are analyzed in this paper.

2.1 Supporting institutes

Within the Scientific Community is now accepted that research can be the driving force for growth and efficiency of research institutes and universities (Sherine Ghoneim, Cheryl Brown, 2011). The contribution of scientific institutes in a scientific conference is very important, as it offers the possibility of analysis, implementation and evolution of the results, which arise from research work, through research programs.

The supporting institutes promote, improve and certify their research data through the presentation of this research, to the scientific conferences. The participation of several entities in working groups, with a common goal, leads to many interactions and creative thinking. This kind of working teams are formed in a large number, during scientific sessions, allowing the creation of strong partnerships between supporting institutions, with benefit of either scientific or business nature.

2.2 Conference proceedings

The conference proceedings are directly associated with the opportunities for publication (Beverly A. Wagner, 2012). Furthermore, they contribute to the promotion of the conference, motivating scientists to participate. The Organizing Committee should give special attention to the process of publishing the proceedings and to use the advantage of publishing the conference minutes at a prestigious publishing house.

The articles that are submitted to scientific journals and those which are published in conference proceedings are of the same and maybe greater importance. Taking this for granted, the trend of researchers for publications in conferences is enhanced. Other factors, also, lead to this option, such as the enlargement of the circle of networking.

The conference proceedings are directly associated with the research field (focus) of each convener and are composed by the research work that each participant submits.

- **Enrollment Procedure:** The registration process constitutes a very important piece of a scientific conference. The use of technology decisively contributes in this procedure, as an automated system helps to disengage the participants from time consuming, bureaucratic processes. Thanks to the development of computers and software, there are now a growing number of software packages that can be used as a tool capable to improve the existing processes. For example, the entry of a new member to the online registration page provides information to the system that may be used, among other things, to issue certificates of attendance, identification mark and hotel booking.
- **Submission process for research papers:** The procedure for submitting a research paper through the webpage of the conference has become a very simplified process. The publications in scientific conferences constitute, nowadays, a necessary process for academics. For this reason, the submission process of research papers is a dynamic factor of success. The upward trend of the network plays a key role in the dissemination of scientific publications.

The documents attached, which accompany the communication of the organizers and potential participants or associates, are a very important factor as well. The rule that should be followed in these cases of submission of research work must be consistent with the 5 Ws (Who, Why, What, When & Where) (Lewis, Stefanie, 2004)

These 5 Ws analyze the reason for holding the conference, where and when the conference is taking place and in what way it will be held. All the above factors are necessary so as to ensure all information regarding the event.

2.3 Scientific conference committee

Academics, of high prestige and scientific standing, with a recognized research work, have the capacity to affect significantly the participation of scientists in a conference. The Organizing Committee must be scientifically renowned, as this shall be a key benchmark for the success of the conference. Also, the committee must be scientifically trained, as one of their tasks is the evaluation of the research papers of the conveners. As a result, the Scientific Committee of the Conference plays a crucial communicational role. The role undertaken by the Scientific Committee requires excellent knowledge of the subject and faultless critical view, so that objectivity and reliability of the judgment process of research work are ensured.

The profile of the organizing committee can be established by the institution that its members belong, as the baseline for evaluating universities is the Scientific Human Resources that staffs it. Nowadays, is documented that the status of a university, is analogous to the research action and scientific training of its component academics (Frida Lind, Alexander Styhre, Lise Aaboen, 2013)

Finally, diversity in the country of origin of the Scientific Committee members offers a multinational character to the conference. Furthermore, different cultures strengthen the competitive advantage of an international conference, as its range is attested. The above will fortify the will of scientists of international cultural prestige to attend the conference.

2.4 Scientific journals

The factors that lead to the decision to participate in scientific conferences, demonstrate the participants' need for publishing opportunities. It is well known that publications consist the official way of information's dissemination and research development. At the same time, this is a criterion for evaluation, for professional advancement and recognition among the wider academic world (Göran Svensson, Terje Slåtten, Bård Tronvoll, 2008).

The growing trend for research leads to the need for securing the conference research papers in recognized scientific journals. This process creates new opportunities for cooperation between the conferences and scientific journals, which can aim not only to the publication of the proceedings of the conference, but also to the possibility of submission of complete versions of publications. Such kind of collaborations with scientific journals or publishing houses for the allocation of scientific journals, provide high quality services and increase the chances for an effective organization of an academic conference.

3. Dynamic simulation system analysis

To understand the function of the dynamic simulation model iThink, we must analyze the parts of which is composed. The dynamic model is composed of: stocks, flows, converters and connectors:



Fig. 1. Dynamic simulation model parameters

4. Identification and explanation of the dynamic simulation model

There was an attempt to put into practice the variables identified by the theoretical framework and research, by using the Dynamic Simulation Model, with main purpose to test their success in real environmental conditions

(Wenxia You, Xianjia Wang, 2009). The dynamic model aims at performing properly the role played by the scientific variables, which we analyzed during our research work, at the start, setting up and perfecting the process of a scientific conference.

The thinking behind the model follows the modern business operations. The tank “Company Resources” supplies the tank “Conference Resources” with resources for the organization of a scientific conference. These resources can be of any kind, such as financial resources, technological resources or human resources, i.e. man-hours that people have allocated to carry out this project. All these resources are available in a scientific conference in order to satisfy leverage and execute the related activities.

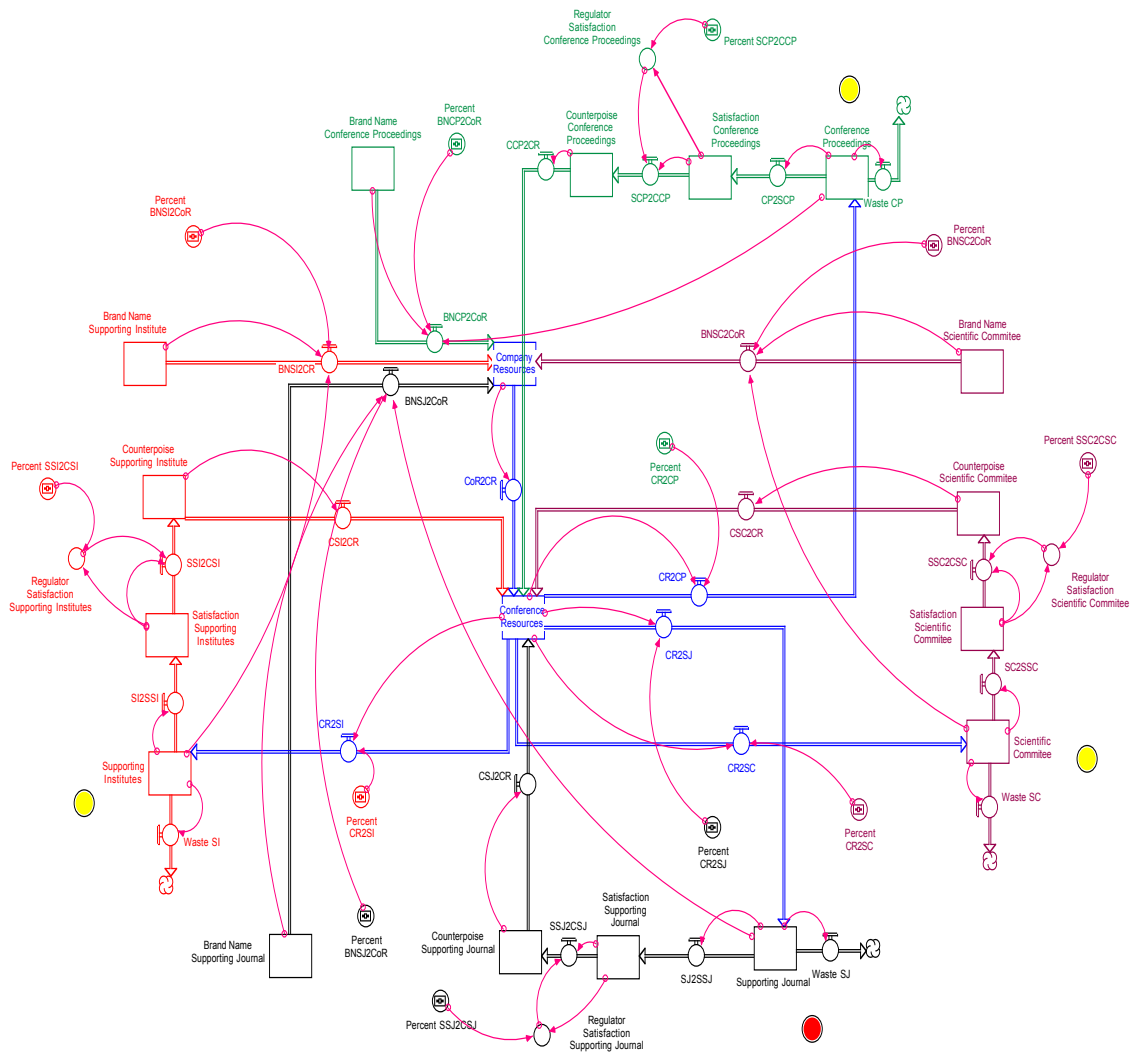


Fig. 2. Dynamic Simulation Model

As shown in the simulation model (Fig. 2.), the resources of the conference interact with the scientific variables. Some of the procedures that we have included in our study consume resources from the tank “Conference Resources” and other add some. These resources are transferred through flows, from the central tank "Conference Resources", to each secondary tank. The secondary tanks, in this case, are the supporting institutions tank, the conference proceedings tank, the conference scientific committee tank and the scientific journals’ tank.

The task of the flows is to transfer the resources available from the central tank “Conference Resources” to the individual tanks (Stock). The process of transferring the resources to the tanks implements the mechanism of a subsystem, which exploits the available resources. Allocating resources is the operating procedure, which follows the model, for successful collaboration between the tanks. At this point, we should note that we have set an upper limit to the diversion of resources to the variables tanks, since these resources are not inexhaustible.

When all the resources that we have decided to import to this tank do not reach the upper limit, this means that the tank is not full and it needs more resources. This signifies the inability to fulfill the desired goal, i.e. the rate of satisfaction is marked with a red bulb. This shows us that some of the scientific variables failed to meet their goal and need to be tested again, paying more effort and consuming more resources to the variables that are not fulfilled.

On the other hand, as soon as the total resources exceed the upper limit, i.e. the tank is full; the set of variables is fully satisfied (green lamp). However, if the tank reaches its upper limit and nevertheless, resources continue to be channeled in, then the tank overflows, which mean that more resources are spent than necessary. This means waste of resources and mismanagement of resources that are allocated for that variable.

The modeling process we followed may not succeed in absolute or it might even be necessary to enlarge the period of operation of the model, in case the goals are not achieved. As a result, some of the resources which are destined for a variable do not enter the tank and are lost through the circuit «waste». In case we have unexploited resources, the individual subsystem of each variable ensures the return of those resources to the central tank, through the mechanism of resources’ return flow.

From the above, we conclude that the circularity that characterizes the Dynamic Simulation Model is of great importance. This is the one, which enables unused resources to be transferred to the central tank, so that a new circle of dynamic transfer of resources towards the individual tanks is launched. The model is characterized by a dynamic nature, which means that it has the ability to readjust itself, depending on the way its manager wants, even during its operation.

4.1 Supporting institutes subsystem

One of the primary objectives that must be achieved, in order to fulfill the purpose of the scientific conference, is the satisfaction of the scientific variable of the supporting institutes. There is an overwhelming majority of scientists who choose to present their work in conferences that satisfy this factor. For this reason, the contribution of supporting institutes is deemed necessary for shaping the image of the scientific conference.

The operation of the subsystem starts from the tank “Conference Resources”, through the flowchart “CR2SI” towards the tank “Supporting Institutes”. Thanks to the given values and through this subsystem, the evaluation criteria are satisfied, leading to a successful result for the strategy followed.

The resources transferred to each tank are specific, so that the organizing committee is requested to allocate those appropriately, depending on which variable is considered more important. The amount of resources that will go into the tank of the supporting institutes is being illustrated with the aid of the mechanism “Percent CR2SI”. Taking into consideration the significance of the variable, the evaluation of the choice of a supporting institute is based, firstly, on the value that the achievement of a possible cooperation shall offer and, secondly, on the cost borne by the conference.

The resources remaining in the tank “Supporting Institute” are led, with the help of flowchart SI2CSI, to the tank “Counterpoise SI”. The role of this tank is to return the resources that were left unexploited, to the main tank “Conference Resources” (flowchart CSI2CR). The purpose of this chart is to redistribute the resources to other activities of the conference.

Using the control button “PercentBNsi2CoR”, we are able to control the amount of resources derived from the supporting institute’s trade name. This means that as soon as the factor “Supporting Institutes” is satisfied, at the rate we have preset, the tank “Brand Name SI” is activated. By activating this tank, trade name resources are sent to the tank “Company Resources”. The result is the increase of the trade name of this Scientific Conference.

4.2 Conference proceedings subsystem

In relation to the quest of scientists for publishing opportunities, it is commonly accepted that the conference

proceedings constitute an indispensable factor.

The role undertaken by the Organizing Committee has to do with the negotiating activities related to the quality of the proceedings of the conference. The concept of quality is determined by the evaluation criteria for the proceedings, such as their participation in a series of books that belong in recognized lists. As a result, the tank “Conference Proceedings” accepts resources, which come from its positive evaluation.

A part of the resources of the tank “Conference Proceedings”, goes to the “Waste” circuit, therefore it is lost. This could be a result, for example, of the failure to achieve the total set of objectives. A portion of the resources that the organizing committee has set for the variable of the conference proceedings is transferred through the flowchart “CP2CCP” to the tank “Counterpoise CP”. This tank is responsible for the transfer of the resources that have been unexploited, after the defined goal for the tank of the sponsor was satisfied.

When the “Sponsor” tank is adequately filled, the trading name of the sponsor adds value to the conference, which, in a further way, means that resources are added, due to the recognition of the sponsor's name. With the aid of the control switch BNs2CoR, these resources are heading towards the main tank “Company Resources” from the tank “BrandName S”, according to the percentage that the organizing committee has defaulted.

4.3 Scientific committee members' subsystem

One of the main success factors for a scientific conference is the identification and invitation on behalf of the organizing committee, of prestigious scientists of undisputable acceptance among the scientific community. The purpose of attracting qualified scientists is the forming of the scientific committee of the conference. It is now unquestionable, the great importance of the existence of renowned researchers in the organization of the conference.

In this subsystem, the organizing committee canalizes a part of the resources coming from the central tank “Conference Resources”, to the tank “Scientific Committee”. The aim is to meet the rate indicated by the organizing committee.

The tank “Scientific Committee” receives the resources needed to be satisfied. Here, as in other variables too, an amount of resources is lost through the flowchart “SC2W”. The rest is transferred by means of the flowchart “SC2CSC” to the “Counterpoise SC” tank. This tank repositions resources to other variables, using the flowchart “CSC2CR”, returning resources to the main tank “Conference Resources”.

The level of satisfaction of this variable illustrates the success or failure of the strategy adopted by the organizing committee, in order to attract members for the scientific committee of the conference. The completion of the transfer of the selected resources, meets the tank “Scientific Committee” full. Thus, the organizing committee has achieved its goal to attract renowned scientists within the conference.

The amount of resources of business name of the “BNsc2CoR” tank is checked using the system PercentBNsc2CoR. Resources from the “Scientific Committee” tank are driven through this flow chart, depending on the rate set in the system “Percent BNsc2CoR”. All trade name resources are transported using the flowchart “BNsi2CoR” to the central tank “Company Resources”, in order to be channeled, on their turn, to another subsystem that might be in need of resources.

4.4 Scientific journals subsystem

Cooperation between the scientific journals and the conference can notably accentuate the trade name of the conference and make it well known within the academic community. The scientific journals are ranked at the highest levels of significance, from the perspective of an incentive of participation in the scientific conferences, due to the publishing opportunities they provide.

The organizing committee of the conference negotiates a possible collaboration with the scientific journals, having at its disposal the research and publications of scientists. The “Conference Resources” tank symbolizes the resources that can be allocated by the organizing committee and act as the driving force for the success of the conference. The collaboration between a scientific conference and journals can result in a public benefit, such as the promotion of the scientific journals through the conference's website. The resources that the conference will provide are transferred to the “Supporting Journal” tank, using the flowchart “CR2SJ”, taking for granted the rate “Percent CR2SJ” that the organizing committee has determined to provide.

A part of the available resources will be lost through the flowchart “SJ2W”. The majority of the resources gathered, will be transferred to the “Supporting Journal” tank and then to the “Counterpoise SJ” tank. This tank is responsible for the return of the unused resources of the “Supporting Journal” circuit to the central tank “Conference Resources”.

The resources earned from the brand name “BrandName SJ” are proportional to the satisfaction levels of the “Supporting Journal” tank. The subsystem is made in a way that the greater is the recognition the scientific journal enjoys, the more are the resources transferred to the tank “Supporting Journal”, through the circuit, and the more the trading name of the scientific conference is elevated.

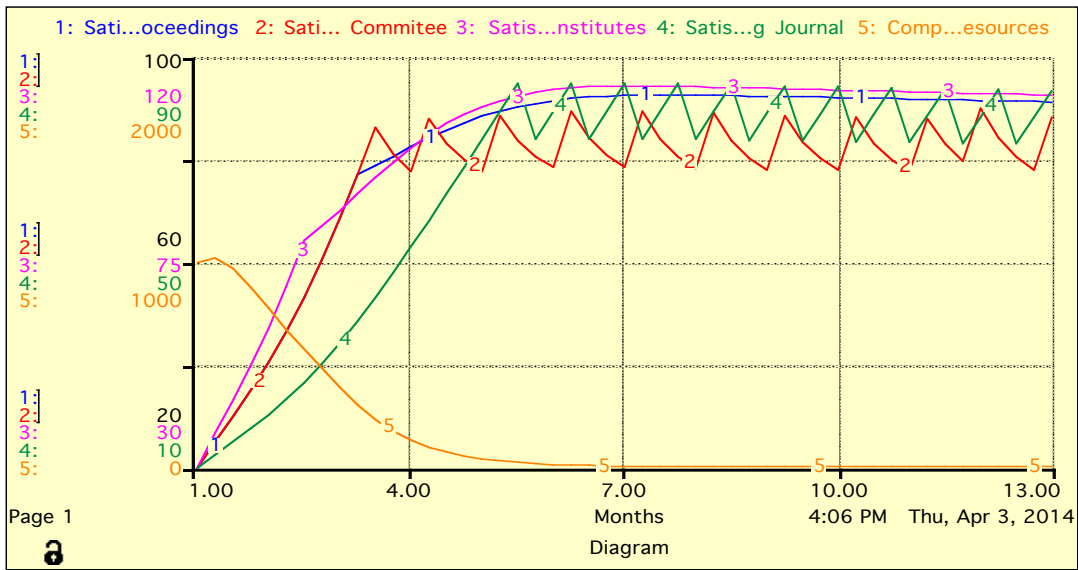
5. Implementation of the dynamic simulation model

To create the models, the modeling software tool iThink, from iSee Systems, was used. iThink creates stock and flow diagrams to model and simulate processes. It presents you the results of specific, defined by the user, inputs and connects the interrelationships between procedures and functions. Outputs can be displayed in the form of graphs and tables. In this case, dynamic simulation model techniques were used in the creation of this model. The implementation of creating the dynamic model was an iterative process. It began with a very simple model and then was developed to ensure that the functions defined were correct.

The results of the Dynamic simulation model are shown in the table and the graph (Table 1 and Graph 1) that we provide.

4:06 PM 4/3/14		Table 1 (Satisfaction)			
Months	Satisfaction Conference Proceedings	Satisfaction Scientific Committee	Satisfaction Supporting Institutes	Satisfaction Supporting Journal	
Initial	20.00	20.00	30.00	10.00	
1	40.45	40.45	60.68	20.23	
2	68.73	68.73	86.50	34.36	
3	82.70	78.01	100.38	53.09	
4	88.68	78.01	109.39	74.22	
5	91.75	78.67	113.09	79.73	
6	92.75	78.76	113.94	85.17	
7	92.83	78.55	113.78	74.15	
8	92.61	78.28	113.40	79.34	
9	92.32	78.03	113.01	84.46	
10	92.03	77.79	112.65	73.55	
11	91.75	90.32	112.30	78.64	
12	91.47	88.45	111.95	83.67	

Table 1.Satisfaction



Graph 1. Company Resources in conjunction with the Conference Proceedings, Scientific Committee, Supporting Institutes and Supporting Journal

6. Support for decision makers

There is a need to create the interface of the dynamic simulation model, to enable the user to change the values that the factors can get, studied in the research we've done. Figure 7 shows the main user interface of the simulation model. There are four main sections on this user interface: "Supporting Institutes", "Conference Proceedings", "Scientific Committee" and "Supporting Journal".

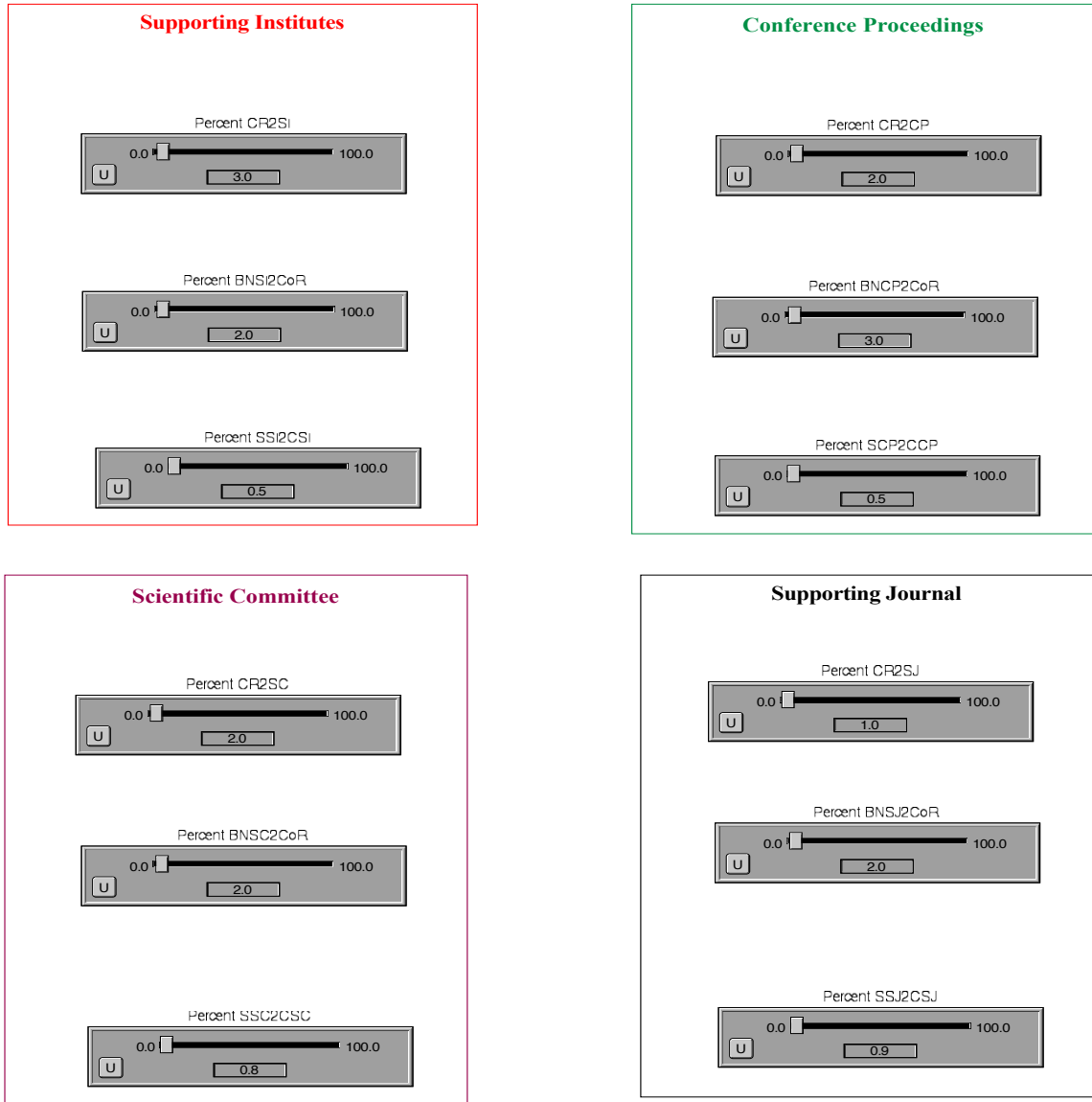


Fig. 3. Simulation Interface

The “Supporting Institutes” section allows the decision maker to determine the amount of satisfaction of Supporting Institutes and Academics. The “Conference Proceedings” section allows the decision maker to define the level of paper presentation. In the “Scientific Committee” section, the decision maker can define the satisfaction of people’s acceptance and “Supporting Journal” section allows the decision maker to define the level of the conference reputation. To begin the simulation, the user chooses all the values of the inputs that are desired, and then clicks the run button. The simulation runs for a period determined by the user and pauses to allow the user to review the effects of the decisions made.

The prototype provides the decision maker with various forms of support that guide them through the decision making process. These guides range from the use of status alarms and notifications to the use of visual aids to enhance learning and understanding of various relationships in the context of International Conferences. To aid the organizing committee in making strategic decisions, the user interface of the sustainability model alerts the user with various notifications during the course of the simulation.

For example, if “Supporting Institutes” and “Supporting Journals” sections are low, a message pops up to notify the users that their System Development is unsustainable. If “Conference Proceedings” and “Scientific Committee” sections are satisfied, a message pops up to notify the user and some of the resources return to the “Conference Resources”.

This prototype caters not only for novice users, who may only navigate through three or four main pages, but for the expert users, as well, who may take advantage of the advanced functionality available in the prototype. The interface was kept simple and designed with ample “help” or “?” buttons that provide the decision makers with a description of various concepts or explanations to improve user’s autonomy. Color templates and common items were kept consistent so as not to confuse the user and improve usability.

7. Conclusions

The study of the scientific dimension of Academic Conferences brings to light all those factors that play a key role in the organization and success of those conferences. It is of great necessity thus, the choice of a communication strategy, which can reveal the significance level of the variables that contribute in the scientific conference. The field of scientific conferences, was selected because of the importance of research that discloses, which is of great importance for the development of universities (Steffen Bernius, 2010).

To get the maximum results, we need to establish a universal communicational strategy approach (Michael K. Allio, 2005). This is achieved by using the simulation software iThink, as proposed model, which has the integrated nature that we seek, during our attempt for direct supporting and addressing the needs of a scientific conference. The dynamic model aims to analyze the main variables of the process of organizing a scientific conference, in order to highlight the services offered and to avoid any problems.

The enhancement of a scientific conference is related to a lasting and complicated process of attracting scientists and presenting research works (Audhesh K. Paswan, 2000). The modern trends of the environment form the opportunities for the presentation of the particular research (Iain Black, 2006). The specific project is an integrated effort for documentation and development of the updated variables, which leads to the creation of a strategic model for the successful organization of international scientific conferences.

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