

Modeling the development of the online conference's services

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Abstract

Purpose – The integrated purpose of the libraries' communication plan in general is to create and accomplish scientific events aiming, first of all, at covering the extensive demand for the scientific conferences. Their primary objective is to raise the prestigious brand name of their organisation, which constitutes the organizing authority. At the same time, this authority, except for its non-profit charitable profile, aims to financial gains by attracting participants for its sustainability. Furthermore, these academic events have contributed to the utmost dissemination of the library's brand name to an expanding mass of people to the extent of attracting new visitors (Broady-Preston and Lobo, 2011). One of the qualitative academic events, among others, is the creation of academic-nature events, whose following-up is blocked by a multitude of financial barriers according to the new visitors' viewpoint. Considering the economic crisis, the purpose of this paper is the creation of interesting, in the science of library, online events, just like the online conferences (Broady-Preston and Swain, 2012).

Design/methodology/approach – This paper highlights the advantages of the dynamic modelling of systems aimed at developing a successful online conference. In this research, the authors have used the science of design and the research methodology for testing the concept of modeling.

Findings – This paper examines the interface among several dimensions for the development of dynamic models. The validity and usefulness of those models in the process of decision-making has been confirmed by the usage of dynamic models in various sectors.

Originality/value – This paper applies the system and the concepts of dynamic modelling, which are pioneering elements as to their nature and evolution.

Keywords Decision making, IT, Dynamic simulation model, National libraries, Open learning, Online conferences development

Paper type Research paper

Introduction

In recent years, financial uncertainty, technological evolution and increasing competitiveness have led to an increase in various events (Freitas *et al.*, 2011). These events, conferences and seminars among others, are characterised in a particular capacity, as it is recognisable that they are specifically active for the development of computer science.

The increased quantity and complexity of conferences leads the way for the evolution of new actions and innovations, which are so evolved that we are able to refer to the transition from the national to the global perspective.

The current environment is marked by the increased demand of participants and the specific aggressiveness by the extensive competitiveness. The organisations of conference management are constantly increasing together with an increase in research.



The need to achieve solutions for important issues, which regard the world of science at every level and sector, is mandatory nowadays.

In the era of economic crisis, none of the organisations active in this field can afford to make financial mistakes, to fail to fulfil the predefined purposes or to have ineffective practices (Faustenhammer and Gössler, 2011). Libraries follow a similar tactic. These days, the management of conferences and of similar events has changed form, many times, from the stage of development up to the stage of maturity.

Before the starting point of its decadence, the organisations active in this field, such as libraries (Allard, 2002), are called to achieve a sustainable development through the strategic planning and through the development of new, innovative actions and ways of carrying out conferences. So in this stage, with the increase of technology and Internet, we have reached the level of referring to the accomplishment of online conferences, which are the last evolution of this field. Online conferences, as top activities, contribute to the dissemination of information that promotes knowledge. For this reason, many academic and public libraries subscribe to scientific conferences, to be able to host on their shelves the volumes of conference proceedings.

Management of online scientific conferences

The contribution of online scientific conferences to the diffusion of information and knowledge is great (Louw and Zuber-Skerritt, 2011). It also promotes the development of universities, research and knowledge. A key point to note is that through online conferences, a basic idea of the libraries of the future is developed: e-learning. The management of online conferences is related to the majority of the procedures, which are to blame for the success or the failure of these conferences. These procedures extend from the defining of the objectives to the financial figures. It is about procedures, which are particularly demanding and need specific attention. It is worth defining in advance the factors which will play a key role in the success or failure of the incident. These factors are the time which has to be consumed, the financial cost and the use of appropriate technologies, as well as the recruitment by the appropriate human resources.

The resources, which will be allocated in each of these factors of an online conference, act interlinked. All of them have an influence in the positive or negative result of the event. As a result, the four fundamental factors of successful or unsuccessful carrying out in case of malfunction or lack of use of an event are the management of time, funding, technology and human resources.

- *Management of time*: the right management of time is considered one of the most important factors for the success of a task for the organisation, as well as for libraries (Rao, 2014). Even if this is a solid and non-reversible agent, the way in which it is used varies significantly. The behaviours, which support the management of time, have a positive effect in the perception of time control, in job satisfaction and in health. On the contrary, in incorrect management of time, very high levels of anxiety were reported. The effective management of time facilitates the immediate implementation of actions and increases the productivity levels. This presupposes priority of objectives and flexibility in implementing the time diagrams.
- *Management of financial figures*: the ultimate control of an event is based upon the disciplinary management of funds. The success has to be compatible with the

economic growth for the feasibility of the large events' remodelling. The organisation puts the economic aspects of the event on a long-term basis, with the aim of gaining long-term profitability. The short-term, middle-term and long-term economic objectives must be defined, the level of the utilisation of technology must be located and systematic control of the economic health of the organisation must exist, for correct financial management. As a result, good financial management of libraries could contribute to their economic stability. In this way, a library is able to control its economic revenues and to act as a "healthy" and profitable company.

- *Management of technology*: the new technological inventions can provide innovative solutions in the way with which an organisation is active and leads its course (Chanaron and Jolly, 1999). Technology increases within the sustenance of the existing actions or their renewal and replacement by new ones. The production of constantly greater technological achievements facilitates the task of many organisations, as they are capable of coordinating, storing, repossessing and securing an oversupply of information. New technology development could increase libraries' audience. The solutions offered by new technology can bring the world of the digital library, even a three-dimensional (3D) one, to the user's computer or TV screen (Chia, 2014).
- *Management of human resources*: the organisational empowerment of the human resources can reinforce not only their job satisfaction but also commitment, psychological empowerment and customer-centred behaviour (Higgins and Zhang, 2009). Men recruiting the organisation are playing a crucial role in the successful carrying out of an online conference, as they preserve high levels of interaction with the common-target and with the entrepreneurial activities. Human resources, as a strategic element in the organising of a library, can change the course of academic and public libraries.

Online conferences, where entrepreneurial actions vary, are involved outside the borders of a country, engage a quantity of interested entities, which may have a personal, financial and emotional contribution to the procedures of the event. As other events, online conferences are great business activities (Lawrence and McCabe, 2001). Given that the contribution of each one is equally important, regardless of the type of event, the actions which take place have to converge towards the successful performance of the online conference and to have as a starting point the adoption of common objectives and visions.

Statistical survey

This research was based on a survey conducted using a questionnaire. The questionnaire was divided into three parts. In the first part, personal questions were asked, while the second part included questions related to the basic services of the scientific conferences. The respondents were asked to rate these questions using a five-point Likert scale. The third part contained the results obtained from research and which identify the key factors for participation in scientific conferences. By using these variables, we were led to the creation of the Dynamic Simulation Model.

Demographics: (Tables I-VI)

Main statistical factors: (Tables VII-XV)

Results

This study was based on a survey by questionnaire with 123 participants, most of them men. An important element for the validity of the research and the generalisation of the results is the fact that among the participants were both postgraduate and doctoral students, PhD students and faculty members at all levels. Therefore, the opinion of all those involved in conferences and engaged in work was estimated and not just a specific part thereof.

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|-------|-----------|-------|-----------|----------------|
| Man | 79 | 64.2 | 64.2 | 64.2 |
| Woman | 44 | 35.8 | 35.8 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table I.
Sex

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|---------------|-----------|-------|-----------|----------------|
| MSc student | 8 | 6.5 | 6.5 | 6.5 |
| PHD | 20 | 16.3 | 16.3 | 22.8 |
| Candidate PHD | 23 | 18.7 | 18.7 | 41.5 |
| Lecturer | 20 | 16.3 | 16.3 | 57.7 |
| Assistant | 13 | 10.6 | 10.6 | 68.3 |
| Associate | 15 | 12.2 | 12.2 | 80.5 |
| Professor | 24 | 19.5 | 19.5 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table II.
Title

| Conference_Attendance ^a | N | Responses | | % of cases |
|------------------------------------|-----|-----------|-------|------------|
| | | | (%) | |
| Oral presentation | 97 | | 35.1 | 78.9 |
| Postal presentation | 54 | | 19.6 | 43.9 |
| Virtual presentation | 21 | | 7.6 | 17.1 |
| Attendance | 22 | | 8.0 | 17.9 |
| Symposium organiser | 39 | | 14.1 | 31.7 |
| Scientific committee | 43 | | 15.6 | 35.0 |
| Total | 276 | | 100.0 | 224.4 |

Table III.
Conference_
Attendance
frequencies

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|-------|-----------|-------|-----------|----------------|
| 1.00 | 3 | 2.4 | 2.4 | 2.4 |
| 2.00 | 10 | 8.1 | 8.1 | 10.6 |
| 3.00 | 57 | 46.3 | 46.3 | 56.9 |
| 4.00 | 36 | 29.3 | 29.3 | 86.2 |
| 5.00 | 15 | 12.2 | 12.2 | 98.4 |
| 6.00 | 2 | 1.6 | 1.6 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table IV.
Days of duration

Among the findings of this research, the most basic reason for which someone might participate in a conference can easily be distinguished. The basic information is obtained from the invitation of the organisers to submit research work (papers) that in many cases are published by the congress or published in a magazine, while already having a major presentation at a conference. We conclude thus, that personal development is often translated to the presentation of a research paper and correspondingly the publication of that paper. Parallel variables also playing a

Table V.
Ways_Of_Learn
frequencies

| Research | <i>N</i> | Responses (%) | % of cases |
|--------------------------|----------|---------------|------------|
| Call for paper | 98 | 37.3 | 79.7 |
| Conference Web site | 46 | 17.5 | 37.4 |
| Email newsletter | 68 | 25.9 | 55.3 |
| Referral | 27 | 10.3 | 22.0 |
| Conference search engine | 24 | 9.1 | 19.5 |
| Total | 263 | 100.0 | 213.8 |

Table VI.
Length of event in
days

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|----------------------|-----------|-------|-----------|----------------|
| Not at all important | 2 | 1.6 | 1.6 | 1.6 |
| Not very important | 5 | 4.1 | 4.1 | 5.7 |
| Neutral | 29 | 23.6 | 23.6 | 29.3 |
| Somewhat important | 54 | 43.9 | 43.9 | 73.2 |
| Very important | 33 | 26.8 | 26.8 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table VII.
Publication
opportunities

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|----------------------|-----------|-------|-----------|----------------|
| Not at all important | 7 | 5.7 | 5.7 | 5.7 |
| Not very important | 6 | 4.9 | 4.9 | 10.6 |
| Neutral | 16 | 13.0 | 13.0 | 23.6 |
| Somewhat important | 40 | 32.5 | 32.5 | 56.1 |
| Very important | 54 | 43.9 | 43.9 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table VIII.
Invited speaker

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|----------------------|-----------|-------|-----------|----------------|
| Not at all important | 7 | 5.7 | 5.7 | 5.7 |
| Not very important | 14 | 11.4 | 11.4 | 17.1 |
| Neutral | 40 | 32.5 | 32.5 | 49.6 |
| Somewhat important | 34 | 27.6 | 27.6 | 77.2 |
| Very important | 28 | 22.8 | 22.8 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

significant role are the publisher which will host the conference proceedings, and the journals which can include a number of the conference papers in a special issue.

Also, from the statistical results, we presume the significant position that all participants hold, in terms of organising the conference, such as the Court's President, banquet organisers, the Organising Committee, the central speakers and the scientific committee.

From the multivariate analyses, two additional important findings arose. Originally, it is observed that depending on the level that one holds has an effect on one's chance to attend a conference. More specifically, the greater the rank within the hierarchy that

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|----------------------|-----------|-------|-----------|----------------|
| Not at all important | 2 | 1.6 | 1.6 | 1.6 |
| Not very important | 6 | 4.9 | 4.9 | 6.5 |
| Neutral | 27 | 22.0 | 22.0 | 28.5 |
| Somewhat important | 41 | 33.3 | 33.3 | 61.8 |
| Very important | 47 | 38.2 | 38.2 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table IX.
Research paper
presentation

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|----------------------|-----------|-------|-----------|----------------|
| Not at all important | 4 | 3.3 | 3.3 | 3.3 |
| Not very important | 6 | 4.9 | 4.9 | 8.1 |
| Neutral | 23 | 18.7 | 18.7 | 26.8 |
| Somewhat important | 55 | 44.7 | 44.7 | 71.5 |
| Very important | 35 | 28.5 | 28.5 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table X.
Importance of
keynotes

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|----------------------|-----------|-------|-----------|----------------|
| Not at all important | 1 | 0.8 | 0.8 | 0.8 |
| Not very important | 6 | 4.9 | 4.9 | 5.7 |
| Neutral | 18 | 14.6 | 14.6 | 20.3 |
| Somewhat important | 56 | 45.5 | 45.5 | 65.9 |
| Very important | 42 | 34.1 | 34.1 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table XI.
Involvement of
publication houses in
conferences

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|----------------------|-----------|-------|-----------|----------------|
| Not at all important | 2 | 1.6 | 1.6 | 1.6 |
| Not very important | 1 | 0.8 | 0.8 | 2.4 |
| Neutral | 28 | 22.8 | 22.8 | 25.2 |
| Somewhat important | 62 | 50.4 | 50.4 | 75.6 |
| Very important | 30 | 24.4 | 24.4 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table XII.
Involvement of
supporting institutes
in conferences

someone has, the greater the likelihood that they will attend a conference. In other words, it seems that professors of a high level will attend a conference, regardless of location, speakers and content. As we go lower in the hierarchy, other factors are also involved in the decision of attending or not attending a conference.

166 Main factors that increase participation in online scientific conferences

Online scientific conferences constitute a basic event for the flow and management of information. They also promote the development of research, information strategy and knowledge management, fields that are essential for the development of library activities.

The industry of events continues to grow rapidly and contributes significantly to the organisations related to this sector (Henderson, 2011). In support of this, the latest statistics of the period 2000-2009 announced by the International Congress & Convention Association (ICCA) (2010) confirm a development in meetings and conferences, which is characterised by upswings. Table XVI shows the top ten countries worldwide with conference high intensity trends. The classification is based on the highest number of conferences during 2009, as announced in the statistical reporting of ICCA.

Table XIII.
Publication of
conference
proceedings

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|----------------------|-----------|-------|-----------|----------------|
| Not at all important | 4 | 3.3 | 3.3 | 3.3 |
| Not very important | 12 | 9.8 | 9.8 | 13.0 |
| Neutral | 27 | 22.0 | 22.0 | 35.0 |
| Somewhat important | 36 | 29.3 | 29.3 | 64.2 |
| Very important | 44 | 35.8 | 35.8 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table XIV.
Networking
opportunities

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|----------------------|-----------|-------|-----------|----------------|
| Not at all important | 2 | 1.6 | 1.6 | 1.6 |
| Not very important | 10 | 8.1 | 8.1 | 9.8 |
| Neutral | 20 | 16.3 | 16.3 | 26.0 |
| Somewhat important | 50 | 40.7 | 40.7 | 66.7 |
| Very important | 41 | 33.3 | 33.3 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table XV.
Interest in a topic

| Valid | Frequency | (%) | Valid (%) | Cumulative (%) |
|----------------------|-----------|-------|-----------|----------------|
| Not at all important | 3 | 2.4 | 2.4 | 2.4 |
| Neutral | 4 | 3.3 | 3.3 | 5.7 |
| Somewhat important | 44 | 35.8 | 35.8 | 41.5 |
| Very important | 72 | 58.5 | 58.5 | 100.0 |
| Total | 123 | 100.0 | 100.0 | |

Table XVI.
The conference
market from 2000 to
2009

| Country | Year | | | | | | | | | |
|---------|------|------|------|------|------|------|------|------|------|------|
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
| USA | 538 | 468 | 571 | 587 | 620 | 648 | 645 | 651 | 637 | 595 |
| Germany | 325 | 299 | 314 | 399 | 409 | 415 | 449 | 525 | 450 | 458 |
| Spain | 212 | 221 | 304 | 302 | 387 | 352 | 316 | 365 | 385 | 360 |
| Italy | 243 | 278 | 293 | 317 | 329 | 324 | 323 | 350 | 350 | 350 |
| UK | 321 | 231 | 310 | 323 | 315 | 389 | 390 | 368 | 381 | 345 |
| France | 297 | 273 | 283 | 283 | 372 | 360 | 370 | 340 | 397 | 341 |
| Brazil | 124 | 105 | 107 | 128 | 161 | 186 | 231 | 223 | 255 | 293 |
| Japan | 176 | 213 | 211 | 197 | 205 | 232 | 243 | 265 | 281 | 257 |
| China | 83 | 79 | 130 | 81 | 229 | 226 | 255 | 264 | 262 | 245 |
| Austria | 101 | 103 | 111 | 156 | 165 | 188 | 240 | 243 | 212 | 236 |

Source: ICCA (2010)

Joining an online scientific conference is a process that can raise prestige and reward, in a professional way, the participants. It also allows scientists to analyse and solve various issues within their research field, as well as to exchange knowledge and opinions relevant to their interests (Louw and Zuber-Skerritt, 2011).

The factors that play a crucial role in participating in a conference can be analysed using the following categories, according to research we have conducted and which is presented in Tables I to XV:

- *Publication house*: While research holds a key role in recent years, the need of researchers for publications is constantly growing. The publishers have taken into account this need and have fuelled their interest in the development of online publications, with the aid of technology. The ever-increasing trend to produce scientific research is a key tool for academic careers. This publication trend has been exploited by the traditional scientific journals as well as by a new category, the so-called “open access” journals, which constitute free sources of information for the academic community (Abicht *et al.*, 2012).
- *Networking circle*: The opportunity to exchange opinions and network with small groups with the same scientific interest is one of the main reasons for participation in a scientific conference. The recognition of the scientist, which can be derived from his own networking circle, is universally recognised by the scientific community (Yoo and Chon, 2010).
- *Topic of a Conference*: One of the main factors for participation in a conference is the theme of the conference. The purpose of organising the conference gives motivation to the stakeholders who are active in the field, to participate, for further development of knowledge and research in their field (Fox and McCormick, 2009).
- *Chairman*: The Chairman is the person who takes full responsibility for the carrying out and the evolution of a conference (Matthews, 2008). His duty is to preserve a high organisational level in relation to the whole procedure of the organisation’s operation and to look ahead for malfunctions. As in every organisation, the Chairman participates in activities for the sustainability of the

conference and the preservation of competitive advantage. The decisions which the Chairman makes contribute decisively to the achievement of the final goals. Thus, agents such as fame and previous experience, leadership and communication skills and conflict handling are some of the characteristics which the Chairman of a conference must have.

- *Invited speakers*: The existence of a key speaker of broad acceptance and reputation is presented as a criterion which influences the rate of participation in scientific conferences (Sakas *et al.*, 2010). The main speeches are differentiated from the other activities of a conference as far as it concerns their structure. They do not have a sequence of presentations, but the most important speech is given to all the participants with a serious impact on the success of the event. The main speakers disseminate important information and form the identity of the conference. Thus, an important “name” can give credibility in the procedure, and it is possible to boost the participation.
- *Workshops*: These constitute one of the most fundamental parts of a conference, as it is about the presentation of research papers, distributed in workshops of similar themes, compatible with the predefined theme of the conference. The workshops play a significant role in the reinforcement of the overall output of the scientific conference by the attraction of scientists (Hood and Forey, 2005). Many conferences offer parallel sessions, wherein the conveners can make choices among the alternative presentations.
- *Symposium organisers*: The competences of this category are identical with those of the members of the scientific committee because of the uniform nature of these actions. Besides these, the symposium organiser must have organisational and organising skills for the successful carrying out of the session of which he is in charge (Guidotti, 2009). The symposium organiser has to be a mediator, philosopher and to act in a catalytic way in cases of possible conflicts, prefacing each convener, justifying his participation in the specific symposium and securing the coherence of the research papers with the theme of the symposium under his responsibility.
- *Scientific committee*: Academics of high prestige and scientific standing, with recognised research work, have the capacity to affect significantly the participation of scientists in a conference. The scientific committee of the conference plays a crucial communication role. The role undertaken by the scientific committee requires excellent knowledge of the subject and a faultless critical view, so that the objectivity and reliability of the judgment process of the research work are ensured. The profile of the scientific committee can be established by the institution to which its members belong, as the baseline for evaluating universities is the scientific human resources that staff it (Valle and Schultz, 2011). Nowadays, it is documented that the status of a university is analogous to the research action and scientific training of its component academics. Finally, diversity in the country of origin of the Scientific Committee members offers a multinational character to the conference (Svensson and Wood, 2007). 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.

- *Organising committee*: The organising committee must be scientifically renowned, as this will 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. The variations in the productive procedure are mainly based upon the utilisation of the human factor (Sorin, 2003). A significant aspect for the achievement of scientific conference objectives is the contribution of the organisational committee, as it consists of one of the most productive resources at the administration's disposal. In the strategic planning of a scientific conference are included the total of the activities concerning the human resources and aim at the realisation of the intended improvement of the competitiveness of this sector.
- *Conference proceedings*: The conference proceedings are directly associated with the opportunities for publication (Abicht *et al.*, 2012). Furthermore, they contribute to the promotion of the conference, motivating scientists to participate. The organising committee should give specific attention to the process of publishing the proceedings and 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 perhaps of 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.
- *Scientific journals*: The factors that lead to the decision to participate in scientific conferences demonstrate the participants' need for publishing opportunities (Louw and Zuber-Skerritt, 2011). It is well known that publications are the official way of disseminating information and research development. At the same time, this is a criterion for evaluation, for professional advancement and recognition among the wider academic world. The growing trend for research leads to the need for securing the conference research papers in recognised scientific journals. This process creates new opportunities for cooperation between the conferences and scientific journals, which can aim not only at the publication of the proceedings of the conference but also at the possibility of submission of complete versions of publications. Such collaborations with scientific journals or publishing houses for the allocation of scientific journals provide high-quality services and increase the chances for the effective organisation of an academic conference.

These factors for participating in a scientific conference are interrelated and act in combination during the process of making the decision to participate, or not, in a conference. As a consequence, the presence of scientists is regarded as indispensable. All the factors that are mentioned lead to the recognition of the role of online conferences, keeping them firmly established in the academic world. A well-established online conference promotes the development of research, information and knowledge in universities, fields that are essential for the development of libraries.

Management of the online scientific conference's resources

The successful management of these resources is of neuralgic and dominant significance (Harung, 1996). The volatile conditions in the field of conferences affect

decisively the successful carrying out of an online scientific conference. Online scientific conferences are characterised by the quest, creation and the preservation of knowledge exchange. This is achieved either through scheduled knowledge exchange in symposiums or discussion panels or as an informal exchange of knowledge during the social events that take place in such events, such as conference forums, which take place online.

During an online scientific conference, a vast amount of different activities take place simultaneously, activating a complicated and constantly variable system. The totality of these crucial factors is used with the aim of the satisfaction of the convenors and the modification of the procedure of decision-making for participation.

It is essential, though, to simulate the event of a conference with a dynamic simulation model (Mayfield and Mayfield, 2013). The resources that will be available for the conference must be allocated with specific punctuality and seriousness, leading to a successful result. The simulation of the online conference's system consists the function of a model in the system. The model can be the tool for the evaluation of the performance of the system of conference management. Also, it can be used:

- to reduce the possibilities of failure of the specifications which the organisational committee of the conference has defined;
- to eliminate unpredictable malfunctions, which may appear in the future during the event or during the conference;
- to deter the use of excessive resources or their unequal allocation; and
- to optimise each factor's performance, as they will increase the attraction of participants at the conference.

The dynamic simulation model, which we will use, based upon a flexible strategy, aims for the accomplishment of the activities of an online scientific conference, as a collective procedure. This means that the register of the necessary resources, accomplished by every interested group, is highlighted with the form of deposits, from which the resources are coming out and are directed towards the accomplishment of the specific activity. The way with which the organisational committee carries out the negotiable procedure is based on the procedure of decision-making, taking into consideration the primary objectives that have been imposed, the resources that are at the committee's disposal and the peculiarity of the side which is involved in negotiation.

The dynamic simulation model, which we shall implement in the field of the online scientific conferences, has as its purpose their success and imposes as an aim the remodelling of a communicational strategy, which will secure coherence among the variables that consist a global event (Hede and Kellett, 2011). The dynamic simulation model allows the analytical visualisation of the existing relations between the scientific and the supplementary variables. This fact is an important factor for its absorption by the stakeholders.

The model as a whole aims to increase the trade name of the online scientific conference through satisfaction in the trade names and the scientific and supplementary variables. The accomplishment of the final aim is derived from within the implementation scenario for finding the best solution, depending on the current conditions. Using the dynamic simulation model is given as a solution to future organisers to be able to implement the optimum scenario for the successful

accomplishment of such events. Simultaneously, through the recording of research data and modeling the problem, the library manager is given the opportunity to raise funds for the library, as we have mentioned before. A scientific conference, as a top event, contributes to the creation of information that promotes knowledge. This is the reason why many libraries, as subscribers, host volumes of conference proceedings on their shelves.

BigBlueButton overview

Today's technology constantly offers new tools in 3D and 2D graphic interface, allowing the researcher and the reader to easily participate in conferences or read a book within a digital library, eliminating distances.

Any type of conference can be organised and take place directly because of the unique technology platform that BigBlueButton offers. The requirements for this to be done are a server and a Web site. For future participants, an invitation from the organisers, an Internet connection and audiovisual media are sufficient. It should be noted that the travel costs, accommodation and dinner costs are eliminated. The organisers are able to offer a unique experience, in a perfectly planned virtual environment.

The BigBlueButton online platform is the main tool that we can use to create an online conference. To obtain real results that have been introduced as data in our simulation model, we installed the BigBlueButton in our servers and created the first International Conference on Business Informatics and Modelling, online conference. The Web page of the conference is www.icbim.net.

The main part of the source code management system (GIT) storage contains the following components of BigBlueButton:

- *BigBlueButton-apps*: The server side red5 web-apps of BigBlueButton, written in Java.
- *BigBlueButton-client*: The Flex/Flash client of BigBlueButton, written in ActionScript.
- *BigBlueButton-web*: The Grails application for the schedule of the conference and helps the user logging in and out, written in Java.
- *Deskshare-app*: The Desktop Sharing server side red5 web-app, written in Java.
- *Deskshare-applet*: The Applet program used to capture the screen on the client, written in Java.

There are a lot of open source components that include BigBlueButton, along with the above parts.

Architecture overview

The architecture overview diagram in [Figure 1](#) shows the main pieces of the BigBlueButton architecture. BigBlueButton uses nginx as a proxy server to route incoming requests to the BigBlueButton client, to tomcat6 (running on port 8,080) for api calls, and for supporting HTTP tunnelling when the client connects using RTMPT (port 80) instead of RTMP (port 1935).

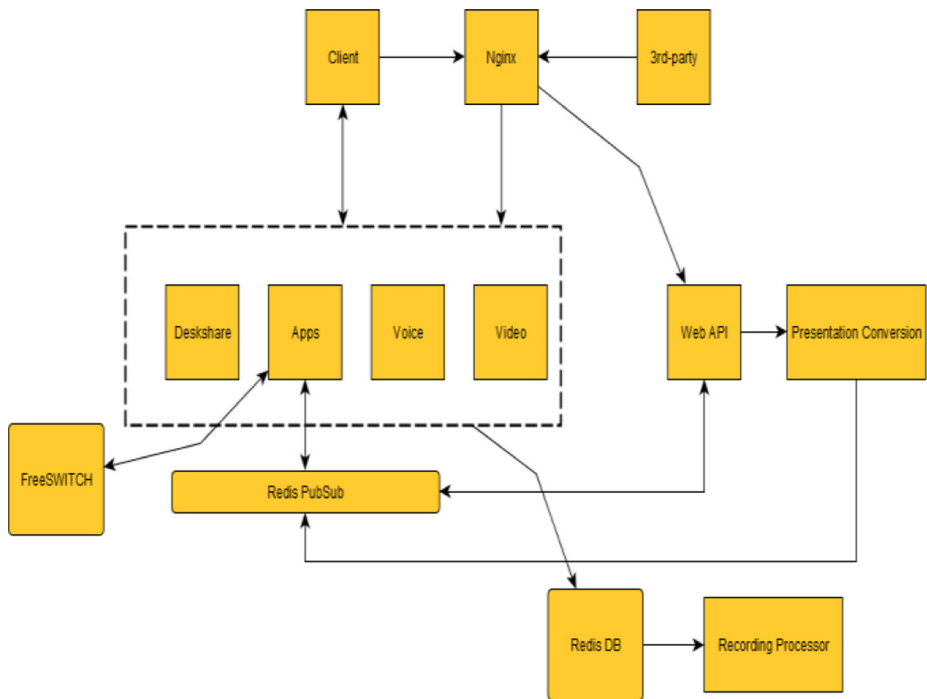


Figure 1.
Major pieces of the
architecture

BigBlueButton client

The BigBlueButton client diagram in [Figure 2](#) shows the real-time client in Flash. Flash is now available on any operating system, and it provides the interface for cooperation with other users.

Joining a voice conference

The process of joining a voice conference diagram is shown in [Figure 3](#). These are the steps that occur when a new client joins a voice conference.

Uploading a presentation

The process of uploading a presentation diagram is shown in [Figure 4](#). These are the steps that occur when a presenter uploads a presentation to the server.

Desktop sharing

The desktop sharing diagram in [Figure 5](#) shows the main components of our screen sharing solution.

Integrated voice over internet protocol (VoIP)

The integrated VoIP diagram in [Figure 6](#) shows the main components of our integrated VoIP (red5 Phone) solution.

The diagrams describe how they all work together.

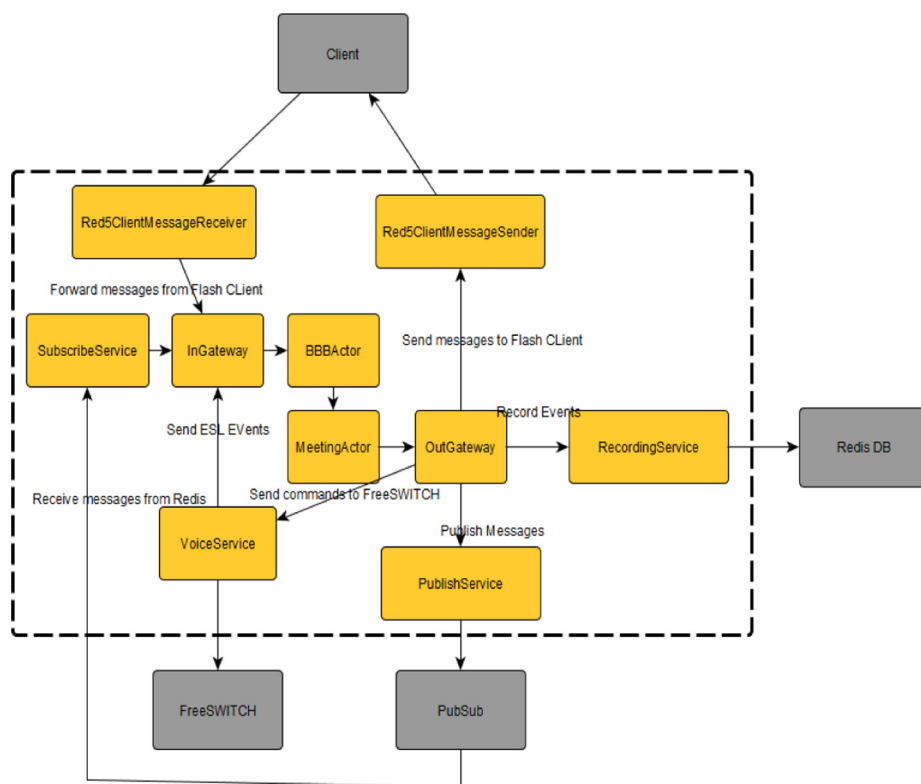


Figure 2.
Real-time interaction
with the client

The main reasons for modelling the problem

By modelling the problem, undesirable situations can be avoided because possible different input data can give different extract results, to find the optimal solution. In the case of a digital library, the manager is able to get the results obtained and use them for the proper organisation of the library.

By using simulation modelling, we can predict the results that will arise from the creation of an online conference. The study of systems either with mathematical methods or simulation is not performed with the system itself, but with a model of the system (Chi, 2000). There are many reasons which lead to the construction of a model:

- *Ease of understanding*: A model is often much simpler to understand than the system itself because during the construction of the model, only the characteristics of the system, which are of particular interest in this study, are retained. In this way, the researcher is not lost in the details of the system but focuses only on the important elements (Gupta et al., 2001).
- *Ease of communication*: It is much easier to spread ideas for a system through the construction of a model than through the description of it. For example, an architect builds a model of a building design and using this model, he gives much more information to the customer than with verbal description or architectural drawings.

Figure 3.
Steps that occur
when a new client
joins a voice
conference

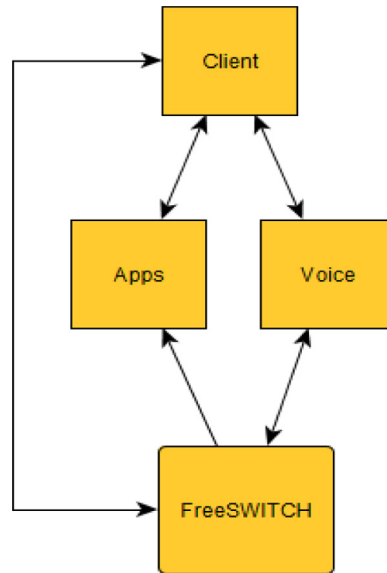
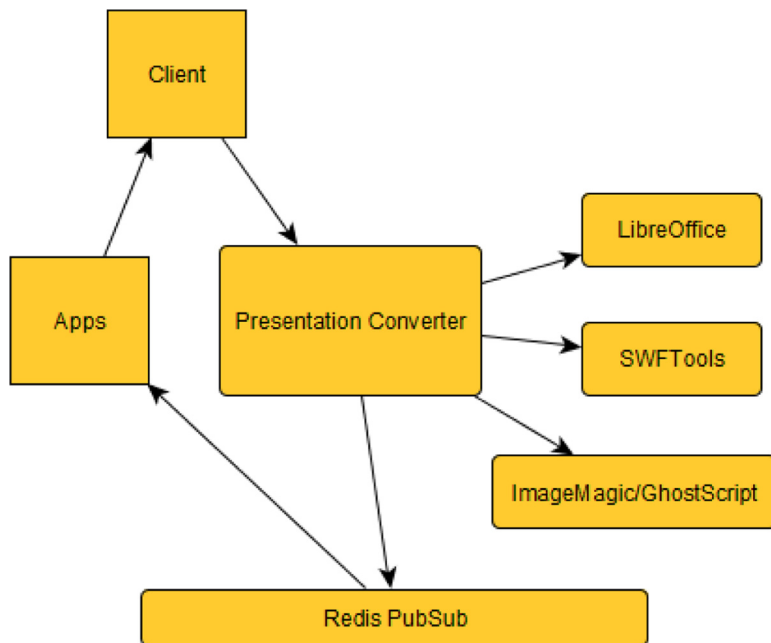


Figure 4.
Steps that occur
when a presenter
uploads a
presentation



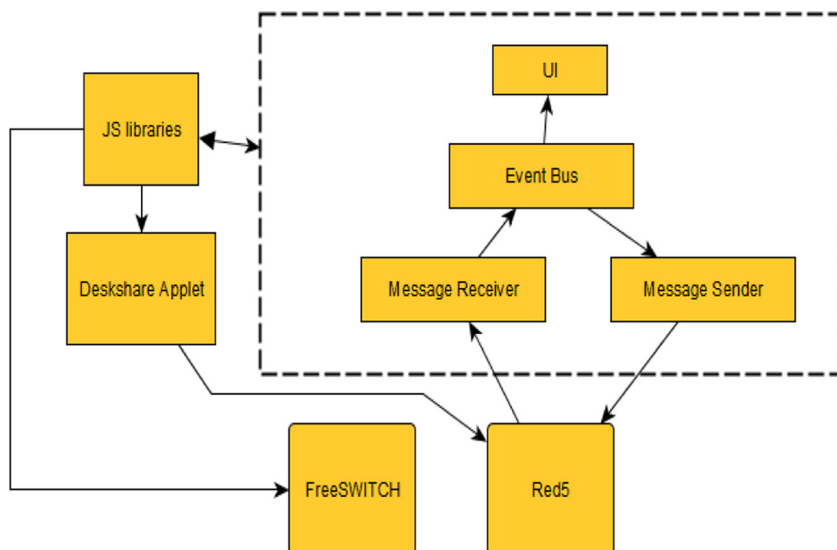


Figure 5.
The main
components of our
screen sharing
solution

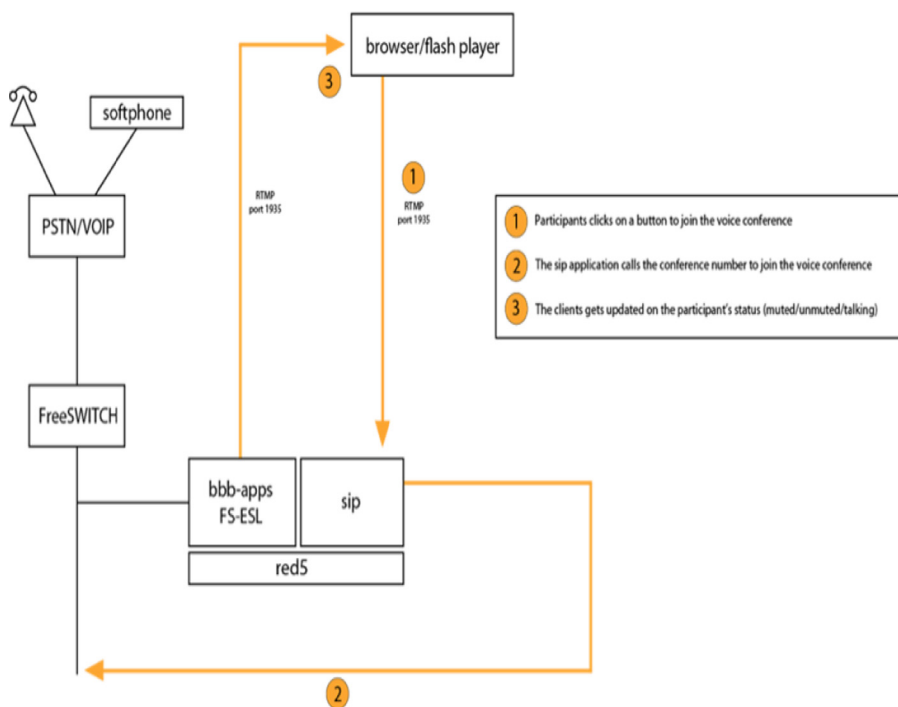


Figure 6.
The main
components of our
integrated VoIP
solution

- *The model is a tool of prediction:* Some systems have very slow alterations of condition, which makes it impossible to predict their behaviour for a long time. Constructing a model of the system, we achieve acceleration of temporal changes, so that we are able to predict the future behaviour of the real system (Wang and Moon, 2013).
- *Lack of access:* Sometimes, access to the real system is impossible or dangerous. Constructing a model, it is possible to study the system without jeopardising the researcher or the system itself.
- *Training:* By constructing a model, it is possible to train the operators without risking disaster through the trainees' mistakes. It is also possible to train operators of a system which has not been constructed yet.
- *Design:* The construction of a model has a great contribution to make to designing a system, as it allows the detection of design errors and their correction, even before the system is constructed.
- *Finding of alternatives and optimisation:* This reason for constructing models is similar to the previous one. During the designing of a system, it is possible that several different models are constructed, and eventually, the suitable one is selected for implementation. This selection is based on some specific criteria of optimisation.
- *Improvement of the performance of the existing system (Harrington, 1995):* By building a model, it is possible to control the behaviour of the system for different values of parameters. Through the study of the constructed model arises the most efficient combination of parameters, which are subsequently applied to the actual system.

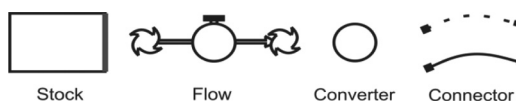
With the descriptions given until now, the contribution of the simulation to the online conferences is now clear. These conferences are expected to gain a technological business advantage, which digital libraries may also gain.

Analysis of the dynamic model of the simulation system

This section deals with the individual dimensions of strategic management of technology for the development of competitive advantage, which was developed using the concepts of dynamic configuration systems. Our dynamic model consists of stocks, flows, converters and connectors. Each of these elements is further described in Figure 7:

- A Stock represents the accumulation of physical or non-physical quantity.
- A Flow represents an activity that fills or reduces a pool. The arrow indicates the direction of positive flow, in or out.
- A Converter can keep values stable or serve as an external input to the standard or convert inputs into results, through the user-defined algebraic relations or graphics functions.

Figure 7.
Dynamic model
elements



- Connectors provide connections between the elements of models. Continuous cable is an action connector and the dotted wire is an information connector.

Dynamic simulation model

Based on the results of our research, we are able to ascribe values to the dynamic simulation model, configuring all of the factors involved in our research. The conjunction between invited speakers, symposium organiser, scientific committee, organisational committee, chairman, publication house, supporting journal, conference proceedings, networking, workshops and topics is dynamic and described perfectly by our model.

As seen from the dynamic simulation model in [Figure 8](#), the results change when altering the provision of resources to agents. Depending on the sources that are provided by the conference resources, involving all these factors, act according to the percentage of success of an online conference.

Dynamic simulation model results

To apply the standards, we used the configuration tool iThink 10.0.2, from the iSee systems. The iThink uses the stock and flow diagrams to model and simulate the processes and scenarios of the model's function. It presents the outcomes of certain and defined by the user imports and links the interdependencies between processes and problems. The results can be presented in form of graphs, tables and alerts. In this case, the dynamic modelling techniques of systems were used in the creation of this model.

The results shown on the tables and diagrams can help conference organisers in the process of decision-making. The results of the dynamic simulation model are shown in figures ([Figures 9-12](#)) provided below.

From the results of the table, we can see that as long as the resources, which are disposed by the company for the accomplishment of the online conference, are dropping, all the factors that we took into account for the completion of the event are rising. Some of these resources return through the flow of the dynamic model to the company, through the Brand Name of every factor. For instance, the company gives some resources to call to the conference a professor of great reputation and many citations in this field, who enjoys recognition within the scientific community. When the professor's name and his participation in the conference appears in the site of the conference, many researchers would be willing to take part in the specific conference to listen to his views, to be acquainted with his work and to talk with him in person (networking). In the same way, the way of our example, all our factors which take place for the successful carrying out of an online conference work.

Support for decision makers

For online conference organisers to be able to manage the simulation system, 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 have done. [Figure 13](#) shows the main user interface of the simulation model. There are 11 main sections on this user interface: Invited Speakers interface, Symposium Organiser interface, Scientific Committee interface, Organisational Committee interface, Chairman interface, Publication House interface, Supporting Journal interface, Conference Proceedings interface, Location interface, Networking interface, Workshops interface and Topics interface.

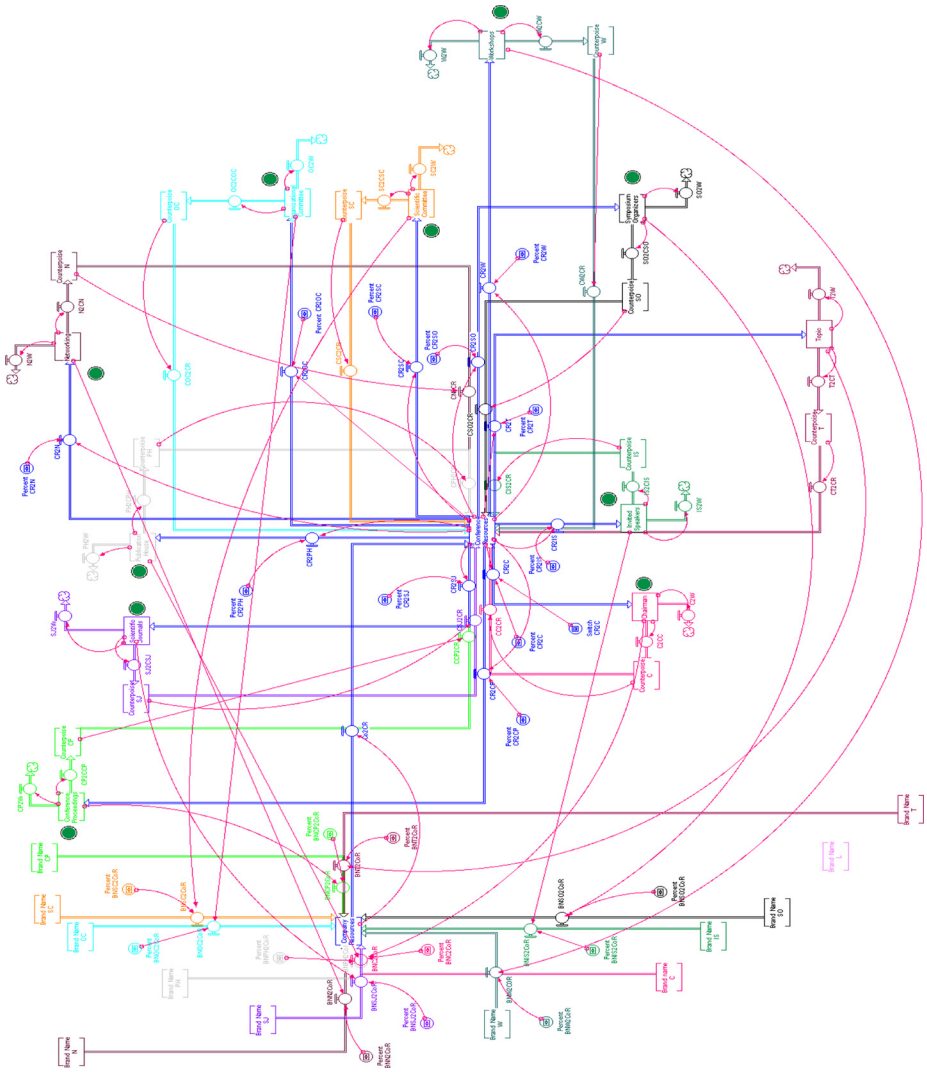


Figure 8.
Dynamic simulation
model

| Months | Company Resources | Invited Speakers | Networking | Organizational Committee | Publication House | Scientific Committee | Scientific Journals | Symposium Organizers | Topic | Workshops |
|---------|-------------------|------------------|------------|--------------------------|-------------------|----------------------|---------------------|----------------------|--------|-----------|
| Initial | 1,000.00 | 66.00 | 66.00 | 65.00 | 69.00 | 75.00 | 72.00 | 71.00 | 69.00 | 67.00 |
| 1 | 466.80 | 93.45 | 110.40 | 91.37 | 100.63 | 119.63 | 109.65 | 101.86 | 96.55 | 95.66 |
| 2 | 298.09 | 105.58 | 127.31 | 103.11 | 114.23 | 137.60 | 125.29 | 115.32 | 108.87 | 108.22 |
| 3 | 244.71 | 110.81 | 134.08 | 108.20 | 119.98 | 144.86 | 131.75 | 121.08 | 114.22 | 113.61 |
| 4 | 227.82 | 115.78 | 139.63 | 113.07 | 125.27 | 150.91 | 137.40 | 126.46 | 119.38 | 118.68 |
| 5 | 222.47 | 121.09 | 145.23 | 118.30 | 130.85 | 157.08 | 143.27 | 132.19 | 124.92 | 124.08 |
| 6 | 70.39 | 125.73 | 150.06 | 122.87 | 135.71 | 162.39 | 148.36 | 137.18 | 129.77 | 128.79 |
| 7 | 22.27 | 126.73 | 151.10 | 123.85 | 136.75 | 163.54 | 149.45 | 138.26 | 130.82 | 129.81 |
| 8 | 7.05 | 126.34 | 150.70 | 123.46 | 136.35 | 163.09 | 149.03 | 137.84 | 130.41 | 129.41 |
| 9 | 2.23 | 125.88 | 150.23 | 123.01 | 135.87 | 162.57 | 148.53 | 137.34 | 129.92 | 128.94 |
| 10 | 0.71 | 125.47 | 149.81 | 122.61 | 135.44 | 162.11 | 148.09 | 136.91 | 129.50 | 128.53 |
| 11 | 0.22 | 125.08 | 149.41 | 122.23 | 135.04 | 161.67 | 147.66 | 136.49 | 129.09 | 128.14 |
| 12 | 0.07 | 124.69 | 149.01 | 121.84 | 134.63 | 161.23 | 147.24 | 136.07 | 128.69 | 127.74 |

Online conference's services

179

Figure 9. Company resources in conjunction with all factors

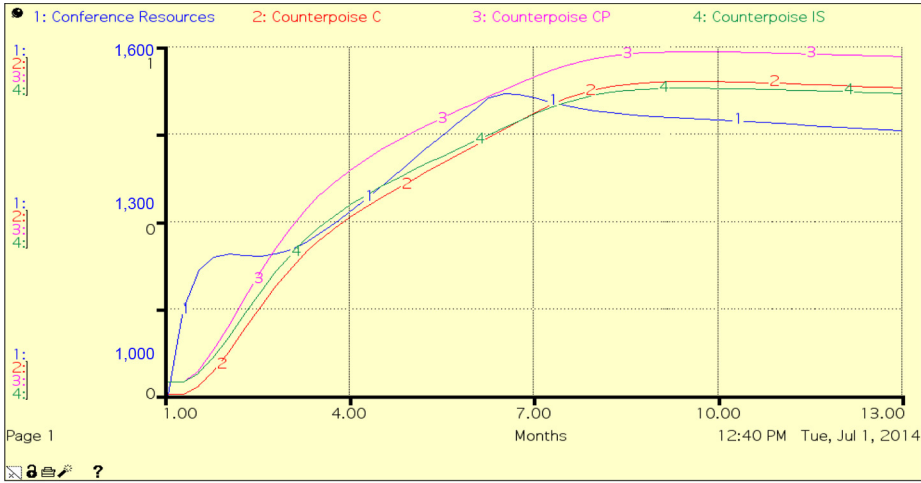


Figure 10. Conference resources in conjunction with Counterpoise C, CP, IS

Conclusions

The study of the international events imposes the carrying out of an extensive research in this field. This fact necessitates the choice of a communicative strategy, which will respect the rate of significance of the variables that recruit an online scientific conference (Hamrefors, 2010). The use of dynamic simulation models is of utmost importance because we can find the best possible relations, which must be used in such a way that such an event will bring about the desirable results and be crowned with success. The flow and knowledge management is much easier through the creation of an online conference, which could be a model for the evolution of a digital library. For the subject of the research, we chose the field of online scientific conferences because of their international orientation, their scientific nature and the wide diffusion of knowledge.

LR
65,3

180

Figure 11.
Conference resources
in conjunction with
Counterpoise N, OC,
PH, SC

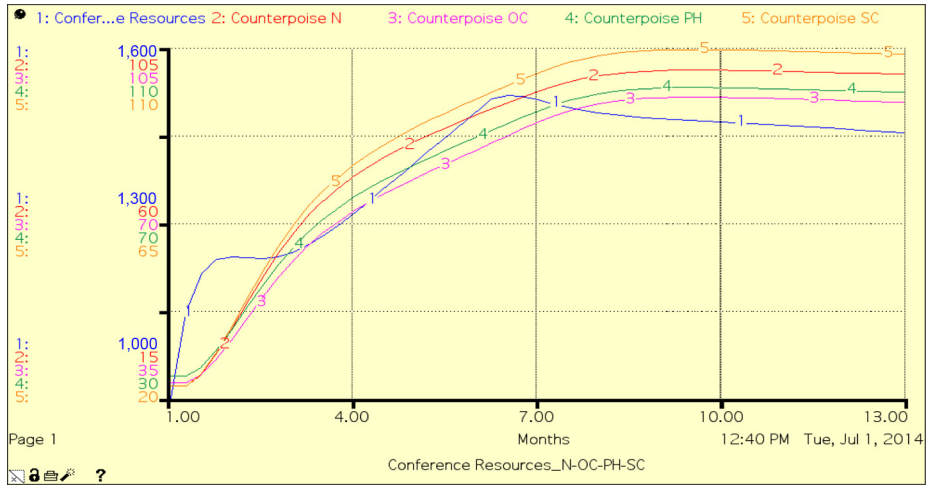
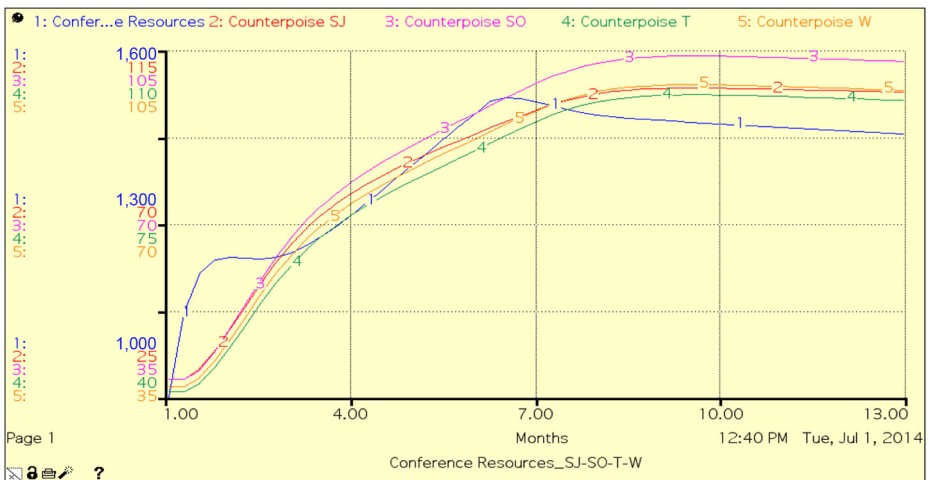


Figure 12.
Conference resources
in conjunction with
Counterpoise SJ, SO,
T, W



The international events belong to the category of facts that constantly gain the interest of the whole scientific community, such as digital libraries. International conferences demand a specific communicative strategic approach for the accomplishment of the best possible results. The strategy of the suggested model has a long-term and completed character, pursuing the immediate support and the optimum confrontation of scientific conferences' needs. The dynamic simulation model aims at the productive integration of the main variables in the procedure of the organisation of an online scientific conference and a digital library, in an attempt to find solutions through the offered services and to avoid unwanted results (Mair and Whitford, 2013).

The communicative environment of the organisation of online conferences is feeding itself by the different factors, which have the aim of attracting a vast amount



Figure 13.
Main user interface

of scientists before and during the organisation of the event. It concerns a constant and complicated procedure, which is called to deal with flexibility and effectiveness in the circumstances formed by the contemporary, competitive environment. This research showed that the totality of the activities taking place during the organisation of online conferences plays one of the most significant roles as far as it concerns the success of the conference. Also, through this research, we testify a complete and optimum strategy, which, according to the results that we achieved, leads to the successful organisation of global online scientific conferences

(Mackellar, 2013). These results came from the graphs and the tables above, which present maximum yields, giving an optimal solution.

This research records the totality of the variables that take place during the creation, carrying out and integration of online international events. The strategies used have the objective to route the procedure of the development of an online event in such a way that the best results will be gained. It is accomplished by a detailed investigation of the totality of the variables that are activated during the carrying out of such an event and by a complete record of the communicative actions that are set to implementation for their satisfaction. A well-established online conference promotes the idea of the virtual university and digital libraries and the development of e-learning.

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