The System Dynamics Italian Chapter (SYDIC) community on the web: an online scientific community

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Abstract
The Italian Chapter (SYDIC) of the System Dynamics Society, needed an effective tool to monitor its member activities, and to support the diffusion of the System Dynamics methodology in Italy, by encouraging the contacts between scholars, researchers and professionals making use of this discipline. Among the existing tools, we identified the web community idea as the most suitable. By carefully searching the available sources and by analysing examples of existing communities, it was possible to identify the characteristics and features of a successful community, and so to identify the main aspects and strategies to build a scientific community. It has been found that an IT-system named "groupware" (that is, a platform to support collaborative work or CSCW – Computer Supported Cooperative Work) generally provides most of the desired features for a scientific community. Based on the main features available in a CSCW groupware, we then developed our idea of what the Italian system dynamics scientific community website should look like and which tools and services it should provide to its members. We finally designed and implemented it based on these concepts.

1. INTRODUCTION

The SYDIC, the official Italian Chapter of System Dynamics Society (SDS), was founded in 1995. The spirit that led to the birth of SYDIC was to share in Italy the new and older experiences that were acquired over the time between academics and practitioners of the methodology of System Dynamics and simulation techniques, by also making use of relative tools. The main goal of the SYDIC is to spread out the concepts of System Dynamics in Italy but also to support and encourage the contacts between scholars, researchers and professionals using this discipline.

Unfortunately, since its birth, the Italian Chapter has not been able to develop adequately, in relation to its potentiality: this has been mainly due to both a territorial dispersion of Universities and Research Centers as well as to a national lack of governmental resources for research, and especially in the field of "innovative" methodologies such as System Dynamics (which, up to date, has not even been officially recognised by the Italian Ministry for Research and University).

No network has been established and, until a couple of years ago, SYDIC members were essentially able to meet each other and discuss possible collaborations either by local meetings or at the chapter formal meeting, typically held during the annual System Dynamics Conference. Furthermore, and basically due to the communication problems, collaboration and team-play was almost impossible inside the SYDIC: it was thus very difficult to establish a shared vision and learning environment in such a way that its members could set apart personal interests. In order to change this deeply rooted and established situation, we have analyzed possible solutions and we identified a possible leverage-effect on mental models modification in the development of a web-community, hoping that it would finally help the SYDIC community to grow strong.

Thus, the idea came up to build a practical growing online community which aims to promote and spread out System Dynamics at all levels: academic and professional, both in public and private sectors.
We have finally realized the www.systemdynamics.it website, designed with the intent of creating a valuable tool for the SYDIC members as well as of constituting a reference point for those involved, for one reason or other, in the field of System Dynamics in Italy.

2. COMMUNITIES

Before we analyze the main characteristics peculiar to the actual SYDIC social and scientific group and previous to the examination of those advantages that building a web-community may bring, we first have to understand what is the common meaning of an online community, by investigating which are the basic aspects to be included and that constitute an award-winning community.

Every time we talk about communities or web-communities we refer to all those communities that, at all rates, make use of a network (also called Social Network) as the main tool for building relationships between their members. Nowadays, the availability of broadband access and low rates for Internet access allow virtual communities (communities online) to be places where it is possible to share resources (in a technology driven way) and information, as well as to work at distance and socialize with other users. First note that throughout this paper we will distinguish between *users* and *members*. The latter are considered as the real community members (that is the subscribers to some specific online services of the virtual community), while the former are basically referring to casual visitors who do not subscribe to specific member services but that can still browse the public part of the Online Community (that is accessing the free services available on the website, like subscribe to the forum, browse the public profiles of people/institutions dealing in SD in Italy, etc…).

Tools and features that an online website should have in order to be defined as a community are:

- **a topic**: this is a common argument for discussion, in fact in communities the main leverage of aggregation is the communion of interests between members or users. It should thus also provide material and information about the chosen topic
- **user friendliness**: a community must be easy to use, with the lowest possible number of technical problems (which of course must be easily reported from users to an online assistance service).
- **Membership feeling**: as pointed out by Kim Amy Jo [Kim Amy Jo, 2001], a community must provide a sense of membership to the subscribers, creating thus the basis for continuous access to the community services, and it should provide the users with the ability to interact easily with each other, as well as being a source of information, services and events, even outside the virtual reality.

Communities which are particularly devoted to virtual meetings, such as *Second Life* or MSN Spaces (*spaces.live.com)*, have thousands of members; unfortunately, we found out by our careful researches, that online scientific communities are not that much developed; even though internet was designed with the goal of allowing an easier knowledge diffusion, unfortunately, after time, most of the online applications lost that "ancestral" intent.

In the System Dynamics field, the main community is obviously constituted by the System Dynamics Society, whose website is available at the link www.systemdynamics.org. This is also the main URL to access in order to have an easy and direct link to the various international SD Chapters, many of which already have their own online web resource.

2.1. Building up a community

In order to build an online community, it may be useful to refer to some so-called "web marketing" strategies. Unlike what many people may think, talking about web marketing does not only technically imply a website rank into the main search engines, rather it refers to the classical marketing concepts applied to the "web case" (Prandelli E., Verona G., 2001); the idea is to put the user, his needs and desires at the centre of the community development strategy.
In this context, it is interesting to refer to the classic marketing idea of the "four P's" (see Fig. 1), which are widely known as to be the classical operational marketing leverages; in the web context, the "four P marketing mix" has become (Prandelli E., Verona G., 2001) the "three C web-marketing mix" (3C) (Fig. 1), where the concept of *Community* is one of the fundamental leverages to act upon.
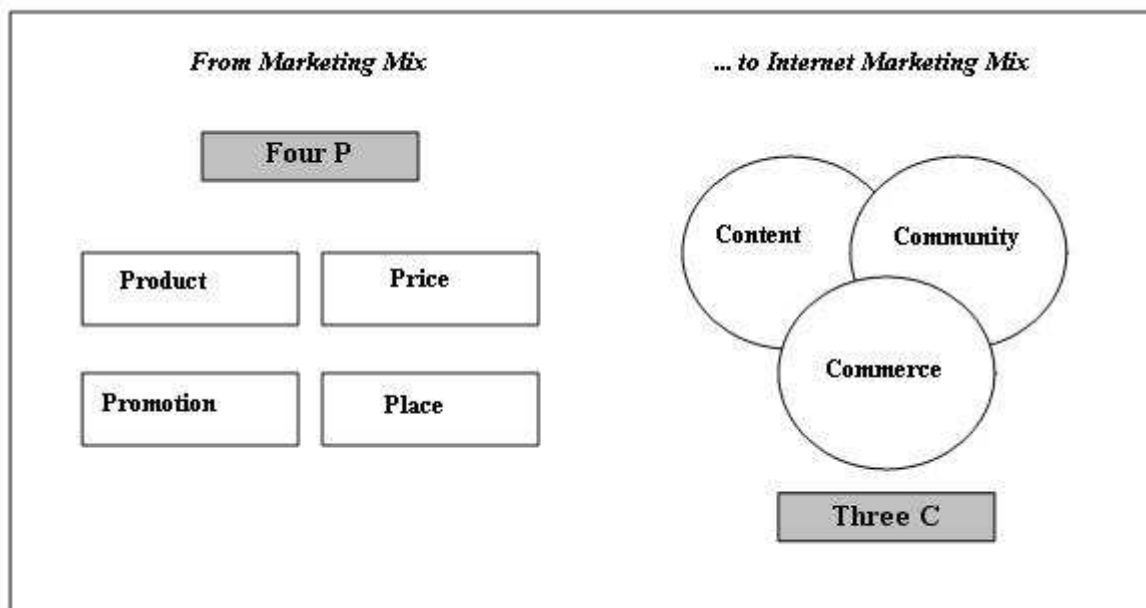
Figure 1: From the four P to the three C (Source: Prandelli, Verona)

We approached the design of the SYDIC Community by referring to the 3C marketing strategies as well as also by analyzing the basic services offered by the SDS website: this was done in order to define similar services, especially where a "decentralized" service was needed, and at the same time also in order to avoid being redundant where instead a centralized service was better to be localized at a Society level.

In order to create a virtual community, it is generally useful to be very careful to maintain three basic conditions (De Baggis M., 2001):

1. Have something to say
2. Develop a user-friendly website
3. Favour the development of a group identity and of shared rules

The first condition may probably seem obvious, but we found out that sometimes it is not put into practice. In fact, while in physical communities (where the contact between members is carried out on a face-to-face basis) the aggregation leverage may be a socio-demographic aspect, in web-communities the key-issue, that is keeping people together, is mainly built over shared interests among its members. Thus, in general, before starting to build a web-community, it is usually needed to identify a main topic, possibly dealing with an argument which is not already so spread on the web and that does not characterize many other web-communities. It is important to keep in mind that the provided content, according to the identified topic (but not only), should be frequently updated by administrators.

As long as the second condition is concerned, it is necessary to keep into consideration the previously identified user target, in order to provide easiness of use of the system's functions, accessibility of content and understandable language. In particular, usability identifies the way a webpage should be built in order to make its use as simple and immediate as possible by the users, while accessibility refers to the guidelines on how a web page should be built in order to be useful for disabled or unpaired people.

The third condition refers to how to provide a group identity and a "membership sense" to the

community members. In this case, it is very important to develop an extremely well done set of shared rules (also called "Netiquette"), on which community members will usually all have to agree.

After having determined the three previous conditions, it will be necessary to identify how to build the web-community's underlying IT system, which basically consists in choosing the most suitable development tool or framework used to develop and deploy the community website. The interdisciplinary IT research field on CSCW (Computer Supported Cooperative Work) and Groupware Systems may be of great help in this decision.

2.2. Groupware and others tool in the Communities

The choice of the tools to be provided in a community is one of the most delicate steps in the design phase when building its website. A community must be provided with efficient tools in order to efficiently enable content accessibility and communication among its members; the provided functionalities must be as much as possible independent from the type of hardware, from the operating system or the browser used by Internet surfers. All tools should be used possibly without failures or uncertainties and members should always feel protected and properly attended. In an early phase of a virtual community's life, it may be important to offer a smaller but well-tested, high-quality and well-performing tool-set: it will always be possible to add new functionalities in the future, which can also be a strategically important rule in order to attract new users. Complicated, error-prone or useless functionalities may in fact sooner or later cause a loss of members as well as keep new users away from the community. The basic idea is that *the best technology is just the necessary one*.

Thus, by inspecting sources of information or examples on the web on existing CSCW and Groupware technologies, it is possible to identify a relationship between offered features and community socio-demographic characteristics. Moreover, it is important not to forget the need to maintain a high compatibility with the most hardware and software platforms actually on the market (including, of course, freeware, proprietary or open-source software solutions).

In particular, groupware frameworks are quite complex systems composed most of the times by both hardware and software, basically implementing tools for communication, resource-sharing and coordination-cooperation among members of the community or even down to single working-groups in the community (see Figure 2).
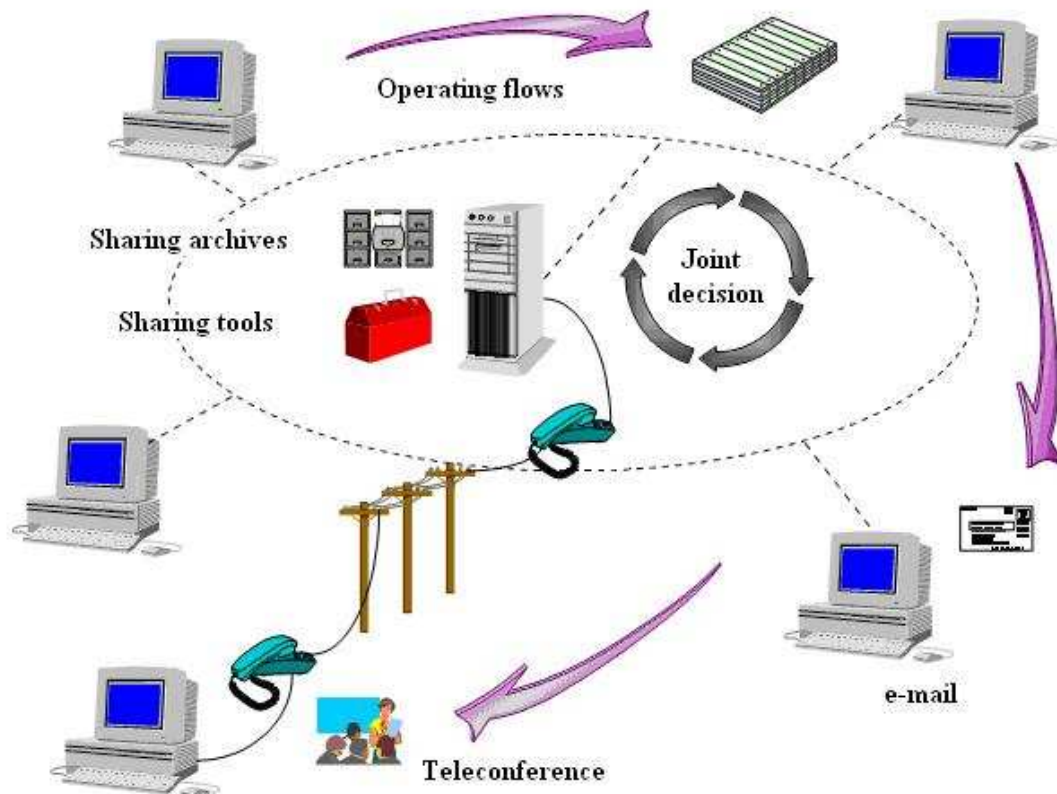
Figure 2: Example of a groupware influence (Source: Calori G.)

Inside a *Groupware* we can usually find the following functionalities:

- **Messaging tools**: e-mail and Forum, also called CMS (Content Management Systems), tools for web-conferences and multi-user editor tools like a Wiki; this is the most used tool-set for scientific communities
- **Document management tools**: these tools allow to manage electronic documents (DMS – Document Management Systems) and allow the documents to be managed also according to specific group needs (shared information spaces), with a database or web support (ex. BSCW)
- **Decision support tools**: group decision support systems (GDSS) are complex structures of hardware and software designed facilitate meetings or activities management. Examples of GDSS tools include shared calendars or shared diaries
- **Workflow Management Tools** (WFMS): these are very useful tools, especially in order to perform work coordination and scheduling the activities on projects
- **E-learning platforms and the simulation tools**: every online scientific community can draw benefits by using a groupware e-learning features, since the latter already contain most of the necessary functions for a clear and effective diffusion of disciplines characterizing a scientific community.

3. THE SYDIC COMMUNITY

According to what has been explained in the previous paragraphs, building up a community may thus be a key-point and a vary useful strength aspect for any developing organization. This is even truer for scientific communities and it is definitely so for a community which is mainly dealing with the System Dynamics methodology. In fact, an online community, with its collaboration and communication tools, is an ideal basis on which to create and build a shared vision among its community members, and for the birth and growth of groups of people sharing common interests, thus collectively cooperating and learning.

We will see that the following peculiar aspects of a web-community may be of particular interest to a scientific community and especially to the SYDIC one:

1. shared content and knowledge (documents, models, papers, etc…)
2. online communication with other previously unknown members (identify other members dealing with SD over the Italian territory)
3. favouring cooperation among members in a collaborative environment (forum, mailing list)
4. offer a common place where to be in touch both with other members but also with the SYDIC committee

The realized web community is accessible through the web site www.systemdynamics.it.
After having analysed the features offered by the main System Dynamics Society website, faced the major user necessities and made some reflections on general communities features, we have focused the tool requirements on the basis of the characteristics of the typical SYDIC (Italian) community member, in order to define what kind of groupware tools best fit this context.

Having started this work almost from scratch (no passed data based on the use of the old site was available) the main requirements were supplied by the specific experiences of the two major active members of SYDIC. From the technical solutions and potential characteristics of present tools, Dr. Stefano Armenia has given excellent hints and Prof. Habib Sedehi (the actual SYDIC president and expert of habits and inclinations of both the Italian Chapter members and the SDS ones), as well as Prof. Edoardo Mollona (University of Bologna) have been very useful in defining various necessary user requirements.

Following their suggestions and by analyzing the characteristic spectrum of possible members (both academics and professionals) interested in the System Dynamics approach and methodology, we were able to identify three main categories of target users for the SYDIC's community:

1. **Students**: Classified as average age around 25 years old, are considered to be in the phase of full development of their knowledge. They frequently have the necessity of immediate consultation supports on the discipline in order to solve doubts or incomprehension during their studies. Generally these "range" of university students have high level familiarity with internet and the latest technologies, and they normally have much available time for access and reading material on the web. They usually do not find particular difficulties in approaching to new web functions. In our requirement analysis, the students were considered to not present special problem in the process of the selection of tools choice for the community.
2. **Professionals and Managers**: This type of users generally has a good knowledge of System Dynamics discipline, and often uses the methodology in his/her practical work. They have in average an age around 40 years and together with the university professors they represent the carrying part of the members. They are probably the most interested members of the Chapter particularly once there is a meeting or an event (Conference/workshop, etc.) where

they participate and hence they increase from one side their skill and from the other their visibility in the community.. They often join the community on behalf of the company or organization to which they belong. They have a good education level, often engineering skills, and they haven't particular problems in the use of groupware's technologies and tools; but unfortunately they have a little time available, which greatly influence the choice of tools for the community.

3. **Scholars and Academics**: Perhaps they are the most difficult and problematic target user to satisfy. They are often rather ahead with the years, and therefore they may have difficulties in approaching with new systems or new technological concepts. Generally they don't need to acquire a lot of visibility, because often they are already known in the academic and working world, but they have great knowledge to be shared and they are often interested in conferences and events. As professionals have always short time available, they need tools as much as possible with high performance and easily to use.

Apart from the lately defined target it is appropriate to note that in System Dynamics there are also people with not always engineering skills (such as students or researchers from "soft" sciences) and therefore may not have high skills in using specific software or overly complex instruments. In this sense a web community is an ideal context where acquire and exchange knowledge as today almost everybody is able to do "surfing" and use an Internet site facilities.

On the base of the already mentioned target users and on the pre-established SYDIC objectives, we have proceeded in the choice of the tools to be included in the website. We have estimated that especially in this early start phase the target users will do not necessity need particularly advanced working tools, because the necessity of direct and frequent knowledge and opinion exchange between the members seems to not be the primary requirement. Probably the users will enter in the community few times a week or very rarely times and so they have the necessity of finding simple tools, although complete, with an immediate high comprehension level (in fact almost all the researchers and academics work in multitasking, making simultaneously various operations, and hence we have to facilitate them as much as possible taking in mind this specific aspect).

3.1. The selected tools

In order to develop a community specifically with a scientific characteristic, a special attention has been given to the introduction of those essential tools for the discipline diffusion: in fact we have included a series of web pages dedicated to the history and the methodology descriptions, a sector is dedicated to the useful links for those (rookies) who are approaching System Dynamics with addition of a list of suitable and recommended references.

Another option which has been decided to be necessary to include, is a function dedicated to the document sharing management between the members of the community. Towards this end, we have introduced in the site some standard applications through which each user will be able to upload or unload documents, models or other software, classified according to different selected parameters.
In order to support the diffusion of the discipline in Italy there has been created a page where anybody can search to find who and where are the community members in Italy, and once find a specific member some synthetic information will be immediately available. This kind of page has been suitably created to ensure visibility to the members of SYDIC. Each member can always check its personal and common information that he/she considers useful to put in evidence at any user availability.

To ensure a simple and fast visibility form, we decided to adopt the personal page tool; in fact every member can create inside the website, and in a completely autonomous way, a personal homepage.

In relation to what has been said regarding the limited time of the generic community member, we have decided to create a suitable proprietary tool (developed, as all the website, with the LAMP framework – *LAMP: Linux, Apache, MySQL, PHP*) for the creation of a personal homepage; this tool helps create personal pages in a standard format for every member, so it offers a simple content and material (both documents and other material) management, fast and quick.

Since there aren't only individual identities involved in SD Italian community, but also many other organisations or companies, we decided to realize a double registration profile inside the site: one profile dedicated to the individual members and another one dedicated to the corporations/organisations and private companies, in order to ensure a different type of visibility and a proper/adequate access to information by whom navigates through the site. Obviously registration functions have been coded from scratch so that they were exhaustive to the purposes of the demands of SYDIC community.

To ensure a more efficient communication by the organization towards the members we decided to insert as messaging tool a classic e-mail tool; this has been sat up in a newsletter site mode. Every user/member can however decide to join or not the newsletter mailing list, in order ensure the maximum freedom. Once the SYDIC intends to announce/promote new web contents or new events, it can be communicated through an e-mail to all the users/members who have in a way or other adhered to newsletter mailing list. In Figure 3 we can see the SYDIC's Mailing List tool, a quite wide-used open source application known as Dada mail.
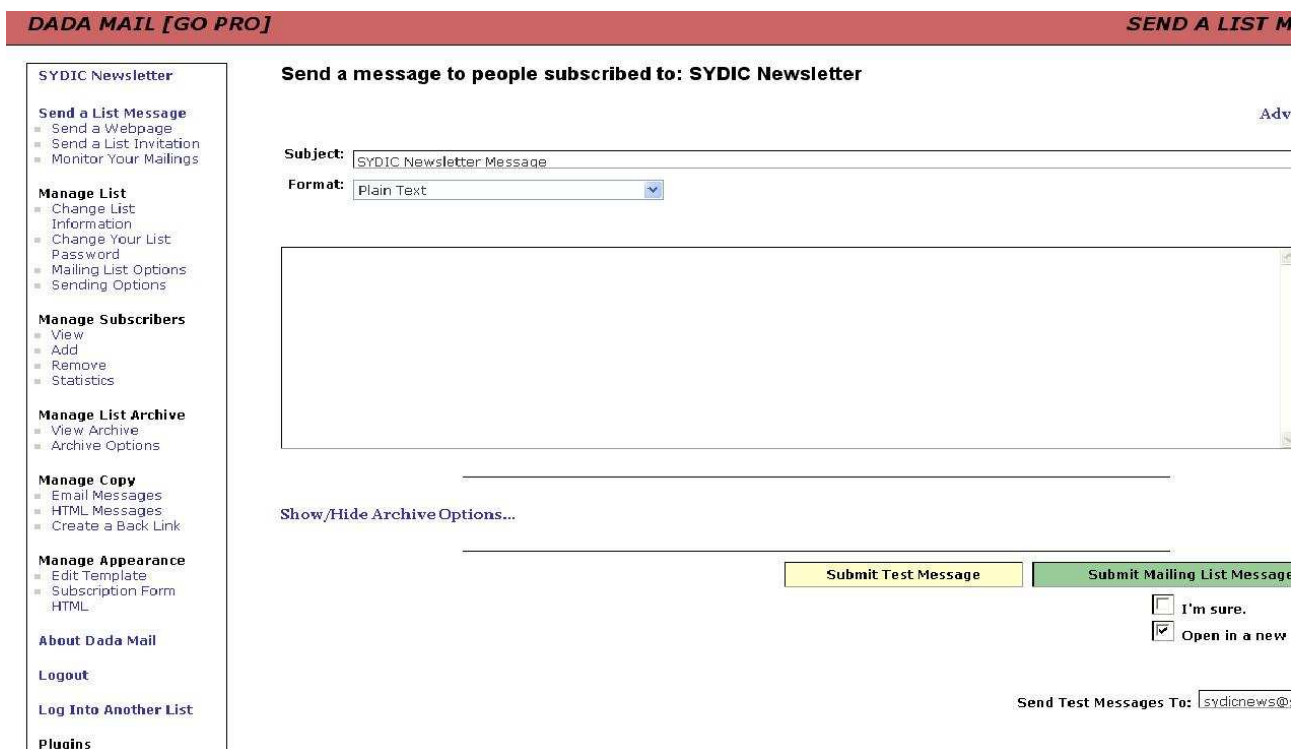
Figure 3: the SYDIC Mailing List Tool

As cooperation tool and for the knowledge/opinion exchange between the users we have chosen to create a forum environment. The forum has been preferred to other tools such as the chat or the newsgroup, because, it is well known by any internet user, it is consolidated to be a standard form of working in community, it allows to maintain a sort of linearity/reflection in a scientific discussion being an asynchronous communication tool. For the context, in our opinion, seems to

best respond to the target user/members requirements identified. In Figure 4 we can see the SYDIC's Forum home page.

Figure 4: the SYDIC online Forum

At this starting time of the community, we have not yet included other specific tools for collaborative work management, i.e. tools dedicated to decision support or to workflow management. These tools, which, in our opinion, are very interesting and useful in communities, at the moment, are considered to be not indispensable.

The realized web community has the aim to become the main tool developed to support the activities of SYDIC. In the end, with the provided tools, SYDIC members are now able to build a real network, collectively learning and collaborating at distance while discussing about models, consulting and sharing information and researches, etc… In particular, through the web-community , even young students or newbies willing to start studying or using System Dynamics are able to find useful references (while before, they could only look at what was available in websites of foreign countries. Now, all members in the community have a clear and well-defined local reference, thus favouring the birth and growth of a shared vision among all chapter members.

4. THE IMPLEMENTED WEBSITE

The site presently realized for the community is built on a classical structure characterized by a Front-End (FE) side, a site's public part visible and accessible to any internet users, and a Back-Office (BO) side, a site's part which can be accessed only through an authentication with username and password. In relation to the users access profile the BO section offers dedicated contents to the different user.

The public part of the SYDIC website (Front-End) is itself divided into two big sections; the first one is simply informative section and supplies all general and first level information, the second section is dedicated both to the community members as well as to occasional users looking for some specific information on system dynamics in Italy. The actual SYDIC website homepage is reported in Figure 5.

Figure 5: SYDIC community Home page

In addition to a presentation text where it is synthetically described the community objectives, there is another window-box (at the bottom) where the latest news and events, dealing with the System Dynamics, scroll together with their relative publication dates: clicking on a news or event a dedicated page will be loaded.

As it can be seen from the above figure, on the Homepage there are management menus: one horizontal, also called service bar, and a second one a vertical menu on the left of the page. Through the service bar it is possible to:

a. access the website's Forum
b. access the FAQ page (Frequently Asked Questions)
c. contact SYDIC's webmaster
d. access to the newsletter page
e. make a login (for registered members) and hence access to the private area (Back-Office).

Clicking on the links on the left side of the Home page (vertical menu) it's possible to consult all the public content present in the site. In the sections SYDIC.IT and SYSTEMDYNAMICS (SD) it is possible to find general information regarding the SYDIC members and useful information dealing with System Dynamics in general and SD International Society. Finally in the SYDIC Community section, the heart of the site, there are four main pages: The Italian SD context, Public documentation, News and events, Resources and, at last, the Registration area. Let us delve into further detail concerning the most important page among these sections: i.e. "Il panorama Italiano" (the Italian SD context).

Figure 6: Il panorama italiano

A shown in Figure 6, in this page we can find and see all the SYDIC members registrations, both organizations and individuals which are present in the system dynamics context in Italy. A map of Italy is presented as divided into different areas (regions or districts). Clicking on the button

corresponding to each area on the map, will show, in a separate list below, a list of all the registered members as belonging (under a residential point of view) to the selected region; the result member list window table is divided into three results views: All ("Entrambi"), Organisations/companies ("Enti") and Individuals ("Utenti"); each of these sections contains results of the selected category and is selectable by a click. In addition, an advanced research feature is available:

- **Name search**: by entering text into the available text-box, a specific name can be selected and related detailed information will be presented.
- **Advanced search**: the advance research allows to search for the members in a region, organizing the output list according to their residence province, to the type of registration (organization or individual) and to the sector of their organization. It is compulsory to select a region and a province to be able to make this type of research. When a region is selected, a *Javascript* snippet runs and drops down a list, where it will appear the list of the provinces corresponding to the selected region; at this point it is necessary to select one province or the voice all inside the drop-down menu, or the research will not get any result. Depending on the type of the advanced research done the table of results can be provided or not with various sections of consultation, identified by specific tabs.
- **Italians resident in foreign countries search**: to consult the list of the Italian members who are resident in foreign countries, it is sufficient to select, one of the present nations, in the relative drop-down menu. Obviously in the menu there are not present all the nations, but only those in which it is present (registered) at least one member of the community.

All the result tables will appear in the same box positioned little down below the map of Italy and the research section. In case the number of founded results is higher than five (five is the maximum number of voices that every table can contain inside a page) it will be possible to consult all the addition results through successive page number under the window.

4.1. The private personal homepage

As it has been mentioned before, each member who has been registered in SYDIC web site has the possibility in defining, through a simple tool, a proper personal section where he/she can include a number of "elements" (curriculum, general documents and papers, SD models, etc…). The personal pages (related to individuals or/and organisations) can, in the actual implementation, be always seen (once he/she has a correct profile and if its publication is enabled by the system administrator) by any other members or users of the community by clicking on the magnifying glass icon in correspondence to the specific person or organisation, present in the members list window table.

Once clicking on the mentioned icon, a following window will appear which will present the member selected personal-private page as the following one, showed in Figure 7.
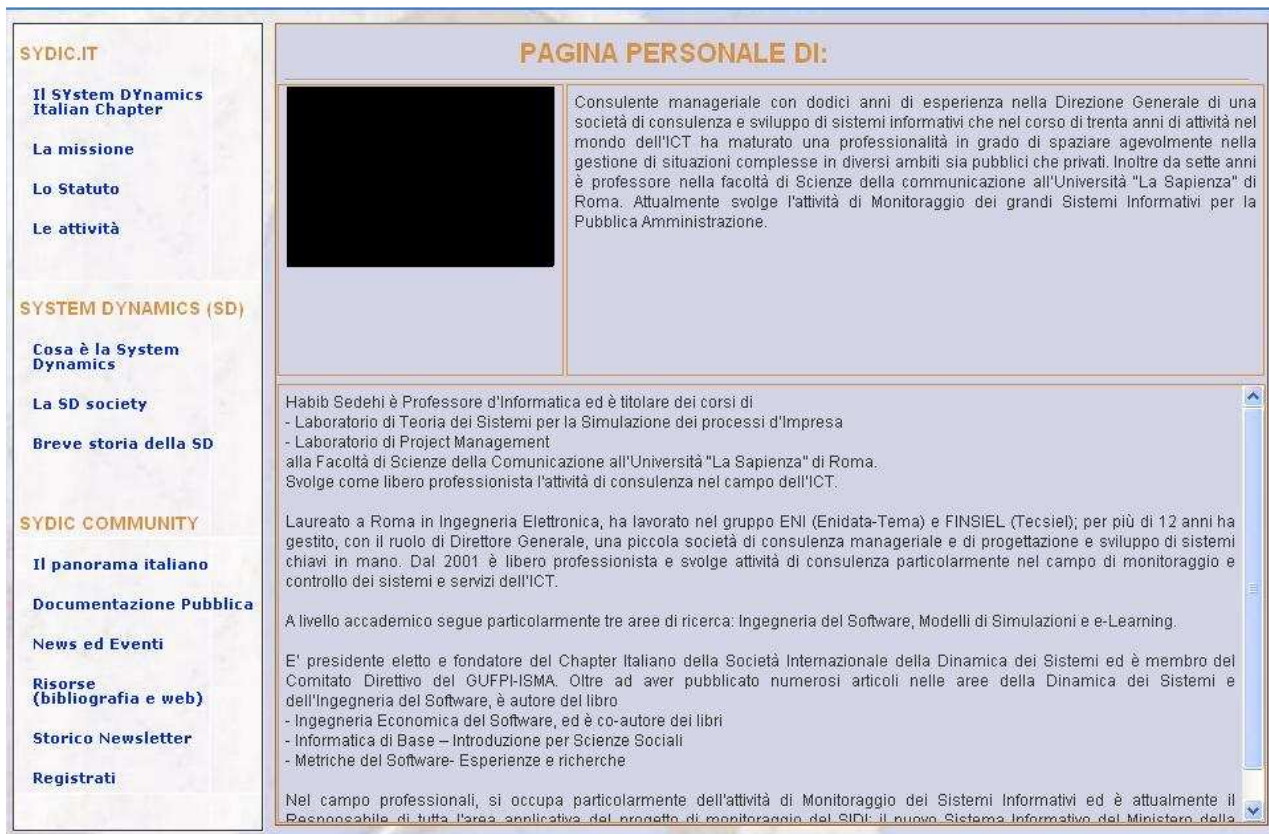
Figure 7: An example of personal page

The possibility to create a personal page, gives to SYDIC web-site members the most important opportunity to be both nationally and internationally visible into the wider SD community (this is also due to the fact, as said before, that the SYDC website is accessible form the international SDS website).

5. CONCLUSIONS AND FUTURE DEVELOPMENTS

After almost three months of the SYDIC web-site online presence, it was noticed that more than forty members were already registered at the community. As it was feared during the site design and development and testing phases, in these initial months of online presence, only very few personal pages were completed by members. This can be probably due to the lack of time and not sufficient stimulation addressed by web-site managers to the members.

Our feeling (based on the present data) confirm that once the community becomes fully operating we will surely exceed the fifty active user-members who interact in a continuative way through the forum. It would be already a success if after one year at least thirty personal pages were completed. Once this target is reached it will be important to conduct a data analysis on the base of the tool use indicators in order to evaluate possible new instruments to integrate CSCW ones. To this regard, any feedback received from active member-users of the community will be of course fundamental.

Concerning the development of the community, it will be essential to plan carefully all the SYDIC specific events and other general SD initiatives. Everything interesting in the sector should be regularly and promptly promoted by the web-site in order to involve all the member-users as, in a prototype way, this has be done in occasion of the cycle of seminaries on SD promoted by the "Tor Vergata" University of Rome in November 2007).

If by now the SYDIC website could be considered as a "young" scientific community, mainly dedicated to the diffusion of the System Dynamics and to the knowledge and opinion exchange

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among research organisations and private companies, our long-term mission (hopeful wish) is to lead this adventure in developing a real groupware (that is, a community with workflow and calendar management tools) at the community service: hence the final objective will be to prepare the best technological environment to host a community dedicated to the collaborative work between Italian researchers (both academic and professionals) in the field of System Dynamics .

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