

# Information Exchange Platform for Humanitarian Development Projects

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## ***Abstract***

The objective of this thesis is to develop a concept and a prototype for a computer based information exchange platform.

The purpose of this information system is to enable different stakeholders of humanitarian development projects to share information.

Project reports and evaluations will be exchanged over the platform in a standardized way. Project proposals can be published to find financing and partners.

The information system will be web-based. Special attention will be given to the standardization of data exchange and security questions.

This paper describes how humanitarian projects work, what problems make their management difficult, how a supra-structural information system could improve the management of humanitarian development projects, and what the architecture for such a system could be.

## **Background**

Almost anywhere in the world there are people who need substantial help to survive and to live on a minimal standard. That is the reason why humanitarian organizations (like the Red Cross) exist. Humanitarian organizations and non-governmental organizations (NGOs) organize programmes and projects in two major fields: relief activities (short term interventions such as refugee support in crises) and development projects (medium or long term actions with sustainable impact such as education of farmers or the construction of infrastructure). Development projects can be better planned and monitored because of their longer time horizon.

The main purpose of this doctoral thesis is to find means to improve the efficiency of development projects. To appreciate the problems and find good solutions, we have to understand the functioning of humanitarian organizations and know what parties have a stake in development projects.

International funding agencies and private donors give financial support to humanitarian organizations. There is an increasing competition for donations between humanitarian organizations. Although many NGOs have similar objectives, the fight for financial resources discourages them from cooperating. On the other hand, many partners can be involved in a project. In general, one or more funding agencies (e.g. ECHO, USAID, GTZ) and many private donors give money or other resources to international humanitarian organizations. They set up programmes which can be composed of several projects (e.g. programme for the eradication of malaria). In cooperation with local partners specific projects are defined and resources are allocated. Local partners can be companies, governments or non-governmental organizations. Sometimes the local partners contract other partners to achieve their goals. The main objective of humanitarian projects is to help needy people.

## **Objectives and Outcomes of the Thesis**

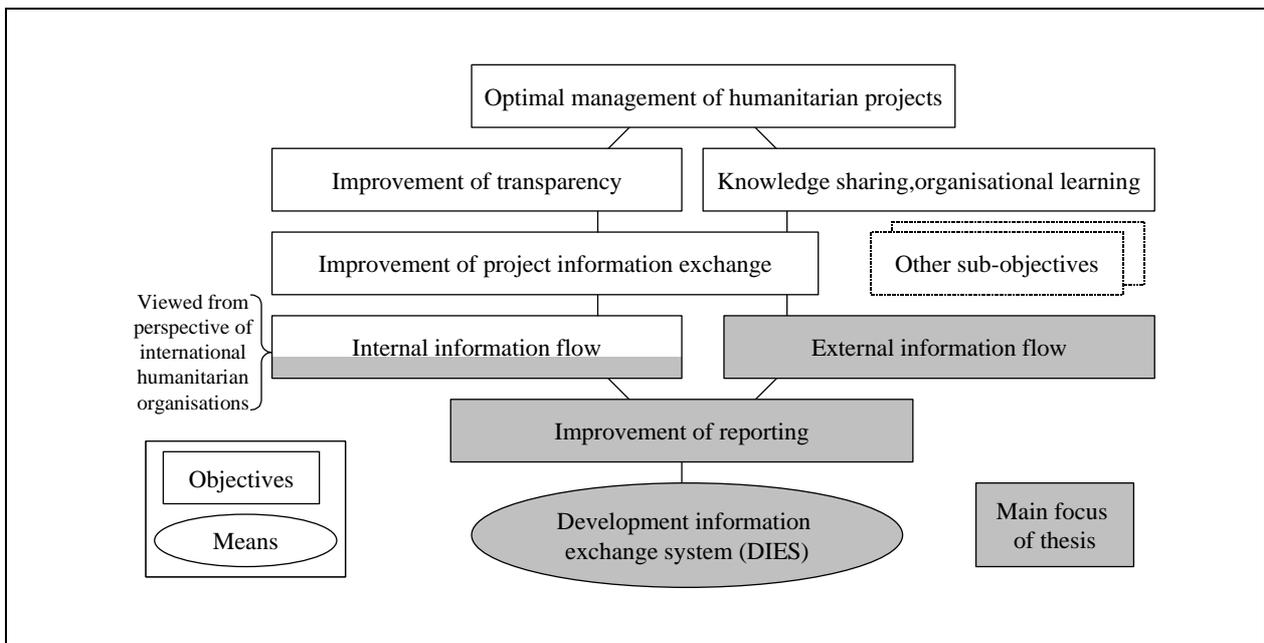
The overall objective of the thesis is to improve the management of humanitarian projects. The means to that end is an information system that allows the users to exchange information within and between organizations. On the following pages this computer-based system will be called development information exchange system (DIES).

The outcomes of this work will be:

- An analysis of existing information systems for development projects.
- A concept for a supra-structural information system for the exchange of development project information.
- A prototype of such an exchange platform to prove its feasibility.

The aspired information system should serve the stakeholders of development projects (donors, humanitarian organizations and other NGOs, local partners). It should help these stakeholders to exchange relevant information and to improve the impact of development projects. The aim is to achieve a better coordination of development projects of various organizations by providing an overview of past, current and future projects.

Figure 1 shows the overall objective and how it can be split into sub-objectives. The thesis will concentrate on the improvement of project information exchange.

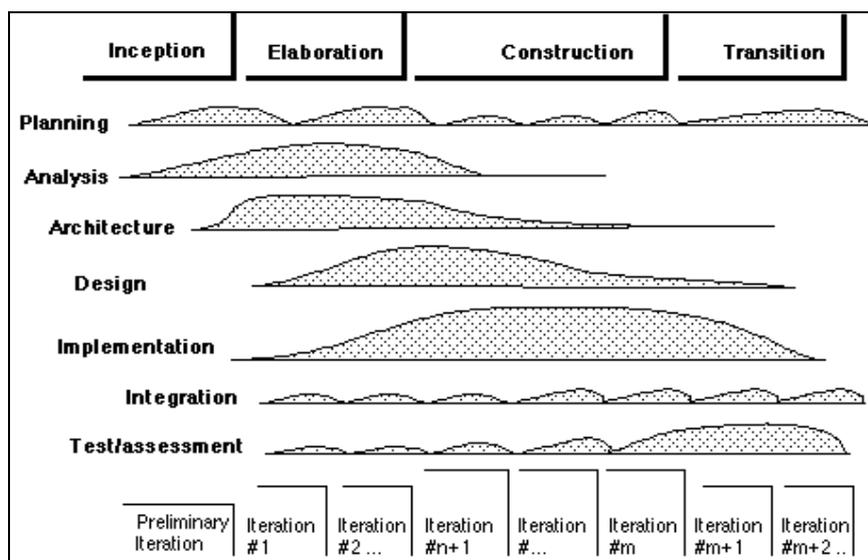


**Figure 1: Hierarchy of objectives to improve management in humanitarian projects**

The main focus will be on exchanges between stakeholders of humanitarian projects, i.e. external information flow. Improved project reporting will help to achieve this objective. The development information exchange system will make reporting more efficient and is thus a means to the end of optimal use of resources in humanitarian projects.

**Research Method, Questions and Plan**

The research objects are information systems and humanitarian projects. The research questions will be answered through literature analysis, a market research and cooperation with humanitarian organizations. The Rational Unified Process (RUP) [Versteegen 2000] will be the method used for the engineering of the development information exchange system. The RUP suggests processes and tools for the different phases of software engineering (inception phase, elaboration, construction, transition, evolution) and cycles (planning, analysis, architecture, design, implementation, integration, test). Figure 2 illustrates the four phases and seven cycles of the RUP.



**Figure 2: Cycles and phases for software engineering according to RUP [Versteegen 2000]**

The following questions will be answered in the thesis. The basic research plan can be derived from these questions.

1. How does a humanitarian development project work?
2. Does it make sense to coordinate humanitarian projects of different organizations?
3. What kind of reporting is required by funding agencies?
4. How do humanitarian organizations decide how to use their money and allocate resources?
5. Can project reports be used to propagate experiences and lessons learned in an organization?
6. What standards exist for the exchange of semi-structured information? Are these standards useful for the exchange of information about humanitarian projects?
7. What requirements does an exchange platform have to fulfill to enable the coordination of development projects of different organizations and to facilitate project reporting?
8. What architecture best fulfils the requirements for an exchange platform?
9. What are the strengths, weaknesses, opportunities and threats (SWOT-analysis) of the proposed system.

## **Challenges**

The challenge of this thesis is to combine the field of information systems with the one of non-profit organizations. Aspects of data- information- and knowledge-management will have an influence on the proposed solution. Exchange standards such as eXtensible Markup Language (XML) will be important for the realization. The analysis of humanitarian project reporting and the specification of a document type definition (DTD) for humanitarian projects are some challenges to be mentioned.

## **Analysis of Problems and some Causes**

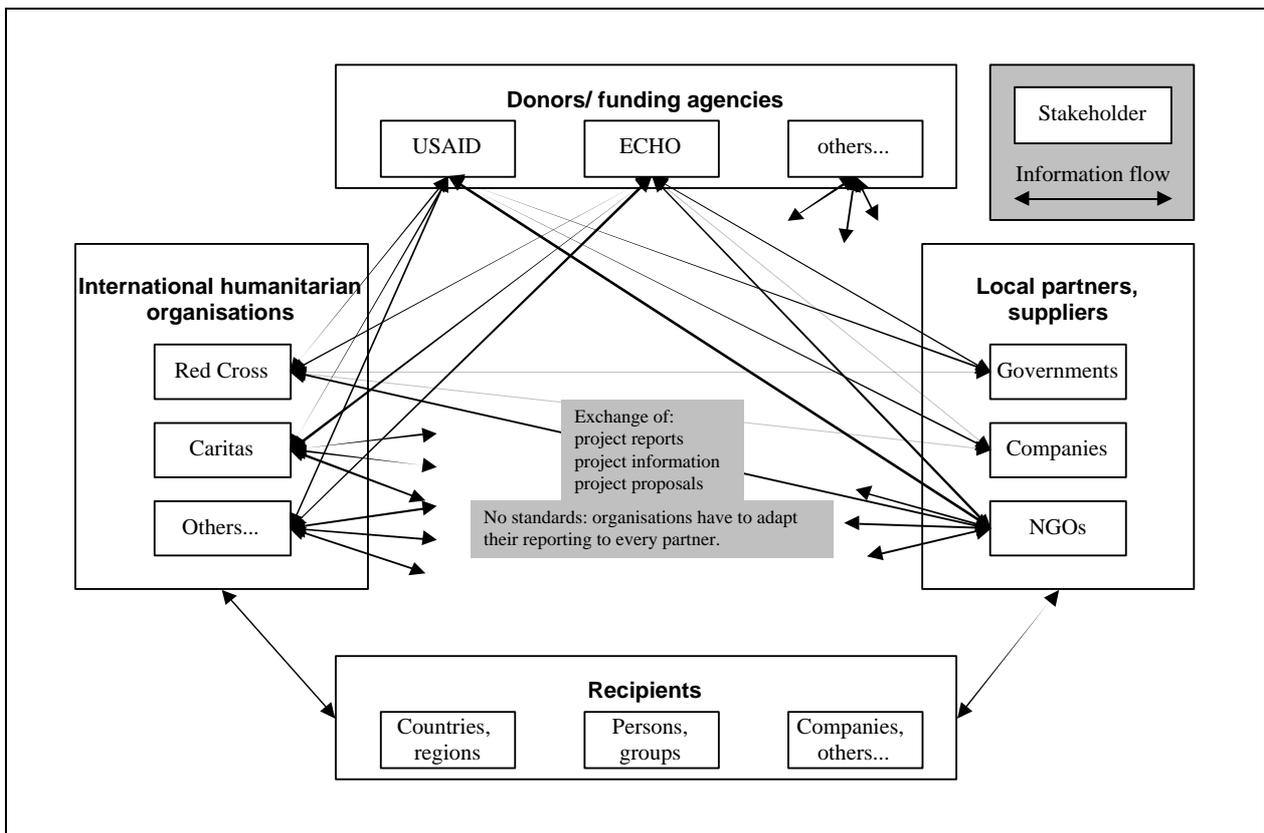
In the inception phase of the RUP we start the analysis cycle to determine problems and their causes. This leads to a description of the context. We can then decide which problems should be addressed by a software and determine requirements.

### **Complexity of humanitarian project management:**

Project management in humanitarian organizations here includes planning, leading, implementing, monitoring/ reporting, controlling/ learning. The basic methods and procedures used are the same as in profit oriented enterprises. However, one typical characteristic is that there are many partners and stakeholders involved in a development project. The higher the number of partners involved in a project, the more complex project management becomes.

### **Variety of stakeholders and of information exchange:**

Another issue is the geographical distribution of the stakeholders. They are located in various countries and continents, speak different languages, and have diverse cultural backgrounds. This makes communication and coordination within and between development projects difficult. Figure 3 shows the information flow between stakeholders of humanitarian projects.



**Figure 3: Information exchange between stakeholders of humanitarian projects**

Every stakeholder has various partners. Some information exchanges are written basis, others are oral. The focus of this analysis is on written project related information. Project proposals, general project information, reports, evaluations are exchanged. There is no standard for the exchange of information. This means for instance that a project report has to be rewritten at every level of the hierarchy. Sometimes, several different reports have to be written to fulfill the formal requirements of the various funding agencies.

**Coordination of projects / transparency:**

There is a great number of non-profit organizations (NPOs) respectively non-governmental organizations (NGOs) working in the field of humanitarian projects. Obviously it is very difficult (and not absolutely necessary) for these organizations to be fully informed about all development projects which are planned or carried out by other humanitarian organizations. On the other hand experience has shown that uncoordinated help within a region can be highly counter-productive, even if the organizations have similar objectives. It is also a fact that problems of coordination are omnipresent even within humanitarian organizations, which are usually structured in a federal, decentralized way.

**Resource allocation:**

The allocation of funds, human resources, and material to the development projects of one humanitarian organization cannot be defined the same way as in profit-oriented companies. This point is further treated in the next chapter “Hypothesis and Implications”.

Help is preferably given to regions in which we find a strong presence of the media, so that the donors can see on TV what is happening with their funds. Vice versa this means by the limited availability of resources that other regions which needed help very urgently are neglected [The Economist 2000].

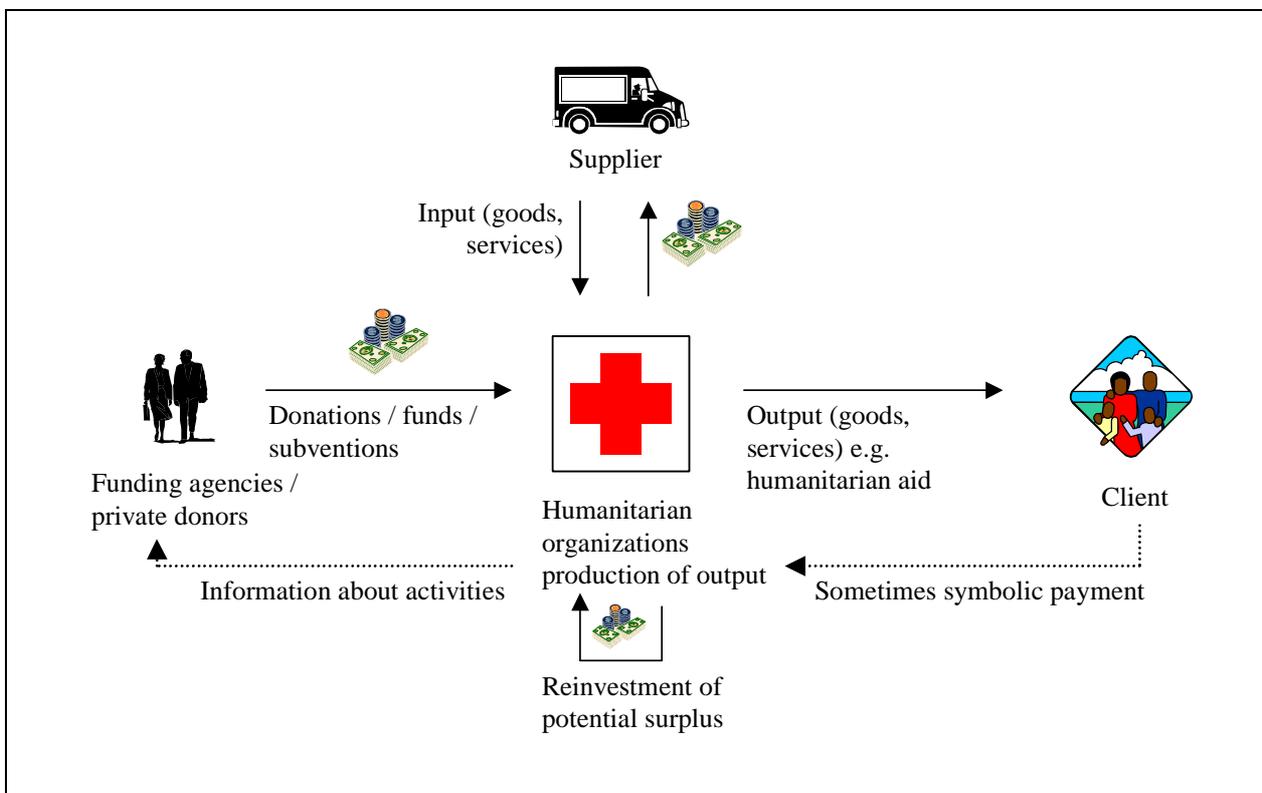
## Hypothesis and Implications

Hypothesis: Within the 3rd sector (to which humanitarian organizations belong) there is little allocation of resources (allocation of funds to the various production factors) by market mechanisms (supply and demand). It is also difficult to conceive an allocation based on financial results, as such measures are not applicable or not available (how should the construction of a well or the education of a child in Asia be evaluated?).

Profit-oriented companies have as their main objective the generation of profits. They can use profit-ratios as feedback for the work they have done (e.g. earnings per share (EPS), earnings before interests and taxes (EBIT) [Boemle 1998]). Based on the results of preceding periods in combination with strategic considerations, the resource allocation is determined for the following period. This cycle is called a cybernetic control loop (feedback loop).

Humanitarian organizations do not aim to earn profits, and there is almost no cash flow out of the projects back to the NGOs. Thus, the financial ratios which are normally used in profit-oriented companies cannot be applied fully to NGOs. The main objectives relate on issues, such as the improvement of training conditions in countries in transition or the eradication of a specific disease [Schwarz/Purtschert/Giroud 1999; Schauer/Blümle/Witt/Anheier 2000]. These kinds of objectives are very difficult to measure and correlation of the impacts with the invested funds is hard to prove (e.g. fighting against drug abuse, elimination of diseases, improvement of the overall economic situation of a country, providing humanitarian relief to refugees).

The cybernetic control loop of humanitarian organizations is interrupted or at least diminished in its functioning at two places as is shown in Figure 4. The one place is the information feedback from projects to humanitarian organizations (within organizations) and the other place is the feedback from NGOs to donors (outside organizations).



**Figure 4: Interrupted control loop in humanitarian organizations**

There is no allocation of resources which could be guided by profit-ratios. The matter can be influenced by the donors in a limited way, above all when we talk about institutional funding

agencies. One precondition, however, is that the donors are well informed about the projects and their implications. Contrary to private donors, governments and funding agencies want to be informed in great detail to know what has happened to their funds, and they have the power to enforce these requirements.

The hypothesis has a number of implications.

Humanitarian organizations have to invest some of the money they get and a lot of time for reporting. They see this often as an administrative burden with no value added. The reporting system is first and foremost an instrument for controlling. But depending on the report, valuable information can be found for future ongoing projects. For this reason one should consider whether and in what form such project reports and project evaluations should be made available. The management of humanitarian projects can be improved by the documentation (explicit knowledge) and handing over of experience (implicit knowledge). These aspects have been considered in the field of Knowledge management [Nonaka 1994; Drucker 1999; Denning 1999]

The donors must be informed about the activities of the humanitarian organizations, so they can control what happens to the funds made available. In case the results achieved are considered positive, the donors will hopefully increase their subsequent funding (which means a more effective distribution of funds outside of the humanitarian organizations).

To keep administrative costs for reporting as low as possible while having the required information available, reports could be composed of various reporting components or modules which could subsequently be joined according to what information the donors require. A standard platform for the exchange of information used by all stakeholders for communication would be very helpful in this respect.

Two potential deficiencies in the cybernetic control loop of an internationally working humanitarian organization have just been described:

- On one hand the information feedback from projects to humanitarian organizations or information flows within an organization (right side of Figure 4).
- On the other hand the information flow from humanitarian organizations to donors (external information flow: left side of Figure 4).

These deficiencies of the system are the starting point for improving the allocation of available resources and the management of humanitarian projects.

The DIES is intended to address the problems arising out of reporting to multiple partners, simplify reporting between humanitarian organizations and institutional donors and make experience from past projects available.

# State of the Art of Information Systems for Humanitarian Organizations

We have seen the problems related to humanitarian projects and determined roughly what objectives a system should fulfill.

Several subjects are important for this thesis. Data-, information-, knowledge-management, project management, information exchange standards, web-based information systems. Literature on all of these subjects has been examined. This chapter outlines the state of the art in information exchange standards and web-based information systems.

## Information exchange standards for humanitarian projects

One of the most important exchange standards in recent years has been the eXtensible Markup Language (XML). To put it in a nutshell, XML describes the structure and the content of a document. This makes it possible for computers to “interpret” documents and to reuse the content in other applications. The presentation or formatting of an XML-document can be defined independently from the content, e.g. with eXtensible Stylesheet Language (XSL) [Dejesus 2000; W3C/XML 1998].

Before XML can be used, the structure of the documents has to be defined. This is done with a schema (Document Type Definition (DTD), XML Schema).

Prior to XML a group of organizations active in the field of humanitarian work defined a set of fields important for information exchange in development projects. The result was the Common Exchange Format for Development Activities (CEFDA) [CEFDA 2000]. These fields are used by some agencies and NGOs for their reporting.

The latest initiative tries to combine XML and CEFDA. The International Development Markup Language (IDML) defines a schema based on the fields in CEFDA [IDML 2000]. The World Bank, Bellanet International and the United Nations are among the participants in this initiative, which is still in the development phase.

These exchange standards will be used as far as possible and extended if necessary for the purpose of the DIES.

## Web-based information systems in the field of humanitarian work

To find out the current status of information systems for stakeholders of humanitarian projects, the author has undertaken a market analysis [Huesemann 2001].

Web-based public information systems with relief and development projects were analyzed. These sites share research knowledge, show lessons learned or inform about current problems in the world. The observation period was August to December 2000. The method used was access to the websites and participation in an online discussion group about the “Global Development Gateway”.

The following points have been analyzed:

- Bearers of website/ sponsors
- Mission, objective of website
- Field of activity
- Target audience, stakeholders concerned
- Functionality and information of the website

Twenty relevant websites were found. The main results of the study were:

- Most sites addressed researchers and humanitarian organizations.
- The majority of the systems are intended for knowledge sharing. Experiences from finished projects are published (e.g. MOST, USAID-DEC, ELDIS, ID21, PRISMA, OneWorld, GDNNet, GKP, Bellanet). This kind of site tries to make a link between theory and practice by giving advice.
- There are only few different holders of sites which means that many sites have the same organization as supporter (e.g. World Bank, United Nations).
- Most information systems were developed over the last two years. Some systems are derived from internal systems which have gone online.
- There are very few public platforms for the exchange of project-related information between stakeholders. Some reasons are:
  - Problems defining exchange standards.
  - Differing requirements of funding agencies concerning project reports and evaluations.
  - Much information is considered to be secret or confidential.

A few conclusions can be made from this field research:

- The competitive attitude of some organizations prevents the free exchange of information.
- The project information that can be found on public websites is very general and cannot be used for project reporting.
- There is an exchange of detailed project information, but it is purely bilateral. The exchange formats are not standardized (reporting requirements differ from one organization to the other).
- No web-based, independent portal could be found which would enable the exchange of project reports and evaluations between the stakeholders of development projects. No platform facilitates the computer-based reuse of data. The systems coming closest to what is described as DIES in this paper are the Development Gateway (Accessible Information on Development Activities AIDA, <http://www.developmentgateway.org/>), an initiative of the World Bank, INDIX-DAI (International Network for Development Information Exchange-Development Activity Information; now part of the Development Gateway) from a consortium of development organizations, and GK-AIMS (Global Knowledge Activity Information System, <http://www.globalknowledge.org/>), a database set up by the Global Knowledge Partnership supported by the World Bank.<sup>1</sup>
- Different initiatives are taking place to define exchange standards (CEFDA, IDML) which are a prerequisite for a DIES.

The detailed description of the analyzed websites can be found at <http://www2-iiuf.unifr.ch/is/index.htm?stefanh/diss/>. This study has shown that a development information exchange system does not yet exist. In the next chapter, the idea of such a system is explained in more detail.

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<sup>1</sup> To get more insights into the Development Gateway the author collaborates with the World Bank and is currently (April 2001) working on the AIDA Prototype.

## ***A Development Information Exchange System***

Now that the situation has been described and some of the problems have been analyzed, a solution can be outlined. The state of the art will have to be taken into consideration. Detailed systems requirements and specifications are not included in this paper.

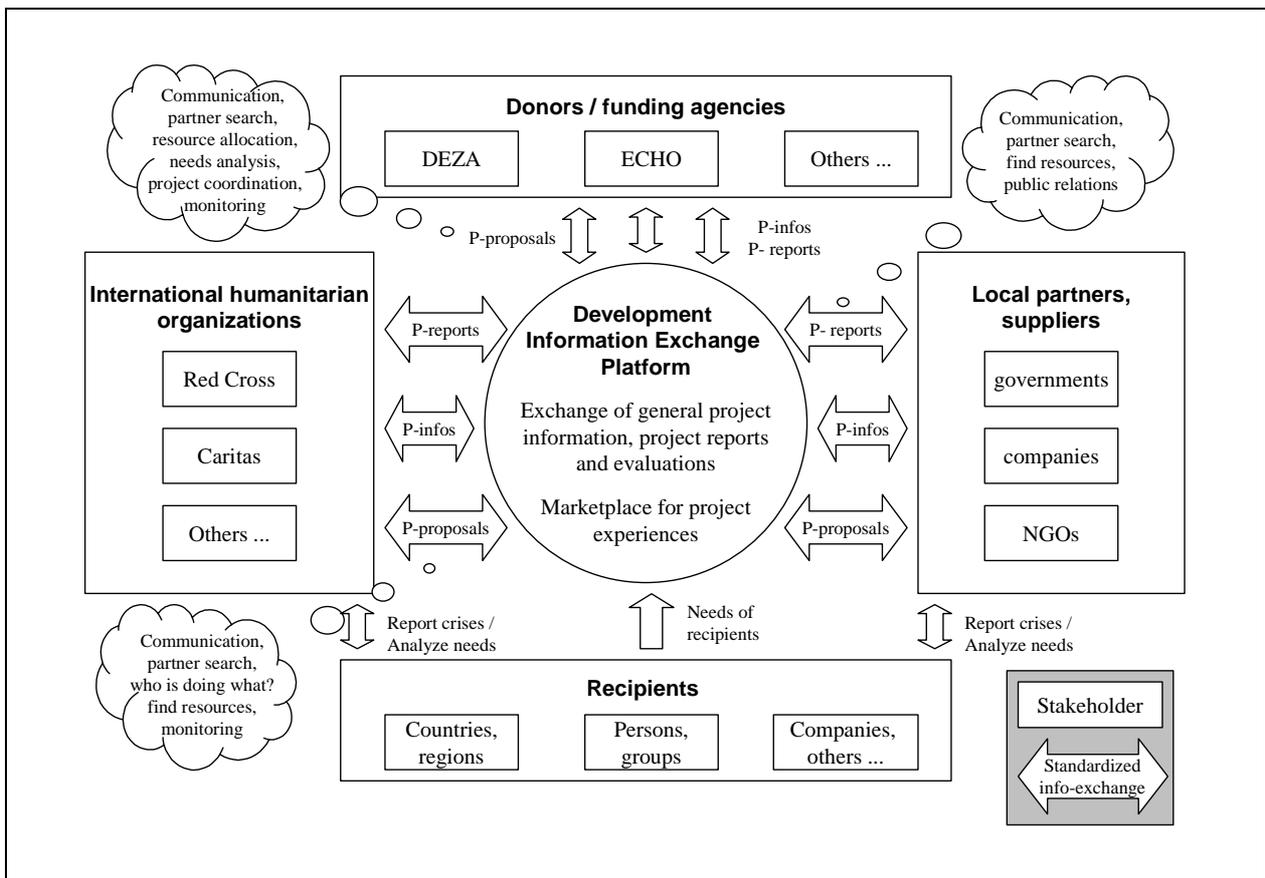
This chapter describes a rough solution to the following issues:

- As seen before, one major problem for humanitarian organizations is the administrative burden related to project reporting at all levels. Unnecessary replication of project reports to fulfill formal requirements are one cause.
- The lack of information about projects other organizations are planning and implementing is causing duplication of efforts. Cooperation and coordination could be very useful where different organizations are working on similar projects.
- Sharing experience from previous projects within or outside the humanitarian organization is important to prevent mistakes recurring.

Figure 5 gives a basic idea that could be used for a computer-based information system. It could be used as standardized platform for the exchange of project information as well as for the coordination of projects. Such a system would be set up independently of the NGOs and funding agencies.

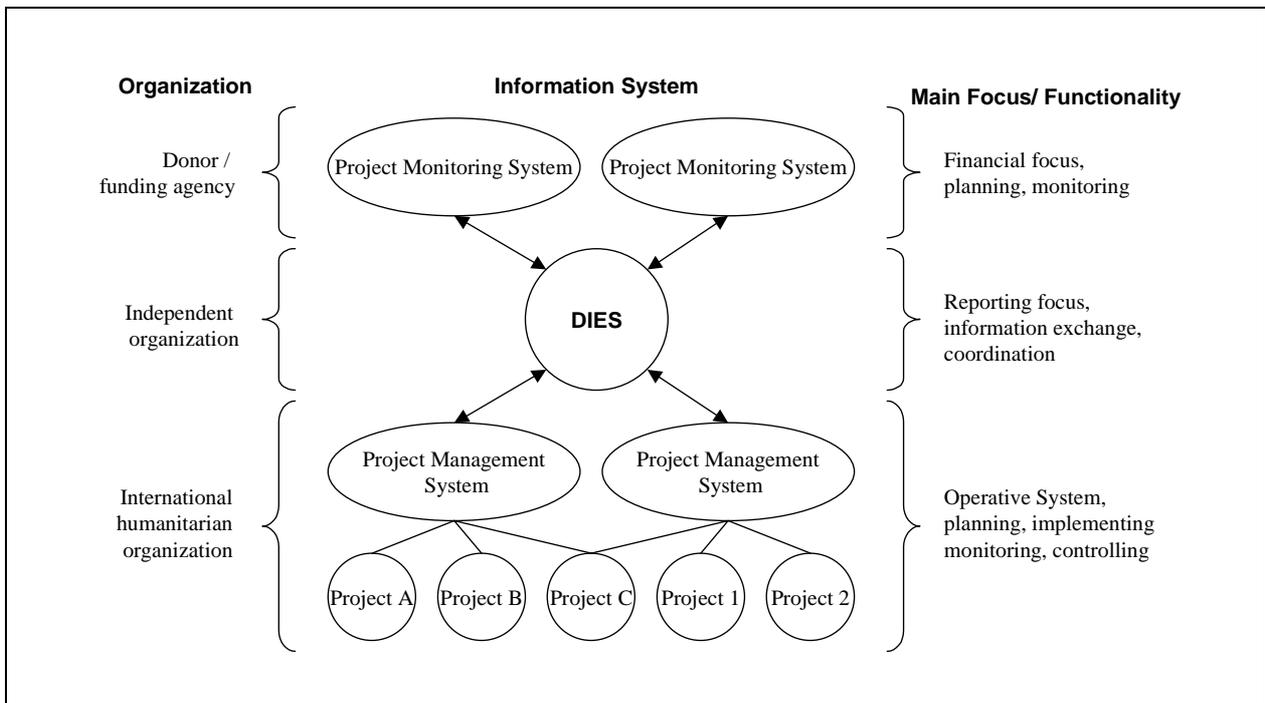
The DIES will act as a central information exchange platform. Most information will reside on the systems of the data owners. If an organization like ECHO needs a report about a project of the Red Cross, ECHO can fetch it on the information system of the partner through the intermediary of the SIS. The SIS will take care of the access rights and extract the information conforming to the requirements of ECHO. If another authorized partner request the same report, it might look different and contain more detailed information, depending on the requirements.

The change from today's information "push" system to a "pull" system implies that the organization requesting information has to actively get it.



**Figure 5: Development information exchange system**

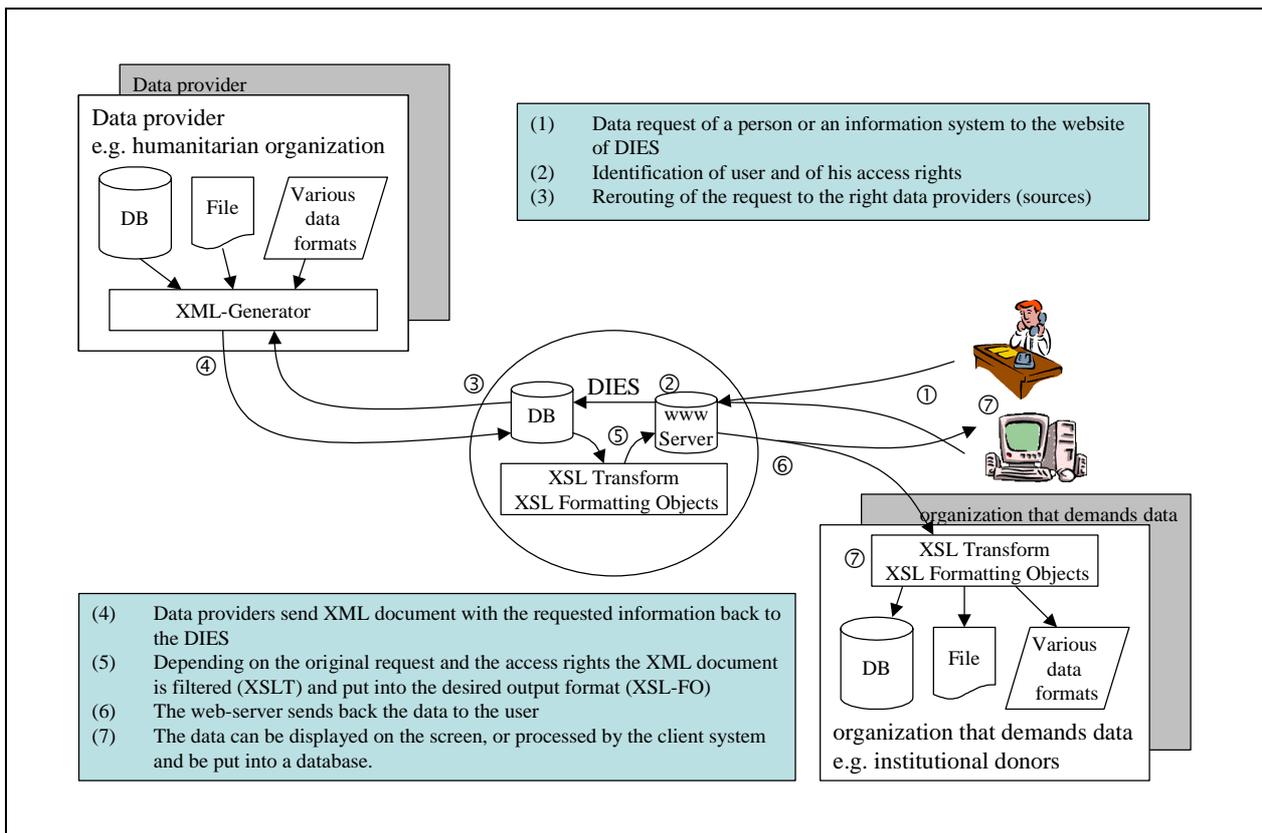
The DIES will also make it possible to get an overview of the activities of organizations which are connected to it. If Caritas Switzerland is planning a well project in Sudan, it might want to know if other NGOs are implementing similar projects. The DIES will allow anybody to access basic information about current and past projects of all participating organizations.



**Figure 6: DIES linking different information systems**

The DIES is intended to serve as interface between the information systems of funding agencies and international humanitarian organizations. This is shown in Figure 6. The architecture of the underlying computer based systems should not have to change in order to pass data to the DIES. The data will be converted into XML using the IDML schema. The information from the DIES can then be fed into other systems that can cope with IDML.

The same concept can be applied to link systems within one organization (the International Federation of Red Cross Societies for instance is composed of many national societies which often have different project management systems). This is an important point for the implementation because it will be easier to launch the SIS within one organization first because of the smaller scale.



**Figure 7: Architecture of DIES**

Figure 7 describes the architecture of the DIES and the process of information exchange through the system. This architecture fulfills the basic requirements determined above. It has the advantage that information is entered, stored, and updated on data owner's systems. The reporting organizations keep full control over their data, which may help to avoid the "political" problems of implementation.

## **Conclusion and Next Steps**

The following conclusions can be drawn from the work that has been done up to now:

- The DIES can help to close the cybernetic control loop. This makes project management more efficient.
- The proposed architecture solves an interface problem between the various partners and stakeholders of humanitarian projects.
- The DIES is placed over or between the operative project management systems and does thus not intervene in their architecture.
- The proposed DIES architecture could also be used in contexts other than development information exchange between humanitarian organizations.

According to the Rational Unified Process, work is currently in the elaboration phase. Next steps for the software engineering will be defining system specifications and then going on to the construction phase.

Other points that still have to be treated in more detail are:

- To learn more about the reporting systems of funding agencies.
- To define detailed system requirements.
- To build a prototype of the DIES in cooperation with one or more humanitarian organizations.
- To test the prototype and analyze the strengths, weaknesses, opportunities, threads.

This document gave an overview of the problems that occur in humanitarian development projects. Some problems can be addressed by a web-based information system. The success of such a system depends on many factors. The stakeholders must be motivated and see a sense in using the system (“carpe DIEM”). It has to be easy to use and reliable. It should be accessible through the WWW. From an organizational point of view, it must use basic computer infrastructure and be cheap. Whether all these requirements can be fulfilled is questionable. The prototype is intended to show what can be done and to test the ideas described above.

Problems of confidentiality of information, competition between the humanitarian organizations, differing objectives of NGOs, and technical issues show that there is a long way to go to implement a DIES in practice. But small steps can make use move forward.

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