Project management in the international aid sector: the perspective of Italian NGOs

Claudia Paciarotti, Filippo Emanuele Ciarapica,
Giovanni Mazzuto, Maurizio Bevilacqua

Dipartimento di Ingegneria Industriale e Scienze Matematiche
Università Politecnica Delle Marche, Italia

Abstract

In recent years, the project management field has received increasing attention, in terms of both practical implementation and research. However, unlike other sectors, project management practice in the field of international humanitarian aids seems to be neglected. In this context, the current paper illustrates an empirical study on international humanitarian aids projects performed by Italian non-governmental organizations. The aim of the paper is to investigate the use of PM tools in humanitarian aid projects and the relationship between critical success factors and project success. The necessary data were gathered through a questionnaire and statistical methods were subsequently implemented for the data analysis.

Keywords: Critical success factors, aid projects, PM tools, project success, survey, international aid sector

1. Introduction

Development cooperation is an integral part of Italy's foreign policy including both public and private initiatives [44]. Its main scope is to satisfy primary needs and, first and foremost, to safeguard human life, food self-sufficiency, the enhancement of human resources, the conservation of the environmental heritage, the implementation and consolidation of endogenous development processes and the economic, social and cultural growth of developing countries, as well as to improve the status of women and children. Moreover, development cooperation includes extraordinary initiatives designed to address calamities and situations of malnutrition and shortcomings in health sanitation provision that threaten the survival of communities.

While there is a growing volume of literature about Project Management (PM) in the construction and manufacturing sectors, humanitarian aid projects are less represented ([57], [18] [3], [31]). This paper aims to contribute to PM research by exploring the relationship between the use of PM tools and project success in non-traditional PM – although project-oriented – humanitarian aid projects.

In this context, our analysis focuses on the following research questions:

- Does the use of project management tools depend on the context of the project?
- What are the critical success factors for humanitarian aid projects carried out by Non-Governmental Organizations (NGOs) and what is their relationship to project success?
- What are the limits and the difficulties that a project manager faces using PM tools?
- Which project management tools are currently used by project managers within humanitarian aid projects?

In order to address these questions, we developed a questionnaire and submitted it to project managers, who are responsible for Italian NGO projects in the humanitarian aid sector.

After the introduction, this paper is structured in 5 sections. It begins with a description of project management in the aid sector and a review of related literature. Particular attention was paid to the concepts of success criteria and critical success factors. The focus of the paper is then expressed in terms of 3 hypotheses to be verified. Section 3 explains the research methodology: the questionnaire is illustrated together with all the measured variables. The data

analysis and the research results are presented in Section 4. Finally, the conclusions discuss the findings of the study, presenting the limitations of the research and suggesting further investigations.

2. Background and motivation

Project management is a recognized and well-known management method that is currently widely applied. Besides the industrial sector, PM has also found applications in other areas of focus, such as risk assessment, construction, health and safety management [8] [10] [38]. A great many studies have been performed in the PM field; the aim of the following literature review is not to provide an overall summary of the subject but to focus on the specific issues that are dealt with in our study: PM in the humanitarian aid sector. Although researchers have already analyzed various aspects of this context the aim of the current study was to examine in depth the tools and techniques used in humanitarian aid projects, the project success and the critical success factors (CSFs) that have a positive influence.

2.1 Project management in the aid sector

The Guide to the Project Management Body of Knowledge defines a project as a temporary endeavor undertaken to create a unique product, service, or result. Project management is the application of knowledge, skills, tools, and techniques to all the activities involved in a project in order to achieve the project requirements [46] [47]. As stated by Shenhar and Dvir [50], projects reveal substantial variations and, consequently, their management approach is anything but universal. In particular, projects performed in the aid sectors are characterized by specific and unique features [14]:

- A large number of heterogeneous stakeholders, with different perspectives and interests, are involved [57]. The stakeholder classification proposed by Diallo and Thuillier [19] gives the idea of this complexity. It identified seven stakeholders involved in humanitarian aid projects: the coordinator, the task manager, the national supervisor, the project team which is directly under the coordinator's authority, the steering committee, the beneficiaries and the population at large. Furthermore, difficulties in stakeholder management derive not only from the great number of people interacting but also from the different interacting cultures.

- The project's goals are mainly “soft” goals concerned with the environment and human rights protection, social transformations, poverty alleviation, assistance for victims of natural or man-made disasters, and economic development [3]. The nature of the project goals generates difficulties in the performance measurement process and increases the risk of political corruption [34].
- The operating environment is often characterized by peculiar and individual features, like socio-political instability, cultural gaps between project actors, particular bureaucratic rules and procedures, a low-tech context and a high level of corruption. These could make traditional PM tools less suitable and effective and consequently, it is essential to adapt PM practices to the local culture [1]. The locality should be taken into consideration starting from the project planning stage [26].

The uniqueness and the peculiarity of aid projects within the project management environment call for a specific focus. Traditional project management approaches have to be evaluated and implemented with caution and the need for possible ad hoc modification has to be taken into account.

2.2 Project success measurement

Project success is a complex and multidimensional notion, which is not univocally defined. Although studies on project success have been at the heart of the project management sector for many years, research has not converged to a mutually agreed approach. An interesting background has been proposed by Crawford and Bryce [18] that has focused on the evolution of project success literature since the 1970s.

Traditionally project success was defined by the “iron triangle” of time, cost and quality [44]; with this type of approach time, budget, and performance are the main indicators for project success [37]. Even if cost, time and quality are still considered to be the central aspects for measuring project success [2], the use of these factors alone can lead to an incomplete and distorted assessment of a project [4] and may fail to correctly evaluate whether the project was properly implemented [32]. Over the past 40 years, the concept of project success has evolved from a perspective focused on the implementation stage to a more holistic approach that involves the evaluation of success along the whole project life cycle [9] [30]. To define and measure project success we need to identify a set of principles, conditions or standards called project success criteria. This type of approach, identified as a multi-criteria approach, requires

the evaluation of different project success dimensions in order to ascertain the success or the failure of a project. Whereas some success criteria are common across different project types, there are also unique criteria that apply only to specific projects [41] and even the relative importance of different success dimensions assigned by project managers depends on the type of project [42]. The strict dependency of the project success criteria on the specific project type encouraged us to focus specifically on the measurement of project success in the humanitarian aid sector.

2.3 Critical success factors

Critical success factors (CSFs) are the conditions and the events that may have a significant impact on project success. The concept of success factors is usually credited to Daniel [17] and it is well described by Rockart [48] as follows:

> *"…the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organization…*
>
> *…the few key areas where things must go right for the business to flourish…*
>
> *…areas of activity that should receive constant and careful attention from management…*
>
> *…the areas in which good performance is necessary to ensure attainment of goals."*

The identification and constant attention to CSFs are particularly important in order to monitor and control project performance effectively and to perform an appropriate allocation of various project resources [12] [5]. In fact, inadequate attention to CSFs could contribute to project failure [31]. In 1988, the Project Management Institute (PMI) [45] proposed a well-known and still commonly applied list of CSFs which includes: project mission, top management, schedule, client consultation, personnel, technical tasks, client-acceptance, monitoring and feedback, communication and troubleshooting. Over the following years, other CSFs have been detected and other CSF classifications have been proposed. Because of the particular features of humanitarian aid projects, the CSFs identified by traditional PM literature cannot be applied directly. In recent literature, some authors have addressed the specific CSFs for humanitarian aid projects. Kwak [35] identified factors to be challenged in international development project management and classified them into ten categories based on their nature: political, legal,

cultural, technical, managerial, economic, environmental, social, corruption, and physical. Khan et al. [33] analyzed the case of a financial reforms project in Bangladesh sponsored by the government and the UK Government's Department for International Development. It was a highly successful project delivering tangible outputs and with prospects for future extension. The authors highlighted the factors that contributed to this success and that influenced the difficulties faced during the first stage of the project: Project Design and Planning, Project Management, Implementation Strategy, Creating an awareness and sense of urgency for change, Publicizing success stories, Creation of a powerful group of `champions' of change, Networking and team building, Anchoring changes in the culture of the organizations. Diallo and Thuillier [20] and Ika et al. [27] analyzed the perspective of African national project coordinators. Their studies showed a correlation between project success and the following factors: communication and trust between donors, recipients, project designers and implementers [20], the use of monitoring and evaluation tools, the project profile [27]. White and Fortune [56] outlined a number of critical success factors that have contributed to the successful implementation of a public financial management information system in the Republic of Bosnia and Herzegovina: integrated solutions, implementing approach, strong project management, extensive training, using the best individuals from each functional area, senior managers, new system knowledge and a top-down strategy. Khang and Moe [34] proposed a questionnaire to key project stakeholders involved in international development projects carried out in Vietnam and Myanmar. They developed a list of 16 CSFs linked to the different stages in the life cycle: clear understanding of project environment, competences of designers, planners and team members, effective consultations with stakeholders, adequate resources, continuing support of stakeholders, commitment to goals and objectives, compatible rules and procedures for project management, clear policies by donors and recipients to support sustainability, adequate local capacities, strong local ownership of the project.

Several of the most recent research studies focus on capturing the relationships between project success measures and critical success factors based on empirical surveys (e.g. [57], [21], [16]); these studies are not however connected with humanitarian projects.

2.4 Purpose of the study

The proposed literature review shows that the Project Management application in humanitarian aid projects is still in its initial stage. For this reason, we decided to investigate this unexplored

field, addressing issues connected with the PM tools and techniques used, project success and CSFs. From the wider perspective of how to manage humanitarian aid projects, a possible solution to improve project performance can be the direct application of well-known PM standards such as the Project Management Body of Knowledge (PMBOK®) or the International Project Management Association Competence Baseline (ICB®). However, standardized PM tools and methods do not appear to be suitable for managing humanitarian aid due to the special features of these projects [34]. The aid industry and humanitarian projects, in particular, are recognized as being unique within PM environments [14]. Firstly, project goals are complex and intangible since they are concerned with poverty alleviation or social transformation; therefore, the usual profit motive is missing. Secondly, projects have a social and political nature that attracts a complex network of stakeholders. Thirdly, the operating environment is unique since it is surrounded by sociopolitical instability, geographic and cultural separation among actors, etc. Finally, knowledge transfer to beneficiaries is a priority during each and every phase of the project [14], [34].

Ika et al. [27] analyzed the empirical relationship between project management (PM) efforts (the extent to which national project coordinators (NPCs) – the project managers in the aid industry sector – make use of available PM tools), project success, and success criteria. The research results suggest that project success is insensitive to the level of project planning efforts although a significant correlation does exist between the use of monitoring and evaluation tools and project "profile", project context and industry features.

In particular, it has been proved that the extent of use of different PM practices varies according to the context [13, 7, 56, and 23]. For this reason, the project context needs to be considered when examining the use of PM tools and techniques. In this study, we analyzed the influence of organization size and project type through H1.

Hypothesis 1: The frequency of use of PM tools and techniques varies with the NGO features, such as the size of the organization within the sector of application.

According to Hermano et al. [25] very little has been written on the way project managers should manage International Development (ID) projects and on ID project success, and the critical factors for achieving that success. Struyk [52] highlighted that when the right

implementing team is selected and when its personnel is sufficiently motivated effective delivery of ID projects occurs. In his work, Struyk underlined that local environment characteristics directly affect project success. Moreover, humanitarian aid projects involve a wide variety of stakeholders. Khang and Moe [34] highlighted that this complex network of stakeholders is one of the most challenging issues when managing an aid project. In addition to the studied connection between CSFs and project success in traditional PM application fields, the significant and positive relationship between the analyzed CSFs and project success identified for Word Bank projects [23] allows a similar relationship for the NGO projects to be presumed.

Hypothesis 2: There is a relationship between some of the CSFs proposed by sectorial literature and humanitarian project success.

According to [6**]** more formal methods of audit and review of relief programs may help in developing improved standards of care and in documenting successes and failures, in considering the equity implications of intervention, and in deriving good practice. Project management tools such as the logical framework and other related approaches, including, for example, the use of agreed measures of effectiveness, could become helpful disaster management tools in complex emergencies [51][11]. Reporting program activities and outputs is a basic requirement for donors. Robust evaluation methods can facilitate an objective assessment of practice through monitoring indicators of achievement [6**]**. Donors can encourage good practice not only by determining what has been achieved but by rewarding those organizations that are willing to declare their failures and to institute robust corrective measures using project management practices [29].

Finally, due to the importance given to appropriate PM training received by the project team, as suggested by Gowan and Mathieu [23], the aim of the current study was to investigate this issue by checking H3.

Hypothesis 3: The use of many PM tools is connected with humanitarian project success.

3. Research method

3.1 Research approach

A survey research method was adopted to test the abovementioned hypotheses and to answer the questions formulated. The questionnaire was developed by a panel of 4 experts, including two academics who conduct their research activities in the project management sector and two project managers employed in no-profit organizations that were not involved in the survey analyzed in this work.

The survey questionnaire consisted of four sections. Prior to the main body, an introduction letter explained the objectives of the study and gave general instructions. In the introduction, the respondents were asked to bear in mind that the questionnaire was anonymous and that the data collected would be treated confidentially. The first section captured the information about the organization and the respondent's personal information. Respondents were then asked to base their responses on the most recent project managed and to provide general project data such as project budget, duration, employees involved and field of interest. In the following section, an evaluation of the critical success factors and project success was required. The last section explored the methods, the tools and the techniques used, the life cycle stage at which they were used and the possible limitations and difficulties in their use.

3.2 Measures

3.2.1 Project success

In this study, project success has been evaluated using the 9 criteria listed in **Table 1**. The authors utilized a revised selection of the success dimensions proposed by Diallo and Thuillier [19]. Information that refers to the judgment of the project was given on a Likert scale from one to five (from strongly disagree to strongly agree).

Success criteria	**CODE**
The project is a success	SC1
The project deadlines were respected	SC2
The project operated within the budget	SC3
The beneficiaries are satisfied with the goods or services generated	SC4
The goods and services produced conform with those described in the project documents	SC5
The project had a positive impact on the beneficiaries	SC6

The initially identified objectives were attained	SC7
The project has a good reputation amongst the principal donors	SC8
The project strengthened local institutional capacity	SC9

Table 1 Project success criteria

3.2.2 PM tools

A list of 37 PM tools was presented to the respondents. For each tool, the respondents were asked to indicate the frequency of use and the stage in the project life cycle at which the tool was used. The tools included in the list were those found in standard books on project management (PMBOK). Each question was assessed on a 5-point Likert scale from "never" to "always" regarding the extent to which PM tools and techniques are used. Respondents were also stimulated to add any potential tools that they usually apply but which were not included in the list.

In the same section of the questionnaire, each PM tool was investigated in terms of potential limits and difficulties connected to its use. Respondents were asked to indicate if they could detect problems connected with the implementation of each specific tool and the nature of the difficulties. In particular, the objective was to investigate whether the problems highlighted were mainly connected to the inadequacy of the tool in the aid project sector or to a lack of knowledge or adequate training.

The amount of effort invested in project management was measured on the basis of the real use of the following PM tools: Activity duration estimates, Activity list update, Activity resource requirements, Objectives Tree, Problem Tree, Strategy Tree, Brainstorming, Cost Baseline, Cost performance report, CCPM, CPM, Earned Value Management, Gantt Diagram, Logframe Matrix, Responsibility Matrix, OBS, Performance indicators (PI), PERT, Project schedule, Checklist, Risk evaluation technique, Schedule Baseline, GERT, Resource leveling, Cash Flow Analysis, Spider diagram, Stakeholders analysis, Supplier evaluation criteria, Supplier proposal evaluation, SWOT analysis, Vienn diagram, Work Breakdown Structure, Work progress monitoring, PMD Pro, Project Cycle Management, Theory of Change, Microsoft Project Software.

3.2.3 Critical Success Factors

The list of the CSFs included in the questionnaire and reported in **Table 2** was developed on the basis of the results of previous studies.

Critical Success Factors	CODE
The most relevant needs of target group beneficiaries were discussed during the project identification stage	CSF1
Implementing partner organizations were selected according to their own experience on the project	CSF2
Identified needs match stakeholders priorities	CSF3
The local institutional capacity is adequate to ensure project sustainability	CSF4
All interested parties showed interaction during the planning stage	CSF5
Project planning was approved by main stakeholders	CSF6
Local political institutional priorities are the same as those planned during the project	CSF7
During the planning stage resources were sufficient and ready to be used	CSF8
Risk analysis was performed and related precautions were documented	CSF9
Project management was geared to professional values and local culture	CSF10
The executive team had already dealt with similar projects	CSF11
During project implementation, resources were available as planned	CSF12
During project implementation, resources were used as planned	CSF13
Activities were carried out as planned	CSF14
Conflicts were resolved on time	CSF15
Stakeholders were periodically informed with reports or communications about project progress	CSF16
During project implementation, stakeholders were satisfied with project progress.	CSF17
Adequate knowledge was shared with beneficiaries	CSF18
Project management was shared with local staff	CSF19
The local institutional capacity is adequate to ensure project sustainability after its delivery	CSF20

Table 2 Critical Success Factors

The project managers were asked to indicate the extent of agreement with the 20 statements proposed; each question was assessed on a 5-point Likert scale (from 1=strongly disagree to 5=strongly agree).

In order to illustrate the relationships between critical success factors, project success, PM tools, and NGO features the following model is proposed (**Figure 1**).

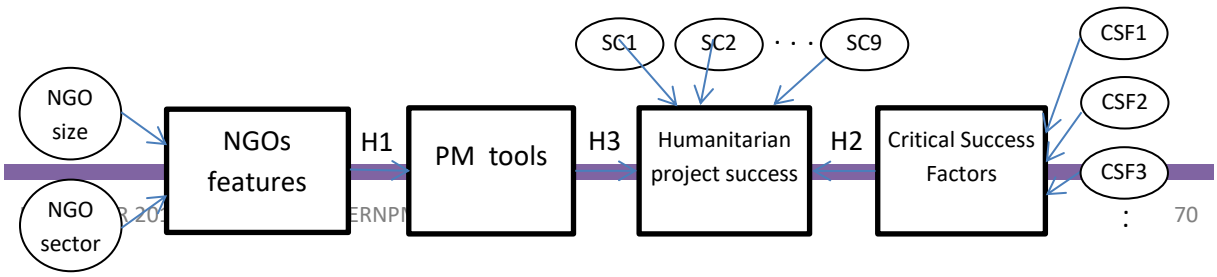

Figure 1: Conceptual model proposed

3.3 Sample

As stated by Italian Law 49 of 26 February 1987 [40] on Cooperation, NGOs need to pass a very selective investigation before obtaining approval by the Ministry of Foreign Affairs for the management of cooperation projects. Of the 246 NGOs approved and registered by the Ministry of Foreign Affairs, 215 received an invitation for their project managers to participate in the study. We excluded from the research 31 NGOs that are not involved in the direct management of international humanitarian aid projects, but which operate in other sectors, such as fund-raising or cultural sensitivity activities. The respondents were contacted by email and, if there was no response, were contacted later by phone in order to increase the sample size.

Overall, 43 responses were obtained, representing a 20% response rate, which is higher than that of other studies performed in similar contexts ([27], [28]). The direct telephone contacts with the NGOs allowed us to ascertain that the low response rate was due to a lack of time or interest.

Considering a confidence level equal to 95%, with a sample size equal to 43 NGOs and a population of 215 NGOs the confidence interval is about 13%[1], which is acceptable for this type of study.

Figure 2 shows the size distribution, in percentage values, of the Italian NGOs in the years 2007 [40] and 2010 [39] compared to our sample distribution.

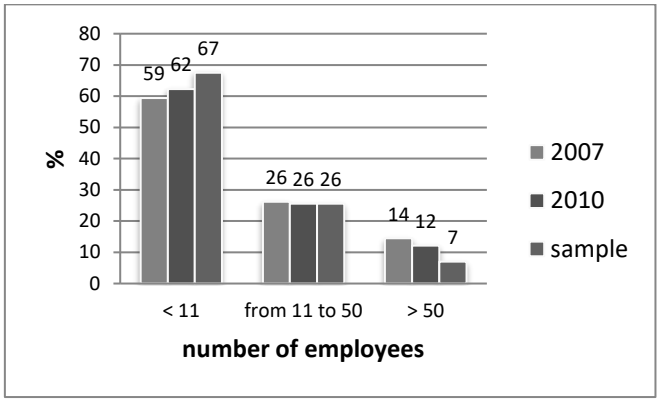

Figure 2 NGO size distributions: number of employees in Italian NGOs (2007 and 2010) and study sample

From **Figure 2**, it is possible to state not only that our sample distribution reflects the real population but also that our sample is in agreement with the increasing trend in the number of small NGOs and the decrease in the number of big NGOs.

4. Research Results

[1] Sample size SS = $\frac{ss}{1+\frac{ss-1}{pop}}$ where pop = population; ss = Z ^{2} * (p) * (1-p) / c ^{2} where: Z = Z value (e.g. 1.96 for 95% confidence level); p = percentage picking a choice, expressed as a decimal (0.5 in this study); c = confidence interval.

A preliminary descriptive analysis of the collected data is performed in the current section in order to define the respondents and the main characteristics of the organizations, the project profile and the degree of usage of the PM tools (section 4.1). Given the nature of the data, both ANOVA and regression analysis were performed in order to investigate the possible relationships between the project context and PM tool usage (section 4.2) [24], while a correlation and a regression analysis were used to examine the relationships between CSFs and humanitarian project success (section 4.3) and between PM tools and humanitarian project success (section 4.4). [49]

4.1 Descriptive analysis

The respondents and the organization profile

The number of employees in the respondent NGOs is classified in 3 groups (lower than 11, from 11 to 50, higher than 50). The breakdown is shown in **Figure 3**.

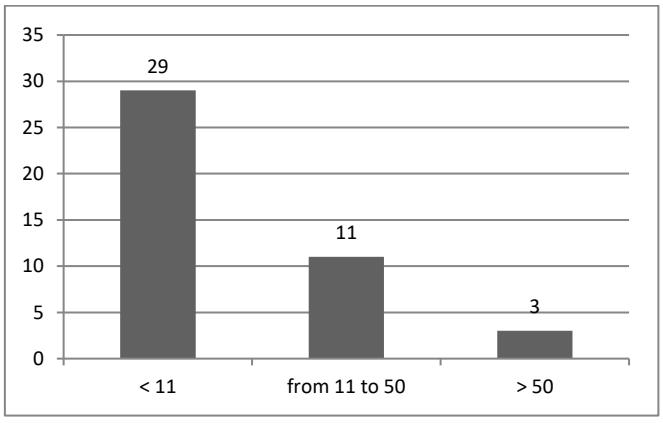

Figure 3 NGO size: number of employees

Nearly 67% of respondents worked for NGOs that employed less than 11 employees. Women represent 46% of the respondents in the sample. Project Managers' experience in the management of international humanitarian aid projects varies from a minimum of 1 year to a maximum of 30 years, with a mean of 8.36 years (standard deviation = 6.36 years).

The age distribution is shown in **Figure 4**. On average, respondents were 40years old.

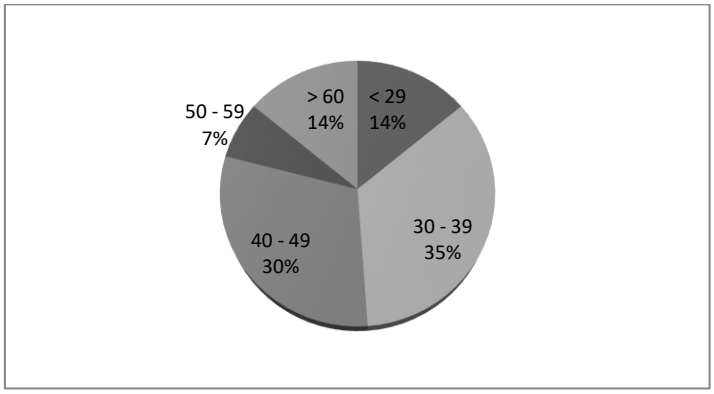

Figure 4 Project managers' age

As regards the respondents' academic background the data about the level [54] and sector of education are summarized in **Figures 5 and 6**.

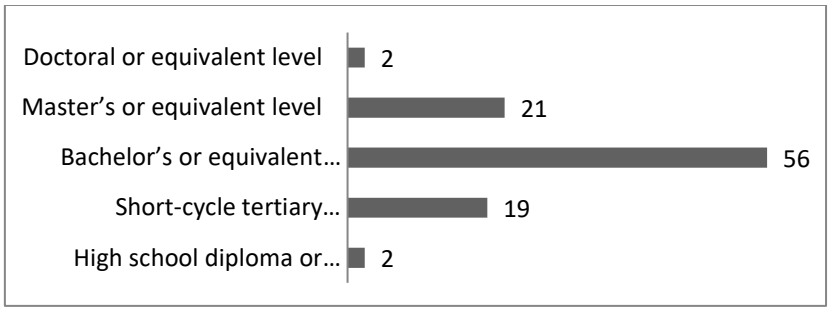

Figure 5 Project managers' level of education (percentage values)

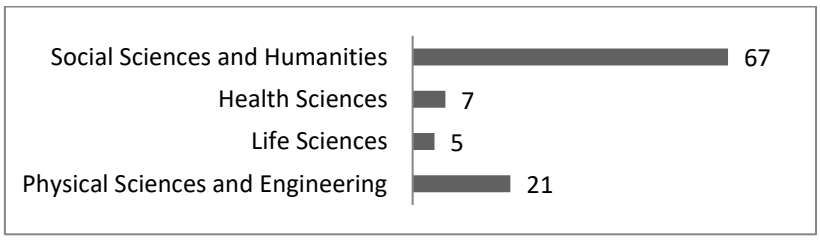

Figure 6 Project managers' academic background (percentage values)

The educational level of 79% of the respondents is equal to or higher than a Bachelor's degree and for only 2% the level of education is equal to or lower than a high school diploma.

Two-thirds of the respondents in the sample completed professional training in the field of Social Sciences and Humanities. Around 21% have an academic background in Physical Sciences and Engineering and the remaining 12% followed courses in Life Sciences and Health Sciences areas.

The project and its success

The respondents were asked to provide the main features of the analyzed project. The projects were classified into 7 groups: Emergency, Education, Environment, Rural Development, Urban Development, Social Development, and Health. The respondents were also allowed to specify any project type not listed in the proposed groups. The results are summarized in **Figure 7**.

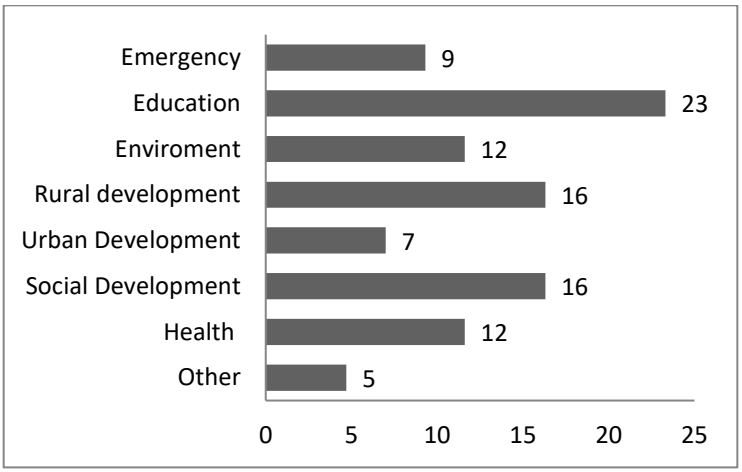

Figure 7 Project type: frequency. N=43

Around 23% of the analyzed projects were in the area of education. The emergency sector accounted for another 9%, whilst the environment accounted for 12%. Social and urban development accounted for 23%. Around 16% of the respondents were involved in social development projects. 12% of projects were carried out within the health sector.

The budget of the projects varies from a minimum of €20,000 to a maximum of €3,000,000. The project budgets were classified into 4 ranges: lower than €100,000, from €100,000 to €250,000, from €250,000 to €500,000 and higher than €500.000. The breakdown is shown in **Figure 8**.

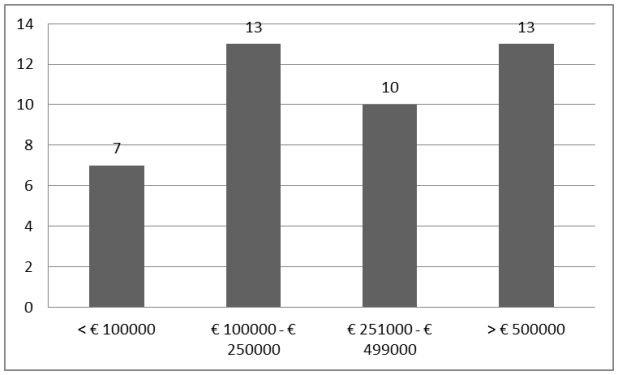

Figure 8 Project size: budget N=43

In order to better define the project size, the respondents were asked to answer the following questions: “How long did the project last?” and “How many people worked on the project?”. The project size in terms of duration and number of participants is summarized in **Figures 9 and 10**.

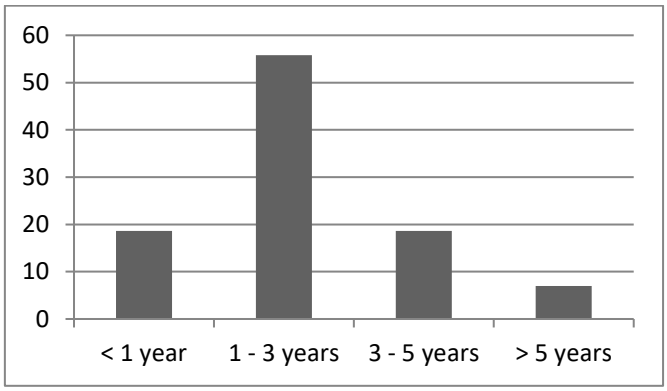

Figure 9 Project size: duration. N=43

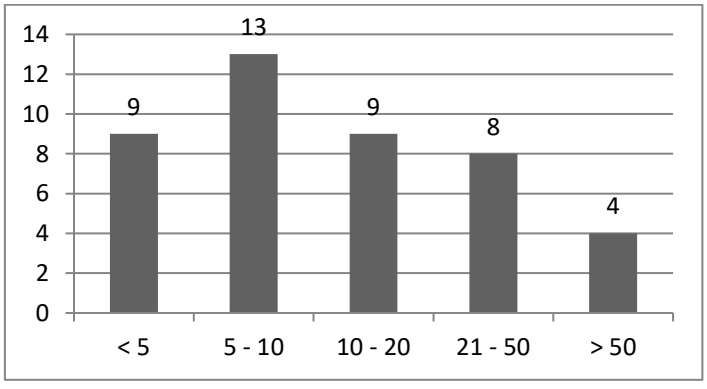

Figure 10 Project size: number of participants. N=43

The degree of project success was seen as a complex construct aggregating 9 criteria. The respondents were asked to judge the performance of their project by indicating the level of agreement with 9 statements on a Likert scale of 1 to 5 where; 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree and 5 = strongly agree. **Table 3** shows, for each success criteria, the minimum and maximum values together with the mean and the standard deviation.

Project success criteria	N	Min	Max	Mean	Std. dev
The project is a success	43	1	5	3.91	0.840
The project deadlines were respected	43	1	5	3.44	0.881
The project operated within the budget	43	1	5	3.72	1.031
The beneficiaries are satisfied with the goods or services generated	43	1	5	4.12	1.005
The goods and services produced conform with those described in the project documents	43	1	5	3.95	0.999
The project had a positive impact on the beneficiaries	43	1	5	4.23	0.972
The initially identified objectives were attained	43	1	5	4.05	0.925
The project has a good reputation amongst the principal donors	43	1	5	4.23	1.043
The project strengthened local institutional capacity	43	1	5	3.53	1.054

Table 3 Descriptive statistics for project success criteria

In order to test the reliability of the construct and the internal consistency of the responses, Cronbach's Alpha was assessed for success criteria at 0.913. The high value of Cronbach's Alpha ([43] and [15]) for this construct demonstrated a good internal consistency of the evaluated success dimensions.

In order to test the proposed hypotheses, the different dimensions of success were combined into a single index: an overall project success score, calculated as the average value of the nine Success Criteria.

PM tools and techniques

Each PM tool was examined individually: the respondents were asked to evaluate the frequency of use of each tool on a Likert scale from 1 (never used) to 5 (always used). For each PM tool, the minimum and maximum values of the frequency of use were calculated as well as the mean and the standard deviation (**Table 4**).

Code	Description	Min	Max	Mean	Std. dev	Code	Description	Min	Max	Mean	Std. dev
LD1	Activity duration estimates	1	5	3.19	1.607	LD20	Checklist	1	5	1.81	1.419
LD2	Activity list update	1	5	2.88	1.721	LD21	Risk evaluation technique	1	4	1.37	0.874
LD3	Activity resource requirements	1	5	3.07	1.595	LD22	Schedule Baseline	1	4	1.65	1.089

LD4	Objectives Tree	1	5	3.70	1.489	LD23	GERT	1	4	1.16	0.574
LD5	Problem Tree	1	5	3.56	1.501	LD24	Resource levelling	1	4	1.33	0.808
LD6	Strategy Tree	1	5	2.95	1.632	LD25	Cash Flow Analysis (CFA)	1	5	2.44	1.436
LD7	Brainstorming	1	5	4.02	1.282	LD26	Spider diagram	1	4	1.19	0.588
LD8	Cost Baseline	1	5	2.65	1.717	LD27	Stakeholder analysis	1	5	2.65	1.617
LD9	Cost performance report	1	5	2.56	1.623	LD28	Supplier evaluation criteria	1	5	1.65	1.131
LD10	CCPM	1	5	1.51	1.099	LD29	Supplier proposal evaluation	1	5	1.86	1.283
LD11	CPM	1	4	1.21	0.638	LD30	SWOT analysis	1	5	3.14	1.567
LD12	Earned Value Management	1	5	1.49	1.077	LD31	Vienn diagram	1	4	1.23	0.649
LD13	Gantt Diagram	1	5	3.49	1.778	LD32	Work Breakdown Structure	1	5	1.79	1.319
LD14	Logframe Matrix	1	5	4.09	1.540	LD33	Work progress monitoring	1	5	2.70	1.698
LD15	Responsibility Matrix	1	5	2.00	1.397	LD34	PMD Pro	1	4	1.16	0.615
LD16	OBS	1	5	1.79	1.283	LD35	Project Cycle Management	1	5	3.40	1.720
LD17	Performance indicators (PI)	1	5	2.67	1.700	LD36	Theory of Change	1	5	1.16	0.754
LD18	PERT	1	5	1.70	1.225	LD37	Microsoft Project Software	1	4	1.19	0.588
LD19	Project schedule	1	5	2.49	1.638						

Table 4 Descriptive statistics for PM practice

The PM practices most frequently applied are: Objectives Tree (mean 3.70, Std.dev 1.489), Problem Tree (mean 3.56, Std.dev 1.501), Brainstorming (mean 4.02, Std.dev 1.282), Gantt Diagram (mean 3.49, Std.dev 1.778), Logframe Matrix (mean 4.09, Std.dev 1.540) and Project Cycle Management (mean 3.40, Std.dev 1.720). The high values of the standard deviation (the standard deviation mean value is equal to 1.471) highlighted a lack of uniformity in the frequency of use of PM practices among project managers. On the contrary, the lower values of standard deviation are associated with a low value of PM frequency of use. This mean that most of the project managers share a scarce use of PM tools such as the Critical Path Method (mean 1.21, Std.dev 0.638), Graphical Evaluation and Review Technique (mean 1.16, Std. dev 0.574), Spider diagram (mean 1.19, Std. dev 0.588), Vienn diagram (mean 1.23,

Std.dev 0.649), PMD Pro (mean 1.16, Std.dev 0.615), Theory of Change (mean 1.16, Std. dev 0.754) and Microsoft Project Software (mean 1.19, Std.dev 0.588).

4.2 PM tool usage and project context

An ANOVA and regression analysis was performed in order to investigate the possible relationships between project context and PM tool usage. These statistical analyses were chosen due to the categorical nature of the analyzed items. The use of each PM tool across the different NGO size and sector was tested. The analysis showed no significant difference in the use of PM tools depending on project sector (F-value between 2.531 (p=0.076) and 0.304 (p=0.948)) and NGO number of employees (F-values between 2.164 (p= 0.1280) and 0.015 (p=0.9850)). This result was confirmed by the regression analysis which was developed in order to verify the relationships. **Table 5** shows the standard coefficients obtained from regression using NGO sector and NGO number of employees as predictors and PM tools as dependent variables.

PM tools	Project sector		NGO number of employees	
	Beta	Sig.	Beta	Sig.
Activity duration estimates	0.307	0.163	-1.391	0.137
Activity list update	-0.888	0.739	-0.974	0.222
Activity resource requirements	0.837	0.185	0.686	0.203
Objectives Tree	1.378	0.067	1.292	0.156
Problem Tree	-1.986	0.264	0.426	0.352
Strategy Tree	1.310	0.183	-0.808	0.784
Brainstorming	-0.306	0.086	0.489	0.187
Cost Baseline	-0.221	0.444	0.350	0.301
Cost performance report	0.155	0.750	0.111	0.663
Critical Chain Project Management (CCPM)	1.886	0.770	0.779	0.856
Critical Path Method (CPM)	0.177	0.076	2.380	0.458
Earned Value Management	0.025	0.852	1.856	0.069
Gantt Diagram	0.374	0.978	-0.421	0.119
Logframe Matrix	0.922	0.142	-0.675	0.149
Responsibility Matrix	-1.424	0.171	0.169	0.355
Organizational Breakdown Structure (OBS)	0.665	0.091	0.028	0.769
Performance indicators (PI)	-0.153	0.241	0.896	0.964
PERT (Programme evaluation and review technique)	-0.565	0.727	-2.666	0.118

Project schedule	-0.887	0.376	0.399	0.110
Checklist	0.747	0.122	-0.665	0.499
Risk evaluation technique	-0.777	0.218	0.048	0.324
Schedule Baseline	0.631	0.099	0.465	0.877
GERT (Graphical Evaluation and Review Technique)	1.942	0.298	-3.771	0.489
Resource levelling	-0.166	0.271	-1.338	0.090
Cash Flow Analysis (CFA)	-0.640	0.749	0.177	0.064
Spider diagram	-1.119	0.075	0.145	0.611
Stakeholders analysis	0.234	0.418	1.002	0.925
Supplier evaluation criteria	1.186	0.570	-0.745	0.073
Supplier proposal evaluation	-2.044	0.202	-0.193	0.458
SWOT analysis	0.525	0.049	-0.145	0.841
Vienn diagram	-0.391	0.226	0.525	0.753
Work Breakdown Structure (WBS)	-0.931	0.546	-0.303	0.483
Work progress monitoring	1.017	0.094	-0.303	0.403
PMD Pro	-0.736	0.084	2.945	0.600
Project Cycle Management (PCM)	-0.715	0.505	0.054	0.085
Theory of Change	0.112	0.071	-1.737	0.887
Microsoft Project Software	-0.966	0.844	-0.112	0.088

Table 5 Relationships between project context and PM tool usage

A Shapiro-Wilk's test showed that the PM tools are approximately normally distributed, with a Skewness z-value = (Skewness measure/Standard Error) that goes from -1.69 to +1.82 (between -1.96 and +1.96) and a Kurtosis z-value = (Kurtosis measure/Standard Error) that goes from -1.75 to +1.59, although the variance of the residuals is not homogeneous across the levels of the predicted values (homoscedasticity) with a p = 0.386 (Breusch–Pagan test). Moreover the regression analysis showed no significant difference in the use of PM tools depending on project sector (F-value between 3.034 (p=0.067) and 0.044 (p=0.978)) and NGO number of employees (F-values between 2.832 (p= 0.069) and 0.046 (p=0.964)).

This result shows that hypothesis 1 is not supported.

4.3 Impact of CSFs on project success

The analysis performed was aimed at both determining the relationship between CSFs (multiple independent variables) and project success (dependent variable) and at establishing the predictive role of the independent variables. At first, in order to test each of the twenty CSFs, two methods of bivariate

data analysis were applied. A correlation analysis was carried out to describe the intensity of the relationships between each CSF and the average score of project success. The calculated Pearson coefficients are reported in Table 6. Starting from the high Pearson coefficients obtained, further analysis focused on verifying whether the projects characterized by the highest project success also had the highest degree of CSFs. To test this hypothesis, the sample was divided into three groups based on project success: “low” level of success, “medium” level of success and “high” level of success. We decided not to divide the available range, from 1 to 5 derived from the application of a 5 point Likert scale, into three equal groups (from 1 to 2.33, from 2.33 to 3.66 and from to 3.66 to 5). In fact, the data collected are not homogenously divided into such a range. Starting from the calculus of the overall average success of the project which generated a value of 3.9, we fixed the first cut point at 3.7 to divide low and medium success projects, and the second cut point at 4.1 to divide medium and high success projects, based on the tertile values. All comparisons between the top group and the bottom group were performed in order to test the significant difference in means. The results are summarized in **Table 6**. The t-test values confirmed the significant difference of most of the CSFs included in the “low” and “high” success groups and provide support for the hypothesized relationship between CSFs and project success.

CSFs	Pearson Correlation Coefficient	Mean value of critical success factors			"high" vs. "low" group
		"low" project success	"middle" project success	"high" project success	t-test
CSF1	0.67**	3.14	3.83	4.50	2.20
CSF2	0.59**	2.71	4.00	4.28	3.12**
CSF3	0.82**	2.43	4.00	4.44	5.40**
CSF4	0.31*	2.71	3.44	3.39	1.56
CSF5	0.57**	2.71	3.89	4.00	3.14**
CSF6	0.69**	2.71	4.11	4.28	2.84*
CSF7	0.64**	2.57	4.06	4.17	3.82**
CSF8	0.44**	2.14	3.56	3.44	2.29*
CSF9	0.33*	2.86	3.56	3.61	1.21
CSF10	0.68**	2.57	4.11	4.44	3.56**
CSF11	0.56**	3.29	3.94	4.39	1.57

CSF12	0.63**	2.71	3.67	3.89	2.26*
CSF13	0.77**	2.57	3.67	4.28	3.46*
CSF14	0.79**	2.71	3.78	4.22	2.81*
CSF15	0.69**	2.57	3.72	4.06	3.91**
CSF16	0.66**	2.43	3.94	4.11	3.91**
CSF17	0.81**	2.86	3.89	4.44	3.04*
CSF18	0.81**	2.86	4.06	4.67	3.20*
CSF19	0.77**	2.86	4.33	4.39	2.48*
CSF20	-0.03	3.29	2.94	3.17	-0.29

* p<0.05; **p<0.01

Table 6 Bivariate statistical analysis results

In addition to this overview of the relationship between CSFs and project success through correlation and t-tests, further analysis was carried out to gain a deeper understanding of this presumed relationship. **Table 7** shows the results obtained from the regression analysis in order to verify the relationships between CSFs (as predictors) and the overall project success score (as a dependent variable).

Critical Success Factors	Standardized Beta Coefficients	Sig.
CSF1	0.163*	0.044
CSF2	0.012	0.855
CSF3	0.169*	0.040
CSF4	-0.136	0.089
CSF5	0.107	0.302
CSF6	0.073	0.477
CSF7	0.139	0.062
CSF8	0.030	0.689
CSF9	-0.150*	0.023
CSF10	0.179	0.118
CSF11	0.005	0.929
CSF12	0.093	0.187
CSF13	-0.028	0.810
CSF14	0.225	0.076

CSF15	-0.034	0.652
CSF16	0.023	0.826
CSF17	0.197*	0.041
CSF18	0.226*	0.029
CSF19	-0.113	0.265
CSF20	0.002	0.966

R^2 = 0.964; F = 29.680***

* p < 0.05; ** p < 0.01; *** p < 0.005

Table 7 Relationship between CSFs and project success

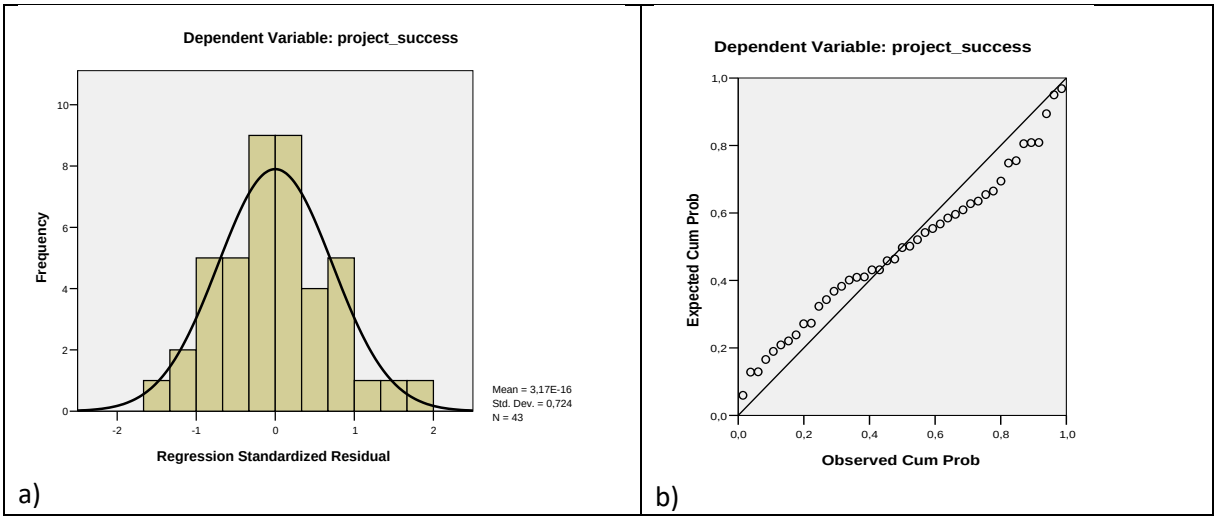

Figure 11 a) histogram; b) Normal P-P plot of regression Standardized Residual (p = 0.041; Breusch–Pagan test)

The graphs are shown in **Figure 11** highlight the fact that project successes are approximately normally distributed, and that the variance of the residuals is homogeneous across the levels of the predicted values (homoscedasticity).

The results are shown in **Table 7** highlight how hypothesis H2 is supported (F = 29.680, p < 0.005, two-tailed test). In fact, there are important relationships between CSF1, CSF3, CSF9, CSF17 and CSF18 and the overall project success score. It is important to underline that the three CSFs: "CSF3" (Identified needs match stakeholders priorities), "CSF17" (During project implementation, stakeholders were satisfied with project progress) and "CSF18" (Adequate knowledge was shared with beneficiaries), all focusing on stakeholder satisfaction and involvement, were, on their own, able to explain 85.8% of the project success variance.

4.4 Impact of PM tools on project success

Tables 8 and 9 show the results obtained from correlation and regression analyses. These results allowed us to verify the relationships between the frequency of use of PM tools (as predictors) and the overall project success score (as a dependent variable).

PM tools	Pearson Correlation Coefficient	Sig.
Activity duration estimates	0.133	0.395
Activity list update	0.148	0.345
Activity resource requirements	0.163	0.297
Objectives Tree	0.046	0.769
Problem Tree	0.229	0.112
Strategy Tree	-0.042	0.787
Brainstorming	0.140	0.370
Cost Baseline	0.144	0.358
Cost performance report	0.112	0.474
Critical Chain Project Management (CCPM)	-0.013	0.933
Critical Path Method (CPM)	0.101	0.518
Earned Value Management	0.168	0.283
Gantt Diagram	0.121	0.438
Logframe Matrix	0.012	0.939
Responsibility Matrix	0.190	0.223
Organizational Breakdown Structure (OBS)	0.153	0.326
Performance indicators (PI)	-0.005	0.975
PERT (Programme evaluation and review technique)	0.137	0.382
Project schedule	0.314*	0.049
Checklist	0.283	0.085
Risk evaluation technique	0.363*	0.019
Schedule Baseline	0.200	0.197
GERT (Graphical Evaluation and Review Technique)	0.170	0.275
Resource levelling	0.067	0.668
Cash Flow Analysis (CFA)	0.001	0.994
Spider diagram	0.153	0.326
Stakeholders analysis	0.078	0.618
Supplier evaluation criteria	0.059	0.709
Supplier proposal evaluation	0.110	0.481
SWOT analysis	0.475**	0.001
Vienn diagram	0.164	0.293
Work Breakdown Structure (WBS)	0.050	0.750
Work progress monitoring	0.340*	0.026
PMD Pro	0.159	0.308
Project Cycle Management (PCM)	-0.011	0.946

Theory of Change	0.167	0.284
Microsoft Project Software	-0.045	0.774

Table 8 Correlation between the use of PM tools and project success

PM tools	Standardized Coefficients Beta	Sig.
Activity duration estimates	0.133	0.918
Activity list update	0.896	0.326
Activity resource requirements	-0.458	0.410
Objectives Tree	-2.141	0.228
Problem Tree	1.499	0.119
Strategy Tree	-0.236	0.733
Brainstorming	-0.279	0.618
Cost Baseline	-0.010	0.992
Cost performance report	-0.420	0.583
Critical Chain Project Management (CCPM)	-0.215	0.865
Critical Path Method (CPM)	-2.055	0.169
Earned Value Management	-0.808	0.538
Gantt Diagram	0.167	0.608
Logframe Matrix	0.901	0.322
Responsibility Matrix	-0.337	0.641
Organizational Breakdown Structure (OBS)	-0.110	0.883
Performance indicators (PI)	-0.924	0.178
PERT (Programme evaluation and review technique)	0.715	0.427
Project schedule	1.002	0.085
Checklist	0.487	0.107
Risk evaluation technique	0.190*	0.026
Schedule Baseline	0.687	0.415
GERT (Graphical Evaluation and Review Technique)	-1.586	0.509
Resource levelling	0.061	0.934
Cash Flow Analysis (CFA)	-0.322	0.464
Spider diagram	2.062	0.305
Stakeholders analysis	-0.449	0.450
Supplier evaluation criteria	-1.723	0.194
Supplier proposal evaluation	1.893	0.154
SWOT analysis	0.739*	0.011
Vienn diagram	0.113	0.901
Work Breakdown Structure (WBS)	0.089	0.837
Work progress monitoring	0.762*	0.038

PMD Pro	-0.230	0.881
Project Cycle Management (PCM)	-0.697	0.178
Theory of Change	1.594	0.093
Microsoft Project Software	1.354	0.191

R^2 = 0.374; F = 3.173; * p < 0.05;

Table 9 Relationship between the use of PM tools and project success

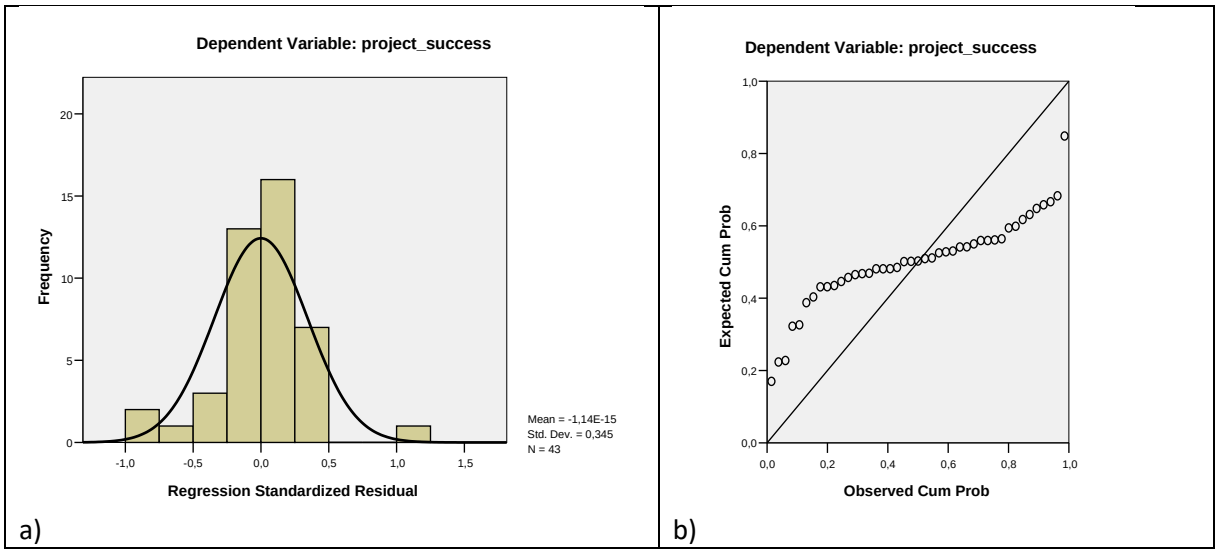

Figure 12 a) histogram; b) Normal P-P plot of regression Standardized Residual (p = 0.259; Breusch–Pagan test)

The graphs shown in **figure 12** indicate that project successes are approximately normally distributed although the variance of the residuals is not homogeneous across the levels of the predicted values (homoscedasticity). Moreover, **table 9** shows very low dependences between the use of PM tools and project success (F = 3.173, sig. = 0.117, two-tailed test). The correlation in **table 8** indicates that the use of "Project schedule", "Risk evaluation technique", "SWOT analysis" and "Work progress monitoring" are positively correlated with project success. The regression analysis in **table 9** partially confirms these results, highlighting that there is a relationship between "Risk evaluation technique", "SWOT analysis" and "Work progress monitoring" and project success. It is important to underline that two of these three significant PM tools are connected with project risk management.

5. Discussion and Conclusions

This paper reports the results of a study aimed at exploring the neglected subject of humanitarian aid project management. Prompted by this research gap, we designed a survey to explore the use of PM

tools in humanitarian aid projects and the relationship between critical success factors and project success. The survey questionnaire consisted of four sections. The first section captured the information about the organization and the respondent's personal information. The second section focused on the main characteristics of a specific project. In the third section, a multi-dimensional evaluation of project success was required and information on CSFs was gathered. The last section explored the frequency of use of the PM methods, tools and techniques. Based on the results of the descriptive statistics, correlation and regression analysis, we are able to answer the questions posed by our research.

The results obtained from statistical analysis highlighted that only hypothesis 2 can be supported by this survey. Hypotheses 1 and 3 cannot be supported because the variance of the residuals is not homogeneous across the levels of the predicted values (homoscedasticity). Moreover, ANOVA and regression analysis confirmed that there are no significant differences in the use of PM tools depending on the project sector and NGO number of employees.

As regards the connection between CSFs and project success, correlation, t-tests and regression analysis were used to gain a deeper understanding of this presumed relationship. The following multivariate regression was used to explore which of the evaluated critical success factors (CSFs) are predictors of perceived project success. The stepwise regression analysis returned the most important CSFs among the 20 proposed. The value obtained by the analysis underlined the significant relationship between these CSFs and project success. In particular, the most important CSFs (CSF1, CSF3, CSF17 and CSF18) are connected with stakeholders' satisfaction and involvement. This result confirms the study carried out by Khang and Moe [34], which highlighted that ID projects involve a wide variety of stakeholders and this complex network of stakeholders is one of the most challenging issues when managing this type of project. CSF9 is also very important (risk analysis was carried out and the related precautions are documented) as it is connected to the identification, assessment, and prioritization of risks followed by coordinated and economical application of resources to minimize, monitor and control the probability and/or impact of unfortunate events. Our analysis of the use of PM tools and project success also highlighted that Project Risk management tools are important in humanitarian project success.

Our results show very low dependences between the use of PM tools and project success. This result disagrees with the study carried out by Ika et al. [27] that highlighted the importance of PM tools in International Development projects. Furthermore, the above authors suggested that NGOs put a lot of effort into monitoring and evaluation. In so doing, they strive to ensure project performance and accountability throughout the project lifecycle, and this contributes to the project "profile."

Some considerations can be included in the limits and difficulties that project managers can face when using PM tools. The data collected are summarized in **Figure 12**: for each PM tool, the percentage of respondents who highlighted limits is reported. The average value is 41%.

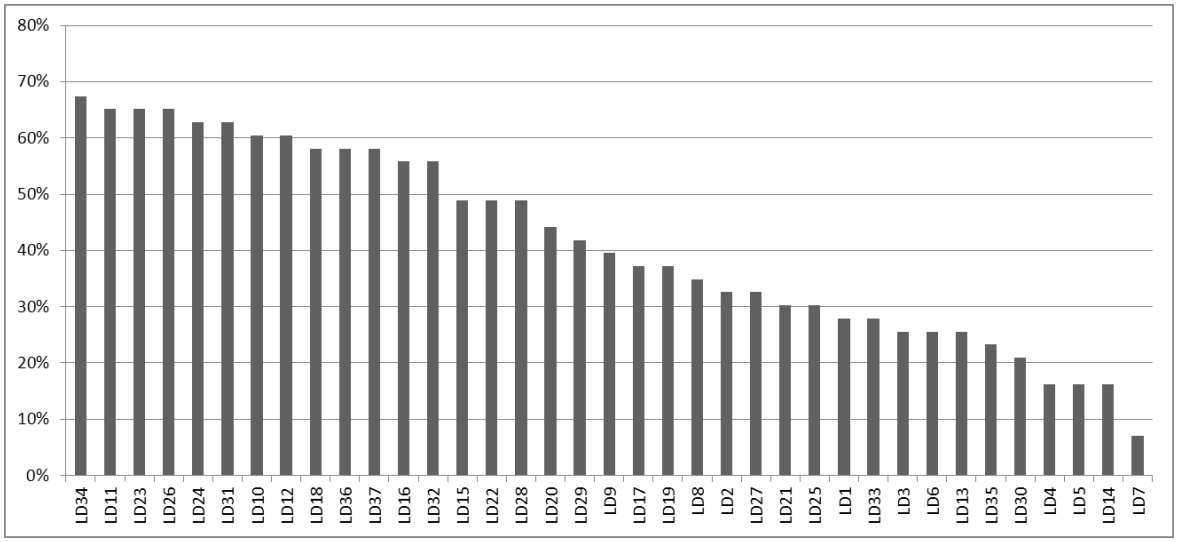

Figure 12 Percentage of respondents who highlight limits

For each tool, respondents were asked to indicate if the difficulties are connected to an inadequacy of the tool or to a lack of tool knowledge. Of the operators who reported problems with PM tools, 81% stated that they do not know the tool or have insufficient experience in its application or a lack of adequate training. On the contrary, only 19% declare that application difficulties are connected to tool inadequacy.

Some Project Managers also emphasized that promoting good practice is difficult in the humanitarian aid sector, which is characterized by rapid staff turnover, the perception that there is little time for learning lessons because there is always another emergency and the scarcity of resources available for encouraging evidence-based practice. This aspect has also been underlined by Youker [59], who highlighted that in developing countries all resources are in short supply. Furthermore, local implementers may have a different sense of time and work.

Although this study provided interesting findings, it is also important to highlight its main drawbacks. The sample size that is made up of only 43 NGOs is the first limitation. Although this sample is sufficient for testing the hypotheses using correlation and regression analyses, it did not allow us to carry out more complex investigations such as Confirmatory Factor or SEM analyses.

Moreover, as the sample in this study was entirely made up of Italian NGOs, the results may only be considered valid in this specific context and caution is advisable when the analysis results are interpreted and generalized. Future research could involve the collection of data from other countries to see whether the findings are replicated or not. Also, other variables should be evaluated in the analysis like, as examples, the different use of PM tool depending on the specific type of project, the use of PM tools internally developed by the organization. Qualitative research should investigate the strategies and the potentials for a wider introduction of PM tools in the humanitarian aid sector.

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About Authors

Claudia Paciarotti, Ph.D., a full time research associate in Industrial Plants at the "Università Politecnica delle Marche", Ancona, Italy. Her research activity mainly deals with logistics, design and management aspects of a "global service" maintenance contract in hospitals and health corporations, process management and reengineering in the healthcare and third sector, risk analysis in the industrial plants and services sector. She is the author of papers that have been published in national and international journals and conference proceedings. Email: c.paciarotti@univpm.it,

Prof. Filippo Emanuele Ciarapica, Ph.D., associate professor in Industrial Plants at the "Università Politecnica delle Marche", Ancona, Italy. He is the author of more than 50 scientific papers that have been published in national and international proceedings and journals. His research topics mainly focus on industrial plant design, facility management in the healthcare sector, fuzzy mathematics and QFD methods, modeling and dynamical systems applied to end-of-life problems, BPR methods in the operations sector, new key performance indicators for industrial plants, innovative models for risk analysis, multiphase flows, soft computing techniques in reliability analysis and maintenance activity planning, and logistics. Email: f.ciarapica@univpm.it

Giovanni Mazzuto, Ph. D. candidate in Industrial Plants at the "Università Politecnica delle Marche", Ancona, Italy, graduated in industrial automation engineering in 2010. His research activity mainly deals with an environmental analysis of process plants and maintenance management, analysis of the behavior of the supply chain, project management and product development. He is the author of several papers that have been published in conference proceedings and international journals (International Journal of Production Research, Journal of Loss Prevention in the Process Industries, International Journal of Business Performance and Supply Chain Modelling, International Journal for RF Technologies: Research and Applications). Email: g.mazzuto@univpm.it

Prof. Maurizio Bevilacqua, full professor in Industrial Plants at the "Università Politecnica delle Marche", Ancona, Italy. His research activity mainly deals with multiphase flow transport and separation analysis, environmental analysis of process plants and maintenance management. He is author of several papers that have been published in conference proceedings and in various national and international journals (e.g. International Journal of Quality and Reliability Management, International Journal of Logistics, International Journal of Operations and Production Management, The Journal of Enterprise Information Management, Technology Law and Insurance, International Journal of Production Economics, International Journal of Production Research, Journal of Purchasing and Supply Management). Email: m.bevilacqua@univpm.it