

إقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان:

Status of Using Quantitative Methods in Project Risk Management

Case Study: UNRWA- Gaza Field Office

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Status of Using Quantitative Methods in Project Risk Management

Case Study: UNRWA- Gaza Field Office

واقع استخدام الوسائل الكمية في إدارة مخاطر المشاريع

دراسة حالة: الأونروا- مكتب غزة الإقليمي

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وبعد المناقشة العلنية التي تمت اليوم الأربعاء 27 شوال 1436 هـ، الموافق 2015/08/12م الساعة

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واللجنة إذ تمنحه هذه الدرجة فإنها توصيه بتقوى الله وئزوم طاعته وأن يسخر علمه في خدمة دينه ووطنه.



والله ولي التوفيق ،،،

مساعد نائب الرئيس للبحث العلمي و للدراسات العليا

.....

أ.د. فؤاد علي العاجز

Dedication

I dedicate this work to my parents.

To my wife.

To my sons, Mohammed, Bilal, and Diya'

And to all my sisters and brothers.

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List of Acronyms

CPM	Critical Path Method
DRPSO	Donor Relations and Project Support Office
ERM	Enterprise Risk Management
ERP	Enterprise Resource Planning
GF	General Fund
GFO	Gaza Field Office
ICIP	Infrastructure and Camp Improvement Programme
PERT	Programme Evaluation and Review Technique
PMBok	Project Management Body of Knowledge
PMI	Project Management Institute
PMO	Project Management Office
PRINCE2	Projects in Controlled Environment
RSSP	Relief and Social Services Programme
SPSS	Statistical Package for Social Sciences
UNRWA	United Nations Relief and Works Agency for Palestine Refugees in the Near East.
WBE	Work Breakdown Element
WBS	Work Breakdown Structure

Abstract

This study aims to evaluate the current project risk management within UNRWA in Gaza in all areas related to the Agency's mandate. Projects implemented by UNRWA in Gaza are subject to risks due to the volatile situation and the adverse situation representing risks and uncertainties that are difficult to predict and that impede the effective and timely implementation of projects according to their plans. This negatively impacts the outputs of these projects and creates grave repercussions and disruption consuming the project resources and budgets. This will also have a negative impact on the Agency's image and funding as the relationship with the donor community will be also distorted.

This study tackled some of the main factors which are related to the management of risks in projects. These are information management, organizational structure, the methodology used in risk analysis and management, and risk planning. Results collected from the study population indicated that there are significant correlations between those factors or variables and project risk management. The results also revealed that there are certain aspects related to planning, organizational structure, information management, and planning in need for enhancement in order to reach effective management of projects risks. The study also discussed some of the project and risk management approaches, mainly quantitative, that could be integrated or incorporated into UNRWA systems and be relied on to achieve effective risk management.

Some of the key recommendations of the study are: developing the current structure and current positions related to grant and project management so that projects risks are dealt with more professionally and in a systemized manner from dedicated staff. Another key recommendation also is designating a focal point staff member within each implementing programme or department to act as the main source of information needed in risk management. The study also revealed that there is gap between the top management who are making the decisions related to projects and the line or operational management of projects which are crucial to effective risk management within the Agency. The study also emphasized and recommended that there should be more utilization of quantitative approaches in risk analysis and management. These approaches maybe b adapted and incorporated within different UNRWA systems.

Arabic abstract

المخلص

يهدف هذا البحث إلى تقييم إدارة المخاطر المتعلقة بالمشاريع التي تقوم وكالة الغوث الدولية في قطاع غزة بتنفيذها في جميع المجالات المنوطة بها. وكما هو الحال بالنسبة لباقي المؤسسات العاملة في المجال الإنساني والإغاثي فإن الأوضاع المتغيرة والظروف الغير ملائمة والتي لا يمكن توقعها تشكل خطرا وعائقا أمام تنفيذ تلك المشاريع كما هو مخطط لها مما يؤثر سلبا على نتائج ومخرجات تلك المشاريع، بالإضافة إلى الأثار السلبية والتي يمكن أن تؤدي إلى زيادة التكاليف وإهدار الموارد المتاحة للمشروع بالإضافة إلى تؤثر العلاقات الخارجية مع المانحين أو الممولين لتلك المشاريع.

لقد تناول البحث عدة عوامل رئيسية مؤثرة في إدارة المخاطر ذات العلاقة بإدارة المشروع وهي: التخطيط، إدارة المعلومات، الهيكل التنظيمي، والطرق المتبعة. حيث من خلال دراسة مجتمع البحث من خلال الاستبانة والتي تم جمع نتائجها من خلال المجتمع والمتمثل في ما يقارب 45 مشاركا من مختلف الدوائر والبرامج المنخرطة في إدارة وتنفيذ المشاريع تبين أن هناك علاقة بين تلك المتغيرات الأنفة الذكر وإدارة المخاطر المتعلقة بالمشاريع ككل. حيث تبين من خلال الردود التي تم جمعها والتي عكست إلى حد ما الوضع القائم لإدارة المخاطر أن هناك بعض النواحي المتعلقة بالتخطيط، وإدارة المعلومات، والطرق المتبعة، والهيكل التنظيمي والتي بحاجة إلى التطوير أو التفعيل. ومن خلال هذا التشخيص الذي قام به الباحث، فقد تم طرح بعض الطرق المنقاة والتي تعتمد على الطرق الكمية والإحصائية والتي يمكن الإعتماد عليها من قبل وكالة الغوث لتحسين إدارة المخاطر التي تواجه المشاريع بشكل علمي وممنهج.

ومن أهم التوصيات التي توصل إليها الباحث هي إعادة هيكلة المواقع المتعلقة بإدارة المنح والمشاريع في مكتب المشاريع لدى وكالة الغوث في غزة بحيث يتم التعامل مع المخاطر بشكل ممنهج ومهنية أكثر، ومن تلك التوصيات أيضا هي تعيين أو تكليف موظف يكون بمثابة نقطة تواصل ومصدر للمعلومات اللازمة لإدارة المخاطر. كما توصل الباحث لوجود فجوة بين الإدارة العليا والتابعة في اتخاذ القرارات المتعلقة بالمشاريع مما يشكل أيضا عائقا أمام تخطيط فعال يواجه المخاطر التي قد تقف عائقا أمام تنفيذ تلك المشاريع بشكل فعال. ومن أهم هذه التوصيات هي الإعتماد وتبني بعض الطرق الكمية المستخدمة في تحليل وإدارة المخاطر والتي قام الباحث بطرح بعضها منها والتي يمكن موائمتها لتناسب أنظمة إدارة المشاريع لدى الوكالة.

Chapter 1

General Framework

1. General Framework

1.1 Introduction

Risk management is essential for projects to succeed and achieve their planned results and objectives. Due to the lack of proper risk management, projects usually end up with financial losses and waste of resources which, in turn, impact the credibility of the organization.

Effective risk management can also lead to sensible and sound decision making. It increases its favorable events and decreases its unfavorable events with its value contributing to the strategy of the organization (Hornbacher, 2012). Organizations concerned with implementation of non- for- profit or humanitarian projects have an office or structure which can handle its projects donations and implementation. In UNRWA's case, the Donor Relations and Projects Support Office (DSRPO) is functioning as the main hub for external donations and as a liaison with other programmes and support departments within UNRWA.

The office also plays a focal and critical role in contributing to the donor compliance by ensuring that grants and donations are spent in line with the terms and conditions in the donation agreements. These terms include the already set timeframes, budgets, results, and objectives. The office is also handling all queries requested by donors and thus managing all related information to projects and grants. Due to this and considering the volatile situation in the Gaza Strip and the limited access to resources, and sometimes to the unpredictable situation, implementation of projects can be adversely affected and thus this office should be always ready for the emergency of contingent event and risks (El-Kariri, 2012).

This study tries to reveal the interrelationships between factors related to project risk management. It will evaluate the current status of project risk management at UNRWA in Gaza and how to enhance the current practices and systems with the utilization of quantitative methodologies. This study will also be limited to handle only the negative impact of uncertainties and will leave the positive side of risks and uncertainties for other studies to be conducted by other researchers.

1.2 Study Problem

A global aspect of projects implemented by organizations is risks and uncertainties. Risk is considered as one of the key factors affecting project implementation. Thus, the negative consequences of risks could be directly or indirectly related to those uncertain events which could pose a threat to projects. Risks could impede projects from being implemented within the set duration periods and could reduce and diminish the achievement of the desired results of projects. Consequently, those implementing organizations may resort to some of their limited resources to remedy these consequences or could end up with negative terms or breach of agreements with their donors and partners due to unexpected delays or lack of proper risk planning and management. In either case, the repercussions of this will be grave and will impact the overall organization in the long run.

Risks could be a result of internal or external factors. Internal factors are those which are within the organization control. They can be easily identified and managed while external risks are outside the control of the project team and the organization. They are generally difficult to predict or identify such as incidents of wars or crimes or any other events which could affect the effective implementation of a project (Tyso, 2010).

In case risks are not properly identified and analyzed during the planning phase of a project, they will lead the organization not being able to commit to the terms and conditions that are mutually agreed with the donor. Breach of these conditions and terms could include unjustifiable delays in implementation, budget deficits or surpluses, or maybe the failure to deliver the results of the project according to plans. In any case, all this will jeopardize the image and relationships with donors. This leads the researcher to the following questions:

How can the project risk management be improved by UNRWA in Gaza?

1.3 Research objectives

The research aims at achieving the following main objectives.

- 1- To evaluate the current situation of project risk management being implemented by Gaza Field Office at UNRWA by looking at the current practices and factors.
- 2- To try to introduce some effective and practical methodologies for risk analysis and management which may suit the case of UNRWA in Gaza? The focus will be mainly on quantitative approaches and their incorporation into the project management and decision support process.
- 3- To encourage all stakeholders involved in the management of projects risks to use data and trends analysis in the risk planning process, hence increasing proactive and effective measures rather than reactive and ad hoc measures.

1.4 Study Importance

Demand for UNRWA's services has increased in the last few years and thus the need for better management systems has emerged. Donors have become also more inclined to provide short term or project funds rather than committing themselves to open ended and un-earmarked funding. This is due to the financial crisis that has started to hit most parts of the world and to the new regulations related to external funding.

Project activities for Gaza Field Office have substantially increased in terms of complexity and magnitude over the past years, with projects budget in 1999 of USD 4 million compared to an annual average of USD 200 Millions in recent years (Saleh, 2012).

Thus, some of the important aspects which the study responds to are as follows:

1.4.1 Context of Gaza.

Gaza Strip has been controlled by the Israeli Occupation since 1967 and ever since it has been subject to unpredictable events and instability. Gaza has been also under blockade and restrictions imposed by the Israeli Occupation for the past eight years. All these circumstances created an exceptional situation where projects became under risks and thus effective risk management became direly needed and inevitable to the success of projects. This study contributes to the risk management best practices and enhancement of the overall project management within UNRWA in Gaza.

1.4.2 The Donor Community

Donors are considered the only source of funding for UNRWA projects and thus maintaining good relationships with them is highly important. By implementing their funded project successfully with no delays or shortfalls, this will build up trust and encouragement to continue the sustainable funding of projects in the organization. This study will indirectly serve this purpose by increasing projects successes and decreasing effects of risks which may distort the image of the organization in front of its donors and jeopardize the future funding of projects.

1.4.3 Projects Beneficiaries

Projects beneficiaries or users are considered one of the key stakeholders. Projects are always implemented to serve beneficiaries or have an impact on them. By having effective project risk management, we can deliver more and achieve more results that can increase the quality of deliverables or we can reach more beneficiaries, thus increasing the overall efficiency and effectiveness of the project management.

1.4.4 Organizational Development

Organizational development focuses mainly on the positive change in the organization and the ways in which it can achieve its strategic objectives. With this study diagnosing the main factors affecting risk management in the organization, and suggesting recommendations to be taken into consideration by all relevant parties in the organization, it will contribute to the positive change and to the overall organizational development of the Agency in order to achieve its strategic objectives and mission.

1.4.5 Project Planning

Proactive responses to risks are key factors to the successful implementation of projects. When responses to risks are based on professional analysis which leads to setting up contingency plans and responses, risks can be proactively treated and thus their negative impact can be minimized in case they happen. The study will also touch upon the importance of the planning process and it will contribute to the development of planning process by presenting conclusions based recommendations pertaining to the planning process of projects.

1.4.6 Decision Making

Since this study will focus on the usage of quantitative methodologies in analyzing and managing risks, it will help the decision making process by providing reliable and factual data, statistics, and trends. The decision making will be also further developed with the information management that can utilize the historical data collected from previously implemented projects.

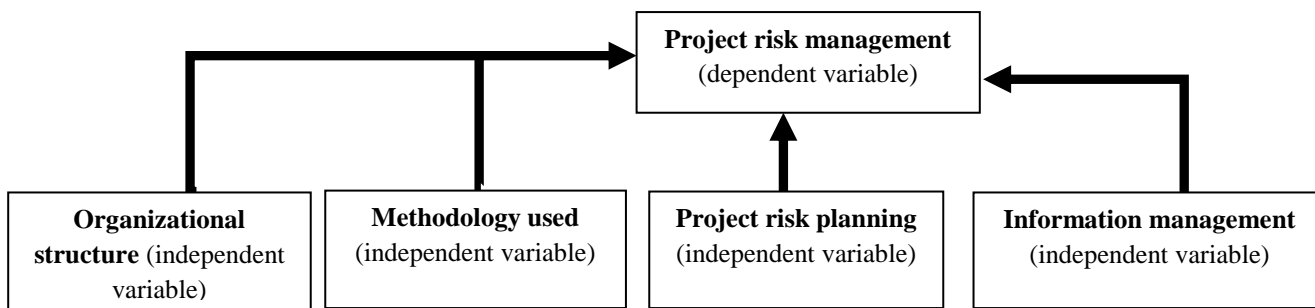
1.4.7 Capacity Building

This study will invoke the top management in UNRWA to pay more attention to the capacity building of their staff members who are involved in projects. It will be imperative for projects officers and managers to develop their skills and competencies in the area of quantitative methods in order to be able to deal with risks effectively.

1.5 The Study Variables

The study aims at studying the interrelated variables pertaining to the study topic and which are key to the development of the risk management for projects within UNRWA in Gaza. These are project risk planning, information management, risk analysis methodologies, and organizational structure. The project risk management is considered here as dependent variable on the rest of the independent variables.

Figure (1): Research variables diagram



Source: Narrated by the researcher

1.6 Study Hypotheses

Based on the reading of the previous studies and the review of literature, the following hypotheses have been identified.

Hypothesis 1: There is a statistical relationship at level ($\alpha \leq 0.05$) between project risk management and project risk planning.

Hypothesis 2: There is a statistical relationship at level ($\alpha \leq 0.05$) between project risk management and methodology used.

Hypothesis 3: There is a statistical relationship at level ($\alpha \leq 0.05$) between project risk management and information management.

Hypothesis 4: There is a statistical relationship at level ($\alpha \leq 0.05$) between project risk management and organizational structure.

Hypothesis 5: There are significant differences among the respondents' views at level ($\alpha \leq 0.05$) due to personal and professional characteristics (level of education, years of experience, job grade, type of involvement related to projects, and percentage of work allocated to projects).

1.7 Study Methodology

The study is conducted using structured interviews with the sample population rather than self-administered questionnaires. Structured interviews can be considered as a means of collecting data similar to a survey questions. In this case, questions are ready in the same order and style without any bias from the researcher. Questions were close ended but where needed, the researcher provided explanation ensuring that questions are fully understood by the participants. The participants were offered to provide their feedback to the questions using likert scale in order to rate their agreement with each of the questions.

Chapter 2

Previous Studies

2. Previous Studies

2.1 Introduction

This chapter introduces the previous literature in the field of project risk management and how using quantitative methods can enhance risk analysis and management in project. The studies reflect on the theoretical and practical insights that can support the study and its results.

2.2 Foreign Studies

(Williams, 2015), “Risk Management” The writer paid attention to the importance of proactive attitudes towards project risk management and being one of the key factors to the success of the project. Losses as a result of failures due to lack of risk management are beyond the direct financial loss and could affect the credibility of the organization and have a negative impact on its image and relations with stakeholders. The writer identified two main aspects of risks which could be seen as global to projects. These are risks related to the project schedule (project delays) and risks related to the project budget (budget overruns or under runs). According to the writer risk management involves risk identification, analysis, prioritization, planning mitigation, monitoring, and communication.

According to the study, organizations usually address projects related risks in either a reactive or proactive way. In the former, the organization lacks the proper planning and the effective risk management procedures where risks are addressed on ad hoc basis and in a fire-fighting mode. Often times, in this mode risks are discovered at later stage of the project and addressing them leads to massive changes in schedule or cost. In the latter, the organization has a better planning where risks are addressed before they occur. The writer recommends using a proactive approach in addressing risk and that risks should be communicated throughout the life cycle of the project as communication is considered central to the project risk management.

(Goh & Abdul-Rahman1, 2013), “The Identification and Management of Major Risks in the Malaysian Construction Industry” The writers identified two major factors causing delays in the construction industry in Malaysia. These are the time risk and the financial risk which are partially due to poor planning of projects. The authors added that due to the independence of the two major risks, one risk could affect or trigger the other leading to cumulative and complicated effects to the achievement of the project objectives. One of the main findings concluded that local organizations in Malaysia apply risk management informally and is done with undocumented practices, which does not achieve the full benefits of formal risk management practices. There exist some qualitative and rather subjective risk management practices within some organizations. The authors also emphasized the importance of systematic risk management as it provides useful risk-reporting for future project reference.

The study concluded that in the Malaysian construction industry, risk management is lacking quantitative analytical tools such as sensitivity analysis and Monte Carlo simulation. Local practitioners only have informal risk management efforts with no proper documentation of all risk inputs and outputs. This tendency reduces the effectiveness and efficiency of risk management. The study also emphasized the importance of having a risk database to be appropriately maintained in order to serve as a data source for similar future projects.

(Virine, 2013), “Integrated Qualitative and Quantitative Risk Analysis of Project Portfolios” This paper has similar attitude towards risk which is common in the majority of several studies. According to the writer, probability and impact of risk are the main two characteristics of risk which needs to be handled by project managers. Risks should also assist in formulating lessons learned for future projects and thus should be properly recorded and documented for future use. Nowadays because organizations have become to concentrate more on projects rather than operations, risk management became substantial to many of the organization. With the case of UNRWA, donors have also become inclined to channel their funds through projects and within set timeframes in order to achieve their objectives and ensure proper reporting is in place. This has also filled the gap due to the organization’s deficit under its general fund. UNRWA, currently, managing those grants based on portfolio division where projects sharing the same aspect or field are grouped under the same portfolio.

The writer suggests that, as a first stage, qualitative risk analysis should take place and cited some examples such as brainstorming, interviewing, and checklists that are used for this purpose. As a second stage, quantitative analysis should be performed to analyze risks in projects, portfolios, and programmes. This is almost typical to the project management environment within UNRWA in Gaza where projects are organized into portfolios and implemented by various programmes and departments within the organization.

(Purnus & Bodeab, 2012), “Considerations on Project Quantitative Risk Analysis” The study emphasized the rationale for advocating for quantitative risk management. New challenges and complexity of projects has made it necessary for quantitative project risk management to model and support uncertainties and risks related to projects. The process will also aid in the decision making process in managing projects and risks. The paper was mainly concerned more with how this process can be integrated with all other project management processes and the organization structure.

According to the paper, the quantitative analysis could be seen as hard because of its use of sophisticated usage of statistical and mathematical methods. However, using relevant software implementation could ease the process and make it more efficient. This is not properly applied or not applied at all in organizations. This is because of the lack of expertise or difficulties in collecting historical data, the complexity of statistical methods to be used, and the absence of the easy to use tools and computation efforts.

The author cited a study conducted by the Chartered Institute of Building which highlights the fact that despite the development of sophisticated tools and techniques, a large number of construction projects are delayed and had budget overruns due to the lack of employment of quantitative risk management. Using only deterministic methods will not lead to feasible results which can be relied on by the project management.

(Sharma, Sharma, & Shekhawat, 2012), “The Best Performance Practices in Project Management of SAP ERP Accomplishment” The article’s focus is on the accomplishments of the SAP ECC module which provides high level of business integration and improves communication within internal and external networks, and enhance the decision making process. The SAP ECC acts as a catalyst for better information management within the organization. The SAP system allows the company to disseminate and share information across the whole

organization in a real-time environment. In addition, it can solve the fragmentation of information in the organization and integrate all the information flow within the organization. In organizations, there are typically independent systems of human resource, finance, procurement systems that are not connected to the same database and data is not well synchronized. This is relevant to the UNRWA case as each supporting department used to have a separate database and module that is somewhat independent from the other. This leads to fragmentation in information and lack of accuracy as data and information flow from different sources of information and in many cases becomes inaccurate and inconsistent. This negatively impact and impede effective decision making as it cannot find the accurate and timely data to base upon..

UNRWA has recently adopted the new Enterprise Resource Planning (ERP) which was developed by the German company known as SAP. This ERP comprises of a sub-system dealing with project management, as well as other functional processes such as procurement and finance. These also indirectly support the project and grant management as each project is in need for managing its financing and budgets, procurement, human resources, etc. It is also crucial that such system in which the Agency invested tens of millions of dollars that it is able to handle all risks related to projects in terms of analysis and management.

(Hornbacher, 2012), “When is Quantitative Project Risk Analysis Necessary?” In his conference contribution, the writer focused on the value of project risk management as it provides a disciplined approach to effectively realize the project’s objectives by increasing its favorable events and decrease its unfavorable events. The value of quantitative risk analysis is to enable the implementation of project risk treatment plans that are most suitable with the organization’s strategy. The writer describes the effects of risks on the project scope, cost, quality, etc. these effects are defined by two attributes which are the probability of occurrence and the impact on the project.

The writer encouraged the proactive management of projects risk and the collective preparation and awareness from the whole organization. According to him, with this proactive approach and enhanced risk management, the organization will acquire more trust and confidence from its stakeholders, improves the project governance, improve organizational learning and resilience, and most importantly establishing a basis for decision making and planning.

The writer emphasized the importance of realistic forecasting which is based on accurate data and distributed to all stakeholders. According to him, qualitative risk description is only words and does not give precise measurement and probabilities which can be relied on in allocation of resources. The writer also emphasized the importance of the maturity of the organization as being one of the key roles to the success of quantitative risk management. Among of the parameters related to maturity are experience, culture, and the applications and tools used in project risk analysis and management.

According to his observations, some of the internal characteristics of the organization with regards to project risk management are the organization’s willingness to adapt, learn, and having consistency in action, and commitment to resilience. Lack of information and inability to effectively analyze risk could be one of the obstacles facing quantitative risk management. The writer also recommends that in order for the organization to employ successful risk management

to project, it should pay attention to planning and good estimations, using best practices in planning and management, have responsibilities well defined and documented, clear procedures and criteria identified and quantified, effective software and tools are being employed, and data and information are effectively maintained.

The writer favors quantitative risk methodologies over qualitative ones as the qualitative approach can only provide a single deterministic value. It is very crucial that risk should be quantified in some methodological way because invalid assessments could lead to improper conclusions which will lead to misapplication of resources.

(MAGNÚSDÓTTIR, 2012), “Project Management Office in International Organizations”

The study mainly tackled the role of the project management office in international organizations. The significance of this study to the research is in its identification of the strategic position of the PMO and its expected roles and responsibilities. The study pointed out that the role of the PMO is multilateral and should be working with all project stakeholders at all levels. Thus, any disruption of the project due to unforeseen risks will be affecting the image of the PMO as it will be looked at as the responsible party for this kind of negative impact. One of the PMO main roles is to drive the change in the organization culture towards projects. It should work at all levels in the organization and should obtain the top management support or reinforcement. This means that the PMO should handle the main responsibility for project risk management and should drive the change towards adopting a new risk management strategy within UNRWA. Not only this, but the PMO should disseminate and try to deliver this culture and practices to the other department involved at all levels until this becomes part of the organizational practices. The PMO should also maintain a risk database that could serve as a hub for all those who seek information regarding risks to help them manage similar risks in the upcoming projects. Eventually, this will lead to having a learning organization and a learning PMO within the organization.

(Matan & Hartnett, 2011), “How Nonprofit Organizations Manage Risk” The paper emphasized the importance of greater risk awareness as being an expectations of the non-profit organizations nowadays. Assuming risks is becoming critical to the success of mission and objectives of the organization. Non-profit organizations that pay attention to corporate governance, strategic planning and risk management are better able to meet their mission and achieve their vision as long as they can balance between growth of their goals and management of risks related to initiatives.

In the case of restricted grants or projects, where the completion from organizations is fierce, it should be noted that before applying for any grant the organization should understand thoroughly the expectation from the donor and weigh the possibility of meeting them. This is very crucial to the organization credibility and impact of such risk that will have long term impacts on the organization and its reputation. As the non-profit world is evolving swiftly, due to the technological advancement that creates opportunity and risks at the same time, the organization leadership should pay more attention to adopting a more structured and disciplined approach to managing risks across the organization.

(Bugalla & Narvaez, 2011), “ERM and Project Management” The article states that the ERM can be embedded into the project management although it is designed to handle risks on the

organizational wider level. The article emphasizes the role of integrating the ERM at the early stage of the project, i.e. during planning, by embedding the ERM into the project risk management in order to have systematic tools and procedures to manage risks in project; this will have a positive outcome that will contribute to the enhancement of the whole organization. On the contrary if such big and complex projects fail to address their respective risks, the whole organization will be negatively affected.

This article emphasized the importance of sharing information and coordination between involved staff members in the project management. The article provided several practical examples of ERM integration into projects such as the Uta Department of Transportation and Mass Development which have both successfully embedded ERM into their project management. This has brought many benefits to the organizations including increased risk awareness, better collaboration, and stronger commitment on projects throughout the organization.

(CLUSIF, 2008/2009), “Risk Management Concepts and Methods” The study was mainly concerned with the methodology used in project risk management especially with using statistical data. The study has performed a comparison between several risk management methods. The paper concluded that the risk management methodology should include quantitative measurement of the risk occurrence. In order to have an impartial data on risks, quantitative and objective measurements should be used and statistical methods should be also utilized. He refers the lack of such data within organizations to the organization’s reluctance to share data that could distort its image. The author emphasizes the importance of the availability of effective information and communication as a key to decision making related to projects risks.

(Bashir & Christin, 2008), “Three Case Studies in Quantitative Information Risk Analysis” The paper includes an empirical case study which provides the reader with practical application of the quantitative analysis of risk in a non-profit organization. The paper favors quantitative risk analysis over qualitative analysis because it provides actual figures to non technical decision makers. The study values quantitative analysis as it provides ROI procedure to the value of reducing risks by utilizing the organization’s resources.

The quantitative analysis tool which the paper used in his case study served as a decision support tool where the discretion lies in the hands of the management to completely or partially utilize it in the decision making process. In the case, where the information security attacks is deemed as risk, the counter measurement proposed was cost effective to the organization comparing the monetary value of the mitigation measurement to the risk value which was found to be more than zero. The paper emphasizes the role of the reliability of the inputs fed in the model as it will affect the output results.

(Olsson, 2006), “Managing Project Uncertainty by Using an Enhanced Risk Management Process” The author links effective project management to the level of uncertainties and the ability to predict them. According to the author, the aim and final effect of project management are to predict the outcome including the cost, time, and quality of the project. The author emphasizes that uncertainty is inherent in the objectives of the project itself and the ability to identify and react to this uncertainty will influence the ultimate outcome of the project.

The paper recommends that risk management process should not place an additional administrative burden. The paper also recommends that when designing the risk management process, administrative burdens should be reduced to the extent possible in order to increase the acceptance of the process. One of the key results of the paper is that by using risk management in project, it will develop a more open and preventative- minded culture within the project and its surrounding organization.

(Goodpasture, 2004), “Quantitative Methods in Project Management” Although the author concentrates on the business projects rather than on the nonprofit sector, his main focus was on the quantitative methodology and its benefits in managing projects. He also highlights the advantages of using Work Breakdown Structure (WBS) and how it is considered a prerequisite to all analytical estimates related to projects. He also points out that the WBS serves two purposes, organizing the work, and providing data on the project deliverables. It can also support more than one view of the project: sponsor’s view, developer’s view, and the operational view as it is most often a hierarchical structure of the project’s deliverables.

(Galway, 2004), “Quantitative Risk Analysis for Project Management: A critical Review” The author represents how quantitative risk management and risk analysis methods were applied to the planning and execution of complex projects, particularly those that are planned to utilize new and untried technologies. The paper recommends several research areas to contribute to evaluating the utility of these methods and improving their applicability. The author also discussed the feasibility and applicability of such quantitative methods in estimating costs and time for projects such as the CPM and PERT approaches towards project management.

The paper discussed the use and applicability of each methodology and concluded that there is a set of issues, which needs to be addressed in a critical evaluation of these techniques: what level of aggregation should be used for the components of the schedule or cost? How should probability distributions be elicited? How to deal with correlations? How to take account of adaptive strategies? How to deal with limited information? How do we judge a good risk analysis? The author also concluded that the accuracy of projects related information is key to accurate risk analysis and risk management.

From the unstructured interview conducted with both practitioners and researchers, the author concluded that there is a consensus on the utility of the quantitative methodologies in risk analysis and it is widely recommended. The author concluded that accuracy of information is an essential input to the risk analysis process and it is dependent on the collection of information and its documentation.

(Kindinger, 2002), “The Case for Quantitative Risk Analysis” The writer identified two methods used in quantitative risk analysis. The first one evolved from the safety analysis and process hazard analysis, where the second one is derived from the system analysis approach. The writer states that the second approach has clear advantages over the first. It has its origins in the discipline of system analysis, and is performed by building a mathematical model of the system to predict results for important performance measures. The System analysis approach provides much more complete and comprehensive results. The writer advocates for the system analysis approach which is used by the Los Amos lab.

(APM, 2000), “Project Risk Analysis and Management” According to the guide there are three aspects of project management which risk management tries to control. These are cost, time, and performance objectives. If they are well managed they will lead to the successful implementation of the project. The guide emphasizes the importance of having accurate data in order to employ statistics in the analysis of project risks. The guide recommends risk management to be in two phases: The first one is risk analysis which could also take two sub-phases, qualitative or subjective analysis or quantitative or objective analysis of risks. The second phase is risk management where the author suggests conducting an initial qualitative analysis before doing a thorough quantitative analysis. Although the project risk management can be done at any stage in the project life cycle, the guide recommends using it at the early stage of the project, thus referring to the proactive management of risks.

(Henczel, 2000), “The Information Audit as a First Step towards Effective Knowledge Management” In this paper, the author recognizes the importance for information audit to the organization as it will be needed when the organization is growing. According to the writer, the information audit is needed to evaluate and ensure that quality information is available to those who need it. In big organizations, information is usually available in multi- formats and its sources are many. Thus, it becomes imperative for information users to have one central source of information which can provide sufficient, efficient, and accurate information to users. In the context of this research, users are those who are involved in the project risk management and who use information as an input in the risk analysis process.

Many big organizations are structured in a way that each department is working independently from another, and they may rely on similar information sources. Some operate without having access to the necessary information needed because they may not know where to find them. Consequently, there might be some gaps in the information provided, inconsistencies, duplication in information within the same organization. This is somehow relevant to UNRWA context in Gaza with regards to project management, where sometimes each involved department relies on a different source of information, and due to the lack of coordination between them, information is not consistent, inaccurate, and sometimes subjective.

(Norris, Perry, & Simon, 2000), “Project Risk Analysis and Management” The authors emphasized the importance of risk management for the overall project management and to the achievement of the project goals and outcomes. According to the author, the process can be divided into two stages: risk analysis and risk management. Risk analysis can be either or both qualitative and quantitative. The benefit of risk analysis is far beyond its costs as risk analysis can lead to successful project planning. The writers also discuss the wider benefits of effective project risk analysis and management as being a tool for decision making for the top management of the project. The author also suggests and explains some of the risk analysis techniques that can be used in the quantitative analysis for project risks.

2.3 Arabic and Local Studies

(El-Kariri, 2012), “Investigating Variation Orders Observance in UNRWA Construction Contracts” The paper was mainly concerned with risks facing the construction projects implemented by UNRWA in Gaza. The writer discussed the causes of the variation orders issued as part of the construction projects in Gaza which are considered deviation orders due to change

in the project implementation. Variation or change orders are due to changes that come up during the initial or final stages of the project and they are looked at as negative and unwelcomed by all project stakeholders. They disrupt project plans and causes project overruns in schedule and budget or both. In his study, Ala conducted three case studies and found out that variation or change orders are due to unpredictable or unplanned emergencies due to new requirement in the project affecting schedule and budget. He concluded that variation order is due to uncertainties or risks which are due to change in the project design, political instability, natural disasters, etc. The writer emphasized the importance of including risk factors in the planning process. He also concluded that among the causes behind change orders are lack of coordination, lack of information, and lack of effective planning. The study recommended investment in capacity building and raising awareness among stakeholders regarding variation and change management in construction projects. The writer also highlighted the need to learn from previous changes in away to improve variation management in future projects.

(Saleh, 2012), “A critical Evaluation of the Internal “Cross- Departmental” Projects Communications Management at UNRWA Gaza Field Office within the Construction and Infrastructure Sector” This thesis was mainly concerned with the cross-departmental communication in UNRWA in Gaza with regards to construction projects. The study revealed that the available information systems do not meet the key internal stakeholders’ information requirements. The study also revealed that the current level of information quality does not meet the requirements of the key internal stakeholders. Another key finding is that the current organizational structure does not support the smooth flow of projects information among the concerned departments. In addition, the current communication flow does not support effective flow of projects information across departments and programmes.

The key recommendations of this thesis were as follows: First, to establish a centralized information system to serve as the main source of information for all project stakeholders and to streamline the exchange of information across departments. Second, increasing the capacity of human resources in order to meet the increase in funded projects. The writer also emphasized the importance of enhancing the capacity of the current staff members by implementing a comprehensive training programme for all involved.

(Janem, 2011), “Analysis of Project Management Practices in Public Sector in West Bank “Ministry of Public Works & Housing” In her thesis, the writer concluded that there is a gap between benchmark best practices n project management and practices being seen in public sector in Palestine. According to her findings, miscommunication among the project team and stakeholders, and lack of specific methodology lead to project failures.

Her recommendations also included channeling of donations to feed into the organization’s strategy and mission. She also recommends that planning should be given more attention and risk management as this is one of the main factors for successful projects. In addition, budgets should also fit contingency plans in order to avoid any unwanted surprises and deviations from the project scope and resource allocation.

The thesis also emphasized the importance of having lessons learned from previous projects and the role of information dissemination, and documentation. She also highlighted the

need for using a comprehensive methodology in project management and its importance in supporting the decision making process.

(Cihan Terzi, Istvan Posta, 2010), “Review of Enterprise Risk Management in the United Nations System” The study reviewed the Enterprise Risk Management (ERM) policies within the UN organizations in order to identify best practices and lessons learned. The study has concluded that UN organizations have become more prone to risk due to the growth of their mandate and to the limits of their resources. The study sees risk management as being the responsibility of everyone in the organization and a coherent methodology of its implementation should be in place.

The study identified ten benchmarks for the organization to succeed in progressing towards positive change in risk management. One of these key benchmarks is the need for communication and a training plan in order to create awareness, and promote risk policy within the organization. Another important benchmark is the integration of risk management with the organization’s systems, planning, programming, and operational and business processes.

Further, this study recommends having an oversight on the implementation of ERM and the cooperation between the executive and top management in order to have a collective implementation of the ten set benchmarks.

(El-Sawalhi, 2003), “Causes of Construction Delay in UNRWA Projects in the Gaza Strip” In his study, the researcher explored 90 completed construction projects. He mentioned the exceptional context of Gaza as being one of the challenges facing the successful implementing projects in line with pre-planned budget and schedule. According to him, delays in construction projects have negative impact on both contractors and owners of projects, and that it is for the best interest of both that these delays are mitigated or at least avoided.

The study concluded that delays in construction projects implemented by UNRWA in Gaza are frequent and became a phenomenon especially in medium and large projects. Most of the delays are due to reasons beyond the contractor’s control such as the political situation, unavailability of materials, bad weather, required changes in project, etc. According to his study 77.8% of the projects have gone through delays.

He indirectly referred to risks which usually face projects and cause delays within UNRWA in Gaza’s context. These risks are being aggravated by the fact that they are discovered and changes to the project are realized or required to be added at later stages in project implementation. This means that there is lack of proactive risk management, and effective project planning. However, the study focused on project schedule without clear link to the project budget and cost due to delay in schedule.

(Shairi, 2013), “The Situation of Using Quantitative Methods in Decision Making and Problem Solving in NGOs” This thesis concentrated on studying the current situation in NGOs in the Gaza Strip in terms of using quantitative methods or operation research in decision making and problem solving. The study revealed that there is a lack of knowledge among most of the NGOs and their working staff in many of these quantitative methods. It also revealed that staff members endeavor to enhance their operation tasks by relying on financial information but due

to the lack of specialized staff who can support with quantitative methods, those methods are not well utilized in the decision making process.

The study recommends that staff should undertake training to raise their capacity in relation to quantitative methods. He also emphasized the importance of having a reliable and efficient information system that can provide the needed information in accurate and timely manner in order to support the decision making processes.

2.4 Commentary on Previous Studies

The main theme of this research is to evaluate the current project risk management within UNRWA in Gaza with the aim to support and promote quantitative techniques in order to enhance the overall management of projects. The previous studies provided the foundation knowledge on the main topic of this study and have shed some light on its dimensions.

Within the context of UNRWA, several studies have been explored. (El-Sawalhi, 2003) highlighted the exceptional context of Gaza where risk is considered inevitable to projects implemented in such a volatile situation. This has supported the rationale behind introducing a sophisticated quantitative risk management to be embedded within projects. The rationale was also supported by (El-Kariri, 2012) who focused on one of the negative results (variation or change orders) of the absence of effective risk management tools within UNRWA. The results of (Saleh, 2012) has also supported this rationale by referring to some of the main factors which affect the project risk management in UNRWA in Gaza. He referred to the lack of effective information management and communication, to the current structure which needs reform in order to have smooth communication flows that support effective flow of project information across departments. These findings are in support to the need a study that can contribute to the enhancement of project risk management within UNRWA in Gaza.

In order to ensure the maturity of the organization before embarking on project risk management and be able to utilize quantitative methods effectively, the roles and responsibilities of the organization should be clear. In his study, (MAGNÚSDÓTTIR, 2012) concluded that the risk management cultures should be initiated by the project office and that in order to achieve this goal it should be supported by the top or strategic management of the organization. The study also supported the logic behind creating a risk database within the organization as it will facilitate data and will promote trend analysis. Overall, this will also create a learning environment at the organization thus increasing the best practices in project and risk management.

The idea of supporting project risk management with quantitative methodologies should not ignore the qualitative means but as (Hornbacher, 2012) pointed out, it should work hand in hand and that qualitative methods could also serve as an initial analysis that could support further quantitative analysis for projects risks. The writer suggests that both quantitative and qualitative methods should be complementary to each other and not any of them should be ignored. He also reiterates that in addition to that expert advice should be also be taken into consideration.

The previous studies have also provided empirical case studies which gave a practical foundation to the study. The case studies presented by (Bugalla & Narvaez, 2011) provided real

time models of integrating the ERM in project management within organizations. This was also supported by (Bashir & Christin, 2008) who also referred to a practical example of how quantitative methods can be utilized in the analysis of risk in the non-profit arena.

The previous studies and this one have emphasized the importance of risk management for projects to succeed especially in the context of Gaza where conditions are volatile and adverse events might unpredictably emerge. They also referred to planning as one of the most critical factor as a measure to avoid substantial deviations from the project's budget, schedule, and scope. In addition, they also referred to the critical role of proactive analysis of risks and the reliance on accurate and relevant information as an important input for further usage of quantitative methods.

This study will add value to the previous ones in the sense that it will conduct a diagnosis to the in order to reveal the causes behind the obstacles facing the efficiency of implemented projects by UNRWA in Gaza. Given, the exceptional and volatile situation in the Gaza Strip, where projects risks are inevitable, the study have recommended several measures in order to overcome the current situation. These measures are based on the practical factors and findings which were realized at the end of studying the study population.

This study has also been designed to have a multi-layered reform that could create a mature atmosphere conducive to the integration of quantitative risk management within the organization. It studied the practical factors that impeded the successful implementation of projects. Based on this it concluded some results on which some key recommendations have been suggested in order to boost the current project risk management for projects implemented by UNRWA in Gaza. Most of these recommendations are considered realistic and feasible, and can be considered to be incorporated.

Chapter 3

Theoretical Framework

3. Theoretical Framework

3.1 Introduction

This chapter provides explanation of the concepts pertaining to the subject area of this study. It discusses the basic information about project management, risk management for projects and techniques used. This information is of substantial importance to the reader as it lays the foundation for better understanding of the whole study results and recommendations.

3.2 Project Management

Project management is relatively a new comer to the management science. Businesses and industry started to realize the benefits of managing projects efficiently only in the early 19th century. This occurred as the need for managing large-scale projects such as the building of roads, canals, ships, etc were being undertaken. Managers of these projects faced many serious problems, and had to deal with large numbers of workers and complicated elements that need to be implemented in order including logistics and allocation of resources (Lockitte, 2007).

Frederick Taylor (1856–1915) undertook a detailed study of work and showed that it could be broken down into elementary parts and that those elements could be planned and built into the production process. Henry Gantt (1861–1919), an associate of Taylor, studied the elementary parts in greater detail. One outcome of his work was the introduction of the Gantt chart, which highlighted the sequence and schedule of projects tasks. The Gantt chart proved to be successful as it is being used for tens of years and up to the present. Other tools have emerged over years such as project evaluation review technique (PERT) and the critical path method (CPM) which improved the scientific approach towards project management (Lockitte, 2007).

Project management can be described as “the application of knowledge, skills, tools and techniques to project activities in order to meet or exceed stakeholder needs and expectations from the project”, or “the integration of all aspects of a project, ensuring that the proper knowledge and resources are available when and where needed, and above all to ensure that the expected outcome is produced in a timely, cost-effective manner” (Norton, 2010).

The term “project management” is sometimes used to describe an organizational or managerial approach to the management of projects and some ongoing operations, which can be redefined as projects, which is also referred to as “management by projects.” An organization that adopts this approach defines its activities as projects in a way that is consistent with the definition of a project. There has been a tendency in recent years to manage more activities in more application areas using project management. More organizations are using “management by project.” This is not to say that all operations can or should be organized into projects. The adoption of “management by project” is also related to the adoption of an organizational culture that is close to the project management culture (PMI, The Standard for Program Management, 2008).

A number of methodologies have emerged in the project management arena. Whereas PMBoK (Project Management Body of Knowledge) is largely common in the public and private domain both internationally and in USA. Other schools of project management have been

developed by schools such as the PRINCE2 which can be seen as the most important alternative methodology and mostly known to be a British approach. According to (PRINCE2, 2011), this approach has the following key features:

- a- It focuses on business justification.
- b- It enforces a clear structure of authority and responsibility on the project team. The structure of supervision and reporting is clear and it ensures that each party has his clear objectives and that they are supported in realizing this.
- c- It is concerned with the production of a number of ‘management products’ associated with the management and control of the project: for example, the project initiation document, the project budget, the project plan and various progress reports.
- d- It supports the planning process by ensuring that all participants in the project (both internal and external to the organization) have a clear understanding of the tasks to be completed.
- e- It contains several quality controls, such as clearly defined and documented technical and management procedures. These procedures ensure that work is completed both on time and at the appropriate level of quality.

According to (PMI, 2015), project management is the “application of knowledge, skills, tools, and techniques to project activities to meet the project requirements”. Thus, Project management is accomplished through the appropriate application and integration of logically grouped project management processes comprising of five process g as follows:

- 1- Initiating.
- 2- Planning.
- 3- Executing.
- 4- Monitoring and controlling.
- 5- Closing.

And the following knowledge areas can be considered the prerequisites for the project to succeed:

- 1- Project integration management.
- 2- Project communications management.
- 3- Project scope management.
- 4- Project time management.
- 5- Project cost management.
- 6- Project quality management.
- 7- Project human resources management.
- 8- Project risk management.
- 9- Project procurement management.

This study attempts to address basically one of these knowledge areas, namely, the project risk management, which is defined by the PMI as the “an uncertain event or condition that, if it occurs, has a positive or negative effect on a project’s objectives”. The study will also explore how it is related to other factors such as planning, information management, and organizational structure.

3.3 Project Definition

The Association of Project Managers defines a project as: “A human activity that achieves a clear objective against a time scale”. A project also can be defined as a unique undertaking to achieve a specific objective that requires resources and activity (Norton, 2010).

The Project Management Body of Knowledge Guide defines a project as a temporary endeavor undertaken to create a unique product, service, or result (PMI, Project Management Body of Knowledge, 2008). UNRWA defines a project as “a series of activities aimed at bringing about clearly specified objectives within a defined time period and with a defined budget” (UNRWA, Programme/ Project Cycle Management Handbook, 2008). In essence, a project is any planned initiative that is intended to bring about beneficial change to a given context whether it is a community, an institution, or an organization, and so on. It has boundaries that are determined by its objectives, resources and time span. According to UNRWA definitions, a project should contain the following features:

- 1- Defined and measurable results.
- 2- A set of activities to achieve those results.
- 3- A finite and defined life cycle.
- 4- Clearly identified stakeholders.
- 5- An organizational structure with clear roles and responsibilities for management, coordination and implementation.
- 6- A defined amount of resources.
- 7- A monitoring and evaluation system.

In UNRWA’s operational context, the term “project” mainly refers to humanitarian interventions, which are externally funded over and above the Regular Budget of the Agency (known as the General Fund budget – GF). Projects in UNRWA either address multi- sectoral interventions (e.g. the restructuring of whole refugee camps, as in the case of Gaza Reconstruction & Recovery Programme following the 2008/2009 war), or simpler interventions which supplement existing activities, e.g. the construction of a school or a health centre (Saleh, 2012).

3.4 Risk Definition

The ISO 31000 (2009)/ ISO guide defines risk as the effect of uncertainty on objectives. According to this definition, risk could be events which may or may not happen and which could happen due to lack of information and ambiguity in the situation. Risks could entail threats and opportunities. This definition was the outcome of an international committee representing over 30 countries and supported by thousands of subject matter experts (Dittmer, 2013).

According to PMBOK guide, project risk is “uncertain event or condition that if it occurs has a positive or negative effect on one or more project objectives such as scope, schedule, cost, or quality”. Based on these definitions, all projects entail certain degree of risks, and so risk management plans should be incorporated into the project plans (PMI, 2008).

According to (Group, 2012) the meaning of risk should be clearly understood in order to be able to manage risks effectively. With regards to projects, project managers are mainly concerned with two aspects of the projects, these are time and cost. So, risk can be defined as “uncertainty that matters; it can affect project objectives negatively or positively”. This uncertainty might be about an event which may happen in the future without knowing its impact on the project. So, two aspects of risk are the probability of occurrence of the risk and the magnitude of its uncertain impact.

Risk and uncertainty are always linked with projects, their nature, context, and magnitude. It refers to the possibility of deviation from the original plan and its impact on planned objectives and results. That is why risks in projects should be monitored and controlled. Risks are also associated with decision making when someone (such as the project manager) is to choose between two options and how he can prefer one to another. This decision making process is always has risks and the decision maker should be aware of these risks in order to take the right decision (Shairi, 2013).

As we can see, all of these definitions refer to risks as the uncertainty of an adverse event that if it may happen it will impact the project negatively. It will impede the project from achieving its objectives and planned outcome. Risks in projects are always associated with schedule and cost, which they are also interrelated. These two aspects are also considered the main resources of projects and resources are always considered scarce and should be managed efficiently.

3.5 Project Risk Management

The PRINCE2 methodology lists risk as one of the seven themes determined by its approach. It is considered one of the key factors for projects failures if not managed effectively. The process of risk management should be systematic and not based on ad hoc, reactive responses. The process of risk analysis or management should also consider proactive procedures such as identification of risks, performing assessment, and controlling risks that are expected to affect the project to realize its objectives even before the starting of the project. Risk analysis and management should also support the decision making process through good understanding of risks, their causes, probability of occurrence and their impact. As risks in projects are inevitable, their management becomes very crucial to the success of the project. In order to effectively manage risks, a systemized risk strategy should be established for any project to take place (Alexos, 2013).

Risk should be addressed proactively and during the planning phase. Organizations have risk tolerance which is affected by their legal status and culture, and risk exists the moment the project is conceived. Moving forward with a project without proactive focus on risk management increases the impact on the project and might lead to project failure. Project risk management tasks should be budgeted well during the planning of the project. Input on risk is needed for the project management plan. The four aspects of risks that could be directly affected are **scope**,

quality, time, and cost and their relation to the degree of occurrence of the risk. If both probability and impact are combined in a matrix it can constitute primary tool that can be used in project risk management (PMI, Project Management Body of Knowledge, 2008).

Risk management should include tracking of risk activities for the benefit of the current projects and for future lessons to be learned and that could help avoid or mitigate those anticipated risks. It is also important to have risk identification and evaluation regularly as risks could also emerge during the life cycle of the project. Qualitative approach in risk management should be also considered expert judgment should be taken into consideration as relying only on quantitative methods can be sometimes misleading.

In June 2008, UNRWA has put in place guidelines for project and programme cycle management represented in its produced handbook. The efforts were to establish standard guidelines which can be followed by staff engaged in the design and management of projects and programmes. Risks can be due to internal or external factors which prevent the programme or project from achieving its objectives. Risk also could be the probability that an event or action may adversely affect achievement of the intervention objectives. Risks which arise from factors actually or potentially under the control of managers are called internal risks, such as ineffective management, delays in procurement, staff turnover, etc. In most cases, management can mitigate the effects of those risks by taking measures during the planning phases of the project. Other risks which are beyond the manager control, such as natural disasters, political instability, armed conflicts, wars, etc, are called external factors which can also impact the project from achieving its objectives. Risks, if addressed in the right time and in the right way can also lead to right decisions and policy making (UNRWA, 2008). Risk management means analyzing potential risks, and managing them by allocating adequate resources such as time and money. The analysis of risks provides an opportunity to assess the conditions under which the intervention will be working and define counter- measures. Risk analysis involves three main steps which are:

- Systematically identifying risks, building on the findings and tools used in the assessment stage.
- Estimating the probability of the risk, and the likelihood it will happen.
- Evaluating the importance of the risk in terms of vulnerability, costs, and benefits.

The risk planning involves the decision how to monitor the risk, take mitigation measures to reduce its probability or importance, or control it by eliminating it altogether. The mitigation measures can be also included within the intervention design to reduce risks. Those measures may also become additional activities or outputs with relevant budget allocation. Collection and organization of information can also contribute to better risk analysis. If analyzed well, they can lead the project managers to track deviations, reasons behind them, and compare planned versus actual achievements, which will lead to better understanding of the risks and the best way to manage them.

3.6 The basic process of risk management

There are several approaches to address this important issue of project risk management, and all of them strive to maximize the effectiveness and efficiency of the project. The project risk management process may also differ depending on the magnitude and complexity of the project.

According to (Group, 2012), there are three main and basic parts of project risk management which can be followed; these are **identification, analysis, and action**.

According to (Group, 2012), risk first should be identified and understood thoroughly, and then be analyzed by the subject matter experts or those who carry sufficient knowledge and expertise in risk or project management. After risk is analyzed, there should be a following action, if the process does not include a response or an action to the risk identified, then the process will be incomplete and useless, because the ultimate aim is to manage risk and not only to identify and analyze it. The process could follow the following process components:

- 1- Risk management planning: This is concerned with the methodology of approaching and executing the risk management activities for a project.
- 2- Risk identification: which means that the project officers or managers should determine which risks could affect the project and record their characteristics.
- 3- Qualitative risk analysis: Prioritizing risks for subsequent further analysis or action by assessing and combining their probability of occurrence and impact.
- 4- Quantitative risk analysis: This is concerned with studying the effect of risks on the overall project objectives by utilizing available data and statistical methods.
- 5- Risk response: This is concerned with developing actions and responses to maximize opportunities and mitigate threats or risks.
- 6- Risk monitoring: Tracking identified risks, monitoring residual risks, identifying new risks, executing risk response plans, and evaluating their effectiveness throughout the project life cycle.

The authors have also identified questions to be answered as part of the risk management process as follows:

- 1- What are the risks which could negatively affect the project implementation and the realization of its objectives? (*risk identification*)
- 2- What are the most important risks of these (*qualitative risk analysis*)
- 3- How could these risks affect the results of the project in probabilistic terms of cost and schedule? (*quantitative risk analysis*)
- 4- What should be done? (*risk response*)
- 5- How the responses affect change and what is the status of the project now? (*risk monitoring*)
- 6- Who are the persons to be informed about this? (*communication*)

These questions should be answered consequently and in order, they should be also repeated every certain period of time as long as the project cycle is still going on. Communication should be also always active and all relevant information should be disseminated to all concerned parties. Figure (7) gives an illustration of this continuous process of risk management.



Figure (2): The risk management process

(Group, 2012)

3.6.1 Information Management System

The counterpoint between the organization and its individual members has particular relevance to information management because of its responsibilities to both the organization at one level and to individuals at another level. This counterpoint means that there is a need to consider both the organization and its members in information terms as a starting point for developing strategies for effective information management in any organization (Kirk, 1999).

A system can be defined as a collection of interrelated components that work together towards a collective goal. The generic model of a system shows that there are five main components of any system; these are: Inputs, processes, outputs, feedback & control.

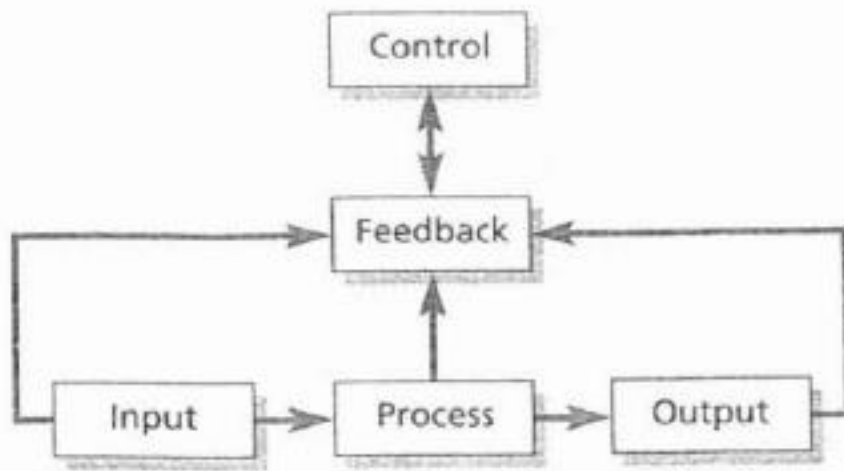


Figure (3): Generic model of a system

(Saleh, 2012)

As per the shown figure, the input to a system can be thought of as the raw materials for a process that will produce a particular output. Inputs are turned into outputs by subjecting them to a transformation process. Information on the performance of the system is gathered by a feedback loop. If alterations are needed to the system (based on the feedback), adjustments are made by some form of control mechanism, to ensure that the resulting outputs fully meet the desired objectives. Systems do not operate in isolation. They contained within an environment that contains other systems. The scope of the system is defined by its boundary; where everything outside the boundary is part of the system's environment and everything within the boundary forms part of the system itself. Thus, there are always exchanges between a system and the environment or other systems. Systems can be complex and made-up of other smaller sub-systems. Systems, therefore, are hierarchal; where systems are made-up of subsystems that may themselves be made-up of other subsystems. From this, it's apparent that parts of a system are dependent on one another and this interdependence means that a change to one part of a system leads to or results from changes to one or more other parts (Saleh, 2012).

Information System, from a pure technical perspective, is a set of inter-related components that: collect and retrieve, process, store, and distribute information to support decision making & control in an organization. Additionally, Information system contains information about specific people, places, services, facts, and things within the organization and in the environment surrounding it as well (Laudon, 2010).

Information systems from a business perspective are an organizational & management solution to business challenges that arise from the business environment. Thus, Information Systems are part of a series of value- adding activities for: acquiring, transforming, and distributing information that mangers can use to improve decisions making, enhance organizational performance and, ultimately, achieve the organizational goals effectively and sufficiently (Laudon, 2010).

A business information system is a group of interrelated components that work collectively to carry out input, processing, output, storage and control actions in order to convert data information products that can be used support forecasting, planning, control, coordination, decision making and operational activities in an organization (Bocij, Chaffey, Greasley, & Hickie, 2006).

Management information system is an organized approach to the study of the information needs of an organization's management at every level in making operational, tactical, and strategic decisions. Its objective is to design and implement procedures, processes, and routines that provide suitably detailed reports in an accurate, consistent, and timely manner. In a management information system, modern, computerized systems continuously gather relevant data, both from inside and outside an organization. This data is then processed, integrated, and stored in a centralized database (or data warehouse) where it is constantly updated and made available to all who have the authority to access it, in a form that suits their purpose (Saleh, 2012).

3.7 Enterprise Resource Planning (ERP)

Enterprise systems integrate the key business processes of an entire organization into a single software system that enables information to flow seamlessly throughout the organization. These systems focus primarily on internal processes but may include transactions with external stakeholders such as customers and vendors. The enterprise system collects data from various key business processes in finance and accounting, services, and human resources and stores the data in a single comprehensive data repository where they can be used by other parts of the business. Managers emerge with more precise and timely information for coordinating the daily operations of the business and an organization-wide view of business processes and information flows (Saleh, A critical Evaluation of the Internal “Cross- Departmental” Projects Communications Management at UNRWA Gaza Field Office within the Construction and Infrastructure Sector, 2012).

According to (Capgemini; UNRWA, 2014), the United Nations Relief and Works Agency (UNRWA) has selected SAP as an integrated ERP system to implement their organizational structure and manage their transactional processing related to its operations in all of its five fields including Gaza. The main ERP objectives can be summarized as follows:

- Improving capabilities in planning and control.
- Decentralizing and empowering delivery in the field whilst maintaining full visibility and oversight centrally.
- Improving the engagement and transparency towards the Agency external stakeholders with particular attention to improving donor relations.

The SAP solution was originally being used by the World Food Programme (WFP) and UNRWA decided to adopt its functionalities that are similar to its operations and processes and to customize the SAP ERP to meet its specific business needs. Therefore, UNRWA adopted the following process groups:



Figure (4): ERP process groups adopted by UNRWA

(Capgemini; UNRWA, 2014)

3.8 Enterprise Risk Management (ERM)

Enterprise Risk Management (ERM) has emerged as a framework to respond to the challenges that face the enterprise from achieving its objectives and planned outcomes. The concept has been worked at in order for the organization to identify, assess, and manage risks associated with its activities or projects. Those risks could be internal, such as

According to (UNRWA, Enterprize Risk Management (ERM)), ERM can be defined as “an organization-wide process of structured, integrated and systematic identification, analysis, evaluation, treatment and monitoring of risks towards the achievement of organizational objectives”. For UNRWA, ERM was introduced as a leading management principle control throughout the organization. It can be defined as the process, set by management, applied in strategy settings and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its appetite, and to provide reasonable assurance regarding the achievement of entity objectives.

According to (LLP, 2004), the ERM concept includes:

- Continuous processes across the organization.
- Is affected by people and all levels of management across the organization.
- Is applied to and affected by the organization’s strategy.
- Identifies potential events of uncertainty that if occur affect the organization and to manage risk within its appetite.
- Is able to provide assurance to the top management of the organization.
- Is directed to enable the organization to achieve its objectives and mange risks that might impede them.

UNRWA, as being part of the United Nations System is facing several risks based in its nature working in unstable environments and scarcity of resources. In order to be able to achieve its objectives and provide high quality services to its clients and beneficiaries, it should integrate risk management or ERM to all of its operations and activities. ERM, of course, does not guarantee that the organization will be risk free after its implementation, but it will increase the possibility of risk identification, and treatment of important risks.

The cost of ERM depends on the sophistication of the chosen ERM structure and tools. Not all organizations require very sophisticated risk management systems. The decision on the degree of technical complexity and which formalized governance structure best fit an organization will depend on the size and nature of the organization's operations. On the other hand, this cost might be offset by its benefits which could not be tangible as UNRWA is still lacking maturity of its implementation. Internal UN audits emphasize the importance of integrating the ERM into the UN systems as a recommended risk management framework (Cihan Terzi, Istvan Posta, 2010)

3.9 Project Risk Management Techniques

3.9.1 The Work Breakdown Structure (WBS)

The work breakdown structure (WBS) is defined by the (PMI, Project Management Body of Knowledge, 2008) as “A deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project objectives and create the required deliverables”.

The WBS could serve as a project management tool that could assist in identifying and managing risks. The reasons to use the WBS in projects is that it helps define and organize the project activities and scope accurately. It can be done by using a hierarchal tree structure of all the activiteis and sub-activities to be taken as part of the project. the WBS can also specify deliverables and measurable baselines for better monitoring of project progress. It also considers the allocation of resources to each of these deliverables wich could also improves the control on the usage of these resources and prevent any diviation as per the alloction. Overall, it is a good monitoring and control plan that can keep the project in line with plan and help discover risks as soon as they emerge.

According to (Capgemini; UNRWA, 2014), UNRWA's new ERP system is mainly based on the work breakdown structure (WBS) which is based on breaking down the projects activities into different levels based on a hierarchical structure model. The individual elements represent activities within the work breakdown structure and those elements are called work breakdown structure elements (WBE) in the project system.

Within the adopted ERP by UNRWA, the WBS has a hierarchy structure where the top level is called the “Project Definition” where it can determine the project start and end dates of the entire project. The individual elements within the WBS are called work breakdown elements (WBEs) and can represent (Capgemini; UNRWA, 2014).

Activities,

Tasks;

Work packages;

A Work Breakdown Element (WBE) is also characterized mainly by:

- Start and finish dates.
- Texts describing the work to be performed.
- Responsible persons or cost centres.
- Cost centres carrying out the project.

And each WBE can be defined as:

- Planning or forecasting element.
- Account assignment element.
- Billing element.

Within SAP, UNRWA has decided to use a standard work breakdown structure to be applied in all of its five fields of operations. The structure consists of eight hierarchical levels as follows:

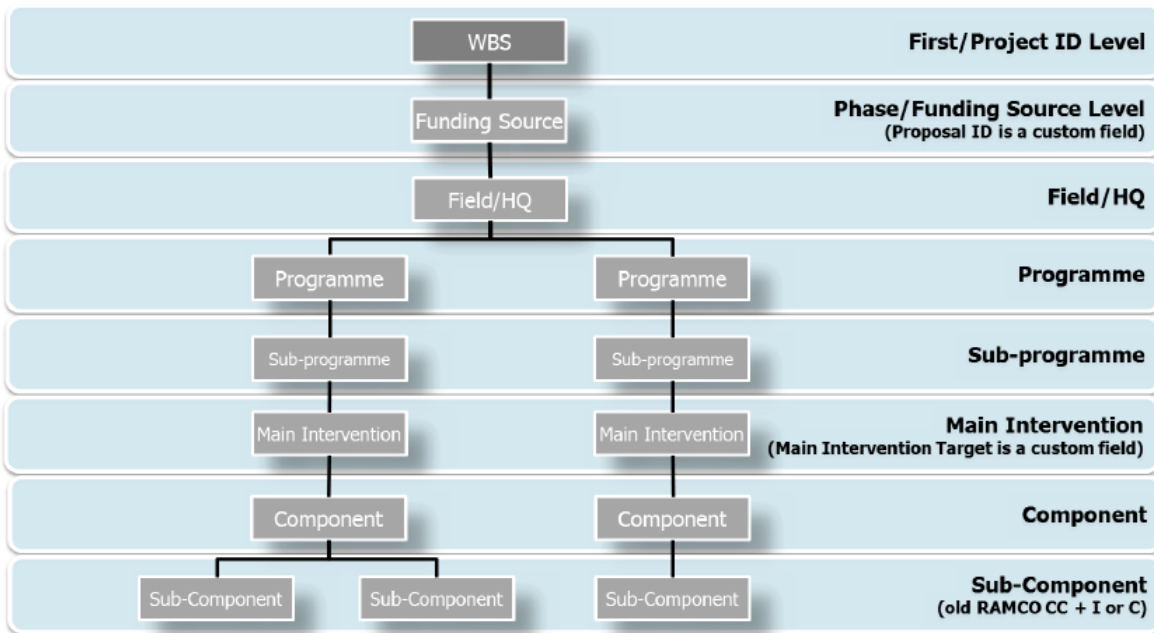


Figure (5): Structure of WBS based on SAP

(Capgemini; UNRWA, 2014, p. 92)

3.9.2 The Monte Carlo Simulation

This is considered one of the most common quantitative methods which is beneficial when it is applied to complex projects which have high level of uncertainty and risks. The method can

provide the project management with the possible scenarios that are expected to happen with the project and the likelihood of achieving its objectives. This method is effective and as it is based on numerical and quantitative data with minimum subjectivity involved (Marom, 2010).

According to (Marom, 2010), some of the key benefits of the Monte Carlo Simulation are:

- It can be applied to explore the likelihood of meeting the project's milestones and goals and can assist in planning proactively for the project. The method can provide an insight on the project in the early stages of implementation.
- The method can help the project manager in providing outcomes of likelihood with associated confidence limits and correlations with other variables.
- The method can be a useful technique for decision making as it support with quantitative data that can help the top management in taking their decisions more easily and with more confidence.

3.9.2.1 Recommended steps to follow in conducting the Monte Carlo Simulation

This method needs to be detailed further in a separate paper, but some of the steps recommended by (Marom, 2010) which he suggests when performing the Monte Carlo analysis for any project are as follows:

- 1- The project manager should identify the key variables or factors of project risk.
- 2- Range limits for each of these variables should be determined.
- 3- A weight should be estimated or specified for the probability for each of the variables identified.
- 4- Identifying relationships between variables.
- 5- Running simulation based on these identified variables and correlations, and statistically analyze the simulation results.

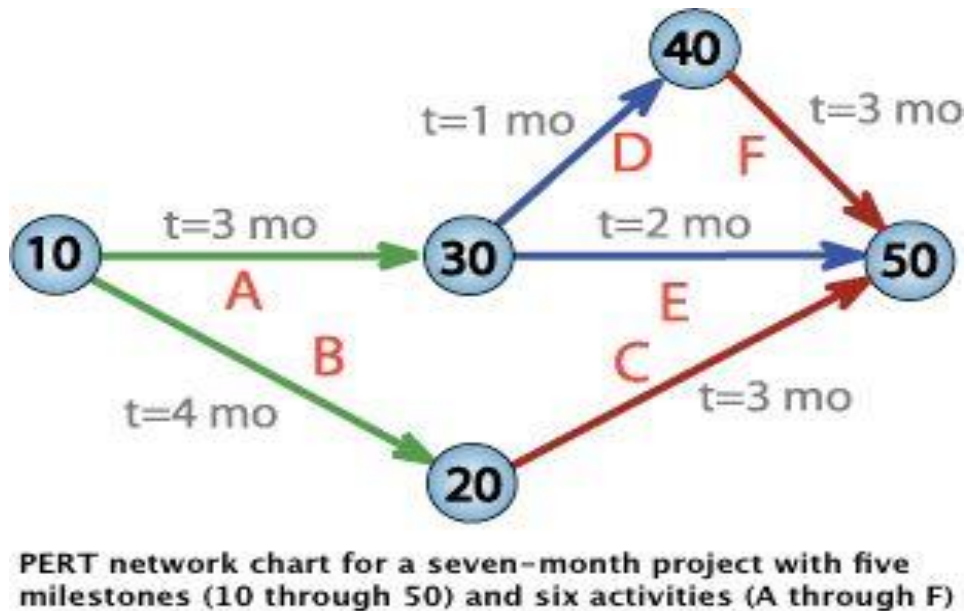
3.9.3 The Programme Evaluation and Review Technique (PERT)

PERT was originally developed by the U.S. Navy in 1958 and 1959 and introduced to its Polaris Weapon System with the aid of the consulting firm Booz, Allen, and Hamilton (Kerzner, 2009)The method mainly includes six main steps. The first two rely on the project manager to identify the project activities represented in a chart flow or any other representative means. Two expectations should be also estimated. The next step is sharing these diagrams and activities with line managers or those who have prior experience in order to get and incorporate their feedback regarding the activities and their interrelationships. Step five is checking and adapting the critical path of the calendar activities and shorten it as much as it can be in order to meet the project or grant criteria. The last step is looking into the devised plan and revising it according to the resources available, which are usually limited (Kerzner, 2009).

3.9.3.1 Basics of the PERT technique

The PERT technique is mainly concerned with managing probabilities and thus it utilized some statistical formulas in getting outputs to project managers and officers. Similar to other techniques, PERT breaks down the project tasks into detailed activities and their dependencies. A tree map could be drawn to represent the whole project and its activities where events are connected together as nodes. The map also can illustrate the earliest time (TE) and the latest time (TL) for each activity where the slack time for each activity is identified as well.

Figure (6): Example of PERT network chart



Source: (tutorialspoint.com)

In PERT the project manager provides three estimates for time: One as the optimistic duration for the activity, the pessimistic, and the most likely. Then a mathematical formula is run to produce the most probable value to occur as illustrated below:

- 1- Optimistic estimation (TOPT).
- 2- Likely time (TLIKELY).
- 3- Pessimist estimation (TPESS)

The most probable or estimated according to PERT

$$E = (TOPT + 4 + TLIKELY + TPESS) / 6$$

Only activities that are on the critical path can cause delay or accelerate the project. If we then calculate the standard deviation by getting the square root of the variances which can give the project manager an indicator of the probability of completing the project on schedule or not (tutorialspoint.com).

3.9.4 The Critical Path Method (CPM)

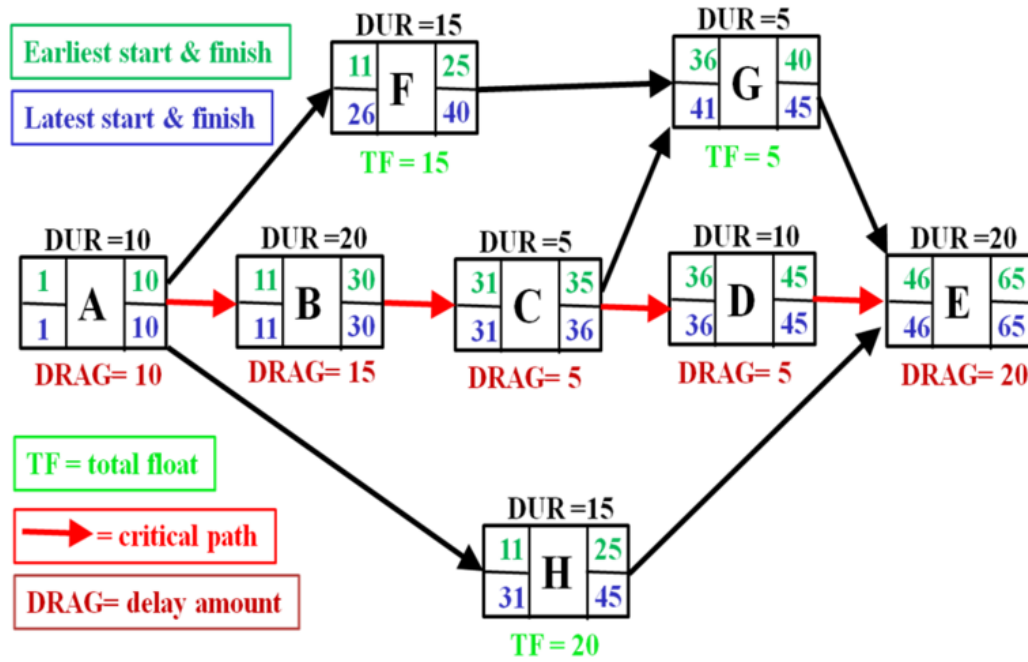
The critical path method is a modeling technique which is used in analyzing projects risks and managing its activities. The technique was developed in late 1950s by Morgan R. Walker and James E. Kelly. The CPM is useful in the project planning especially when the project includes several activities and have precedence order. The CPM can help define the project start and end date, and the critical path of the project which helps in identifying activities that if delayed, the whole project will be delayed (Baker, 2013). Due to the limitation of the study, we will only mention some of the advantages of this approach but will leave the details and techniques of this approach for the reader to further explore.

3.9.4.1 Advantages of the Critical Path Method (CPM)

According to (Peter Stelth, 2009) some of the advantages of the critical path method are:

- It motivates project managers to identify and represent the project activities and specify their requirements and logical order.
- When project manager depict the activities in a network diagram, it offers them a predication of the completion time for each of the activities and the project as a whole.
- When the project management identify the activities on the critical path, that is activities which may delay the whole project if any of them is delayed, this will lead to the early identification of the risks and problems which might occur.
- CPM also encourages disciplined and logical approach to planning and the causes for project overruns in terms of budget and schedule.
- With CPM, managers can identify activities that may cause potential problems if not managed and controlled effectively over a period of time by identifying time and cost relationships. This will also help managers to diagnose the causes behind problems impacting the time and cost variables.
- With CPM project managers will be able to identify risks at the early stages of the project and if more time is needed in relation to budget and cost or vice versa. With this, risks and uncertainties associated can be known before implementation of the project.
- CPM also can help in managing risks even when the occur and when unpredictable events take place. For example, the critical path can be changed and tweaked if a natural disaster happens; so that managers will be fully aware of what implications this will have on the time and cost of the project.

- The CPM also identifies slack time, where activities have some space that can be reallocated to other activities. This will ensure that resources are used in the optimum way possible without impacting the cost and schedule of the project.



Activity-on-node diagram showing critical path schedule, along with total float and critical path drag computations

Figure (7): Example of CPM diagram

Source: (Wikipedia, 2015)

To develop an effective information systems plan, the organization must have a clear understanding of both its long and short term information requirements. Two principal methodologies for establishing the essential information requirements of the organization as a whole are:

- 1- Enterprise Analysis (Business System Planning).
- 2- Critical Success Factors (Strategic Factors Analysis) (Laudon, 2010).

Enterprise analysis (also called business systems planning) argues that the firm's information requirements can be understood only by examining the entire organization in terms of organizational units, functions, processes, and data elements. Enterprise analysis can help identify the key entities and attributes of the organization's data. The central method used in the enterprise analysis approach is to take a large sample of managers and ask them how they use information, where they get their information, what their objectives are, how they make decisions, and what their data needs are. The results of this large survey of managers are

aggregated into subunits, functions, processes, and data matrices. Data elements are organized into logical application groups—groups of data elements that support related sets of organizational processes. The weakness of enterprise analysis is that it produces an enormous amount of data that is expensive to collect and difficult to analyze. The questions frequently focus not on management's critical objectives and where information is needed but rather on what existing information is used. The result is a tendency to automate whatever exists rather than developing entirely new approaches to conducting business (Laudon, 2010).

The strategic analysis, or critical success factors, approach argues that an organization's information requirements are determined by a small number of critical success factors (CSFs) of managers. If these goals can be attained, success of the firm or organization is assured. CSFs are shaped by the industry, the firm, the manager, and the broader environment. For example, CSFs for the automobile industry might include styling, quality, and cost to meet the goals of increasing market share and raising profits. New information systems should focus on providing information that helps the firm meet these goals. The principal method used in CSF analysis is personal interviews—three or four—with a number of top managers identifying their goals and the resulting CSFs. These personal CSFs are aggregated to develop a picture of the firm's CSFs. Then systems are built to deliver information on these CSFs. The strength of the CSF method is that it produces less data to analyze than does enterprise analysis. Only top managers are interviewed, and the questions focus on a small number of CSFs rather than requiring a broad inquiry into what information is used in the organization. This method is clearly biased toward top managers, although it could be extended to elicit ideas for promising new systems from lower-level members of the organization (Laudon, 2010).

Chapter 4

Study Methodology

4. Study Methodology

4.1 Introduction

This chapter describes the methodology that is used in conducting this study. The following techniques were adopted in order to come up with the study results: Collection of information about the study design, identifying the study population, questionnaire design, statistical data analysis, validity and reliability of the questionnaire, and conducting a pilot study in order to verify the questions and get the participants' feedback and input.

The study has been conducted using the following phases.

4.2 Study Design

Phase I: This phase of the study included writing thesis proposal and identifying and defining the problems and establishment of the objectives and plan.

Phase II: This phase of the study focused on exploring the previous studies and reviewing the literature of the selected topic and its relationship to the context of UNRWA in Gaza.

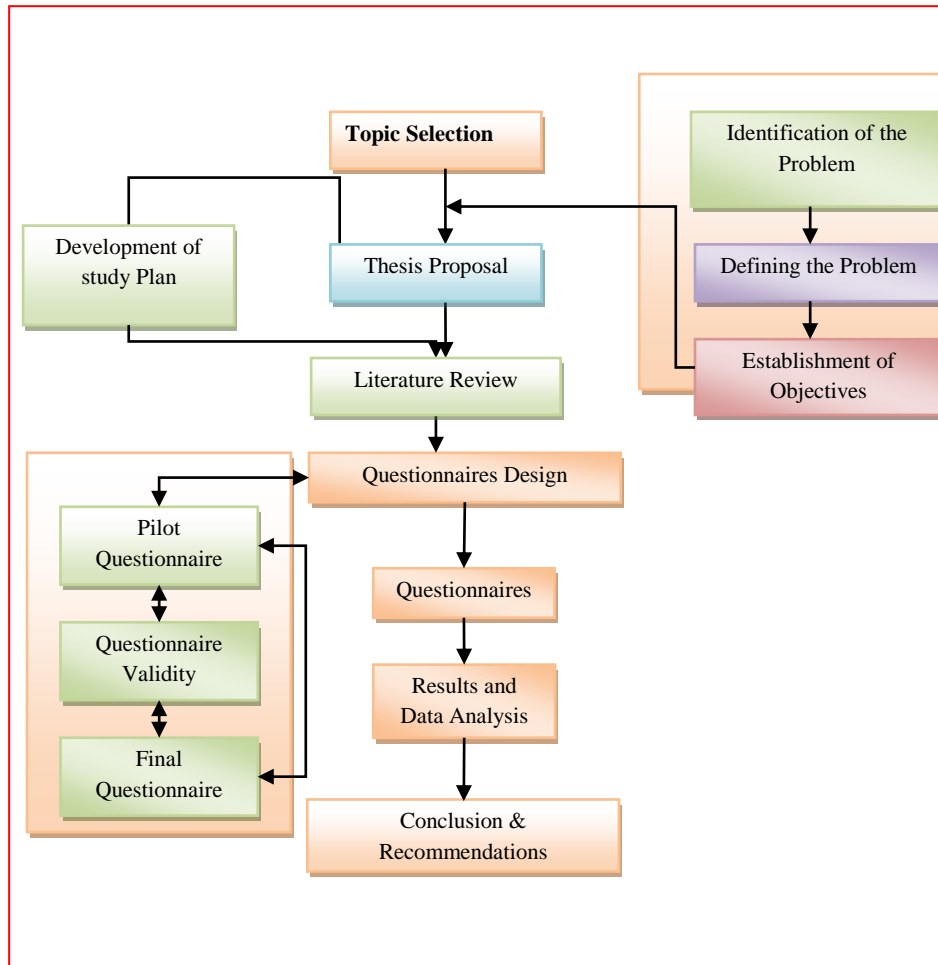
Phase III: This phase of the study, which was linked to the theoretical framework section was conducted to examine the current situation and practices of project risk management and the approaches used in project risk management. This stage laid the foundation for this study, and helped in building up of the hypothesis and recommendations.

Phase IV: This phase of the study focused on the modification of the questionnaire design, through distributing the questionnaire to a pilot population. The purpose of the pilot study was to test and prove that the questionnaire questions are clear to the participants and can be answered in a way to help achieve the study objectives. Feedback and input from the target population were also taken into consideration, in addition to the consultation which was done with experts in the field of the study.

Phase V: This stage focused on the distribution of the questionnaire. The questionnaire was exposed to participants using structured interview methodology where the questions were read and clarified by the interviewer or the researcher and responses were obtained.

Phase VI: At this stage data analysis and discussions were made. Statistical Package for the Social Sciences (SPSS) was used to perform the required analysis and the final phase included the conclusions and recommendations of the study. Forty five questionnaires were distributed to the research population and forty two questionnaires were completed.

Figure (8): Study methodology stages



Source: Adapted by the researcher

Data Collection and Analysis

In order to collect the needed data for this study, the researcher used secondary resources in collecting data including books, journals, statistics and web pages, in addition to preliminary resources that are not available in secondary resources through conducting this questionnaire with the research population with the aim of getting their opinions about the subject topic. The data obtained were analyzed using descriptive analysis using the SPSS. The tool used for collecting data was the structured interview which can be considered as a study tool used to collect quantified data on an issue similar to a survey or questionnaire. One advantage of this approach is ensuring that questions are presented exactly in the same order in order to guarantee the reliability of the questions and create confidence in comparisons between the results of the subgroups of the survey periods.

4.3 Study Population.

The study population was chosen carefully and after several discussions with experts in the field who have conducted similar studies possess the working experience in project management. Several ideas were proposed and suggestions have been obtained, assessed, and, examined before were taken into consideration in designing of the questions of the questionnaire and determining the dimensions of the study. Moreover, the questionnaire was judged by five persons, including two professionals and two academic persons. Generally, the population of the study was chosen from those who are involved in projects and who perform tasks related to them in Gaza Field Office, UNRWA. Those included staff members involved in the planning, management, and implementation of projects in Gaza.

Forty five staff members with different positions were identified as the population of the study. They have hold positions in different departments and with different level of involvement in tasks pertaining to grants and project management. Most of the study population was identified in the core programmes at UNRWA such as the Health Programme, Education Programme, RSS Programme, ICIP Programme, as well as those working in the Projects Office and other support departments. Table (1) explains the demography of the population and their level of participation in the response to the questions. Out of the 45 targeted populations, 42 responses were collected.

4.3.1 Characteristics of the Population.

Table (1) provides details on the demography and characteristics of the population and the rate of participation for each group. The total number of participants reached 42 persons.

Table (1): Characteristics of the study population.

Variable name	Group	Frequency	Percentage
Age	20-29	7	16.7
	30-39	15	35.7
	40-49	10	23.8
	50 or more	10	23.8
Gender	Female	33	78.6
	Male	9	21.4

Education	Diploma	6	14.3
	Bachelor	23	54.8
	Master	11	26.2
	PhD or more	2	4.8
Years of experience	< 5 years	7	16.8
	5-9 years	8	19.0
	10-14 years	8	19.0
	>15 years	19	45.2
Job grade	G. 6-10	21	50.0
	G. 11-15	16	38.1
	G. 16-20	5	11.9
Involvement related to projects	Almost admin or support	15	35.7
	Almost technical	5	11.9
	Hybrid of technical & managerial	22	52.4
	Strategic/policy making	0	0.0
Allocation of project related work	Up to 24%	6	14.3
	25% - 49%	10	23.8
	50% - 74%	10	23.8
	75% or more	16	38.1

Functional department	Health Programme	6	14.3
	Education Programme	12	28.6
	Relief & social services	4	9.5
	Infrastructure & Camp Improvement.	6	14.3
	Finance department	0	0.0
	Procurement & Logistics Department	3	7.1
	Projects office	8	19.0
	Others	3	7.1

Age

By looking at table (1), we can observe that the highest percentage was for the age category of “30-39” with 35.7 percent. This category represents almost the mid-career professionals who possess several years in project implementation and who have witnessed the historical changes in the organizational structure and changes in UNRWA projects systems. This group will be able to reflect on the future of the Agency in terms of its planning and strategies. They might also include emerging leaders who are contributing to the organization’s succession plan. The second group (based on percentage) is the group of 40-49 with a percentage of 23.8. This group represents those who have long working experience either within UNRWA or outside of it. This diversity in the population can enrich the study and provide more insights based on long years of experience in the organization and on comparative perceptions between UNRWA and other organizations with which staff were also involved.

Level of education

In Table (1) those who hold master or PhD degrees can provide responses based on their perceptions which are influenced by their level of knowledge and education. Those who hold lower degrees such as diploma or bachelor will be more influenced by their experience in operations and day to day tasks they usually perform. Those with higher degrees such as masters or PhD will have their responses influenced by strategic thinking and holistic analysis on the current situation in UNRWA.

Years of experience

According to this classification of the population based on “years of experience” we can ensure that all strata of the population are included and all group is represented. In other words,

we can ensure that almost all categories of staff working with projects in UNRWA- Gaza are represented and that input will be based on different perceptions and from different angles. This will enrich the study and will avoid having any bias by increasing the population of the study.

Job grade

With this distribution, we can say that almost all of the three managerial lines within UNRWA are represented. Those who fall within the grading group 16-20 could represent the senior level staff including the top management and those with grades 11-15 include middle management and line managers within the Agency, while those who fall within the grading group 6-10 could be considered the lower management in charge of daily operations related to grants and projects management.

Allocation of project related work.

Referring to table (1), the distribution indicates that the majority of the participants have the highest work load related to projects, i.e. those who work 75% or more with projects have the highest participation of 38.1 %, while the lower percentiles are allocated to the rest of the categories. This distribution ensures that participants with the highest involvement have their views sufficiently represented without neglecting the rest of categories. It should be noted that staff involved in tasks related to project management also perform other tasks related to the regular operations of UNRWA as part of its general fund (GF).

Functional department

By referring to table (1) we can comment on the staff members who have been chosen to participate in the research based on their functional department as follows:

- Health Programme: This includes the administrative staff involved in project implementation, deputies/chiefs and other staff members involved in the implementation on ground.
- Education Programme: This will includes the administrative staff involved in project implementation, deputies/chiefs and other staff members involved in implementation on the ground.
- Relief and Social Services Programme: This mainly includes staff members who are involved in the financial aspects of projects, and to the implementation on the ground.
- Infrastructure and Camp Improvement Programme: This mainly includes staff members who are involved in the financial aspects of projects and in the implementation on the ground.
- Finance Department: Staff members in finance who are working on the financial aspects of projects, some from the budget section and some from the claims section. Both are involved in the processing and management of daily transactions under projects.

- Procurement and Logistics Department: Staff members who are involved in purchasing or procurement of goods and items, tendering and awarding, etc and who are mainly concerned with the time bounds of project.
- Projects Office: Staff, such as projects officers, assistant projects officers, coordination officers and administrative staff who are foreseeing the implementation of projects and the management of grants, maintaining communication with donors and ensuring compliance with donors' terms and conditions.
- Others: Any other staff members who are concerned or involved in projects from any other department or division in the field.

4.4 Questionnaire Design and Content

The questionnaire was provided with a covering letter explaining the purpose of the study, the way of responding, and the aim of the study with a note regarding the protection of the privacy of the information in order to obtain the highest response needed. The questionnaire included close ended questions, which aim to meet the study objectives, and to collect all the necessary data that can support the discussion, results and recommendations of the study. As stated, the questionnaire was not self administered by the participants but it was conducted using a structured interview where the researcher read the questions and clarified any ambiguity to the participants where needed. The same sequence and clarification including examples were used with all participants in order to ensure that consistency is preserved and bias is avoided. The questionnaire consisted of two main sections:

Section one: The first part of the questionnaire is meant to reflect on the demography of the participants and statistics of the targeted population. It contained (8) main items/ questions which could be relevant to the study topic.

Section two: This part is considered the core of the questionnaire and it was directly related to the topic of the study. It included five dimensions as illustrated in table (2):

Table (2): Dimensions of the study

SN	No. of Items	Dimension	Designed to measure
1 st dimension	6	Project risk management	The dependent variable
2 nd dimension	6	Project risk planning	One of the independent variables
3 rd dimension	5	Methodology used	One of the independent variables

4 th dimension	8	Information management	One of the independent variables
5 th dimension	7	Organizational structure	One of the independent variables

Thus, the total number of questions was 32. The respondent can answer the questionnaire item following the Likert scale by checking the corresponding box as indicated in the questionnaire indicating his/her acceptance degree of each item. The options provided represent a scale from 1-5 where 5 represents the highest acceptance degree (strongly agree) and 1 represents the lowest acceptance degree (strongly disagree) with the following weights allocated as per table (3). The questionnaire was originally designed in English language, and then was translated into Arabic language in order to encourage more participation and to have accurate responses from participants.

Table (3): Likert scale with corresponding weights.

Level	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Scale	1	2	3	4	5
Weight mean	20% - 36%	36% - 52%	52% - 68%	68% - 84%	84% - 100%

Statistical Analysis Tools

Data analysis was performed by using (SPSS) application where the following statistical methods were used:

- 1- Descriptive analysis (frequencies and percentile).
- 2- Alpha- Cronbach test for measuring reliability of the questionnaire's items.
- 3- Spearman – Brown coefficient.
- 4- Person correlation coefficients for measuring validity of the questionnaire's items.
- 5- One sample t-test.
- 6- One way ANOVA analysis of variance.

Pearson correlation coefficient was used to examine whether there is a significant statistical relationship between the study variables. Independent t-test was used to examine the opinions of the participants on the content of each dimension. One-Way Analysis of Variance “ANOVA” test was used to examine if there is a significant statistical difference between several means among the respondents due to their level of education, years of experience, job grade, involvement in project tasks, and allocation of project related work (Saunders, Lewis, & Thornhill, 2007).

It is important to highlight that all of the aforementioned statistical analysis test are considered as parametric tests and the study population was tested for normality (being in line with the normal distribution) by applying the “Shapiro Wilk” test as follows:

4.5 Test of Normality (Normal Distribution)

The “Shapiro Wilk” test was used to identify if the data follows the normal distribution or not. This test is considered necessary as most of the parametric analysis stipulates that data should follow the normal distribution. This type of test was found the most appropriate one as the sample size is less than 50. The results of the test, as shown in the table (4), clarifies that the calculated p-value is greater than the significant level which is equal 0.05 (p-value. > 0.05), this in turn, reflects that data follows normal distribution, and so parametric tests can be applied to it.

Table (4): Results for the Shapiro Wilk test

Dimension	Title	Items No.	Statistic	P-value
1	Project risk management	6	0.960	0.093
2	Project risk planning	6	0.554	0.918
3	Quantitative methodology	5	0.630	0.822
4	Information management	8	0.801	0.543
5	Organizational Structure	7	1.035	0.235
	All sections	32	0.400	0.997

Chapter 5

Data Analysis and Discussion

5. Data Analysis and Discussion

5.1 Introduction

In this chapter, hypotheses are being tested and correlations between variables were explored. The chapter represents the diagnosis of the research problem and the findings of the statistical tests which lead the researcher to the conclusion and the recommendations of the study.

5.2 Analysis of the dimensions and discussion

A one sample t- test was used to determine if the opinions of the respondents on the content of sentences are:

- Positive: Weighted mean greater than "60.0%" and the p-value is less than 0.05.
- Neutral: P-value is greater than 0.05.
- Negative: Weighted mean less than "60.0%" and the p-value less than 0.05.

5.2.1 Analyzing the 1st dimension:

The first dimension investigates the current project risk management as perceived by key staff members. A one sample t-test was used to determine the opinion of the respondents and table (5) shows the results according to the weighted mean from the highest to the lowest.

Table (5): Means and t-test for the 1st dimension (risk management)

#	Items	Mean	Standard deviation	Weight mean	t-value	P-value
1	The current risk management related to projects within Gaza Field Office rarely leads to effective implementation of project activities and to the realization of their objectives.	3.64	0.791	72.86	5.268	0.000
2	In my point view, the projects implemented by Gaza Field Office face risks due to several factors, most importantly due to the volatile situation in Gaza Strip.	4.07	1.068	81.43	6.500	0.000
3	Projects risk management within Gaza Field Office is supported by	2.93	0.947	58.57	-0.489	0.628

#	Items	Mean	Standard deviation	Weight mean	t-value	P-value
	standard systems and approaches, which are usable by all respective departments and programmes.					
4	Projects are subjected to undesirable results (which can be avoided in case a project management tool is in place) due to the lack of proper risk management.	3.74	0.989	74.76	4.836	0.000
5	Impartial evaluation is usually made upon completion of projects and lessons learned are elicited, and utilized to manage risks anticipated to encounter prospective projects.	3.12	1.131	62.38	0.682	0.499
6	Risks related to projects are not usually responded to throughout the life cycle of the project and to the best interest of achieving its objectives.	3.64	0.727	72.86	5.734	0.000
	All items	3.52	0.452	70.48	7.515	0.000

Critical value of t at df "41" and significance level 0.05 equal 2.02

- a. Paragraph # 2 has the highest weighted mean value of 81.43% and p-value of 0.000 which is less than 0.05, that means "... the projects implemented by Gaza Field Office face risks due to several factors, most importantly due to the volatile situation...". As this is the highest weighted mean in this dimension, it can be elicited that we have almost a consensus on this item from most of the participants. This means that the issue of risk is a critical issue for most of the staff involved in projects and that the problem is well recognized by most of the participants.
- b. According to the results in item #4, we can conclude that projects are subjected to undesirable results due to lack of proper risk management. These results can be avoided in case there is an effective management tool in place. With this as the highest rate of

agreement after the 2nd item, it can be elicited that a high percentage of the staff members recognize that projects related risks are inevitable in projects implementation and that those negative effects of risks can be avoided in UNRWA context if there is an effective and proper risk management tool in place. This indirectly shows that the current risk management within UNRWA in Gaza is not sufficient to address projects risks.

- c. In paragraph # 1 the weighted mean equals 72.86% and p-value equal 0.000 which is less than 0.05. That means “The current risk management related to projects within the Gaza Field Office rarely leads to effective implementation of project activities and to the realization of their objectives”. It can be also elicited that the current risk management practices related to projects are not as effective as it should be and there is a gap that needs to be filled.
- d. In paragraph # 6 the weighted mean equals 72.86% and p-value equals 0.000 which is less than 0.05. This means that “Risks related to projects are not usually responded to throughout the life cycle of the project and to the best interest of achieving its objectives”.
- e. In paragraph # 5 the weighted mean equals 62.38% and p-value equals 0.499 which is greater than 0.05, that means “Impartial evaluation is not always made upon completion of projects and lessons learned are not always elicited and utilized to manage risks anticipated to encounter prospective projects”. This proves the logic that evaluation of projects could be a useful tool for the planning of future projects where lessons learned can be obtained. The figures indicate that those who are involved with projects do not have enough trust in the evaluations conducted and they question their neutrality and impartiality. This leads us to the conclusion that, even if those evaluations are conducted, they do not necessarily reflect real findings and may not be reliable to conclude lessons learned. Their added value in the planning and design of future projects might be also affected.
- f. In paragraph #3 the weighted mean equals 58.57% and p-value equals 0.628 which is greater than 0.05. That means “Projects risk management within Gaza Field Office is not supported by standard systems and approaches, which are usable by all respective departments and programmes”. This leads to the fact that there is no standard risk management tool being used by UNRWA in Gaza in terms of project and grant management. The result also reveals that the current systems and approaches are not effectively used or they do not provide the necessary services that can be used by end users or projects managers. This indicates that there is a need for information systems that incorporate or perform risk analysis and are able to support the decision making process pertaining to project risk management.

Generally, the results for all items of this dimension show that the average mean equals 3.52 and the weighted mean equals 70.48% which is greater than 60%, and the value of t-test equals 7.515, which is greater than the critical value which equals 2.02 and the p-value equals 0.000 which is less than 0.05. That means the current risk management related to projects within UNRWA in Gaza needs to be enhanced by utilizing more effective tools and methodologies at level $\alpha = 0.05$. These results support the above hypothesis and conclude that the overall situation of the project risk management at UNRWA in Gaza needs to be developed and enhanced. In addition, more effective tools and approaches should be explored, studied and

applied. It should be also mentioned that UNRWA should try to integrate quantitative methodologies to support risk management into its Enterprise Risk Management (ERM) initiative in order to make the best use of it and can be adapted to be applied to projects.

This is in line with (El-Kariri, 2012) who concluded that change or variation orders are one of the negative results being faced in the construction projects implemented by UNRWA in Gaza. (El-Sawalhi, Causes of Construction Delay in UNRWA Projects in the Gaza Strip, 2003) has also emphasized the exceptional context in Gaza as being full of uncertainties, which poses a potential challenge and risk which could impede the successfulness of project implementation. All this reiterates the need for a more reliable and systemized risk management in UNRWA-Gaza.

5.2.2 Analyzing the 2nd dimension:

The second dimension investigates the planning related to projects and risks. A one sample t-test was used to determine the opinion of the respondents where table (6) shows the results according to the weighted mean from the highest to the lowest.

Table (6): Means and t-test for the 2nd dimension (project planning)

#	Items	Mean	Standard deviation	Weight mean	t-value	P-value
1	There is always an effective risk plan prepared alongside each project proposal or concept note, e.g. risk register, matrix, etc.	3.21	0.925	64.29	1.502	0.141
2	There is always a contingency budget line and contingency time frame prepared in each of the project plan or proposal.	3.21	1.025	64.29	1.355	0.183
3	Risk is always an issue of consideration during the initial stage of project, i.e. before the initiation of the project such as during concept stage, brainstorming stage, project formulation, etc.	3.21	0.898	64.29	1.546	0.130
4	The risk planning during initial phases of the project lacks the utilization of statistical methods and	3.36	1.032	67.14	2.243	0.030

#	Items	Mean	Standard deviation	Weight mean	t-value	P-value
	quantitative methodologies.					
5	The current planning related to projects effectively contributes to responding to risk and hence to the overall project management.	3.40	0.939	68.10	2.795	0.008
6	In my point of view, the new enterprise resource planning (ERP), which has been implemented in UNRWA, is capable of providing meaningful and useful information to the risk analysis and management of project.	2.90	1.055	58.10	-0.585	0.562
	All items	3.22	0.718	64.37	1.970	0.056

Critical value of t at df "41" and significance level 0.05 equal 2.02

- a. We can elicit from paragraph # 5 that that the participants have a relative agreement on the statement and that the current planning within UNRWA has some contribution to the risk management related to projects. It also indicates that the overall project management can be enhanced with the development of risk management related to projects.
- b. Paragraph # 4 has a weighted mean of 67.14% and p-value of 0.030 which is less than 0.05, that means “The risk planning during initial phases of the project lacks the utilization of statistical methods and quantitative methodologies.
- c. In paragraph #1 the weighted mean equals 64.29% and p-value equals 0.141 which is greater than 0.05. That means “Not all project plans or proposals prepared include an effective risk plan prepared, e.g. risk register, matrix, etc. It can be concluded from this result that if a risk plan is prepared it is not effective enough to be used by project managers or officers. It also can be elicited that for some proposals, and as required only by the project sponsor or donor, there is a risk plan prepared alongside the project proposal but even if this plan exists, it is still not active and not relied on in the project cycle management.
- d. In paragraph # 2 the weighted mean equals 64.29% and p-value equals 0.183 which is greater than 0.05. That means there is not always a contingency budget line and contingency time frame prepared for each of the project plan or proposal). Accordingly, we

can conclude that risk is not taken considered properly in projects budgeting which is part of the planning process and represents a projection of the financial plan of the project. This means that there is a need for better budgeting for projects which can respond to contingencies and risks in case they emerge, otherwise, the project as a whole can be negatively impacted.

- e. In paragraph # 3 the weighted mean equals 64.29% and p-value equals 0.130 which is greater than 0.05, that means “Risk is not an issue of consideration during the initial stage of project, i.e. before the initiation of the project such as during concept stage, brainstorming stage, project formulation, etc”. The result shows that risk is not considered during the early stages of the project, e.g. during brainstorming sessions, or concept note preparation.
- f. In paragraph # 6, the weighted mean equals 58.10% and p-value equals 0.562 which is greater than 0.05, that means “In my point of view, the new enterprise resource planning (ERP), which has been implemented in UNRWA, is not capable of providing meaningful and useful information to the risk analysis and management of project”. The result indicates that staff members involved in projects within UNRWA in Gaza do not believe that the new ERP system can provide useful data necessary for risk analysis and management. This could be due to the system shortfalls and lack of integrated information needed by the staff or due to the fact that staff members are still not well acquainted to the system, as it was only applied recently and the time was not enough for the staff to realize its capabilities.

Generally, the results for all items of the field show that the average mean equals 3.22 and the weighted mean equal 64.37% which is greater than 60% and the value of t- test equals 1.970 which is greater than the critical value which is equal 2.02 and the p- value equals 0.056 which is greater than 0.05. That means the participants have a moderate agreement on this statement, and that more focus should be put on the quantification of the risk management and the way it is handled.

These results of this dimension are supported by (El-Kariri, 2012) who referred the causes of project disturbances and budget and time overruns due to the new emerging and ad hoc requirements. He emphasized the importance of incorporating risk factors in the planning process and of having effective coordination, information, and planning. (Hornbacher, 2012) also encouraged the proactive management of projects risk and the collective preparation and awareness from the whole organization. According to him, with this proactive approach and enhanced risk management, the organization will acquire more trust and confidence from its stakeholders, improves the project governance, improve organizational learning and resilience, and most importantly establishing a basis for effective decision making and planning.

5.2.3 Analyzing the 3rd dimension

The third dimension investigates the methodology used in risk management. A one sample t-test was used to determine the opinion of the respondents. Table (7) shows the results according to the weighted mean from the highest to the lowest.

Table (7): Means and t-test for the 3rd dimension (methodology)

SN	Items	Mean	Standard deviation	Weight mean	t-value	P-value
1	Currently, UNRWA follows a risk management technique which is based on/ incorporates quantitative approach (such statistics, simulations, modeling, analytics, etc) in analyzing and managing risks associated with projects and grants.	3.12	0.916	62.38	0.842	0.405
2	The decision and policy making process related to projects within Gaza Field Office is (partially) based and supported by statistics, analysis of data and trends analysis	3.31	1.070	66.19	1.874	0.068
3	Approaches incorporating data analysis and processing are not sufficiently used in the overall management of projects and grants.	3.57	0.914	71.43	4.050	0.000
4	The current systems and tools in place, which are supposed to support the risk analysis and management processes, are not based on statistical or quantitative methodology.	3.57	0.941	71.43	3.937	0.000
5	Staff working with projects (e.g. projects officers, projects managers, coordination officers, etc) are well trained and can perform statistical analysis as part of the risk analysis and management process.	3.43	0.941	68.57	2.952	0.005
	All items	3.40	0.791	68.00	3.276	0.002

Critical value of t at df "41" and significance level 0.05 equal 2.02

- a. In paragraph #3 the weight mean equals 71.43% and p-value equals 0.000 which is less than 0.05, that means “Approaches incorporate data analysis and processing are not sufficiently used in the overall management of projects and grants”.
- b. In paragraph #4 the weight mean equals 71.43% and p-value equals 0.000 which is less than 0.05, that means “The current systems and tools in place, which are supposed to support the risk analysis and management processes, are not based on statistical or quantitative methodology.
- c. The result in paragraph #5 support the statement “Staff working with projects (e.g. projects officers, projects managers, coordination officers, etc) are well trained and can perform statistical analysis as part of the risk analysis and management process”. This indicates that the current staff members who are involved in project management have the abilities and the competencies needed and that there is enough trust in their capacities. This also leads us to the fact that the current staff members are not satisfied with the current practices in place but they also have the trust in the competencies of staff members. Based on this, we can conclude that the top management in UNRWA should pay more attention and give more guidance to the boost the risk management and risk analysis for projects.
- d. According to the result in paragraph #2, “The decision and policy making process related to projects within Gaza Field Office is not based and supported by statistics, analysis of data and trends”. This indicates that the policy makers and those in charge of the strategic management are somehow disconnected from real information at the field. This indicates that there is a need for more effective communication between the top management and operational level on the ground. It is worth mentioning that this will need the organization to increase the participation of the lower level staff members, as they are the ones who can provide the real figure and facts directly collected from the fields of project operations. Otherwise, information channels and flows will be disrupted and data will become disintegrated which will lead to the increase in project risks.
- e. According to the result in paragraph #1, we can say that “Currently, UNRWA does not follow a risk management technique based on/ incorporates quantitative methods (such as statistics, simulations, modeling, analytics, etc” in analyzing and managing risks associated with projects and grants). This means that quantitative methodology in risk analysis and management should be utilized, and that more statistics or modeling techniques could add value to the overall project management.

Generally speaking the results for all paragraphs of the field show that more scientific/ quantitative methodology for risk analysis and management needs to be utilized in the project risk management within UNRWA. This is also supported by the following literature.

According to (Hornbacher, 2012), the value of quantitative risk analysis is to enable the implementation of project risk treatment plans that are most suitable with the organization’s strategy. The writer describes the effects of risks on the project scope, cost, quality, etc. these effects are defined by two attributes which are the probability of occurrence and the impact on the project. The writer encouraged the proactive management of projects risk and the collective preparation and awareness from the whole organization. According to him, with this proactive

approach and enhanced risk management, the organization will acquire more trust and confidence from its stakeholders, improves the project governance, improve organizational learning and resilience, and most importantly establishing a basis for decision making and planning.

The writer also emphasized the importance of realistic forecasting which is based on accurate data distributed to all stakeholders. According to him, qualitative risk description is only words and does not give precise measurement and probabilities which can be relied on in allocation of resources. According to his observations, some of the internal characteristics of the organization with regards to project risk management are the organization's willingness to adapt, learn, and have consistency in action, and commitment to resilience. Lack of information and inability to effectively analyze risk could be one of the obstacles facing quantitative risk management. The writer also recommends that in order for the organization to employ successful risk management to projects, it should pay attention to planning and good estimations, using best practices in planning and management, have responsibilities well defined and documented, clear procedures and criteria identified and quantified, effective software and tools are being employed, and data and information are effectively maintained (Hornbacher, 2012). The writer also favors quantitative risk methodologies over qualitative ones as the qualitative approach can only provide a single deterministic value. He also points out that risk should be quantified in some methodological way because invalid assessments could lead to improper conclusions which will lead to misapplication of resources.

(Galway, 2004) The author represents how quantitative risk management and risk analysis methods were applied to the planning and execution of complex projects, particularly those that are planned to utilize new and untried technologies. The paper recommends several research areas to contribute to evaluating the utility of these methods and improving their applicability. The author also discussed the feasibility and applicability of such quantitative methods in estimating costs and time for projects such as the CPM and PERT approaches towards project management.

(CLUSIF, 2008/2009) The study was mainly concerned with the methodology used in project risk management, especially with using statistical data. The study has performed a comparison between several risk management methods and concluded that risk management methodology should include quantitative measurement of the risk occurrence. In order to have an impartial data on risks, quantitative and objective measurements should be used utilizing statistical methods. Her refers the lack of such data within organizations to the organization's reluctance to share information that could distort its image. The author emphasizes the importance of the availability of effective information and communication as a key to decision making related to risks.

The author has also discussed the use and applicability of each methodology and concluded that there is a set of issues, which needs to be addressed in a critical evaluation of these techniques: what level of aggregation should be used for the components of the schedule or cost? How should probability distributions be elicited? How to deal with correlations? How to take account of adaptive strategies? How to deal with limited information? How do we judge a good risk analysis? The author also concluded that the accuracy of projects related information is a key to accurate risk analysis and to risk management (CLUSIF, 2008/2009). From the unstructured

interview conducted with both practitioners and researchers, the author concluded that there is a consensus on the utility of the quantitative methodologies in risk analysis and it is widely recommended. The author concluded that accuracy of information is essential input to the risk analysis process and it is dependent on the collection of information and its documentation.

5.2.4 Analyzing the 4th dimension

The 4th dimension investigates information management related to projects. A one sample t-test was used to determine the opinion of the respondents and table (8) shows the results according to the weighted mean from the highest to the lowest.

Table (8): Means and t-test for the 4th dimension (information management)

SN	Items	Mean	Standard deviation	Weight mean	t-value	P-value
1	Information related to projects is currently well managed in a way that can provide projects managers with the needed information in a timely manner.	3.19	0.943	63.81	1.309	0.198
2	The current information management tools can provide accurate and relevant data on projects as needed.	3.26	0.989	65.24	1.716	0.094
3	The current information management tools and systems play a substantial role in the development of project risk management.	3.21	0.782	64.29	1.776	0.083
4	In my perspective, information management is a key factor to the success and effectiveness of projects risk analysis and management.	4.26	0.798	85.24	10.246	0.000
5	Information and data pertaining to projects and their risks are accessible to staff who are concerned with project risk analysis and management.	3.31	0.950	66.19	2.112	0.041

SN	Items	Mean	Standard deviation	Weight mean	t-value	P-value
6	Data collected on projects and their implementations are always consolidated and not relayed in fragments.	3.31	1.199	66.19	1.673	0.102
7	In my point of view, the existing enterprise resource planning ERP, which was recently applied by UNRWA in all of its fields of operation, can be considered an effective project management system which can contribute to the projects risk management process.	2.88	1.109	57.62	-0.696	0.490
8	Data and information related to projects and their progresses are promptly updated reflecting actual facts on the ground.	3.10	1.100	61.90	0.561	0.578

Critical value of t at df "41" and significance level 0.05 equal 2.02

- a. According to the result in paragraph # 4 we can say that according to the participants' perspectives "information management is a key factor to the success and effectiveness of projects risk analysis and management". This indicates that there is almost a consensus from the respondents that information management is critical to the success of effective project risk management.
- b. According to the result in paragraph # 6, we can conclude that "Data collected on projects and their implementations is not always consolidated and is relayed in fragments)". This indicates that there is an issue with the data collected on projects and their activities is always available for analysts and project managers/officers.
- c. The result in paragraph #2 indicates that "The current information management tools cannot provide accurate and relevant data on projects as needed". This indicates that although information could be provided and tools are available but data and information still lacks the accuracy needed and the relevance to the subject matter. This, in turn, decreases the effectiveness and efficiency in dealing with project related information.
- d. According to paragraph #3, "The current information management tools and systems play no substantial role in the development of project risk management". This also support the

preceding statement and indicates that the current tools and system are in need for more development or restructuring in order to meet the requirements of effective risk management which is based on quantitative and statistical methods.

- e. We can also deduce from the result in paragraph #1 that “Information related to projects is not currently well managed in a way that can provide projects managers with the needed information in a timely manner”
- f. According to the result in paragraph #7, we can conclude that core system being used by UNRWA do not handle risk management in systematically. The project risk management is not also well addressed in these systems and thus limiting the effectiveness of the overall project management in the organization.

Generally speaking, and according to the overall results in all paragraphs, we can conclude that risks related to projects within UNRWA Gaza are not well analyzed/ managed due to lack of proper information management.

According to (Henczel, 2000) information audit is very important to the organization as it will be needed when the organization is growing. Information audit is required to evaluate and ensure that quality information is available to those who need it. In big organizations, information is usually available in multi- formats and its sources are many. Thus, it becomes imperative for information users to have one central source of information which can provide sufficient, efficient, and accurate information to users. In the context of this research, users are those who are involved in the project risk management who use information as an input in the risk analysis process and management process.

(Saleh, 2012) was mainly concerned with the cross-departmental communication in UNRWA-Gaza with regards to construction projects. The study revealed that the available information systems do not meet the key internal stakeholders’ information requirements. The study also revealed that the current level of information quality does not meet the requirements of the key internal stakeholders. Another finding is that the current organizational structure does not support the smooth flow of projects information among the concerned departments. In addition, the current communication flow does not support effective flow of projects information across departments.

The key recommendations of this thesis were as follows: First, to establish a centralized information system to serve as the main source of information for all project stakeholders and to streamline the exchange of information across departments. Second, increase the human resources in order to meet the increase in funded projects. Third, to enhance the capacity of the current staff members by implementing a comprehensive training programme for all involved staff.

For (Bugalla & Narvaez, 2011) sharing information is needed for effective coordination between staff members involved in project management. They provided several practical examples of ERM integration into projects such as the Department of Transportation and Mass Development which have both successfully embedded ERM into their project management. This

has brought many benefits to the organizations including increased risk awareness, better collaboration, and stronger commitment to projects throughout the organization.

5.2.5 Analyzing the 5th dimension.

The 4th dimension investigates the organizational structure related to projects. A one sample t-test was used to determine the opinion of the respondents. Table (9) shows the results according to the weighted mean from the highest to the lowest.

Table (9): Means and t-test for the 5th dimension (organizational structure)

#	Items	Mean	Standard deviation	Weight mean	t-value	P-value
1	The available procedures, as stated in the current manuals and instructions or other documents, regulate how project risks should be handled throughout the life cycle of projects.	3.31	0.897	66.19	2.237	0.031
2	Staff members, engaged in project formulation, planning, or management, are well trained and qualified to deal with risks arising during the project life cycle.	3.57	0.770	71.43	4.812	0.000
3	The current coordination between staff members involved in project implementation and management is sufficient to contribute to the risk analysis and management of projects.	3.12	0.889	62.38	0.868	0.391
4	The top strategic management who have the decision making authority related to projects are always aware of the risks associated with projects.	3.26	1.211	65.24	1.402	0.169
5	The current staff and positions within the projects office correspond to the human resources needed for effective risk management of projects.	3.05	1.103	60.95	0.280	0.781

#	Items	Mean	Standard deviation	Weight mean	t-value	P-value
6	In my point of view, there should be designated and dedicated staff members who can work closely with projects officer to handle risk management issues.	4.29	1.019	85.71	8.177	0.000
7	Implementing departments do not usually designate focal point staff member who can provide information on projects who can provide input and feedback on projects.	3.60	1.363	71.90	2.831	0.007
	All items	3.46	0.654	69.12	4.519	0.000

Critical value of t at df "41" and significance level 0.05 equal 2.02

- a. Results of paragraph # 6 reflect that there should be designated and dedicated staff members who can work closely with projects officers to handle risk management issues. This indicates that having a focal point for each project in each of the programmes or implementing departments is very crucial to effective project management. This also means that having one main source of information in each of the programmes will help having more accurate data and data will not be relayed in fragments but rather in unified and consolidated way.
- b. Results in paragraph #2 reveal that staff members, engaged in project formulation, planning, or management, are well trained and qualified to deal with risks arising during the project life cycle. This also indicates that the majority of staff working at the projects office have the competencies and skills needed for risk analysis and management. The results also indicated that trust and confidence in staff exist which is a good indicator to the potential of having activities and that trust exist in those staff members which could be considered an indicator to the success of quantitative project risk management in case applied.
- c. According to paragraph #1 “the available procedures, as stated in the current manuals and instructions or other documents, regulate how project risks should be handled throughout the life cycle of projects”. This indicates that staff members believe that there is something on paper which needs to be activated by practice. Although, these could not be perfectly done, but at least it can formulate a starting point for more development of more effective procedures and regulations.

- d. Tests for paragraph #4 reveal that “the top strategic management and the decision makers in regards to projects are not always aware of the risks associated with projects”. This indicates that there is a gap between the top management and the staff working in projects at the operational level, and that the top management is working at some kind of autonomy way without sufficient involvement of the lower level staff.
- e. Paragraph #3 reveal that “the current coordination between staff members involved in project implementation and management is not satisfactory enough to contribute to the risk analysis and management of projects”. This indicates that the current coordination will need to increase and to be enhanced.
- f. According to results in paragraph #5 “The current staff and positions within the projects office do not correspond to the human resources needs for effective risk management of projects”. This indicates that the current positions with the current staff are not enough and more positions should be established based on need.

Generally, the overall results for all items reveal that projects risk management within UNRWA in Gaza can be enhanced by developing the existing organization structure. The results are supported by (Hornbacher, 2012) who encourages proactive management of projects risk and the collective preparation and awareness from the whole organization. According to him, this approach can enhance risk management, and increase the trustworthiness and confidence with stakeholders. It also supports the project governance and improves the organizational development and resilience. Most importantly, it supports the decision making and planning process. (Saleh, 2012) recommends that: First, to establish a centralized information system to serve as the main source of information for all project stakeholders and to streamline the exchange of information across departments. Second, hiring additional human resources in order to meet the increase in funded projects. Third, to enhance the capacity of the current staff members by implementing a comprehensive training programme for all staff involved.

According to (Henczel, 2000) many big organizations are structured in a way that each department is working independently from another, and they may rely on similar information sources. Some operate without having access to the necessary information needed because they may not know where to find them. Consequently, there might be some gaps in the information provided, inconsistencies, duplication in information within the same organization. This is somehow relevant to UNRWA context in Gaza with regards to the project management, where sometimes each involved department relies on a different source of information and due to the lack of coordination between departments, information becomes inconsistent, lacking accuracy, and even subjective.

5.3 Hypotheses testing and discussion

Hypothesis 1: There is a statistical relationship at level ($\alpha \leq 0.05$) between project risk management and project risk planning.

Pearson correlation was used to test the correlation between project risk management and planning and the results in table (10) show that the correlation coefficient equal 0.470

which is greater than critical value which is equal to 0.302 and p-value equals 0.000 which is less than 0.05, which means there is a positive correlation between project risk management and planning.

Table (10): Correlation between risk management & planning

Section	Statistic	Project risk planning
Project risk management	Pearson Correlation	0.470
	P-value	0.002
	N	42

** . Correlation is significant at the 0.01 level (2-tailed).

It can be elicited from the results in the above table that project risk planning is affected by risk planning which contributes to better risk management. This also applies to UNRWA context in Gaza and can be supported by the fact that a project management plan is necessary for the mitigation of risk. This means that risk management and response to risks are key parts of the risk planning process where risks are being mitigated by either risk avoidance, risk sharing, risk reduction, or risk transfer. Each of the four responses can be considered part of the risk management of projects (Risk Management Process).

Planning can be also deemed as the heart of project management and is so important to the extent that it is considered the heart of project management. Planning offers some insights on the challenges that can be expected to encounter the project. One of those challenges is the risk and uncertainty. Planning will show us how to address those anticipated risks and uncertainties and how to eliminate them (Heerkens, 2002).

Hypothesis 2: There is a statistical relationship at level ($\alpha \leq 0.05$) between project risk management and methodology used.

The Pearson correlation test was used to test the correlation between project risk management and the methodology used. Results in table (11) show that the correlation coefficient equals 0.578 which is greater than the critical value of 0.302, and the p-value equals 0.000 which is less than 0.05. That means there is a positive correlation between project risk management and the methodology used.

Table (11): Correlation between project risk management & methodology

Section	Statistic	Quantitative methodology
Project risk management	Pearson Correlation	0.578
	P-value	0.000
	N	42

** . Correlation is significant at the 0.01 level (2-tailed).

According (Hombacher, 2012), quantitative methodology in risk analysis can benefit the project risk management in a way to use disciplined approach to increase the likelihood of successful delivery of project objectives by increasing favorable and decreasing unfavorable events. The value of quantitative risk analysis can be in the assessment and combination of effects of risks and their prioritization and in preparing and executing risk management plans that can best fit the organizational strategy.

(Galway, 2004) supported this hypothesis by illustrating the usage and the benefit of using quantitative analysis. He points out that the quantitative risk analysis frame work (which requires measurement of probabilities and impacts) forces us to think hard about the project, regardless of what the final estimates reveal. The author also explores the CPM and PERT approaches and how best they can be utilized to assess and manage risks related to schedule and costs.

Hypothesis 3: There is a statistical relationship at level ($\alpha \leq 0.05$) between project risk management and information management.

The Pearson correlation test was used to test the correlation between project risk management and information management. Results in table (12) show that there is a positive correlation between project risk management and information management.

Table (12): Correlation between project risk management & information management

Section	Statistic	Information management
Project risk management	Pearson Correlation	0.434
	P-value	0.004

	N	42
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** . Correlation is significant at the 0.01 level (2-tailed).

The result is supported by the fact that the input and output of risk analysis is information which should be managed in order to support risk management and the overall project management by providing information that can support decisions regarding project direction and the setting of schedule, cost targets and contingencies (Kindinger, 2002).

After risk is identified and analyzed it is turned into information that guides the decision making process, information is also important for the risk planning process and some budget should be considered to obtain more information and for managing it by reducing perceived risk with obtaining more information. The author also mentions information is also important for monitoring risks and should be shared as it is considered the cornerstone of effective risk management (Williams, 2015).

Hypothesis 4: There is a statistical relationship at level ($\alpha \leq 0.05$) between project risk management and organizational structure.

The Pearson correlation test was used to test the correlation between project risk management and organizational structure. The results in table (13) show that there is a positive correlation between project risk management and organizational structure.

Table (13): Correlation between project risk management & org. structure

Section	Statistic	Organizational Structure
Project risk management	Pearson Correlation	0.324
	P-value	0.036
	N	42

** . Correlation is significant at the 0.01 level (2-tailed).

According to (Heerkens, 2002), within the risk analysis of project, and once the project team has identified the work, prepared the schedule, and estimated the project costs, the components of the planning can be considered complete. Then it could be an excellent time to deal with risks or threats that may happen; this process is called risk management which is also supported by maintaining a team or relationships throughout of the life cycle of the project.

Risk management is dependent on project risk governance and the organization's positioning such as the roles and authorities at various levels of the organization. The author emphasizes that effective risk management starts at the top management, and the management executive committee. He mentions the role of risk management committee and its roles and responsibilities within the organization. He also refers to having a certain risk officer who can assume the overall management of risks (Protiviti, 2013).

5.3.1 Analyzing potential differences among the participants.

Hypothesis 5: There are significant differences among the respondents' views at level ($\alpha \leq 0.05$) due to personal and professional characteristics (level of education, years of experience, job grade, type of involvement related to projects, and percentage of work allocated to projects).

This main hypothesis was divided into five sub-hypothesis as follows:

Sub-hypothesis 5.1: There is a significant difference in the respondents' views at level ($\alpha \leq 0.05$) due to level of education.

One way ANOVA was used to test this hypothesis, and the result illustrated in table (14) indicate that the p-value equals 0.253 which is greater than 0.05, and the value of $F_{stat} = 1.415$ which is less than $F_{critical} = 2.85$. This means there is no significant differences in the respondents' views based on the level of education.

Table (14): One way ANOVA test for level of education

Field	Source	Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
All dimensions	Between Groups	1.339	3	0.446	1.415	0.253
	Within Groups	11.990	38	0.316		
	Total	13.330	41			

Critical value of F at df "3.38" and significance level 0.05 equals 2.85.

Sub-hypothesis 5.2: There is a significant difference in the respondents' views at level ($\alpha \leq 0.05$) due to years of experience.

One way ANOVA was used and the result illustrated in table (15) shows that there is no significant difference in the correspondent's views at level ($\alpha \leq 0.05$) due to the participants' years of experience.

Table (15): One way ANOVA test for years of experience

Field	Source	Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
All dimensions	Between Groups	1.458	3	0.486	1.555	0.216
	Within Groups	11.872	38	0.312		
	Total	13.330	41			

Critical value of F at df "3,38" and significance level 0.05 equals 2.85

Sub-hypothesis 5.3: There is a significant difference in the respondents' views due to their job grade.

One way ANOVA was used for testing and the results illustrated in table (16) show that there is no significant difference in the correspondent's views due to their job grade.

Table (16): One way ANOVA test for job grade

Field	Source	Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
All dimensions	Between Groups	0.108	2	0.054	0.159	0.854
	Within Groups	13.222	39	0.339		
	Total	13.330	41			

Critical value of F at df "2,47" and significance level 0.05 equal 3.24

Sub-hypothesis 5.4: There is a significant difference in the respondents' views of the population at level ($\alpha \leq 0.05$) due to their involvement in projects activities.

One way ANOVA was used for testing and the result illustrated in table (17) shows that there is no significant difference in the correspondent's views due to their involvement in projects.

Table (17): One way ANOVA test for involvement in projects activities

Field	Source	Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
All dimensions	Between Groups	1.921	2	0.961	3.184	0.051
	Within Groups	11.409	39	0.293		
	Total	13.330	41			

Critical value of F at df "2,39" and significance level 0.05 equals 3.24

Sub-hypothesis 5.5: There is a significant difference in the respondents' views due to amount of project work allocated to them.

One way ANOVA was used for testing and the results illustrated in table (18) show that there is no significant difference in the respondents' views due to amount of project work allocated to them.

Table (18): One way ANOVA test for amount of project work allocation

Field	Source	Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
All dimensions	Between Groups	0.856	3	0.285	0.869	0.466
	Within Groups	12.474	38	0.328		
	Total	13.330	41			

Critical value of F at df "3,38" and significance level 0.05 equal 2.85

According to the results of the tests for the five sub-hypotheses, we can conclude that hypothesis 5 which states that there are significant differences among the respondents' views at level ($\alpha \leq 0.05$) due to personal and professional characteristics (level of education, years of experience, job grade, type of involvement related to projects, and percentage of work allocated to projects), cannot be accepted and that there are no significant differences among the respondents' views due to their personal and professional characteristics.

Chapter 6

Conclusions and Recommendations

6. Conclusions and Recommendations

6.1 Introduction

This chapter provides the main conclusions reached and the recommendations of the study in light of these conclusions. The recommendations can benefit researchers, universities, academics, decision makers, and all stakeholders of related to project risk and management.

6.2 Main conclusions

- 1- The overall risk management related to projects within UNRWA in Gaza needs more development by utilizing more effective tools and methods. Development is needed in the following specific areas:
 - a- Current practices related to project risk management within UNRWA in Gaza needs to be more effective and more systematic.
 - b- Evaluation should be conducted upon completion of each project. The evaluation should be neutral and designed towards producing lessons learned in future implemented projects.
 - c- Standard systems for project risk management should be developed and made available for utilization by all projects stakeholders within UNRWA in Gaza.

- 2- Risk management needs to be integrated within UNRWA programmes, especially within the planning process of projects. Risk management should be based on proactive approach and not based on ad hoc responses. The following specific points need specific attention.
 - a- Project risk management and planning needs to be based more on statistical and quantitative data analysis, and historical data from previous projects should be effectively utilized.
 - b- Project risks are not well reflected in the project budgeting regarding time and cost. Project budgeting should include line/s pertaining to risk and risk mitigation plans.
 - c- Project risks are not sufficiently taken into consideration during the initial phases of projects, e.g. during brainstorming sessions, concept notes, negotiations, etc.
 - d- Staff involved in projects does not yet consider the new ERP as a risk management tool that can be relied on in risk analysis and management.

- 3- The current systems and tools, which are supposed to handle risks analysis and management, are not based on statistical or quantitative methods. The following points need specific attentions.
 - a- The current staff members working in projects are capable to handle risks and to produce risk management tools or products.
 - b- The current policy making and practices are not fully based on or supported by statistical methods and analysis of data.

- 4- Risks related to projects within UNRWA in Gaza are not well analyzed/ managed due to the lack of effective information management. Attention should be paid to the following points.
 - a- Data and information are always scattered and communicated through fragments making them unreliable and not corresponding to actual needs. Data should be always consolidated so that a holistic picture is provided to stakeholders.
 - b- The current tools and system are in need for more development or restructuring in order to meet the requirements of effective risk management which is based on quantitative and statistical methods.

- 5- The organizational structure related to project and grants management should be developed in order to be able to respond to projects risks. The following points should be given specific attention:
 - a- Having a projects' focal point in each implementing programme or department is very is needed in order to rely on one main source of information. This will ensure accuracy and timeliness of this information whenever required.
 - b- The current risk management related to projects within UNRWA in Gaza needs to be enhanced by utilizing more effective tools and methodologies.
 - c- Instructions and manuals related to project risk management are somewhat inactive and not taken into consideration when managing risks. This means no standardized procedures are actively in use.
 - d- The top management within in UNRWA-Gaza and the decision makers authority are not always aware of the risks associated with projects. There is a gap exists between the top management and the operational level in terms of sharing information and risks associated with projects.
 - e- The current positions and posts of staff are not sufficient and more positions should be established based on a prior needs assessment to be conducted.
 - f- Risk management within UNRWA in Gaza needs to be integrated within the project planning process and proactive planning should be promoted.

More scientific methods, especially those based statistics and quantitative techniques, in risk analysis and management needs to be utilized in the project risk management in UNRWA.
 - g- Risks related to projects within UNRWA in Gaza are not well managed due to lack of effective information management.

- h- The current organizational structure within UNRWA in Gaza needs to be more developed in order to enhance project risk management.
- 6- The demography of the population does not play a significant role in the research variables, i.e. there is no significant difference in the participants groups due to their “level of education, years of experience, job grade, type of involvement..., or percentage allocated to projects related tasks”.
- 7- There is a positive correlation between project risk management and organizational structure.
- 8- There is a positive correlation between project risk management and information management.
- 9- There is a positive correlation between project risk management and planning.

6.3 Recommendations

- 1- Perform an assessment of the current posts and positions at the Donor Relations and Projects Support Office within UNRWA in Gaza which will eventually lead to a restructuring and re-allocation of staff. This should also include clear roles and responsibilities of staff where allocation of capacity should take into consideration the need for dedicated staff who can handle planning and risk management.
- 2- For each of the implementing programmes or departments, there should be a designated focal point, and possibly establishment of a new position, in order to act as a focal point and be the main source of information in his/her respective programme. This position will be in charge of providing any needed data on implemented projects in his/her programme so that all data will be channeled through him/her.
- 3- The top management and decision makers who are in charge of strategic management and planning should follow a participatory approach where lower level staff become more involved and information becomes mutually shared at all levels.
- 4- A new approach using quantitative methods in risk management should be adopted in order to effectively utilize available data and information systems in place. Some of the recommended approaches include the CPM, PERT, and Monte Carlo simulation.
- 5- The new ERP system which was recently implemented by UNRWA in all of its five fields of operations should be further developed to serve as an information hub where staff can find relevant data that can be useful in quantitative analysis of risks.
- 6- The current available manuals and instructions should be further developed to include customized risk management procedures and techniques based on quantitative and statistical methods. They should also be activated and promoted to be used as a reference by projects staff.
- 7- UNRWA should strive to have an evaluations conducted upon for every implemented project. This evaluation should be neutral and designed in a way to provide lessons learned that can contribute to risk mitigation and better planning for future projects.
- 8- Project risk analysis and management should be considered in the early stages of project preparation and planning. This will promote proactive culture towards risk responses and can contribute to the effectiveness of the overall management of projects.

6.4 Proposed Future Studies

- 1- Utilization of data mining and analytics of on donor relations and funding to enhance fund raising.
- 2- Building a knowledge base for effective dissemination of knowledge that can enhance fund raising for projects.
- 3- Critical evaluation of the monitoring and evaluation for projects within UNRWA in Gaza. Integrating the M&E in UNRWA to better serve projects and donor requirements.
- 4- A critical evaluation of the external Projects Communications Management at UNRWA.

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Appendices

Appendix (1): Questionnaire Judging Committee

Prof. Yousef Ashour	Islamic University of Gaza
Dr. Khalid Dehlis	Islamic University of Gaza
Dr. Azzam Abu Habeeb	UNRWA Projects Office and part time lecturer at the Islamic University of Gaza.
Eng. Ismail Saleh	Projects Coordination Officer, UNRWA
Dr. Nafez Barakat	Islamic University of Gaza
Mr. Fadel Al-Salloul	Deputy Chief Education Programme, UNRWA

Appendix (2) Validity and Reliability of the Questionnaire

Pilot Testing

A pilot testing was performed for the questions by involving academics and practitioners to ensure that the questions are practicable and unambiguous. Practitioners included testing the wording and the structure of the questions and dimensions of the study. The draft questions were first in English. As a result of the pilot it was decided that the wording should be translated into Arabic (mother tongue of the population) in order to ensure consistency of the data collected as the population may have different levels of English language. The feedback from the pilot is important to improve the quality and removing any obstacles for responding to the questions. Then, the questionnaire was checked and judged by a group of academics and practitioners who contributed to its improvement in terms of content and statistical aspect.

Validity of the Questionnaire

We can define the validity of an instrument as a determination of the extent to which the instrument actually reflects the abstract construct being examined. Validity refers to the degree to which an instrument measures what it is supposed to be measuring. High validity is the absence of systematic errors in the measuring instrument. When an instrument is valid; it truly reflects the concept it is supposed to measure. Achieving good validity requires the care in the research design and sample selection. This questionnaire was exposed to three experts in the field who agreed that it is valid after providing their input and the questionnaire has been amended and improved.

Content Validity of the Questionnaire

Content validity test was conducted by consulting two groups of experts. The first was requested to evaluate and identify whether the questions agree with the scope of the items and the extent to which these items reflect the concept of the research problem. The other was requested to evaluate that the instrument used is valid statistically and that the questionnaire was designed well enough to provide relations and tests between variables. The two groups of experts did agree that the questionnaire was valid and suitable enough to measure the concept of interest with some amendments.

Statistical Validity of the Questionnaire

To insure the validity of the questionnaire, two statistical tests should be applied. The first test is Criterion-related validity test (Pearson test) which measures the correlation coefficient between each item in the field and the whole field. The second test is structure validity test (Pearson test) that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one field and all the fields of the questionnaire that have the same level of similar scale.

Criterion Related Validity

Internal consistency:

Internal consistency of the questionnaire is measured by a scouting sample, which consisted of thirty questionnaires, through measuring the correlation coefficients between each paragraph in one field and the whole field. Tables No. 19-23 below show the correlation coefficient and p-value for each field items. As shown in the tables, the p- Values are less than 0.05 or 0.01, so the correlation coefficients of this field are significant at $\alpha = 0.01$ or $\alpha = 0.05$, so it can be said that the paragraphs of this field are consistent and valid to measure what it was set for.

(First dimension: Project risk management)

Table (19): Correlation coefficient between each paragraph and the whole field

#	Question	Pearson coefficient	p-value
1	The current risk management related to projects within the Gaza Field Office rarely leads to effective implementation of project activities and to the realization of their objectives.	0.641	0.001
2	In my point view, the projects implemented by Gaza Field Office face risks due to several factors, most importantly due to the volatile situation in Gaza Strip.	0.666	0.000
3	Projects risk management within Gaza Field Office is supported by standard systems and approaches, which are usable by all respective departments and programmes.	0.606	0.001
4	Projects are subjected to undesirable results (which can be avoided in case a project management tool is in place) due to the lack of proper risk management.	0.642	0.001
5	Impartial evaluation is usually made upon completion of projects and lessons learned are elicited, and utilized to manage risks anticipated to encounter prospective projects.	0.550	0.004
6	Risks related to projects are not usually responded to throughout the life cycle of the project and to the best interest of achieving its	0.462	0.020

#	Question	Pearson coefficient	p-value
	objectives.		

(Second dimension: Project risk planning)

Table (20): Correlation coefficient between each paragraph and the whole field

#	Question	Pearson coefficient	p-value
1	There is always an effective risk plan prepared alongside each project proposal or concept note, e.g. risk register, matrix, etc.	0.740	0.000
2	There is always a contingency budget line and contingency time frame prepared in each of the project plan or proposal.	0.806	0.000
3	Risk is always an issue of consideration during the initial stage of project, i.e. before the initiation of the project such as during concept stage, brainstorming stage, project formulation, etc.	0.789	0.000
4	The risk planning during initial phases of the project lacks the utilization of statistical methods and quantitative methodologies.	0.506	0.010
5	The current planning related to projects effectively contributes to responding to risk and hence to the overall project management.	0.436	0.029
6	In my point of view, the new enterprise resource planning (ERP), which has been implemented in UNRWA, is capable of providing meaningful and useful information to the risk analysis and management of project.	0.463	0.020

(Third dimension: Quantitative methodology)

Table (21): Correlation coefficient between each paragraph and the whole field

#	Question	Pearson coefficient	p-value
1	Currently, UNRWA follows a risk management technique which is based on/ incorporates quantitative approach (such statistics, simulations, modeling, analytics, etc) in analyzing and managing risks associated with projects and grants.	0.530	0.006
2	The decision and policy making process related to projects within Gaza Field Office is (partially) based and supported by statistics, analysis of data and trends analysis	0.479	0.015
3	Approaches incorporating data analysis and processing are not sufficiently used in the overall management of projects and grants.	0.540	0.005
4	The current systems and tools in place, which are supposed to support the risk analysis and management processes, are not based on statistical or quantitative methodology.	0.475	0.017
5	Staff working with projects (e.g. projects officers, projects managers, coordination officers, etc) are well trained and can perform statistical analysis as part of the risk analysis and management process.	0.728	0.000

(Fourth dimension: Information management)

Table (22): Correlation coefficient between each paragraph and the whole field

#	Question	Pearson coefficient	p-value
1	Information related to projects is currently well managed in a way that can provide projects managers with the needed information in a timely manner.	0.618	0.001

#	Question	Pearson coefficient	p-value
2	The current information management tools can provide accurate and relevant data on projects as needed.	0.638	0.001
3	The current information management tools and systems play a substantial role in the development of project risk management.	0.480	0.015
4	In my perspective, information management is a key factor to the success and effectiveness of projects risk analysis and management.	0.472	0.017
5	Information and data pertaining to projects and their risks are accessible to staff who are concerned with project risk analysis and management.	0.494	0.012
6	Data collected on projects and their implementations are always consolidated and not relayed in fragments.	0.702	0.000
7	In my point of view, the existing enterprise resource planning ERP, which was recently applied by UNRWA in all of its fields of operation, can be considered an effective project management system which can contribute to the projects risk management process.	0.787	0.000
8	Data and information related to projects and their progresses are promptly updated reflecting actual facts on the ground.	0.759	0.000

(Fifth dimension: Organizational Structure)

Table (23): Correlation coefficient between each paragraph and the whole field

#	Question	Pearson coefficient	p-value
1	The available procedures, as stated in the current manuals and instructions or other documents, regulate how project risks should be handled throughout the life cycle of projects.	0.657	0.000
2	Staff members, engaged in project formulation, planning, or management, are well trained and qualified to deal with risks arising during the project life cycle.	0.511	0.009
3	The current coordination between staff members involved in project implementation and management is sufficient to contribute to the risk analysis and management of projects.	0.709	0.000
4	The top strategic management who have the decision making authority related to projects are always aware of the risks associated with projects.	0.637	0.000
5	The current staff and positions within the projects office correspond to the human resources needed for effective risk management of projects.	0.787	0.000
6	In my point of view, there should be designated and dedicated staff members who can work closely with projects officer to handle risk management issues.	0.688	0.000
7	Implementing departments do not usually designate focal point staff member who can provide information on projects who can provide input and feedback on projects.	0.500	0.005

Structure Validity of the Questionnaire

Structure validity is the second statistical test that is used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one field and all the fields of the questionnaire that have the same level of likert scale.

As shown in table (24), the significance values are less than 0.01, so the correlation coefficients of all the fields are significant at $\alpha = 0.01$, so it can be said that the fields are valid to measure what it was set for to achieve the main aim of the study

Table (24): Structure validity of the questionnaire

Dimension	Title	Pearson correlation coefficient	p-value
1	Project risk management	0.841	0.000
2	Project risk planning	0.923	0.000
3	Quantitative methodology	0.862	0.000
4	Information management	0.618	0.000
5	Organizational Structure	0.773	0.000

Reliability of the Research

Reliability of an instrument is the degree of consistency with which it measures the attribute it is supposed to measure. The test is repeated to the same sample of people on two occasions and then the scores obtained were compared by computing a reliability coefficient. For the most purposes reliability coefficient above 0.7 are considered satisfactory. The statistician indicated that in order to overcome the distribution of the questionnaire twice to measure the reliability, it can be achieved by using Kronpakh Alpha coefficient and Half Split Method via using the SPSS software.

Half Split Method

This method depends on finding Pearson correlation coefficient between the means of odd rank questions and even rank questions of each field of the questionnaire. Then, correcting the Pearson correlation coefficients can be done by using Spearman Brown correlation coefficient of correction. The corrected correlation coefficient (consistency coefficient) is computed according to the following equation:

Consistency coefficient = $2r/(r+1)$, where r is the Pearson correlation coefficient. The normal range of corrected correlation coefficient $2r/(r+1)$ is between 0.0 and + 1.0 as shown in table (25), and the general reliability for all items equals 0.8884, where the significant (α) is less than 0.05. So all the corrected correlation coefficients are significance at $\alpha = 0.05$. It can be said that according to the Half Split method, the questionnaire is reliable.

Table (25): Split-half coefficient method

Dimension	Title	person-correlation	Spearman-Brown Coefficient	Sig. (2-Tailed)
1	Project risk management	0.7829	0.8783	0.000
2	Project risk planning	0.8435	0.9151	0.000
3	Methodology	0.8057	0.8924	0.000
4	Information management	0.7514	0.8581	0.0000
5	Organizational Structure	0.7324	0.8455	0.0000
	All Dimension	0.7992	0.8884	0.0000

Cronbach's Coefficient Alpha

This method is used to measure the reliability of the questionnaire between each field and the mean of the whole fields of the questionnaire. The normal range of Cronbach's coefficient alpha value is between 0.0 and + 1.0, and the higher values reflects a higher degree of internal consistency. As shown in table (26) the Cronbach's coefficient alpha was calculated and the general reliability for all items equals 0.9078. So, this range is considered high and this result ensures that the questionnaire is reliable.

Table (26): Cronbach's Alpha for reliability

Dimension	Title	No. of Items	Cronbach's Alpha
1	Project risk management	6	0.8957
2	Project risk planning	6	0.9325
3	Methodology	5	0.8457
4	Information management	8	0.8657
5	Organizational Structure	7	0.8715
	All Dimension	32	0.9078

Appendix (3) Questionnaire (Arabic version)



الجامعة الإسلامية بغزة

كلية التجارة- الدراسات العليا

ماجستير إدارة الأعمال

واقع استخدام الوسائل الكمية في إدارة مخاطر المشاريع

دراسة حالة: الأونروا- مكتب غزة الإقليمي

يسرني أن أضع بين أيديكم هذه الإستبانة من أجل تقييم الوضع الحالي والإجراءات المتبعة في إدارة المخاطر التي تواجه المشاريع في وكالة الغوث الدولية في غزة. سوف تقوم هذه الدراسة بدراسة أثر كل من التخطيط، الوسائل المتبعة في تحليل المخاطر، إدارة المعلومات، الهيكل التنظيمي للأونروا على إدارة المخاطر التي تواجه المشاريع والتي سوف تنعكس على إدارة المشاريع ككل. صممت هذه الإستبانة من محورين:

- 1- المحور الأول: المعلومات الأولية، والتي تشتمل على البيانات الأساسية أو الشخصية والتي سوف يتم التعامل معها بشكل يضمن خصوصية المشارك.
- 2- الجزء الثاني: ويشتمل على البيانات المراد جمعها من المشاركين من خلال أربعة محاور هي:

المحور الأول: إدارة المخاطر المتعلقة بالمشاريع.
المحور الثاني: التخطيط ومخاطر المشاريع.
المحور الثالث: الوسائل والطرق المتبعة
المحور الرابع: إدارة المعلومات المتعلقة بالمشاريع
المحور الخامس: الهيكل التنظيمي

إن جميع البيانات التي يتم جمعها من خلال هذه الإستبانة هي للغرض البحثي فقط وسيتم التعامل معها بسرية تامة. أرجو التكرم بالإجابة عن الأسئلة التالية حسب تقديرك وفهمك للموضوع. وشكرا.

الجزء الأول: البيانات الأساسية

1- العمر 29 - 20 30 - 39 40 - 49 50 أو أكثر

2- الجنس

ذكر أنثى

3- المستوى التعليمي

دبلوم بكالوريوس ماجستير دكتوراة أو أعلى

4- سنوات الخبرة لدى وكالة الغوث

أقل من 5 سنوات 5 - 9 سنوات 10 - 14 سنوات 15 سنة أو أكثر

5- الدرجة الوظيفية

6 - 10 درجة 11 - 15 16 - 20

6- طبيعة المهام المتعلقة بالمشاريع التي تقوم بها، من حيث كونها مهام ذات طابع إداري أو فني.

في أغلبها إدارية في أغلبها فنية تجمع بين الجانب الفني والإداري

7- بشكل تقديري، ما هي نسبة انخراطك في المهام ذات العلاقة بالمشاريع كنسبة من إجمالي ساعات العمل على سبيل المثال

24 % أو أقل 25% - 49% 50% - 74% 75% أو أكثر

8- الدائرة التي تعمل بها.

برنامج الصحة برنامج التعليم برنامج الإغاثة والخدمات الإجتماعية
 برنامج البنية التحتية وتطوير المخيمات دائرة المالية دائرة التوريدات والدعم اللوجستي
 مكتب المشاريع أخرى.....

الرقم	المحور الأول: إدارة مخاطر المشاريع	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
1	إن إدارة المخاطر المتبعة و المتعلقة بالمشاريع لدى وكالة الغوث في نادرا ما تقود إلى التنفيذ الفعال والوصول إلى تحقيق الأهداف غزة المرجوة كما هو مخطط لها.					
2	من وجهة نظري فإن المشاريع التي يتم تنفيذها لدى وكالة الغوث في غزة تواجه بعض المخاطر بسبب عدة عوامل منها عدم الاستقرار (مثلا بسبب الوضع السياسي والإقتصادي والحصار على سبيل المثال)					
3	إن إدارة مخاطر المشاريع لدى وكالة الغوث في غزة تتم بناء على طرق وأنظمة ممنهجة. (مثلا هناك أدوات محددة وعلمية لتحليل وإدارة المخاطر تعتمد على معايير معينة بحيث يمكن استخدامها من قبل جميع الدوائر المعنية بشكل موحد)					
4	إن المشاريع التي تنفذ من خلال وكالة الغوث في غزة تكون عرضة لبعض النتائج الغير مرجوة (والتي يمكن تفاديها) نتيجة لغياب الإدارة الفعالة للمخاطر المتعلقة بالمشاريع.					
5	دائما ما تكون التقييمات التي تقوم بها وكالة الغوث في غزة للمشاريع محايدة ونزيهة بحيث يتم الاستفادة منها باستخلاص العبر والدروس المستفادة من أجل تطوير المشاريع المستقبلية.					
6	نادرا ما يتم الإستجابة للمخاطر التي تواجه المشاريع خلال فترة حياة المشروع بشكل يضمن تحقيق الأهداف المرجوة منها.					

الرقم	المحور الثاني: التخطيط وإدارة المخاطر	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
1	عند إعداد مقترح أو فكرة لمشروع ما فإنه يتم له إعداد خطة تتعلق بتحليل وإدارة المخاطر التي قد تشكل عائق أمام تنفيذ المشروع بنجاح.					
2	عند إعداد أي مقترح أو خطة لمشروع ما يتم تخصيص جزء من الموازنة لمواجهة المخاطر أو الطوارئ التي قد تحدث أثناء فترة المشروع.					
3	دائما ما يتم الإهتمام للمخاطر التي قد تواجه المشروع منذ المراحل الأولى، فعلى سبيل المثال أثناء إعداد مقترح المشروع أو الخطة الخاصة به، أو اللقاءات والتداولات.					
4	يتضمن التخطيط للمشروع في المراحل الأولى على طرق ووسائل إحصائية مبنية على بيانات تاريخية سابقة يتم جمعها وتحليلها بحيث يمكن الإستفادة منها في توقع المخاطر التي قد تحدث أثناء المشروع (على سبيل المثال، التنبؤ بمدى احتمال تنفيذ نشاط معين في الوقت المحدد له حسب الخطة)					
5	تتمتع عملية التخطيط المتعلقة بالمشاريع بفاعلية كافية بحيث تساعد على مواجهة المخاطر التي قد تواجه المشاريع مما يسهم في تحسين إدارة المشاريع ككل.					
6	من وجهة نظري فإن نظام تخطيط موارد المؤسسات (ERP) والذي تم تبنيه حديثا من قبل إدارة الوكالة قادرا على توفير معلومات ذات					

					قيمة لتحليل وإدارة مخاطر المشاريع.
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الرقم	المحور الثالث: الوسائل والطرق المتبعة	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
1	تعتمد وكالة الغوث في غزة في الوضع الراهن على وسائل إدارية كمية (مثل الطرق الإحصائية والمحاكاة) في إدارة وتحليل المخاطر المتعلقة بالمشاريع.					
2	تعتمد عملية صناعة القرار والسياسات المتعلقة بالمشاريع على بيانات إحصائية وتحليل ممنهج للمعلومات.					
3	نادرا تستخدم وكالة الغوث في إدارة المشاريع الطرق والوسائل الكمية والإحصائية في إدارة المشاريع بشكل كاف.					
4	إن أنظمة المعلومات الداعمة للقرارات وتحليل وإدارة المخاطر نادرا ما تعتمد على توظيف الوسائل والطرق الكمية والإحصائية وتحليل البيانات.					
5	إن الموظفين المنخرطين في إدارة وتنفيذ المشاريع لديهم القدرة والتدريب الكافي للقيام بعمليات تحليل المخاطر بطرق إحصائية وكمية تمكنهم من إدارة المخاطر بشكل فعال.					

الرقم	المحور الرابع: إدارة المعلومات	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
1	يتم إدارة المعلومات والبيانات المتعلقة بالمشاريع بطريقة سلسلة وفعالة تتيح الوصول إليها في الوقت المبرر وتلبي الغرض المطلوب.					
2	إن أنظمة المعلومات والأدوات المتاحة توفر معلومات دقيقة وملائمة للغرض بما يتعلق بإدارة المشاريع ومخاطرها.					
3	إن أنظمة المعلومات المتوفرة حالياً تولي إهتمام كبير لتطوير نظام متكامل لإدارة المخاطر التي قد تواجه المشاريع.					
4	من وجهة نظري، إن إدارة المعلومات من أهم العوامل التي تلعب دوراً مهماً في نجاح وفعالية تحليل مخاطر وإدارة المخاطر المتعلقة بالمشاريع.					
5	من السهل الوصول للمعلومات اللازمة لإدارة وتحليل المخاطر المتعلقة بالمشاريع من قبل الموظفين المعنيين.					
6	تكون البيانات التي يتم جمعها عن تنفيذ المشاريع وأنشطتها من الميدان متكاملة ومترابطة بحيث لا تتفكك كأجزاء متفرقة.					
7						

					من وجهة نظري فإن نظام تخطيط موارد المؤسسات (ERP) يمثل نظام فعال لإدارة المشاريع والمخاطر المتعلقة بها.	
					يتم تحديث البيانات والمعلومات المتعلقة بالمشاريع وتنفيذها بشكل سريع وفوري بحيث تعكس الحقائق الموجودة على أرض الواقع.	8

الرقم	المحور الخامس: الهيكل التنظيمي	أوافق بشدة	أوافق	محايد	لا أوافق	لا أوافق بشدة
1	إن الإجراءات واللوائح والتعليمات المتبعة (تلك المتعلقة بالمشاريع) لدى وكالة الغوث في غزة تنظم كيفية التعامل مع المخاطر وإدارتها بشكل فعال.					
2	إن الموظفين المنخرطين في إعداد وتخطيط المشاريع لديهم التدريب والمهارات والمؤهلات اللازمة التي تمكنهم من تحليل وإدارة المخاطر خلال فترة المشروع.					
3	إن مستوى التنسيق الحالي بين الموظفين المنخرطين في إدارة المشاريع وتنفيذها كافي بحيث يساعد على تحليل المخاطر المتعلقة بالمشاريع وإدارتها بشكل فعال.					
4	إن الإدارة العليا المعنية باتخاذ القرارات المتعلقة بإدارة المشاريع تكون على دراية تامة بالمخاطر التي قد تعيق تنفيذ المشاريع وتحقيق أهدافها بنجاح.					
5						

					إن الوظائف الحالية والعاملين لدى مكتب المشاريع تلبي الموارد البشرية اللازمة لإدارة وتحليل المخاطر المتعلقة بالمشاريع بشكل فعال وكفاء	
					من وجهة نظري، فإنه ينبغي تعيين شخص أو أكثر يكون بمثابة نقطة تواصل مع مسؤولي المشاريع ويقوم بتحليل المخاطر التي قد تؤثر على تنفيذ المشاريع بشكل ناجح ورفعها إلى الموظف المسؤول.	6
					تفتقر كل دائرة لشخص يمثل نقطة التواصل لما يتعلق بالمشاريع، حيث يوفر المعلومات والبيانات اللازمة لإدارة المشاريع وتحليل مخاطرها.	7

Appendix (4) Questionnaire (English version)

The Islamic University of Gaza
Deanship of Graduate Studies
Faculty of Commerce
Department of Business
Administration



Status of Using Quantitative Methods in Project Risk Management

Case Study: UNRWA- Gaza Field Office

Dear participant,

The primary purpose of this research is to evaluate the current situation and the measures taken for projects risk management within UNRWA's Gaza Field Office. The research will also examine different factors and relationships between different variables which could contribute to the enhancement of projects risk analysis and hence the overall project management. The researcher will also use the findings of the research to propose different approaches and models which are mainly based on quantitative methodologies in project management to be adopted by the top management within UNRWA and by the projects officers in charge of grants and projects management. The questionnaires will be anonymous and the data included will be dealt with high privacy and neutrality. Data will be used for research purposes only and your cooperation is crucial to the success of the research.

Thank you so much.

Researcher

Samer M. El-Ja'bari

Section one:

Primary information

9- Age

20 – 29 30 – 39 40 – 49 50 or more

10- Gender

Male Female

11- Level of education

Diploma Bachelor Master PhD or more

12- Years of experience.

Less than 5 years 5-9 years 10-14 years 15 years or more

13- Job grade

Grades 6 – 10 Grades 11 – 15 16 -20

14- Type of involvement related to projects activities.

Almost administrative or support Almost technical A hybrid of both
technical and managerial strategic or policy making

15- Out of your regular workload, how much is approximately allocated to projects related tasks.

Up to 24% 25% - 49% 50% - 74% 75% or more

16- Functional department

Health Programme Education Programme Relief and Social Services
Programme Infrastructure and Camp Improvement Programme Finance
Department Procurement and Logistics Department
Projects Office Other

SN	First dimension: Project risk management	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	The current risk management related to projects within the Gaza Field Office rarely leads to effective implementation of project activities and to the realization of their objectives.					
2	In my point view, the projects implemented by Gaza Field Office face risks due to several factors, most importantly due to the volatile situation in Gaza Strip.					
3	Projects risk management within Gaza Field Office is supported by standard systems and approaches, which are usable by all respective departments and programmes.					
4	Projects are subjected to undesirable results (which can be avoided in case a project management tool is in place) due to the lack of proper risk management.					
5	Impartial evaluation is usually made upon completion of projects and lessons learned are elicited, and utilized to manage risks anticipated to encounter prospective projects.					
6	Risks related to projects are not usually responded to throughout the life cycle of the project and to the best interest of achieving its objectives.					

SN	Second dimension: Project risk planning	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	There is always an effective risk plan prepared alongside each project proposal or concept note, e.g. risk register, matrix, etc.					
2	There is always a contingency budget line and contingency time frame prepared in each of the project plan or proposal.					
3	Risk is always an issue of consideration during the initial stage of project, i.e. before the initiation of the project such as during concept stage, brainstorming stage, project formulation, etc.					
4	The risk planning during initial phases of the project lacks the utilization of statistical methods and quantitative methodologies.					
5	The current planning related to projects effectively contributes to responding to risk and hence to the overall project management.					
6	In my point of view, the new enterprise resource planning (ERP), which has been implemented in UNRWA, is capable of providing meaningful and useful information to the risk analysis and management of project.					

SN	Third dimension: Quantitative methodology	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	Currently, UNRWA follows a risk management technique which is based on/ incorporates quantitative approach (such statistics, simulations, modeling, analytics, etc) in analyzing and managing risks associated with projects and grants.					
2	The decision and policy making process related to projects within Gaza Field Office is (partially) based and supported by statistics, analysis of data and trends analysis					
3	Approaches incorporating data analysis and processing are not sufficiently used in the overall management of projects and grants.					
4	The current systems and tools in place, which are supposed to support the risk analysis and management processes, are not based on statistical or quantitative methodology.					
5	Staff working with projects (e.g. projects officers, projects managers, coordination officers, etc) are well trained and can perform statistical analysis as part of the risk analysis and management process.					

SN	Fourth dimension: Information management	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	Information related to projects is currently well managed in a way that can provide					

	projects managers with the needed information in a timely manner.					
2	The current information management tools can provide accurate and relevant data on projects as needed.					
3	The current information management tools and systems play a substantial role in the development of project risk management.					
4	In my perspective, information management is a key factor to the success and effectiveness of projects risk analysis and management.					
5	Information and data pertaining to projects and their risks are accessible to staff who are concerned with project risk analysis and management.					
6	Data collected on projects and their implementations are always consolidated and not relayed in fragments.					
7	In my point of view, the existing enterprise resource planning ERP, which was recently applied by UNRWA in all of its fields of operation, can be considered an effective project management system which can contribute to the projects risk management process.					
8	Data and information related to projects and their progresses are promptly updated reflecting actual facts on the ground.					

SN	Fifth dimension: Organizational Structure	Strongly agree	Agree	Neutral	Disagree	Strongly Disagree
1	The available procedures, as stated in the current manuals and instructions or other documents, regulate how project risks should be handled throughout the life cycle of projects.					
2	Staff members, engaged in project formulation, planning, or management, are well trained and qualified to deal with risks arising during the project life cycle.					
3	The current coordination between staff members involved in project implementation and management is sufficient to contribute to the risk analysis and management of projects.					
4	The top strategic management who have the decision making authority related to projects are always aware of the risks associated with projects.					
5	The current staff and positions within the projects office correspond to the human resources needed for effective risk management of projects.					
6	In my point of view, there should be designated and dedicated staff members who can work closely with projects officer to handle risk management issues.					
7	Implementing departments do not usually designate focal point staff member who can provide information on projects who can provide input and feedback on projects.					

