Knowledge Management within the United Nations Development Programme

A case study of knowledge management and its impact on the implementation of a renewable energy project.

Author: Yasmim Domingues Tuxen
Supervisor: Kristjan Jespersen
Master Thesis
Hand-in Date: August 26th, 2016

Master in Business, Language and Culture – Business and Development Studies
Copenhagen Business School

STU count: 162.469

Abstract

The predominant use of fossil fuels has detrimental environmental effects and is unsustainable in the longer term. In contrast, energy efficiency through renewable energy supply presents a unique opportunity to tackle some of the environmental challenges the United Nations has addressed in the Sustainable Development Goals launched in 2015. A wide range of renewable energy technologies are recognized as growth industries by most governments. Additionally, developing countries can give access to affordable energy for all and lower the environmental impacts with the implementation of a renewable infrastructure.

One of the United Nations Development Programme´s (UNDP) role in national contexts is to help to build capacity in developing countries to integrate environmental considerations into development plans and strategies, by means of knowledge exchange and technology deployment. The Country Office ICT Advisory Services (CIAS) unit in the UNDP has, since 2014, adopted a Green Energy Solutions (GES) project with a strategy to improve the UNDP office facilities with a sustainable approach, by installing solar PV systems in every UNDP Country Office (CO) around the world. By leading by example and using the internal project as a pilot experience for specific national contexts, the UNDP can disseminate information, transfer technology and assist with policies for facilitating the promotion of renewable energy in developing countries.

However, the Green Energy team of the GES project faces challenges regarding the engagement of the ICT managers in COs with the new proposal coming from the CIAS unit, which is the installation of Power Consumption Measuring and Monitoring (PCMM) devices. These devices support the measuring and monitoring of electrical circuits for a proper design and installation of a solar PV system. PCMM installation is part of the 1st step of the 7 step solar solution process the CIAS unit provides as a service to the COs.

This paper presents a theoretical exploration of knowledge management (KM) in the UNDP. Furthermore, the research question seeks an explanation of the causal relationship between KM processes in the CIAS unit and performance outcomes in the Green Energy Solutions Project. KM continues to inspire researchers and managers as knowledge is challenging to define and consequently, to manage. Previous literature has not focused or emphasized what are the implications of KM in internal projects related to renewable energy in the UN.

An analysis of market facilitation organizations and the actual scenario for renewable energy deployment sets the frame in which the UNDP´s influence on national context takes place. The empirical findings are based on the triangulation of the following data gathered: ten semi-structured interviews conducted with CIAS unit staff members; my participant and researcher observations in the organization; UNDP internal reports, documents and Intranet; and a survey conducted by the CIAS unit regarding Green Energy client satisfaction and answered by the ICT managers in the COs. The study makes a contribution to the literature on KM processes in global and international organizations (IOs).

The performance outcomes of the GES project were analyzed from the perspective of current targets of the project: installation of PCMM in all COs. The analysis of data from the UNDP´s KM strategy framework, confirmed the theoretical tendency of approaching knowledge management from a practical perspective. However, the findings highlight that changing the organizational culture and structure from objective to people-centered approach in a complex environment such as the UN system, might require more than efficient knowledge management tools. Knowledge sharing need to be institutionalized as a cross-practice exercise, which is concluded to be a challenging task within the settings of IOs. Nevertheless, that does not reject the positive causal relationship between efficient KM processes and the performance outcomes of the GES project.

Acknowledgement

"Once the renewable infrastructure is built, the fuel is free forever. Unlike carbon-based fuels, the wind and the sun and the earth itself provide fuel that is free, in amounts that are effectively limitless."
– Al Gore

Table of Contents

Acronyms and Abbreviations

CIAS: Country Office ICT Advisory Services Unit

COs: Country Offices

GES: Green Energy Solutions

KM: Knowledge Management

KMS: Knowledge Management System

PCMM: Power Consumption Measurement and Monitoring

PV: Photovoltaic

SDGs: Sustainable Development Goals

UN: United Nations

UNDP: United Nations Development Programme

Table of Figures

1. Introduction

While countries need to meet their continuously rising energy consumption, the production and consumption of energy emitting carbon dioxide (CO_2) is thought to be the main cause of climate change (Heshmati et al., 2015). In recent years, many countries have contributed to the target of zero carbon emission, with policies targeting the use and promotion of renewable energy (Chen et al., 2010; Hoffmann, 2014; Hordeski, 2010; International Energy Agency, 2015). "*People in developing countries are in desperate need of energy, governments and international organizations are prioritizing the use of renewable energy, and equipment providers are producing solar panels*" (Tabernacki, 2016).

A recent initiative entailing the use of renewable energy in a global perspective is the Sustainable Development Goals (SDGs) released by the United Nations (UN) in 2015, substituting the Millennium Development Goals (MDGs) which came to the end of its term on the same year. One of the seventeen goals is the 'access to affordable, reliable, sustainable and modern energy for all'. In the agenda of the SDGs, countries are expected to substantially increase the share of renewables (New Energy, 2015). Moreover, among other objectives, the United Nations Development Programme (UNDP) helps to build capacity in developing countries to integrate environmental considerations into development plans and strategies (UNDP.org, 2016; Mühlen-Schulte, 2010).

Having said this, the UN initiatives have also been highly criticized on the actual influence on development and environmental issues (Easterly, 2015; Hickel, 2015; Mühlen-Schulte, 2010). One criticism towards the SDGs is the too broad perspective of the goals with contradictions within themselves (Hickel, 2015). Therefore, it is incumbent that the UN, the UN system and different countries come together to agree on different concrete plans to achieve the SDGs (Renwick, 2015), just as the COP21[1] climate change agreement which was defined by Harvey (2015) as the world´s greatest diplomatic success. Furthermore, in contrast to the critics of the UN and the SDGs, Harvey (2015) debates the opportunity given to developing countries to participate in the discussions and decisions towards this climate change agreement, and she concludes: "*Only at the UN are they heard*".

---

[1] COP21 has been the UN conference on climate change, held in December, 2015 (Harvey, 2015).

The Country Office ICT Advisory Services (CIAS) Unit of the UNDP has since the end of 2014 embraced a Green Energy Solutions (GES) project with the proposal of Photovoltaic (PV) solar system installation for the UNDP country offices (COs) all over the world (Tuxen, 2016). Among the motivations for establishing the GES project, the CIAS unit names the protection of the environment, to 'champion' the UN SDGs and to lead by example of concrete action, with a possible package for all UN agencies to follow (CIAS unit, 2016).

The GES project in the CIAS unit leads to reflection on the actual work that is being done on ground level, the little by little that could be influencing structural changes, in accordance with the development of a more decentralized UN system. Considering the macro environmental perspective of the SDGs and a possible impact of the UNDP on capacity building for environmental policy (UNDP.org, 2016), it is relevant that the CIAS unit develops the operational level of the GES project to influence in achieving the organization´s strategic objective. One common process used to achieve organizational objectives is the use of knowledge management activities (Frost, 2014; Hislop, 2013; Jashapara, 2004). Knowledge processes are in the nature of consultancy and advisory services. Once a consultancy provider is involved in an activity where transferring knowledge impacts on the change processes of the customer, it can influence on setting policy agendas and outcomes (Sturdy, 2011).

1.1 Background

After some decades of discussions on knowledge-intensive industries in a post-industrial society, 'knowledge management' has gained increased attention in the literature since the 1990s (Hislop, 2013; Jashapara, 2004). Recently, strategic management research has increasingly emphasized the roles of learning and knowledge in organizations. Developing valuable knowledge and spreading it throughout the organization with systematic knowledge management processes is the basis for sustained high performance (Bogner et al., 2007).

Hence, knowledge has a vital role in successful organizations (Dearing, 2012), and the way each organization decides to manage it, depends on its business environment and basic organizational features

(Hislop, 2013). While the service sector is noticed to be information and knowledge intensive (Hislop, 2013; Jashapara, 2004), recipients or customers of advisory services report that their organizational capabilities are enhanced by the advising they receive, but occasionally, it is reported that consultants lack expertise or do not fully understand the customer´s business (Smallbone et al., 1993, in Cumming et al., 2011). According to Sturdy (2011), a usual domain of internal consultants is to be involved in the implementation of change and related advisory services, aiming at avoiding the kind of criticism mentioned before. As noticed by Radnor et al. (2013), the way knowledge is developed within consulting and advisory services is highly impacted by the way the customer and consultant interactions are given in different contexts.

Knowledge Management has two main epistemological approaches to it: an objectivist perspective, with an orientation towards information systems, where knowledge is mainly seen as an entity that can be codified and separated from the people who possess it; while a practice-based perspective looks at the people´s dimension of knowledge creation and sharing, where knowledge is embedded in people´s practices and in the context they are in (Huseman et. al, 1999: Jashapara, 2004: Hislop, 2013). Recent studies on knowledge management have been giving attention to personal knowledge, where knowledge is seen as a process of acquisition, creation, development, dissemination, transfer, sharing, and application (Chatti, 2012). Cusumano (1997, in Grant et al., 2000) defines knowledge integration as the combination of different types of knowledge to transform inputs into outputs, which also requires mechanisms to access knowledge from different locations avoiding heavy costs.

1.2 Problem Discussion

During the existence of the GES project, there are encountered challenges regarding the engagement of the Country Offices with the new proposal coming from the CIAS unit which is the installation of PCMM devices for a future solar PV system installation (CIAS unit, 2016). The Green Energy team in Copenhagen face issues with the response from COs in all stages of the 1st step: from deciding to buy the PCMM device, to its installation.

For sustained high performance of projects, knowledge management should englobe not only knowledge as a resource but also the process of knowing as an organization (Bogner et al., 2007). Recent literature on project-based working shows that project-based learning often retains knowledge only on the individual and group levels. However, learning at these levels needs to impact organizational-level processes and structures for effective organizational learning (Hislop, 2013). According to Frost (2014), the implementation of knowledge management needs to be focused on the organization's strategic objective. It requires a long-term and practical outlook, to result in outcomes that e.g. the COs would have with a solar PV system installation: reduce energy expenditure, gain energy security, secure business continuity and protect the environment (CIAS unit, 2016).

Therefore, what is important here is to find effective knowledge management processes that could influence on the interaction between the CIAS unit and the COs (Radnor et al., 2013), resulting in organizational learning within the UNDP and on positive outcomes of the GES project. It is critical to understand by what means the end outcomes predicted both in micro and macro levels in the project can be achieved according to the UNDP´s institutional context.

Based on the previous arguments, I aim to answer the following **research question**:

To what extent can knowledge management processes in the CIAS unit improve the performance outcomes of the Green Energy Solutions project?

This thesis strives to contribute with insightful information on how the CIAS unit can use knowledge management to influence on the performance outcomes of the GES project for the greater purpose of increasing renewable energy deployment in developing countries. By the use of a single-case study, this research contributes to the existing literature by the use of in-depth empirical findings and support from relevant literature. The motivation for selecting this case-study was twofold. The first aspect is the environmental concern with reducing CO_2 emission with the use of renewable energy. The scenario seems to be slowly changing in developing countries with measures to reduce regulatory barriers, improve the system and grid integration of distributed solar PV, and financing conditions with solar lease or solar

Power Purchase Agreements (PPAs)2 (International Energy Agency, 2015). However, fossil fuels are subsidized in many countries and still play an important role in the energy sector, posing many obstacles to the promotion of renewable energy (Heshmati et al., 2015).

Secondly, the few authors taking a knowledge management perspective of the renewable energy promotion in developing countries, are focused on the technological and industry outcomes of effective knowledge management, as in Chen et al. (2010). In contrast, Fadel et al. (2012) presents a mapping of knowledge management in renewable energy promoted through international and regional organizations in developing countries. However, the authors claim that the UNDP does not present activities within technology transfer in the promotion of renewable energy, e.g. through pilot projects and funding. Nevertheless, besides the GES project in the CIAS unit being a pilot project in itself, the unit advises the engagement with donors, supports the training of the UNDP local staff, offers the service of purchase and installation of the PCMM and the solar PV systems during the 7 steps process, and supports possible PPAs (CIAS unit, 2016). The GES project is aligned with the UN´s strategic objective by taking environmental initiatives internally in the organization, supporting external outcomes as it is in the nature of the UN. This practical aspect of environmental initiatives contrasts with the critics on the UN and the SDGs.

These factors make it interesting to study the knowledge management activities in a renewable energy project within the frame of international organizations. To summarize, this thesis aims to investigate the integration of the micro-perspective of knowledge management regarding measures for organizational learning, and the macro-perspective of the end outcomes of the GES project. Therefore, this study seeks to contribute to the debate on the influence of efficient knowledge management on the implementation of renewable energy projects, and to understand the importance that context provides for the promotion of renewable energy in developing countries. This study can, therefore, be relevant for researchers and

---

[2] *"With a solar lease, you agree to pay a fixed monthly "rent" or lease payment, which is calculated using the estimated amount of electricity the system will produce, in exchange for the right to use the solar energy system. With a solar PPA, instead of paying to "rent" the solar panel system, you agree to purchase the power generated by the system at a set per-kWh price." (in https://www.energysage.com/solar/financing/solar-leases-and-solar-ppas)*

practitioners on the fields of environmental sustainability, renewable energy, knowledge management and international organizations.

1.3 Case Description

In addition to the capacity building from the aspect of the operational activities on the country level, it is relevant to understand the internal capacity building of UNDP COs as according to Lewis (2001), recognizing issues outside as well as inside the organization is important for performance outcomes. Lewis (2001) points out to the tendency of organizations in addressing its internal capacity building with technical assistance, including technical resources and specialized advice. Mühlen-Schulte (2010) discusses the structural power of the private sector in relation to the UNDP and states that the organization has *"incorporated methods and organizational architecture of the private sector by directly managing business relationships through service provision and procurement"* (Mühlen-Schulte, 2010: 143). The CIAS Unit, under the Office of Information Management and Technology and the Bureau for Management Support[3], is part of the UNDP Headquarter (HQ) in New York, but with its office strategically located in Copenhagen. It is an example of a unit that has the strategic role of supporting all COs so that the goals of the UNDP can be achieved globally, with their mission stated as the following:

"The CIAS unit provides ICT support to UNDP Country Offices across the globe, emphasizing simplified and unified support structures for greater cost efficiency and effectiveness."

(UNDP Intranet [1], 2016)

The CIAS unit has been created in 2010 with the aim of supporting and building capacity at the COs, while managing business relationships with service providers, collaborating with other International Organizations (IOs), UN agencies, and with the Procurement Support Office (PSO) of the UNDP to establish Long Term Agreements (LTAs) with vendors, and communicating with the HQ in New York. Among its values, the CIAS unit names collaboration and knowledge sharing, while having the Motto: *"Globalize innovative local solutions and localize global solutions"* (UNDP Intranet [2], 2016).

---

[3] See Appendix 1

The GES Project of the CIAS Unit started after the UNDP COs of Liberia, Sierra Leone and Guinea were facing emergency situations when relying on fuel generators during the Ebola crisis by the fall 2014. The CIAS Unit administered the installation of solar panels as a suitable solution to damaged generators (personal communication, 2016). However, in the following months, these installations presented issues related to no self-assessment of the energy used to design a proper solar panel solution. The CIAS Unit developed then the "7 Steps Solar Solution Process" for the GES project. The 1st step named 'self-assessment' is currently being applied in some COs (Tuxen, 2016). In this step, the procurement and installation of the Power Consumption Monitoring and Measuring (PCMM) device (see figure 1) assists on the management of measuring power critical circuits and consequently, on the design of a proper solar PV system installation (CIAS unit, 2016: TED, 2016). The three main outcomes of the installation of a PCMM device are (CIAS unit, 2016):

Figure 1. PCMM Device (in UNDP Intranet [1])

1. Provide valuable information to establish an energy profile, by collecting accurate data of the country office´s energy consumption.

2. At a second stage, the collected data is essential to plan and design an efficient, reliable and sustainable energy solution for the CO.

3. It enables knowledge on where to save energy and reduce costs by providing information on which appliances consume the most.

1.4 The Delimitations of this Study

The research question to be answered in this paper is limited to the context of knowledge in a specific organization. Answering it by taking all the possible and different aspects of knowledge management would exceed the scope of this thesis, especially when studying such complex organizational system and structures such as the United Nations. According to Kanbe et al. (2008), when looking into either knowledge management strategy, processes or environment, the organization requires different tasks, as

each organization has a specific context. This thesis looks into the internal environment of the CIAS unit for the creation and integration of new knowledge into the organization. Furthermore, the basis for the analysis is the organizational direction of the UNDP, and therefore, it is relevant to include an analysis of how the UNDP strategically provides an enterprise knowledge vision, and how it supports knowledge sharing and consequently, knowledge management systems. Within the different knowledge management processes, this paper will focus on the following: the knowledge creation and sharing culture within the staff in the CIAS unit; how knowledge sharing and transfer happens between the CIAS unit and the Country Offices (COs); how knowledge sharing and transfer is facilitated by the organization; and how to measure the performance of it.

Even though the COs can be considered customers of the CIAs unit, they are also part of the same organization. Therefore, under the context of knowledge management environment and strategy in the UNDP, I take the perspective of the COs as offices that collaborate with the HQ, and are supposed to implement a project that is aligned with the ultimate goals of the organization. It is under the context of knowledge management processes that the COs are analyzed as customers as well as UNDP COs. In any organization, knowledge sharing happens within and across different teams, departments and units.

Traditionally, the external and internal factors influencing an organization are quite evident. The complex environments the UNDP encounters require a delimitation of certain factors to ensure a well-structured analysis. This thesis focuses mainly on the internal knowledge sharing within the UNDP, but due to the organizational nature of the UN and the CIAS unit, and of the renewable energy sector, the current scenario of this sector in developing countries is presented as an external factor which influences on the knowledge creation and sharing processes. External factors such as the economy, finance, laws and weather are aspects that normally influence the decision on solar PV systems installation. However, as these aspects are individual to each country´s context and this thesis has a global perspective, these external factors will not be part of the analysis, leaving a general outlook of the industry as the only aspect taken into consideration.

Finally, renewable energy commonly refers to both traditional biomass, and modern technologies based on solar, wind, geothermal and small hydropower (Martinot et al., 2002). However, in alignment with the current goals and objectives of the GES solutions project studied here, the focus on this paper is mainly on the use of Solar PV systems.

1.5 Project Structure

The paper is structured into 5 main sections:

Figure 2. Project Structure, by the author.

Section 2 describes the methodology used in this paper. The aim of this thesis is to inspire new ideas and illustrate the abstract concept of knowledge with an empirical research. The GES project in the CIAS unit will serve as a single-case in this study, while the triangulation of different methods of investigation and sources of data characterizes the ethnographic approach to the research. Apart from observation methods and interviews, a survey sent out by the CIAS unit and answered by the COs will also be analyzed. This will support the exploration and building of new theory with an optimal method.

In **section 3,** the theoretical framework is formed by the presentation of the theories used and their literature review. To better understand the dynamics of knowledge creation, sharing and transfer, emphasis is put on how to integrate knowledge in the individual, group and organizational levels. Knowledge Management Systems are discussed from a multiple perspective: technical, organizational and personal aspects are taken into consideration. While understanding the role of institutions to social behavior, managers are discussed as agents of change, and, thereafter, organizational performance is analyzed from the perspective of efficient teams. Finally, the section presents the analytical approach to this study.

In **section 4**, the current scenario for renewable energy in developing countries is presented, with a focus on solar PV systems. A further discussion on Market Facilitation Organizations is taken. Thereafter, the data collected during this research is analyzed in **section 5**. The analysis is structured by an initial understanding of the UNDP´s strategic approach to knowledge, followed by the analysis of the CIAS unit, the GES project and knowledge management processes.

Finally, **section 6** presents the conclusive discussion on the causal relationship between knowledge management processes and performance of the GES project. After reflecting on my findings, I suggest further research possibilities.

2. Methodology

With a pragmatist philosophical worldview, a researcher emphasizes the research problem and uses all approaches available to understand the problem, instead of adopting exclusively one philosophical position (Creswell, 2014; Saunders et al., 2016). By dealing with the complex concept of knowledge which is ambiguous in nature, this research focuses on a subjective epistemology where knowledge is analyzed from a practical perspective of the present case study.

Furthermore, I aim at contributing with practical solutions that inform future practice for the CIAS unit, by understanding the context in which the problem takes place (Saunders et al, 2016). Maylor et al. (2005) argue that it is inappropriate to treat organizations with an objective ontology, as they aren't a tangible idea when their reality can actually be constructed by social actors. Therefore, based on a subjectivist ontology, or also called social constructionism (Bryman et al., 2011; Saunders et al., 2016), I take human behavior, both on the level of the individual and on the social system, as a reality that can be socially constructed. Moreover, an interpretivist approach is also taken, as I believe that the success or failure of the implementation of the GES project depends on the perspective of the individuals or groups affected by it (Bryman et al., 2011; Saunders et al., 2016).

In the following, the research strategy and theory development will first be presented. Thereafter, the mixed method approach to design will be discussed, followed by the procedures for data collection and analysis. Finally, the research quality will be discussed based on criteria for evaluating the quality of ethnographic research methods.

2.1 Research Strategy and Theory Development

"A case study investigates a contemporary phenomenon in depth and within its real-world context, while the boundaries between the phenomenon and the context might not be evident" (Yin, 2014: 16). 'Unusual'

single-case studies are chosen by the researcher when the case presents a deviation from the theoretical norms and everyday occurrences, where it is more important to clarify the deeper causes behind a given problem and its consequences than to describe what causes the problem (Flyvbjerg, 2001; Yin, 2014). The nature of the UNDP as a global organization entails that this is an 'unusual' case when looking into the challenges faced by the CIAS unit regarding knowledge sharing and transfer between the unit and the COs, both as HQ-CO and as service provider-customer in the framework of the GES project. The political and social-economic contexts in which the UNDP COs are found, influence on the unusual behavior the ICT managers in the COs have towards the knowledge being shared by the GES project.

The installation of solar PV systems in the UNDP COs is a large project which I have previously taken part in the team during my internship[4] with the CIAS unit. I consequently got an interest in exploring how it could turn into a successful project when realizing some of the limitations the Green team had to face to achieve the project objectives. After deciding I would take the GES as my case study for my internship report and noticing that knowledge sharing processes did not seem to be optimal, I decided to understand how knowledge could be optimally explored by the CIAS unit. My internship report[5] handed-in in February, 2016, was my first attempt to make this single-case study based on knowledge management influences on performance outcomes. Advised by my supervisors at Copenhagen Business School, I used the report as a first milestone on the pathway to a full and comprehensive research.

My internship report was mainly an exploratory stage of the internal context of the GES project in the CIAS unit. In this thesis, I explore not only the internal but also the external context. Owing to the exploratory and descriptive stages of the research, an inductive perspective was the initial approach to collection, organization and analysis of data. However, my focus is on describing the profile of the CIAS unit and the GES project, and on trying to explain a causal relationship between knowledge management

---

[4] My internship took place from the period of August, 2015 to February, 2016.
[5] The internship report is available under the appendixes uploaded in Digital Exam at CBS.

processes and performance outcomes, using a structure based on my analytical approach which is guided by my literature review. Therefore, my approach to theory development can be defined as abductive as I moved back and forth from theory to data, which is a method occurring when the data is collected to explore a phenomenon and further identify and explain patterns that enable the researcher to adjust existing theory (Saunders et al., 2016). Bryman et al. (2011) defines it as iterative, where the induction approach represents an alternative strategy to link theory and research, while there is a deductive element to it.

2.2 Research Method and Design

Maylor et al. (2005) distinguishes between scientific and ethnographic approaches to business and management research. I seek to develop an understanding of how an organization and social systems behave with an objective approach, where in some stages of the research I relied on deduction leading me to create an analytical approach based on my theory and literature review. However, my prevailing approach is ethnographic. With an in-depth research on the specific situation of the GES project in the CIAS unit, I emphasize the extent to which views on knowledge processes differ among the members of the CIAS unit that I have interviewed. As noticed by Easterby-Smith et al. (in Saunders, 2016), understanding the possible research approaches, enables the researcher to adapt the research design to cater for constraints, such as the limited access to data.

According to Yin (2014), the 'embedded case study design' involves units of analysis at more than one level. In this present case, the UNDP is a global organization, while the CIAS and COs and the staff in the CIAS are, respectively, the intermediate and individual units of analysis. In this type of design for a case study, it is important that the focus on subunits levels does not fail in allowing the researcher to return to the larger unit of analysis when the study is not an employee study, but instead, an organizational study (Yin, 2014). During a qualitative approach, researchers take into consideration the contextual

understanding of social behavior. A detailed investigation of what happens in the social settings and events is very significant to the units being studied and provides an account of the context where people´s behavior takes place (Saunders et al., 2016). Additionally, it is important to be aware of the sin of 'descriptive excess', where the amount of detail inhibits the analysis of data (Bryman et al, 2011).

The triangulation of data entails studying social phenomena by using more than one method or source of data, resulting in greater confidence in findings (Bryman et al., 2011; Saunders et al., 2016). Accordingly, this paper presents a mixed method design, as holistic data collection is used as a strategy to study the UNDP as an organization and understand its objectives, at the same time the operational details of the subunits of analysis are examined by observation, data collected through interviews and quantitative secondary data (Yin, 2014). As Bryman et al. (2011) points out, ethnographers might employ quantitative analysis when encountering difficulties to access certain groups of people. Moreover, this research design provides the thesis with a dynamic, rather than a static, analysis of the actual knowledge management processes in the CIAS unit.

2.3 Data Collection

The process of primary and secondary data collection for this research was supported by my diverse degree of participation in the CIAS unit. By using a strategy to obtain a role as internal researcher and maintain my personal access to the organization after the end of my internship, I highlighted to management of the unit the possible benefits of this research to the CIAS unit, ensured I was familiar with and understood the UNDP, established credibility and developed my access incrementally (Saunders et al., 2016). By being open and honest in communicating information to all participants, emphasizing the mutual benefits of the research and building trust within the CIAS unit, the agreement upon moral norms was enforced (Bryman et al., 2011).

After my internship finished in February, 2016, I gained access to the UN City in Copenhagen, where the CIAS office is located, while my UNDP e-mail account was also kept active until June, 2016, allowing me to gather internal secondary data. However, it is relevant to notice that as an internal researcher, you

may still need to obtain formal approval to proceed with your data collection (Saunders et al., 2016). In this research, the collection, transcription, and analysis of data occurred iteratively throughout the research process. The model used to interpret and present my data is what Maylro et al. (2005) describe as thick description, where I describe the individuals and events to familiarize the readers with them.

Table 1 presents the summary of the data sources which will, thereafter, be presented and discussed.

Table 1. Summary of Data Sources

Period and Location of Data Collection	Semi-structured Interview	Observation	Secondary Data from UNDP
Sep.-Dec., 2015: UN City	None	*Total Participant*: team member of the Green energy project and researcher in the exploratory stage.	Collected documents in the CO Library from different stages of the GES project.
Jan.-Feb., 2016: UN City	2 semi-structured Interviews.	*Total Participant*: team member of the Green energy project and researcher in the exploratory stage.	Collected information from the CIAS Quality Manual.

March, 2016: UN City	None	*Researcher-participant*: I observed a GES project 'monthly meeting' and a Webinar for the ICT managers in the COs. Observed and participated in informal discussions with the Green energy team.	None
April-June, 2016: UN City	None	None	Collected data from the UNDP Knowledge Strategy Report, and minutes of GES project 'monthly meetings'.
July, 2016: UN City	8 semi-structured interviews.	*Total researcher*: Observed a webinar for the ICT Managers in the COs.	Received the data collection results from the Green Energy Client Satisfaction Survey sent to the ICT Managers in the COs. Collected PowerPoint presentation material from the Webinar I observed.

2.3.1 Primary Data

The data collection techniques for sources of primary data are presented in the following order: observation; semi-structured interviews; and, finally, a discussion on the discarded questionnaire I designed, as I did not get a formal approve to proceed during the data collection process.

2.3.1.1 Observation

Participant observation emphasizes on discovering the meaning that people give to their actions (Saunders et al., 2016), and according to Bryman et al. (2011), it enables a researcher to gain an insider perspective on the process being investigated. Gans (1968, in Bryman et al., 2011: 438) outlines three roles of a participant, reflecting degrees of involvement and detachment from the organization, recognizing that researchers do not typically adopt a single role while conducting the research:

1. *Total participant*, where the researcher is completely involved in a certain situation and has to take the position of researcher once the situation is clarified and then write down notes;

2. *Researcher-participant*, where the researcher is only semi-involved, so he can function fully as a researcher in the course of the situation;

3. *Total researcher*, which entails observation without involvement in the situation.

Delbridge et al. (1994, in Saunders et al., 2016) present three different types of data collection by participant observation: primary observation, secondary observation and experiential data. The first relies on notes taken after observing an event or something that has been said. Secondary observation would be the observer´s interpretations and statements of what happened or was said. Finally, experiential data are the perceptions of the observer, which could also be data collected in the form of notes. Saunders et al. (2016) adds that factors material such as organizational structure and communication patterns are also data collected by participant observation.

Structured observations can yield highly reliable results as a systematic method for data collection is predetermined to quantify behavior (Saunders et al., 2016). However, my observations were mainly unstructured. Apart from the limited time frame of this research not allowing me to invest in a structured method of data collection, an unstructured method for my participant observations resulted as a fit to my need to generate ideas along the way by monitoring, when applicable, all relevant aspects of knowledge management in the GES project. I used a structure to summarize all the notes I had taken, as after summarizing the notes in the following days they were taken, I categorized the data into three main themes of my research during my role of total researcher. The first was organizational culture, as when I had the role of total participant, I observed the culture of knowledge sharing among the CIAS unit members. The

second was the communication with COs and vendors, which supported me along the definition of research design. The last category was that of organizational structures, where I tried to gather different approaches to knowledge management from the complex structures of the UNDP. Table 2 presents the collected data from my observations.

Table 2. Data Collected from Unstructured Observation

Observer Role	Primary Observation	Secondary Observation	Experiential Data	Factors Data Material
Total Participant	None	Observed informal conversations regarding the GES project and took notes.	In my role as a researcher while also an intern, I experienced the communication between the CIAS unit, COs and vendors, and took notes.	Notes on the organizational structure of the CIAS.
Researcher-Participant	Notes from one monthly meeting; notes from one webinar.	Observed informal conversations regarding the GES project and took notes.	None	None
Total Researcher	Notes from one webinar.	None	None	None

Bryman et al. (2011) points out to the importance to penetrate not only the formal language used in the organization, but also the culture of special words and argot used in a complex context. In the case of the CIAS unit, based on my unstructured observations as a *total participant*, one can take some months to get used to all the abbreviations and special words from all the contexts of ICT. Therefore, this can be seen as an advantage of participant observation to overcome the challenge of familiarization with the environment and make the process of research less time consuming. For example, if the primary observations I made when I took notes during the two webinars I observed had to be analyzed without myself being familiarized with the formal and informal language of the CIAS unit, the process would have taken more time.

Bryman et al. (2011) mentions another advantage in comparison to qualitative interviewing. The extensive interaction with people gives the researcher the capability of linking behavior and context. To take advantage of this extensive interaction, an ethnographer can rely on key informants as a strategy to find directions to relevant situations, events or people. During my roles of researcher-participant and total researcher I have decided to use the GES project team as informants of possible events that I was not aware due to the distance I had taken from the CIAS unit. The observation of a webinar in July, 2016, happened due to an informal conversation with one of the team members who informed me about it, and therefore, I asked for management for permission to observe it.

2.3.1.2 Semi-Structured Interviews

With an interpretivist epistemology, it is relevant to use semi-structured interviews to guide interviewees into explaining and building on their response (Bryman et al., 2011; Saunders et al, 2016). For all interviews[6], I had a list of questions to guide me and cover specific topics of KM. By providing the interviewees a chance to elaborate on the answers, I consequently understood the social construction of their reality. This approach gives the advantage of close collaboration between the interviewees and myself (Saunders et al., 2016).

According to Maylor et al. (2005), for qualitative research design, one should try to select the sample of interviewees based on their representation of the concepts that the researcher wants to generalize the findings to. To select the participants, I had two different approaches according to the different time frame of each interview. For the interviews conducted in January, 2016, during the exploratory stage of the research, I have selected the main manager of the unit, together with the manager of the GES project. For the interviews conducted in July, 2016, as the CIAS unit is not very large in number of staff members, I intended to interview all staff that integrated project teams and was related to the development of the GES and OneICTbox projects. Nevertheless, I managed to conduct only eight interviews due to vacation period and limitations to availability. A summary of interview participants' job titles is specified in Figure 3.

---

[6] See Appendix 2 with all interview transcripts.

- 1 Global ICT Advisor
2 Global ICT Specialist
- 3 ICT Green Energy Interns
- 1 ICT Specialist (not CIAS staff)
- 1 OneICTbox Specialist

Skype Interview

- 1 ICT Manager and Regional Coordinator

Figure 3. Participants list. By the author

The settings for the interview have to be agreed with the participants (Maylor et al., 2005). Nine interviews have been conducted in the CIAS office in Copenhagen, apart from the interview with the Regional Coordinator of the African Region, who is located in Senegal, and, therefore, agreed to meet me on Skype. Maylor et al. (2005) claim the importance of informing the participants about the subject, how long the interview will take and what are the benefits they will get for their participation. For agreeing in mostly all interviews, I have sent e-mails explaining the aim of my research, as well as informing the length and benefits of the interview. Only for the interviews with Interns of the CIAS unit, I have verbally agreed on conducting the interviews, as I depended on the more restricted time available for interview with managers, and tried to fit the Interns interviews in between the available time.

The structure of the first two interviews conducted in January with the Global ICT Specialists were slightly different from the interviews conducted in July, where more flexibility of the questions was allowed to achieve an overall understanding of the management approach to KM and experiences from the GES project. They were conducted with Gerald Demeules, the Global ICT Advisor, and with Shathiso Nyathi, a Global ICT Specialist who is the manager responsible for the key services of Crisis Response, Benchmarking and Knowledge Management, and Green Energy Solutions. The interviews took place on the 29th of January, 2016, and they were recorded while I also took notes. Right after the interviews took

place, I transcribed the audio recording[7] and then compiled it with the notes to guarantee the exact nature of explanations was not lost (Bryman et al., 2011; Saunders et al., 2016). I first conducted the interview with Shathiso, which assisted me in guiding my interview questions for the interview with Gerald, gaining different knowledge and perspectives of the GES project and KM in the unit. The questions from my list of themes were changed during the course of the interviews, according to the participants' development of answers.

The questions for the eight interviews conducted in July, 2016, have been designed in accordance to the data previously gathered by the two first interviews, and from the Survey conducted by the CIAS and which I used as secondary data. Before starting the questions, I have explained that the interview would be recorded, and asked for permission to take notes. Thereafter, I started with closed-ended questions and moved towards open-ended questions regarding the KM processes of the CIAS unit. In the end, the participants were asked to reflect on the impact of KM to the performance of their specific project. As some participants were not specifically from the GES or OneICTbox projects, I have skipped some questions. This also happened due to the manager´s time restrictions, so I decided to choose the most important questions in case they would run out of time. Furthermore, I encountered one issue during the interview with the OneICTbox Specialist. As I was using my mobile phone to record the audio, a phone call interrupted the interview in the middle, and, therefore, I had to continue with a new audio. As Maylor et al. (2005) points out, it is important to check that your mobile is not available for receiving calls or messages during the interview.

These interviews took place in a small range of days, not allowing me the time to make transcriptions right away. However, the transcriptions were made in the following days, which I am aware of not being the most optimal method for analyzing my data. To supplement this weakness, I have conducted a more thorough reading of what the participants said, permitting repeated examinations of the answers (Brysman et al, 2011). I categorized similar answers by job title as they tend to have similar experiences. I structured some of this data in a descriptive analysis for a thorough understanding of the situation with the GES

---

[7] All audio recordings have been delivered in a USB to CBS.

project, allowing an assessment to the evolution of the project.

2.3.1.3 Discarded Questionnaire

Bryman et al. (2011) defines qualitative research as a facilitator for quantitative research. Although deductive approaches are more commonly associated with quantitative research, I attempted to use a quantitative secondary analysis with an inductive approach. The in-depth knowledge of the social contexts acquired in the qualitative research conducted for my internship report was used to inform the design of the questionnaire I intended to send out to ICT Managers.

Surveys can be used as a data collection technique where the researcher ask questions to a range of respondents. It can be a cheap and quick way to find out information when you are interested in studying groups (Maylor et al., 2005). A survey design often used is questionnaires with a web survey method. However, Maylor et al. (2005) point out to the difficulties the researcher can find in getting enough respondents to return the questionnaire, and when they do not understand questions they will often skip them.

After collecting and analyzing the data from the first two interviews I conducted during the research for my internship report, I realized that I should expand my methods to understand the relationship between knowledge management and the performance outcomes of the GES project. As a pragmatist, I decided to look into different approaches for collecting and analyzing my data (Creswell, 2014). Therefore, from the findings derived from the interviews, I decided it would be relevant to gather data from the ICT managers in the COs regarding their perspective on the knowledge sharing and transfer with the CIAS unit.

Hence, I designed a questionnaire to send out to all ICT Managers in the COs. It was based on my analysis of data from being a participant and researcher observer, that I designed the questions. Once ready to be sent out, I presented the questionnaire to Gerald Demeules, the Global ICT Advisor and head of the CIAS unit. He instructed me not to send it out as the CIAS unit had a very similar survey they had just gathered data in the month of July. Hence, it would not be appropriate to ask more questions to the ICT Managers.

Therefore, instead of gathering my own data to further analyze it, I was authorized to use the CIAS´s survey results as a source of secondary data.

2.3.2 Secondary Data

Secondary data can take the form of both qualitative and quantitative data (Saunders et al., 2016). Even though it can be hard to control the quality of the data and that it requires an extra time to be familiarized with it, *"secondary data can reduce difficulties with gaining access to people or organizations"* (Maylor et al., 2005: 168). My qualitative secondary data sources providing me with additional knowledge were books, articles, magazines, industry statistics and reports, the UNDP´s website, the CIAS´s reports and minutes from meetings, e-mails, and UNDP´s database and Intranet (Saunders et al., 2016). Moreover, I gained access to the collected data results from the ad hoc survey conducted by the CIAS unit.

The secondary data collection happened in all stages of the research process. Apart from the UNDP´s internal secondary data collection as previously seen in Table 1, the process of data collection from books, articles and renewable energy industry related material started from the very early stage of the research.

Just as with the design of my own questionnaire, the analysis of the CIAS survey was based again on an inductive approach, as not only have my strategy to data collection derived from my previous data from my qualitative research, but also from the limitations and opportunities offered by the data I could work with (Bryman et al., 2011). The survey data collection was intended to capture the general client satisfaction of the COs regarding the services provided by the CIAS unit, as well as a measure of the knowledge the CO managers have regarding the GES project. Out of the 177 UNDP COs (UNDP, 2014), 119 participants responded the survey, ranging mainly from ICT related staff accounting for 89, and to CO management accounting for 15 participants. The regions the COs belong to accounted for the following: 26 from the African region; 25 from Asia and the Pacific; 25 from Europe; 24 from Latin America and the Caribbean; 12 from the Arab States; and 7 from Central Bureau.

2.4 Research Quality

Maylor et al. (2005) approaches reliability and validity as goals of scientific research. The first relates to the consistency of the studies, where other researchers would get the same findings if they repeated my research design, while validity measures how accurate my research methods are (Maylor et al., 2005; Saunders et al., 2016). Alternatively, Maylor et al. (2005) claims that ethnographers see the world as subjective and believe that subjectivity can be managed in social research by three ways in terms of the criteria to assess the quality of it. One way is to follow strategies that are developed to generate theory from data, avoiding unrecognized subjectivity, which demonstrates *neutrality*. The second way is by being *transparent* and explicitly stating the subjective approach to the research. Moreover, in a subjective study, *dependability* as a research goal is more realistic than reliability. This third way to assess the quality of the research is explained by Maylor et al. (2005: 160) as referring to "*the repeatability of the process of inducing theory from data, rather than the repeatability of the findings themselves*".

Flyvbjerg (2001) claims that the criticism towards case study researchers being biased and being subjective and less rigorous with their methods, is actually useful, as it informs experienced case researchers that the critics lack knowledge of what is actually involved in case study research. Yet, as Saunders et al. (2016) points out, we cannot avoid observer bias, but we can be aware of the threat it poses to reliability and try to control it. The potential for bias in unstructured observations is high. Saunders et al., (2016) argue that insider researchers might have a personal stake and substantive emotional investment in the setting, and, therefore, physical access to the organization might impact my objectivity as a researcher in order to attempt to answer my research question and meet my objectives in an unbiased way, producing reliable and valid data.

During the period as a total participant, I attempted to return to my focus on the research when judgmental or emotional thoughts emerged. Furthermore, when I finished my internship report, I was advised to try to maintain physical distance from my personal relations with the individuals and the environment of the CIAS unit and the GES project. By being aware of that, I decided to use mostly the university´s library as my work place from April to June, and only approach the UN City when I decided observations were needed to support my research methods. This decision resulted in a detachment from personal relations

with members of the CIAS unit and supported my role as a researcher, avoiding what Bryman et al. (2011) and Saunders et al. (2016) describe as 'going native'.

The use of semi-structured interviews can also affect the reliability of this case study, as the interviewer can influence the interviewee's response depending on e.g. its tone of voice to ask questions. Additionally, my interpretation of the answers could be biased, especially when I have been a total participant in the GES project during the research period. The latter can also influence on the choice of answers by the interviewee when certain questions could relate to sensitive information that they are not empowered or do not want to share with me (Saunders et al., 2009; Easterby-Smith et al., 2012).

Furthermore, after gathering all my observations and the data from the first two interviews, I designed the questions for my interviews conducted in July, based on possible verifications with the data I had already gathered. This inductive approach which was repeated on the later stages of the research, demonstrates a possible consistency on my research design as well as my neutrality. Adittionally, the triangulation method described can be used to approach verification of data (Maylor et al., 2005; Saunders et al., 2016). Apart from the triangulation methods, I employed the following approaches to guarantee validity of my study: conducted interviews with all relevant and available CIAS staff; used a survey as secondary source, where a large number of the COs had answered; used trustworthy secondary data such as peer-reviewed articles, academic books, renewable energy industry related magazines and reports. Saunders et al. (2016) points out to the measures of secondary survey data not necessarily matching the measures the researcher needs. Even though the CIAS survey I used as secondary data did have some measures that were not useful for my research, I tried to evaluate the extent of the data´s validity by certifying that the data I used from the survey was relevant to my research.

3. Theory and Literature Review

In this section, I will present an overview of theories and the literature that is relevant to the research question of this thesis. It is relevant to notice that apart from recognizing the UNDP as an International Organization and a Global Organization, it is also defined in this paper as a Multinational Organization in order to have use of a broader literature available to support this study.

In the first part, I review knowledge management from a practical perspective, where thereafter, the evolution of knowledge creation models is presented and discussed on the basis of the reciprocity among the learning levels in this process: the individual, group and organizational levels. This follows by the drivers for organizational learning and a discussion on efficient knowledge sharing and efficient knowledge management systems and organizational performance. Subsequently, the literature on institutional theory is reviewed from the perspective of institutions as guidelines for social behavior, followed by the discussion on how managers can affect change. Finally, the analytical approach in this thesis will be presented.

3.1 Knowledge Management from a practical perspective

Barney (1991) defines capabilities, knowledge and information as some of the resources which enable an organization to improve its efficiency. From a capability perspective, learning is an ongoing process (DiBella et al, 1998: Kogut et al., 1992). *"Capabilities rest in the organizing principles by which relationships among individuals, within and between groups, and among organizations are structured"* (Kogut et al.,1992: 384). Knowledge management consists on the ability of a firm to create, combine and share knowledge among its members. Some organizations might be actively managing the knowledge of their workers, but not necessarily labeling these activities as knowledge management, which means their approach is to focus on addressing micro-level day-to-day knowledge related challenges (Hislop, 2013).

By investing in knowledge management systems, a prominent mechanism to access knowledge from different locations avoiding heavy costs is the use of information and communication technologies (ICTs), as it not only facilitates collaboration between people and teams which are geographically dispersed (Hislop, 2013), but also facilitates knowledge management and sharing activities through codification of knowledge and interactive forms of communication (Argyris, 1994; Hislop, 2013). Knowledge acquired by learning is very important for performing well in tasks that require cooperation (Kubon-Gilke, in Helmstadter, 2003), but strong collaborative relationships can only become truly effective if individuals develop mechanisms to share knowledge.
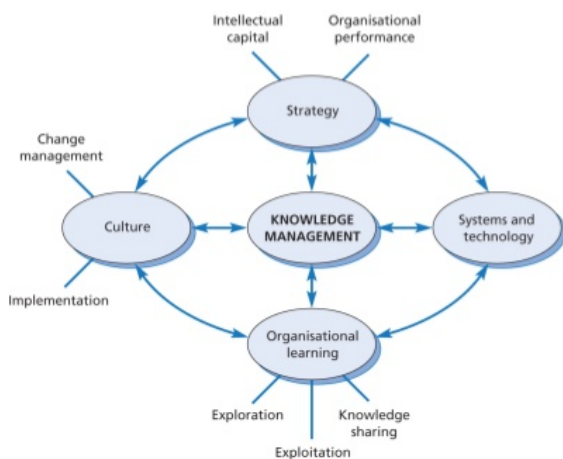
Figure 4. Integrated Model of Knowledge Management (in Jashapara, 2004: 294)

The Integrated Model of Knowledge Management presented by Jashapara (2004) (see Figure 3) combines a perspective of knowledge as a human resource, where learning processes are taken into consideration, at the same time as information systems are also influencing organizational change and performance. The structure used in the following discussions is based on this model.

3.1.1 Knowledge Integration: an evolution in models

Tacit and *explicit* knowledge are the two types of knowledge defined by Nonaka (1994). The first refers to the individual knowledge which is acquired through personal experience. It combines experiences, ideals, skills, values, emotions, being difficult to share. Explicit knowledge on the other hand, is codifiable, objective, impersonal, context independent and easy to share, as e.g. policies, procedures and strategies, being possibly disseminated without any interpersonal interactions (Hislop, 2013; Jashapara, 2004; Nonaka et al., 1998). Nonaka et al. (1998) use the Japanese concept of *'ba'* considering it to be a shared space (physical, virtual and mental spaces) serving as a foundation for knowledge creation. These authors describe knowledge as an intangible resource, embedded in these shared spaces and acquired by an individual's own experience or reflections on the experience of others.

Furthermore, knowing how to do something is the definition of know-how which Nonaka et al. (1998) point out as the technical dimension of tacit knowledge. Kogut et al. (1992) give the example that when a manager has the practical skills to organize a firm efficiently, one can say he has the know-how to do so. Another dimension of tacit knowledge defined by Nonaka et al. (1998) is the cognitive dimension, consisting of e.g. our values, ideals and beliefs. Information on the other hand, is when knowledge is separated from '*ba*' (Nonaka et al., 1998), and can be defined as 'when we know what something means' (Kogut et al., 1992). "*Essentially, information is a message…it gives shape to data and to people´s perceptions*" (Huseman et al., 1999: 106).

Many authors (Hislop, 2013; Jashapara, 2004; Lasserre, 2003; Nonaka et al., 1998) explain the SECI (Socialization, Externalization, Combination and Internalization) model defined by Nonaka (1994), where the interaction between tacit and explicit knowledge lead to the creation of new knowledge. The modes of knowledge creation presented by the SECI Model are described in Table 1.

From Tacit to Tacit, through *Socialization*: Sharing knowledge through observation, imitation and practice.	From Tacit to Explicit through *Externalization*: Articulating tacit knowledge into explicit concepts, as e.g. metaphors, concepts and models.
From Explicit to Tacit, through *Internalization*: To internalize explicit knowledge into individual tacit knowledge, as e.g. technical know-how	From Explicit to Explicit, through *Combination*: Systematizing concepts into a knowledge system.

Table 3: Adapted from Nonaka (1994). Made by the author.
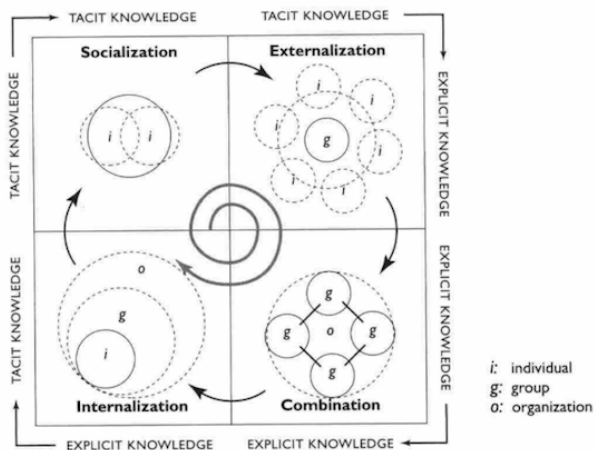
Figure5. Spiral Evolution of Knowledge Conversion and Self-Transcending Process, (in Nonaka et al., 1998).

The SECI model was originally viewing knowledge creation as a linear process, but Nonaka et al. (1998) acknowledged this fact and presented a spiral evolution of knowledge conversion and self-transcending process, verifying the reciprocity of the three learning levels: individual, group and organizational (see Figure 2). This new model combines the learning levels in the different processes of knowledge creation.

The complex interrelationship between learning in the individual, collective and organizational levels is further developed and represented in the Crossan/Zietsma framework of organizational learning (Hislop, 2013), represented in Figure 3.
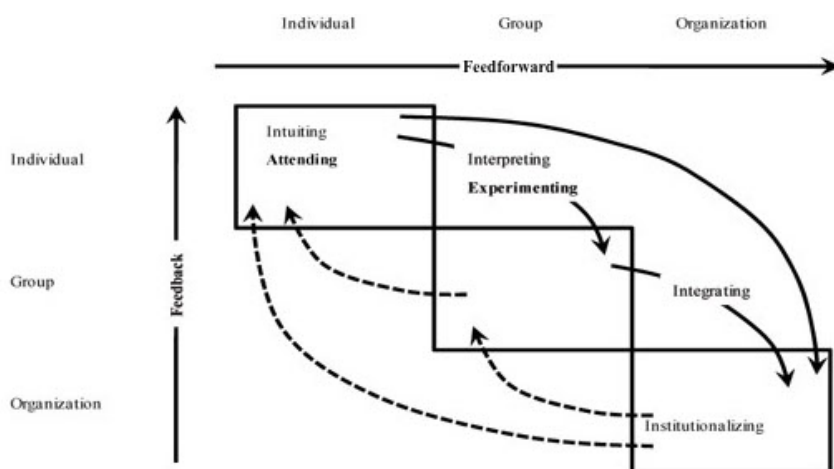
Figure 6. The Modified Crossan et al. Model (by Ziestma et al., 2002, in Hislop, 2013)

In the individual level, learning requires cognitive processes and the process of actively searching for and absorbing new ideas. In an individual-group level, interpretation can come as an individual or group process by either interpretation of one´s own insights, or individual´s insights that are discussed collectively. Experimenting is another process in an individual-group level, where change comes through the attempt of implementing and utilizing new learning. In a group-organization level, integration allows the development of shared understandings and practices through dialogue and coordinated action. Organizational learning occurs by ensuring routinized action through embedding insights in organizational systems and processes (Hislop, 2013: 89). Another term for the organizational

learning process is institutionalization, which can be characterized as e.g. the endurance of the behavior over a period of time (Jashapara, 2004).

According to Choo (1996), sense making guides the knowledge creation processes. It is an everyday process where individuals or groups, perceive, interpret and act (Cecez-Kecmanovic, 2005: Choo, 1996; Weber et al., 2006). Both the production and the interpretation of knowledge required to develop an understanding of it, involve an active sense making process (Weber et al., 2006). The meaning making capacity of an individual facilitates the adaptation of tacit knowledge to unfamiliar situations that might not fit previous templates. Correspondingly, the dynamic sense making capabilities of individuals requires more than just explicit static representation of individual´s tacit knowledge, as the same explicit data might evoke different responses of individuals depending on their context and time (Malhotra, 2012).

According to Weber et al. (2006), institutions are the substance for sense making, they guide an individual´s action formation and they are enacted in ongoing sense making processes. From the previously mentioned practice-based perspective of knowledge management, knowledge is socially constructed and culturally embedded (Hislop, 2013). *"The capability to develop new knowledge focuses on the social knowledge and the processes of knowing that exist in a firm, not an individual"* (Nahapiet et al., 1998, from Bogner et al., 2007: 167).
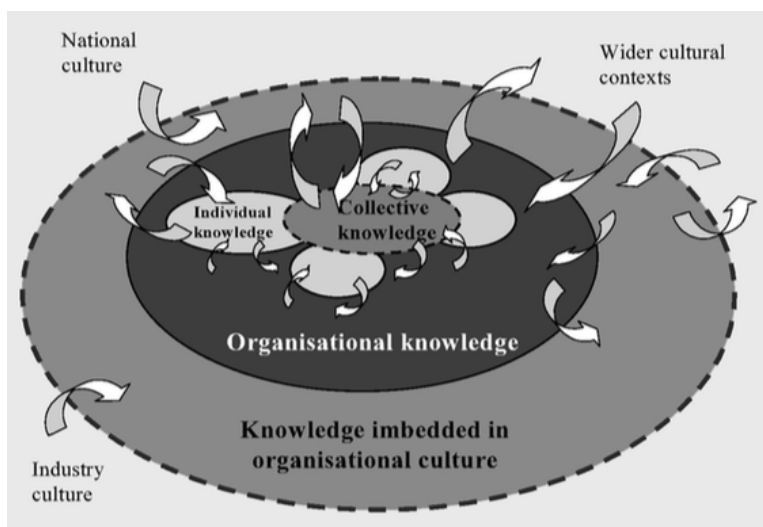
Figure 7. The Sensemaking Model of Knowledge Management in Organizations. (In Cecez-Kecmanovic, 2005)

Accordingly, Cecez-Kecmanovic (2005) argues that organizations are a dynamic web of sense making processes. The author presents the Sensemaking Model of Knowledge (Fig. 4), where he adds a fourth knowledge type to the three already described by the models above: the cultural knowledge. The interrelationship between all the knowledge types means they

continuously influence and recreate each other. This model contributes to the understanding of organizations as distributed knowledge systems. "*At each level of sensemaking, knowledge is emerging: it is continually created, recreated, maintained, shared and applied*" (Cecez-Kecmanovic, 2005: 62).

3.1.2 Organizational Learning

Organizations are defined by Kogut et al. (1992) as social communities in which knowledge can be understood and shared. Knowledge acquired by learning is very important for performing well in tasks that require cooperation (Kubon-Gilke, in Helmstadter, 2003). Hislop (2013: 87) affirms that "*organizational learning only occurs when learning at the individual or group level impacts on organizational-level processes and structures*". Yet, "*the literature on project-based working shows how project-based learning is often not transferred to an organizational level*" (Hislop, 2013: 87). As Grant et al. (2000) points out, a globally networked organization that includes knowledge creation roles may require structures and management processes that differ from the traditional organizational structures noticed some decades ago.

Knowledge management processes start in the individual level, and according to personal knowledge networks (PKNs), they end in the same level. According to Chatti (2012), neither the traditional knowledge management models nor the more recent trend of personal knowledge management are tackling the complexity of the environment of knowledge in an organization. The author discusses the PKNs model, in which the PKN is a unique adaptation for each worker, according to its tacit and explicit knowledge nodes and to one´s theories-in-use. The latter is described by Chatti (2012: 836) as "*norms for individual performance, strategies for achieving values, and assumptions that bind strategies and values together*". Argyris and Schon (1978, in Chatti, 2012) introduced the concept of theories-in-use, which is based on the organizational learning process of detecting and correcting errors, where the organizational theory-in-use will change according to an individual´s experience with a problem and a consequent work on solving the problem.

There are three ways to correct error. The first is the single-loop learning, where change of behavior happens, but the organization´s theories-in-use will remain the same. Thus, action is taken in the same

traditional ways and patterns. In contrast, double-loop learning means that learning will result in change of values, strategies and assumptions of the theories-in-use (Argyris, 1994; Chatti, 2012; Jashapara, 2004). A third way to correct errors is defined by Bateson (1987, in Jashapara, 2004: 61) as 'deutero-learning', where "*individuals become effective at 'learning to learn' and more skilled at problem solving*".

The other concept that drives the PKN model is knowledge ecology. PKNs take both external and internal levels of a personal network into consideration, where an individual build, maintains and activates his personal network not only through external personal social networks, but also through its internal knowledge network, that is its norms, values, strategies and assumptions (Chatti, 2012). The key characteristics of knowledge ecology are complexity, adaptation, emergence, self-organization, openness and decentralization. Knowledge ecologies "*are formed by long-term personal relationships among individuals who self-organize in highly flexible, dynamic, and unpredictable networks, without predetermined role*" (Chatti, 2012: 839). However, to fully benefit from networking, individuals have to be known and trusted by the group. Personal networking needs to be carefully managed as it is a management tool with the potential to deliver greater individual value and organizational performance (Burtonshaw-Gunn et al., 2009).

Pedler et al. (in Hislop, 2013) describe a learning organization as the one facilitating the learning of all its members and consciously transforming itself and its context. However, learning organization practices can mean a higher level of control, where rather than empowering workers for having a greater potential for self-development, they reinforce the power of management (Hislop, 2013). If the environment is not propitious for creating a PKN, the learning processes in the organization might be disrupted. Hislop (2013) addresses power and politics as two factors in the environment that affect the learning processes. First, power and knowledge are either intimately related or totally inseparable. Secondly, accounting for power in the learning processes relates to the embeddedness of power in the employment relationship. The third pillar of the connection between learning and power is that conflicts and disagreements can arise from the lack of value consensus (Hislop, 2013).

In environments where changes are more substantial and discontinuous, the 'unlearning process' might ensure organizational survival, where an effective response is to unlearn old behaviors and learn new ones (Jashapara, 2004: 74). However, organizations do not respond in new ways to all problems, as they might not be able to afford the necessary risks implied in the unlearning process. According to Jashapara (2004), problems typically arise from the gap between performance and expectations, and this gap needs to be large before any adjustments are likely to occur. Unlearning can also happen if triggered by opportunities in the external environment, or *"if individuals leave the organization taking the experiences of procedures and processes from the organizational memory"* (Jashapara, 2004: 75).

There are dysfunctional aspects of organizations that limit their performance. Dibella et al. (1998) argues that the role of organizational learning is to help organizations to overcome these limits and become something different from what they are at present. An essential tool for true organizational learning is the use of multiple advocates who promote a new idea and who bring knowledge into the system. To make a piece of knowledge useful to many members of the organization, a number of respected, key members of the organization must be seen trying to influence others regarding its value. However, involvement is critical in every level of the organization, not only the manager level. *"The more people who promote a learning mode, the more learning in general is encouraged"* (Dibella et al., 1998: 75).

3.1.2.1 Transferring and Sharing Knowledge

Knowledge adds value and is very significant from the strategic perspective of an organization (Grant et al., 2000). The capability of creating new knowledge and developing it is an important mean to increase individual and organizational performance (Bogner et al., 2007). However, for an organization to create value, it should use the process of *knowledge building*, which combines knowledge creation with knowledge sharing and transfer (Gran et al., 2000). According to Jansen et al. (2007), strong collaborative relationships can only become truly effective if individuals develop mechanisms to share knowledge. An effective knowledge sharing process requires dialogue and language, as a mutual sense making process happens through the exchange of distinctive individual knowledge. Accordingly, sharing and transferring knowledge between different social and cultural contexts is likely to be complex and time-consuming (Hislop, 2013).

Burtonshaw-Gunn et al. (2009) argues that both employee and employer behavior, values and culture are the elements of organizational culture that influence in converting the organization's desired performance targets into meeting and supporting longer-term strategic objectives. There is an emerging literature on knowledge-sharing culture, which is useful to understand the impact of different types of culture in an organization´s knowledge sharing processes (Jashapara, 2004). The socialization process previously defined, creates knowledge when individuals transfer knowledge under the support of values such as care, trust and commitment. Supportive or cooperative cultures based on these values are more likely to create knowledge. However, this kind of environment might discourage change. To avoid the latter and effectively create a knowledge-sharing culture, Jashapara (2004) points out two relevant actions: make a clear connection between sharing knowledge and the practical organizational goals; and provide resources to encourage knowledge sharing in communities of practice.

"Communities of practice are groups of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis." (Wenger et al., in Jashapara, 2004). These communities can help to drive strategy, solve problems quickly, transfer best practices, develop professional skills, and help companies recruit and retain talent (Jashapara, 2004). Grant et al. (2000) consider three aspects of knowledge for an organization to create value once sharing knowledge: to understand that technological knowledge is only one of the forms of productive knowledge, as individual employee skills and management capabilities are some of the examples of an organization´s stock of knowledge; knowledge is acquired in different ways, e.g. through research, learning-by-doing, or from external sources; and that knowledge creation is something happening in all parts of the firm. According to Kogut et al. (1992), when sharing this common stock of technical and organizational knowledge, the transfer of knowledge within groups is facilitated.

For effective management of knowledge, the organization needs to clarify its goals between knowledge generation and knowledge application. Furthermore, it needs to define the characteristics of the knowledge being managed. Grant et al. (2000) classify organizations in the consulting industry as *codifiers* and *personalizers*. The codification strategy is used by organizations that use IT to generate

value through codified knowledge, while the personalized strategy relies heavily upon tacit knowledge, providing innovative and customized products/services. The two kinds of knowledge should drive management decision on how to transfer this knowledge across units. Explicit knowledge can be transferred e.g. by storing data in electronic databases, therefore the strategy is to persuade the workers to codify their knowledge. On the other hand, tacit skills must be transferred through a combination of transfer of staff, on-the-job training and more formalized training sessions, where persuading people to share knowledge is crucial (Grant et al, 2000; Hislop, 2013; Jashapara, 2004).

Knudsen et al. (2009) discusses the importance of inter-organizational relationships as a core component of strategy to provide access to capabilities that may otherwise be unavailable, through knowledge diffusion, information retrieval or shared problem solving. The importance of building and maintaining fruitful relations to core partners through close relationships is highlighted by the acquisition of external knowledge as a complement and not as a substitute to existing knowledge in the organization. In collaborations, the characteristic of the knowledge being shared, as codified or personalized, influences on the organization's ability to make use of the knowledge.

3.1.3 Knowledge Management Systems

Malhotra (2002: 11) discusses the importance for a knowledge management system (KMS) to adapt to "*sensing complex patterns of change in business environments and using that information for adapting the digitized logic and databases to guide decision-making, actions, and resulting performance outcomes*." Jashapara (2004) states that in the literature, there is no current consensus on the best system's methodology for a given knowledge management situation, but instead, there can be advantages of combining methods to offer creative solutions to complex situations. A relevant method approach to KMSs is to see it from multiple perspectives: technical, organizational and personal.

Hislop (2013) describes the difference between objectivist- and practice-based approaches to ICT-enabled knowledge management. The purpose of the two different perspectives are, respectively: libraries of codified knowledge, and task-related codified knowledge embedded in documentation and standard operating procedures; mapping of expertise and collaboration tools to facilitate ICT-based communication

and knowledge sharing. By combining the two perspectives, some common systems are the Intranet, Group Support Systems (GSSs) and Document Management Systems (DMSs) (Frost, 2014; Jashapara, 2004).

DMSs require some crucial features to ensure a successful implementation: data characterization and indexing to record the information with correct meta data association; the control of user access to documents; audit trail to monitor changes in a document over time; and control to ensure only one user modifies a document at a time (Frost, 2014; Jashapara, 2004). Moreover, GSSs can rely on a wide range of communication tools like e-mail, wikis, voice and video systems, webinars and telephone (kstoolkit.org, 2016). However, successful GSSs are designed with a personal perspective to it, requiring: face-to-face meetings; prepared and structured meetings; the use of video links where possible to develop trust; provided regular information on progress and milestones; and attention to training and intercultural differences (Jashapara, 2004).

For a KMS to shift from objective to practical means to approach knowledge from a complexity perspective, presenting a *"dynamic two-way flow of power and authority based on information, knowledge, trust and credibility enabled by interconnected people and technology"* (Husband, in Chatti, 2012: 834). The key driver of KMSs is to improve the quality management processes. Quality standards such as ISO 9000 support quality control, allowing an independent assessment of quality systems and procedures (Jashapara, 2004). Moreover, Jashapara (2004) presents the method by Dr. William Deming to ensure quality of tasks, where Deming not only proposes control to monitor processes of variation, but also planning to meet the organizational objectives, and improvement by changing the culture.

When discussing the objective approach of a 'command-and-control' KMS, Malhotra (2002) and Helmstadter (2003) point out to the inhibition of initiatives by knowledge workers when there is a control of the organizational goals to comply with pre-determined 'best practices' and standard operating procedures. This environment reinforces a single-loop learning process, in contrast to the double-loop process. Malhotra (2002) encourages organizations to design information architectures based on principles of flexible and adaptive information systems, where path dependency is not a threat to ongoing

experimentation and adaptation. Malhotra (2002) also points out that 'coordinating-and-channeling' a KMS is only viable when attending the fundamentals of agility and flexibility.

The two models created by Malhotra (2012) are represented in Figure 8, where the author compares an objectivist with a practical approach to knowledge management.
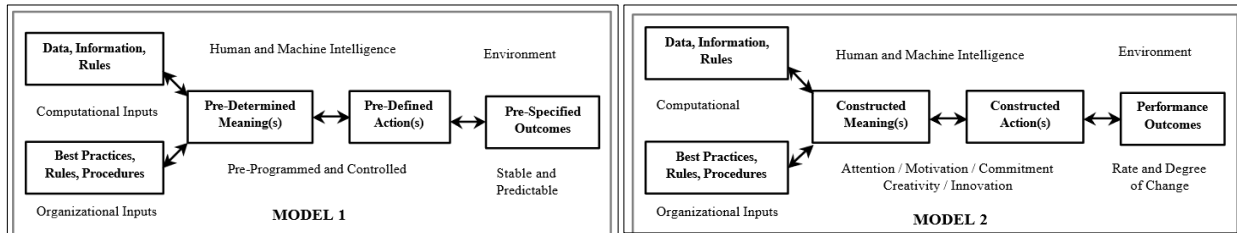
Figure 4. Model 1 as Knowledge Management for Routine and Structured Information Processing. Model 2 as Knowledge Management for Non-routine and Unstructured Sense Making. (In Malhotra, 2012)

Model 1 is based on the belief that technology inputs, rather than only knowledge workers, would impact more on the performance outcome of the organization. Model 2 is a performance-driven version, taking into consideration that the subjective interpretation of individuals and groups transform data, information, and best practices into actions and performance. The performance outcomes need to be continuously reassessed to ensure that they indeed represent best business performance, as the dynamic construction of knowledge in this model is based on the different interpretations that different individuals can give to the same information inputs, across different contexts and at different times (Malhotra, 2012).

It is relevant to look at how these different approaches to knowledge management affect knowledge managements systems in an organization. The following table was created by Malhotra (2012):

Enablers & Constraints	Model 1 KMS	Model 2 KMS
Business & Technology Strategy	Pre-definition of Outcomes	World of re-everything
Organizational Control	Control for Consistency	Self-Control for Creativity
Information Sharing Culture	Based Upon Contracts	Based Upon Trust
Knowledge Representation	Static and Pre-specified	Dynamic and 'Constructed'
Organization Structure	Insular and Top-Down	Inclusive and Self-Organized
Managerial Command and Control	For Achieving Compliance	For Achieving Commitment
Economic Returns	Decreasing Returns	Increasing Returns

Table 4. Enablers and Constraints of KMS: Model 1 and Model 2 Compared. (In Malhotra, 2012)

One of the strategic purposes of knowledge management activities is to enhance organizational performance (Jashapara, 2004; Hislop, 2013). The enablers and constraints in Table 2 are described by Malhotra (2012) as the challenges that need to be met for successful knowledge management. The coordinating-and-channeling approach to KMS will need to *"ensure a rapid adaptation of the business performance outcomes to the dynamic shifts in the business environment while keeping them loosely coupled with pre-specified technology architectures. The new paradigm of flexible, adaptive, and scalable systems will accommodate real time changes in information and data across the business ecosystem network"* (Malhotra, 2012).

3.2 Social Behavior: An Institutional Perspective

Institutional theory has been developing from what is called the 'old institutionalism' to the 'new institutionalism'. Peters (2005) points out to the structural approach of the first, where formal structures determine behavior, thus generalizations could be made, as informal unique features were likely to be excluded from analyses[8]. However, every organization is unique, and therefore, an approach based on the 'new institutionalism' means a researcher could carry out a case study to be able to examine it as a whole, including the interplay between the organization and the environment (Forsgren, 2008; Peters, 2005; Richter, 2005). According to Peters (2005), the environment includes formal and informal institutions as well as values and expectations of the society. "*Institutions are regulative, normative and cognitive structures and activities that provide stability and meaning to social behavior*" (Scott, 1995, in Peng et al., 2008: 922).

It is up to discussion among the different approaches to institutional theory if individuals or the environment matters the most for an analysis - the logic of designing formal institutions is that of structuring decisions and eliminating individualistic elements. Nonetheless, the same individuals can make different choices depending on the nature of the institution in which they are in, in that specific time. The normative institutionalism, considered by Peters (2005) as the root of the 'new institutionalism',

---

[8] The 'old-' and 'new institutionalism' should be seen as complimentary approaches instead of competitive (Peters, 2005).

presents "*an emphasis on the norms of institutions as a means of understanding how they function and how they determine, or at least shape, individual behavior*" (Peters, 2005: 19). Within 'new institutionalism' it is assumed that individuals cannot be autonomous and fully rational, instead, "*they must pick and choose among influences and interpret the meaning of their institutional commitments*" (Peters, 2005: 26). March and Olsen (in Peters, 2005) argue that behaviors will be 'intentional but not willful', when dominant institutional values shape the conscious choices made by individuals.

In contrast, the rational choice approach to institutions has an individualistic basis underpinning the analytic approach, assuming the existence of a behavioral element, resulting in dysfunctional behaviors. Hence, rational choice approaches are concerned with ways of constraining the variability of human behavior through the design of institutions. While noting that this approach has similarities to the normative institutionalism such as when both define institutions as relying upon the establishment of standards of behavior to establish the nature of structures, Peters (2005) also notes that in contrast to the normative and the historical institutionalists, this approach disregards the past history of the institutions or organization, as behaviors could be easily changed by new incentives.

'Historical institutionalism' is hard to separate from other versions of institutionalism, having most of economic researchers approaching it to find historical economic reasons to explain policy-making and economic behavior (Peters, 2005; Richter, 2005). This approach introduces the argument of 'path dependency', where decision-making in an organization in the past will influence the choices in the future. Peters (2005) goes beyond Paul Pierson´s (in Peters, 2005) argument that path dependency can be explained according to how positive feedback from initial policy choices are reinforced. He discusses the fact that some organizations have vague measures of their success and failure, but can still code their outcomes as positive and use them to support policy views and maintain balance in face of challenges.

According to Peters (2005), in normative institutionalism, rules are the formalization of 'logics of appropriateness', and are believed to structure the macro-level behavior of political systems. A system comes to existence when a common behavior is sufficiently common to be governed by rules. They serve as guides for newcomers, or to attempt to create more uniform understandings of what the logics are.

Peters (2005) notices that greater analytic level can be acquired if a macro-level analysis perceives the analysis of individual behavior, while there is also an awareness of institutional influences and constraints on the behavior of individuals.

In an institutional environment, when organizations use institutionalized structures and practices to shape action and behavior, they obtain legitimacy and increase the chances of assistance from other constituents (Jenkins et al., 2016). However, if the institutions go through changes, what once was legitimate might not be legitimate any longer, and therefore, an organization needs to be aware of its unique competencies to efficiently adapt to changes. *"Social expectations may, in some cases, run counter to the pursuit of efficiency. That is, an organization might be less efficient as a consequence of meeting institutional expectations"* (Jenkins et al., 2016: 15).

3.3 Managers as Agents of Change

"There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things" (Machiavelli, 1532, in Burtonshaw-Gunn et al., 2009). Kogut et al. (1992) present the concept of *combinative capability*, where strategic decision making is influenced by how capable is the organization to combine the internal and external learning in alignment with possible future opportunities. The process of being capable of developing new knowledge improves the firm´s knowledge and its capacity for knowing. According to Bogner (2007), this allows managers to identify future opportunities related to new knowledge within the organization.

Jenkins et al. (2016) discuss the links between strategic management and institutional theory. According to them, institutionalists suggest that all managers are constrained to understanding opportunities as they are 'socialized' to social-cultural norms. Compliance within normative institutionalism is moral and normative, while within the rational choice version of institutionalism, it tends to be regulative. The rational choice approach to institutionalism helps to identify why managers take conscious decisions and bring change in a world of structuralized preferences and institutional failures. In normative institutionalism, change is thought as a continuing process of adjustment and learning with a reshaping of

preferences: organizations identify change in their environment and then adapt through a process of learning. "*Changes in the environment constitute a set of opportunities for the institution, as well as a threat to its established pattern of behavior*" (Peters, 2005: 35). Furthermore, the political climate in an organization can lead to managers making decisions based on irrational grounds (Jashapara, 2004).

Forsgren (2008) points out to top managers not only acting as leaders in a business context dealing with strivings from internal groups, but also as 'statesmen' in a political context where values of society have to be taken into consideration. Managers are faced with pressure for social approval and expectations of appropriate conduct. Notwithstanding, according to Jenkins et al. (2016), the term 'institutional entrepreneurs' was introduced to define for example strategic decisions that account for deviation, or an experiment with the established ways of doing things, leading to a possible institutional change. When managers have to deal with situations of institutional complexity, they might adopt strategies and structures that innovatively combine elements from multiple logics, possibly resulting in a broader institutional change (Jenkins et al., 2016). Hislop (2013) points out to the differences between the role of leaders in senior/top management and the role of middle managers. The first is supposed to communicate the vision of the organization to others, based on their own efforts to creating that vision. Furthermore, top managers are supposed to recruit, train and communicate with middle managers. The latter have the responsibility of motivating workers to create knowledge, while translating the high-level vision of the organization into relevant concepts and frameworks.

Burtonshaw-Gunn et al. (2009) introduces five kinds of change an organization may adopt: change in tasks, roles, structure, behavior or culture. The latter two are much harder to implement as they bring a higher level of discomfort due to substantial time and investment. Additionally, there is a challenge for managers to cultivate commitment of knowledge workers to the organizational vision when the environment is not favorable to specifying long-term goals and objectives. In these situations, workers would need to take the role of self-leadership and self-regulation to sense the dynamic changes in their immediate business environment (Malhotra, 2012).

Strategic change tends to occur incrementally, according to the dependency path of the organization. However, according to Jenkins et al. (2016), incremental change may not fulfill the requirements of the market environment for a task to be efficiently accomplished. Burtonshaw-Gunn et al. (2009) points out to a participative strategy to change as the most appropriate for organizations that need to realize new values, processes and behaviors, as it promotes an active involvement of people, increasing their commitment to the change process. Additionally, an educative strategy can also augment operational changes and harmonize support through the communication with staff, customers and stakeholders.

3.4 Organizational Performance

Ahmed et al. (2008) define performance as the fulfillment of specific outcomes through managing organizational portfolios of people, processes and programmes. As managers are under pressure to improve performance, the organization must determine what performance capabilities and outcomes they need.

Ahmed et al. (2008) discusses the positive relation between cohesiveness within teamwork and task performance, being the most important goal of the first, to improve performance in the future, and not just for the employee. "*Working together as teams to establish specific performance objectives helps transform a team from a group of individuals into a committed group. Before a team begins formal work on its assignment, it is critical that executive management clarify the reason for the team's existence*" *(Ahmed et al., 2008: 20).*

Ahmed et al. (2008) present some of the most relevant Key Performance Indicators (KPIs) for highly effective teams. This thesis focuses on knowledge management, where both individual, group and organizational levels are taken into consideration. However, as looking specifically into the performance outcomes of the GES project, it is relevant to apply KPIs related to teams, where the knowledge processes previously discussed are taken into consideration. The KPIs Ahmed et al. (2008) define are:

1. **Openness and trust**, where team members trust one another, and are happy to share information and feelings openly;

2. **Cooperation, support and interpersonal communication and relationships**;

3. **Individual and team learning and development**, where both learning levels are evident and a good balance is achieved between developing knowledge, skills and competence;

4. **Sound inter-group relations and communications** between the team and other parts of the organization, where there is good evidence of effective working relationships and communications with both individuals and other functional teams and departments;

5. **Leadership style** contributing towards the motivation and empowerment of the team;

6. **Regular review of procedures**;

7. **Output and performance**, where customer feedback (both internal and external) is good to excellent;

8. **Change and creativity** are welcome in the team, while there is a culture of regularly challenging the way things are done;

9. The team members deal with **decision-making and problem-solving** through consultation with other team members and can identify and tackle challenges and obstacles that are likely to be in the way for them achieving their objective.

Even though the focus of this thesis is on the performance outcomes of a specific project, Talbot (2008) considers there is a direct link between the internal performance complexities within organizations and the complexity of their external context. The author argues that there have been many studies on the performance within individual public organizations. However, not much emphasis has been put into the complexity of the institutional environments where these organizations function. This is a point to take into consideration when analyzing the UNDP, as besides the outcomes of the performance include internal financial gains for the Country Offices with the installation of solar PV systems, they are also included in a widely complex context where external social-economic matters are the main motivations for high sustained performance of the project. Therefore, measuring the CIAS unit´s performance means an understanding of its external environment.

3.5 Analytical Approach

Based on this theory and literature review, I propose an analytical approach to study to what extent knowledge management processes can improve performance outcomes in the GES project in the GIA unit. According to Baligh (2006), organizational structures have performances, and the efficiency of this structure will define the performance outcome of this organization. I aim at explaining how the knowledge management processes in the CIAS unit can lead to optimized team performance in the GES project, but not taking for granted and understanding the organizational performance in a macro level. This means that I also want to understand the role of the CIAS unit as an advisory and service provider unit for the installation of solar PV systems in COs.

After reviewing the literature, I consider knowledge management processes as part of the organizational structure of the CIAS unit, and that knowledge in the personal level is created from both internal and external inputs, while organizational learning results from efficient knowledge sharing and transfer from project teams and individuals. The institutional context will be approached from an organizational perspective, where internal organizational culture and external industry context will shape the approach to answering the research question.

Assuming there is an interrelation between creation, sharing and use of knowledge, the analytical framework is presented as the following:
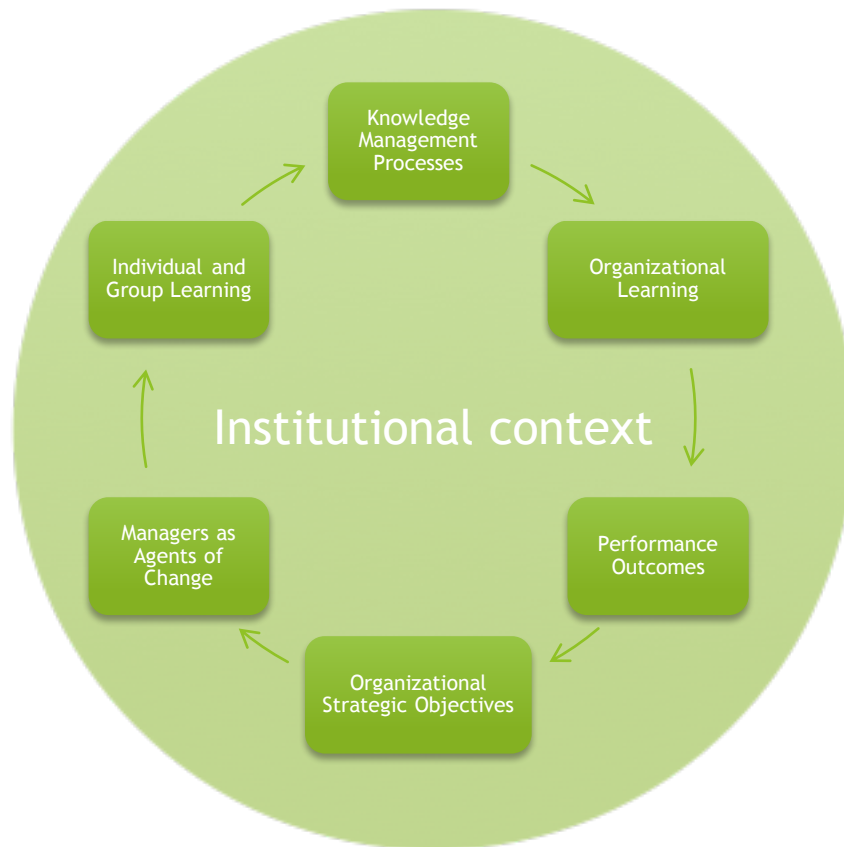
Jashapara (2004: 10) states that we live in uncertain times and therefore, "*any assumptions about approaches to organizational alignment and adaptability need to be considered carefully*". With a background of the institutional environment of the CIAS unit, the processes leading to learning in the organizational level are analyzed. Current performance outcomes will be analyzed based on the ultimate goal of the GES project to install solar PV systems in every UNDP CO around the world.

4. Renewable Energy

This section presents the current renewable energy scenario for developing countries, with a focus in solar PV systems, and a further explanation of the role of Market Facilitation Organizations for the promotion of renewable energy.

4.1 Renewable Energy in the spotlight

Renewable energy provides electric power for tens of millions of people in rural areas of developing countries, while two million households use solar lighting systems (International Energy Agency, 2015). Government policies have played an important role on the recent growth of the renewable energy sources. The scenario seems to be slowly changing in developing countries with measures to reduce regulatory barriers, improve the system and grid integration of distributed solar PV, and financing conditions with solar lease or solar Power Purchase Agreements (PPAs)[9] (International Energy Agency, 2015).

The EY[10] Renewable Energy Country Attractiveness Index (RECAI) reveals that half of the countries in the index are from emerging markets. Until ten years ago, only China and India used to be as attractive for renewable energy investment as the more developed markets (Renewable Energy World Editors, 2016). Currently, developing countries are looking for larger, utility-scale solar projects (Tabernacki, 2012: Hill, 2016). Now, investments in renewable energy projects in emerging markets have on average 28% higher returns than projects in Europe or North America (Hill, 2016). The attractiveness of renewable energy depends on government willingness to maintain policy support and appropriate market design, but the forecast for solar PV generating costs is to continue decreasing (Hoffmann, 2014; Hordeski, 2010; International Energy Agency, 2015; Michalena et al., 2013). "*This improving economics suggests that renewables are an increasingly valuable option in a well- diversified portfolio of energy investments from both the investors and system perspective*" (International Energy Agency, 2015: 6).

---

[9] *"With a solar lease, you agree to pay a fixed monthly "rent" or lease payment, which is calculated using the estimated amount of electricity the system will produce, in exchange for the right to use the solar energy system. With a solar PPA, instead of paying to "rent" the solar panel system, you agree to purchase the power generated by the system at a set per-kWh price." (in https://www.energysage.com/solar/financing/solar-leases-and-solar-ppas)*

[10] EY is an advisory services multinational company (in ey.com).

Renewable approaches to energy supply might require and benefit from the involvement of users, active citizens and collaborations between the private sector, international and civil society organizations (Genus, 2016; Hoffmann, 2014) and market facilitation organizations[11] (see section 3.5) (Martinot, 2005; Schröder, 2011). According to Genus (2016) and Hoffmann (2014), Germany is a successful example of the promotion of renewable energy facilitated by the institutional environment, which is a result of a social market economy. The country has small renewable energy companies forming effective advocacy coalitions with NGOs and others to lobby in favor of e.g. the regulations for the uptake of solar energy (Genus, 2016). In the developing world, Zambia has a successful example on the collaboration of many players who influenced and assisted on the elaboration of policies to foster the investment in renewables in the country. The United States Agency for International Development (USAID), the Zambian government, the private sector and civil society organizations collaborated to improve regional capacity for energy sector policy making and implementation (USAID, 2015).

Even though the Green Energy Solutions project of the CIAS unit has the objective of expanding to other technologies such as wind power solutions, this paper is only concerned with the Solar PV system solutions to Country Offices, as this is currently the focus[12] of the Green Energy team in the CIAS unit.

4.1.1 Solar PV systems

Hoffmann (2014) describes photovoltaics (PV) as fascinating technologies, while Wengenmayr et al. (2013) defines it as convincingly elegant, as it transforms the energy of sunlight directly into electrical energy. There are various technologies of solar cells, which is the basic element of a PV, and they vary in efficiency and cost. A number of solar cells form a solar panel with common power output of some hundreds of Watts (Michalena et al., 2013). Twidell et al. (2006) presents three types of PV systems: stand-alone applications; balance of system components; and grid-connected systems. The latter is the largest and fastest-growing use of PV, where grid-connected inverters transform the DC electricity from the PV array into AC as used by the greed. Batteries can be used as part of these systems to store

---

[11] Market facilitation organizations (MFOs) are the supporters of growth of renewable energy markets, investments, industries, and policies (Martinot, 2005).
[12] The CIAS unit has recently started a new green solution project of windmill installation in some COs. However, this is not taken into the analysis in this research.

electricity, being the lead acid battery widely used, and recently the lithium ion batteries becoming more competitive in price and efficiency (CIAS unit, 2016).

When planning a solar PV installation, high priority has to be given to the annual insolation at the location, the optimal arrangement of the installation and its components, and questions of financing and availability of possible subsidies. According to Wengenmayr et al. (2013), all these depend on the region and precise location of the installation.

Martinot (2005: 31) states that "by 2005, *more than 2 million households in developing countries were receiving electricity from solar home system*", being most of these countries in Asia. By this same year in Africa, Kenya had almost half of all the solar home systems in the continent. Hoffmann (2014: 203) has a very positive view on the likelihood of a world powered by 100% renewable energy:

> *"I am convinced, however, based on the superior cost development of all renewables compared to today's traditional energies that the financial argument, once understood by decision makers in politics, the financial institutions and industry, will make this change much quicker than most people would anticipate today."*

Solar resources, the electricity costs and policies influence on solar PV system adoption (Hordeski, 2010). The technical potential of solar PV systems is infinitely higher than other renewable energy sources, due to the solar irradiation to the earth. However, some factors have to be taken into consideration for successful projects in developing countries: provision of technical infrastructure, training and cultural understanding and design of the payment and institutional structure. Twidell et al. (2006) emphasize that training local people to install and maintain PV systems is critical to their success.
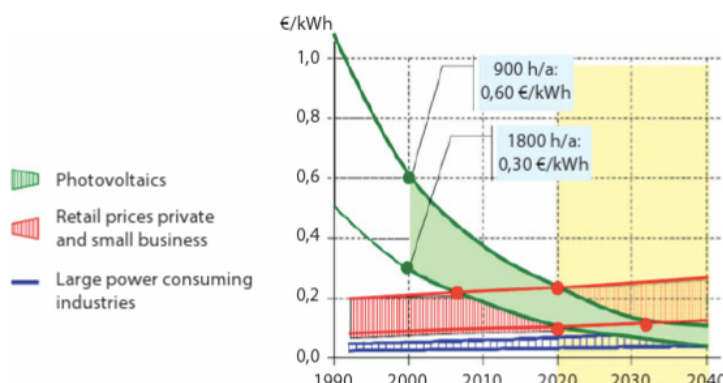
Figure 5. PV Competitiveness (from Hoffmann, 2014)

Figure 4 shows what happens whenever the PV production cost in different locations becomes equal to the price the various customers pay to their electricity provider. According to Hoffmann (2014), no

other known electricity generating technology has demonstrated such a decrease in cost and price in such a short period of time.

4.1.2 Market Facilitation Organizations

According to Martinot et al. (2002), developing countries account for 80% of the world´s population, but consume only 30% of global commercial energy. The market facilitation organizations (MFOs) are fostering the use of renewable energy in these countries through some combination of networking, information exchange, markets research, training, partnering, project facilitation, consulting, financing, policy advice, and other technical assistance (Martinot, 2005). They can operate with a business interest, but most importantly, their public interest in seeing the technology widespread comes from a variety of apparent public benefits (Martinot et al., 2002).

Old paradigm		New paradigm
Technology assessment	➔	Market assessment
Equipment supply focus	➔	Application, value-added, and user focus
Economic viability	➔	Policy, financing, institutional, and social needs and solutions
Technical demonstrations	➔	Demonstrations of business, financing, institutional and social models
Donor gifts of equipment	➔	Donors sharing the risks and costs of building sustainable markets
Programs and intentions	➔	Experience, results, and lessons

Figure 10. Renewable energy: from technologies to markets. (In Martinot et al., 2002)

As a result of a new paradigm of renewable energy markets, Martinot et al. (2002) notices an increase on literature that approaches renewable energy from a market or end-use perspective. Figure 6 shows the relevant shift of a donor aid approach to sustainable markets of renewable energy, where a wider variety of stakeholders participate on decision-making.

The projects that MFOs are involved in are now demonstrating institutional and commercial viability, with mechanisms for equipment maintenance, sustainable sources of credit and expertise, and incentive structures for sustained operating performance (Martinot et al., 2002). There is a consensus in the literature that MFOs should focus on their role as catalysts instead of directly delivering services. Schröder (2011: 82) adds that *"in addition to the institutional requirements of having an adequate*

incentive structure and resources, a review of practical experience corroborates the need for good

management practices and organizational sustainability".

5. Data Analysis

The analysis aims at understanding the case of the CIAS unit to find answers to the research question. This section follows a similar arrangement to the one presented in the analytical approach. As institutions shape social behavior (Peng et al., 2008), it is relevant to analyze the institutional framework shaping the knowledge processes of the groups and individuals studied, which lead to organizational culture. Therefore, it is critical to first understand the structural change undertook in the UN system since the 1990s, and the consequent development of the UNDP´s knowledge management strategy and the 'toolkit for managing change'. Thereafter, looking into the CIAS internal structure will outline the path to analyzing the current knowledge management processes and performance of the GES project.

5.1 The UNDP

A concrete institutional environment is essential for supporting knowledge creation and knowledge sharing (Kubon-Gilke, in Helmstadter, 2003). Hence, it is appropriate to understand some organizational structures, strategies and approaches lying under the dynamic interactions of KM processes in the UNDP.

5.1.1 A Structural Change

The United Nations is by definition an International Organization (IO) (Haas, 1990; Mühlen-Schulte, 2010). According to Deming (1993: 155 in Marshall et al., 2011), a system is defined as "*a network of interdependent components that work together to try to accomplish the aim of the system*". In 1989, the UN General Assembly called for a more decentralized UN system, aiming at having the organizations to come closer to their 'customers' and better adapt their assistance to the local needs of the developing countries to adjust their programmes accordingly. There is a general complaint from staff outside of the HQ in New York, regarding that they need approval for many minor decisions in a context of delayed communications (Beigbeder, 1997). Weiss (2009) criticizes the UN system as being bureaucratic with too many agencies trying to work on development efforts for the environment, calling it a feudal system. The UNDP has also been a specific target of criticism as for its dispersed nature of bureaucracy and management, leading to questioning of its efficiency (Mühlen-Schulte, 2010).

However, the UNDP has been through fundamental organizational changes in the last years, dealing with change from a managed interdependence perspective, where instead of only adapting to changes, an IO actually learns from it. According to Haas (1990) who introduced this model of change, when those leading the organization switch from a passive to an active stance, they will actually turn themselves into an inner circle of reformers committed to a new approach, searching for a viable new problem definition. To improve on previous performance, the goals of the organization have to be seen as increasingly interconnected with political, economic and social goals, where new consensual knowledge is available. Accordingly, the UNDP's system currently demonstrates an organizational structure and behavior very similar to Multinational Corporations (MNCs), especially when looking into organizational behavior as an outcome of the interaction between Headquarters (HQ) and COs. "*Understanding the response of the UNDP to reform pressures, and the actions of its staff, requires an understanding of influence flow between the internal and external elements of the organization*" (Mühlen-Schulte, 2010: 6). According to Mühlen-Schulte (2010), UNDP staff are different in character and experience in comparison to staff from other IO studied in typical IO investigations. For this, the UNDP can be defined not only as an IO but also as a Multinational Organization.

The UNDP system consists of the network of all UNDP Country Offices (COs), Regional Centers, HQ in New York, UN organizations and the external relationship with governments, other IOs and the Private sector (pers. comm., 2016). While the COs work directly with accomplishing the goals of the UNDP through local programmes, the HQ support the COs by providing the tools for achieving their goals efficiently (Mühlen-Schulte, 2010; pers. comm., 2016; UNDP, 2014). It is in the HQ where most of the executive heads of the UNDP are located, and just as in other UN agencies, these executive heads delegate the management responsibilities to different units with competent, dynamic and loyal managers (Beigbeder, 1997; pers. comm., 2016). As pointed out by Beigbeder (1997), the performance of the different units is measured and controlled by UN's governing boards, while the UNDP complies with the ISO 9001 Quality Standards (S. Nyathi 2016, pers. comm., 29th January). The latter is aimed at providing an organization with a quality management system to help improve its overall performance and provide a basis for sustainable development initiatives (www.iso.org, 2015).

5.1.2 Knowledge Management Strategy

In the UNDP Knowledge Management Strategy 2014-2017, UNDP (2014) states that *"KM means using the resource 'knowledge' more effectively to improve the way UNDP does business and to achieve greater impact in its development outcomes as formulated in UNDP's Strategic Plan"*. Drawing on internal KM can improve the quality and efficiency of operational work of staff, consultants and project teams (UNDP, 2014).

Knowledge networks were established in the UNDP since 1999. Before that, nearly every e-mail being sent out of a bureau had to be signed by a supervisor. The COs drove a fundamental culture change towards a standard of knowledge sharing across all staff levels, which UNDP benefits from until today. The UNDP´s Knowledge Strategy 2009-2011 focused on the role of people in creating and sharing knowledge, while training was conducted in COs to promote the idea of knowledge sharing, and investments in technology were made (UNDP, 2014).

The UNDP identified Communities of Practices (COPs) and Teamworks as two successful tools for KM, after knowledge practices started in 1999. COPs have been connecting practitioners across regions, flattened hierarchies and increased exchange among staff. The current KM strategy emphasizes that *"formal COPs transcending regional, thematic and organizational boundaries are a critical complement to informal social networking, and that successful communities require dedicated facilitation, content curation and quality assurance that need to be adequately resourced"* (UNDP, 2014: 15).

Teamworks is *"an advanced corporate peer-to-peer platform within the UN, taking knowledge networking across UNDP and partners to another level (UNDP, 2014: 4)*. In 2012, the organization conducted an internal KM and Teamworks Survey. Teamworks was rated as beneficial for the UNDP´s business by 84% of respondents, while 70% found it beneficial for their personal work (UNDP, 2014). Furthermore, the survey conducted by the CIAS unit has demonstrated that 35% of the respondents consider the UNDP´s performance on enhancing collaboration and knowledge sharing as very good, while other 35% consider it good and 16% just average. The ICT Manager and Regional ICT Coordinator for the African region Y. Fall (2016, pers. comm., 25th July) defines webinars and CO library as the most

efficient tools for knowledge sharing between the CIAS unit and the COs.

The two other successes of KM were the initiatives of COs to put in practice public online consultations and knowledge mobilization, and regional level innovative approaches to strengthening knowledge networks of policymakers in support of south-south learning. The organization considers that the embedding of social inclusion as a key of the SDGs, and the strong co-leadership in the environmental sustainability theme, were supported by these four successes of KM (UNDP, 2014).

The KM Survey conducted in 2012 served as a building tool towards new strategies. The survey summary suggested that the organization should approach KM from a more practical perspective, where emphasis on creating and sharing knowledge for organizational learning 'during, before and after' should equal the emphasis on information technology. "*KM always needs to be people-centered rather than document-centered*" (UNDP, 2014: 10). The challenges for this new approach would be:

1. Knowledge sharing processes are not systematically embedded in programme and project cycles, and, therefore, it would be hard to capture lessons with the aim of reusing the same processes. Furthermore, where there are requirements of KM reporting, compliance is low;

2. Knowledge sharing is not yet fully institutionalized as a cross-practice exercise, especially low emphasis is put on cross-fertilization between projects and programmes;

3. *"The current process of knowledge product definition, development, dissemination and measurement does not yield the quality, reach and impact that is needed for UNDP to be a thought leader in development"* (UNDP, 2014: 6).

Based on analyses of outcomes of the UNDP Knowledge Strategy 2009-2011, the organization launched a new framework for Knowledge Management (KM) strategy for the period of 2014-2017, where the priorities of the strategic plan are the areas around Sustainable Development Pathways, Inclusive and Effective Democratic Governance, and Resilience. All KM activities should serve these areas, fostering an organizational culture of learning and exchange. Evidence from a country perspective and internal experience will support the organization in understanding what works in the prioritized areas of the plan. This strategy strengthens the UNDP´s profile as a leading knowledge organization, connecting partners

to global knowledge (UNDP, 2014). One proposal for organizational learning by the new framework is to use the Development Solutions Teams (DST) to create knowledge in specific development areas. The goal is to create knowledge production plans, where key stakeholders will be collaborating to address knowledge gaps.

5.1.3 Approach to Performance

A proposal from the UNDP KM Strategy Framework 2014-2017 is a project to develop a 'KM Performance Indicator Framework' to link KM directly to measurable results. With metrics and tracking mechanisms, it would assist measuring the impact of knowledge creation, knowledge sharing and knowledge products across COs, Regional Centers and the HQs. Based on what is measured, the organization also aims at boosting incentives for business units and individual levels, by recognizing those who contribute distinctively to knowledge and innovation in the UNDP, rewarding those individuals whose work reflect an ongoing knowledge creation and sharing. Furthermore, KM metrics should be embedded into business work plans, projects and programmes (UNDP, 2014). The defined learning and sharing inter-dependency is illustrated in Figure 10.
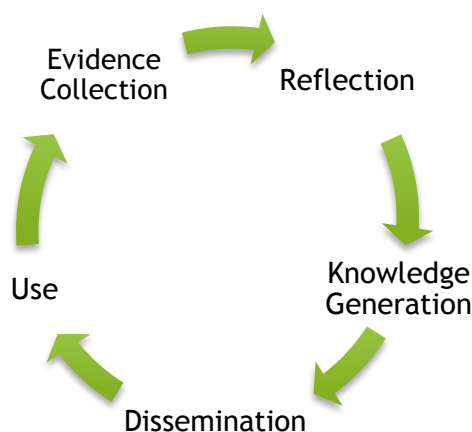
Figure 11. Learning and Sharing Inter-Dependency. By the author, based on the UNDP KM Strategy Framework

Another strategy to reinforce the measurement of performance is given by the UNDP as a Toolkit for managing change in the organization. It is offered for senior managers and management practitioners across the organization. It is intended to provide tools and guide management, facilitating the

improvement or realignment of processes. "*Change requires leadership, integrity and needs to be grounded in the core values of our organization and set within its strategic goals and objectives. Furthermore, change is hard work – and can also be a high risk enterprise if not planned and implemented correctly so you need to ensure that you as a team have set clear objectives for the transitioning or improvement exercise in your office, and that you are monitoring the progress being made carefully*" (UNDP Intranet [2], 2016).
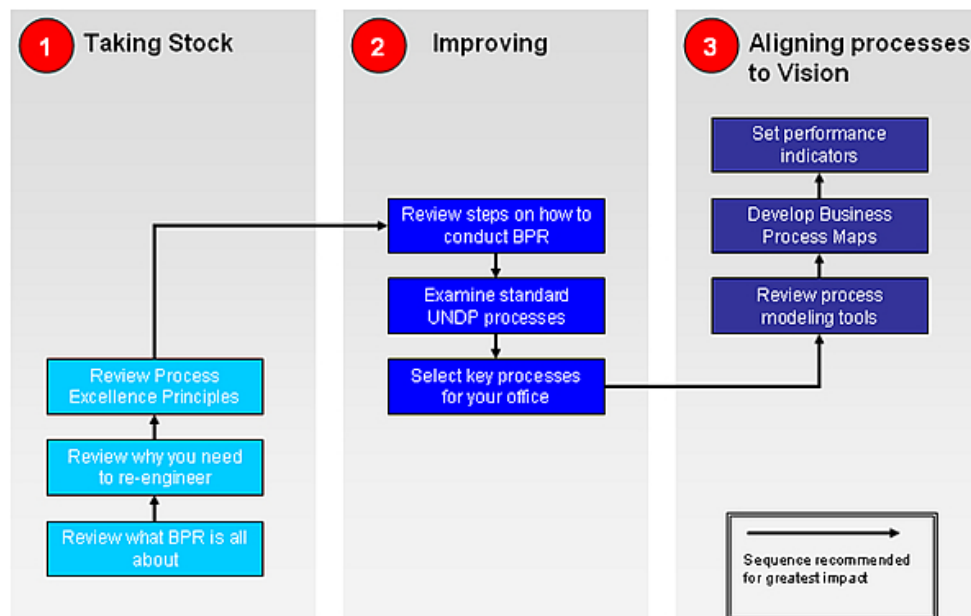
Figure 12. Process Improvement Framework. in UNDP Intranet [2], 2016.

The organization´s performance can be indicated by process measures and targets. The performance tool which extracts data from Atlas[13], was developed to allow offices to compare their efficiency with other offices, to see if they meet their own expectations. The performance tool analyzes the average time between two process steps. However, the organization acknowledges that it is difficult to measure efficiency within the UNDP processes. Performance indicators are usually established from a broader perspective of the projects as e.g. the annual targets of a project (UNDP Intranet [2], 2016).

A third performance measurement strategy detected was in the report named 'Non- conformity, Corrective

---

[13] Atlas is a name for the Enterprise Resource Planning (ERP) system used by UNDP.

and Preventive Action' (NCR/CAPA) aims at preventing problems in the Quality Management System. According to the Handbook for OIMT/GIA Procedures, problems can be identified by channels such as employee input, customer feedback and management review. S. Nyathi mentions that this report was used after the problem with the solar panel installations was identified. After a problem is identified, there are four other processes to go through for filling in the NCR/CAPA report as according to Figure 11:
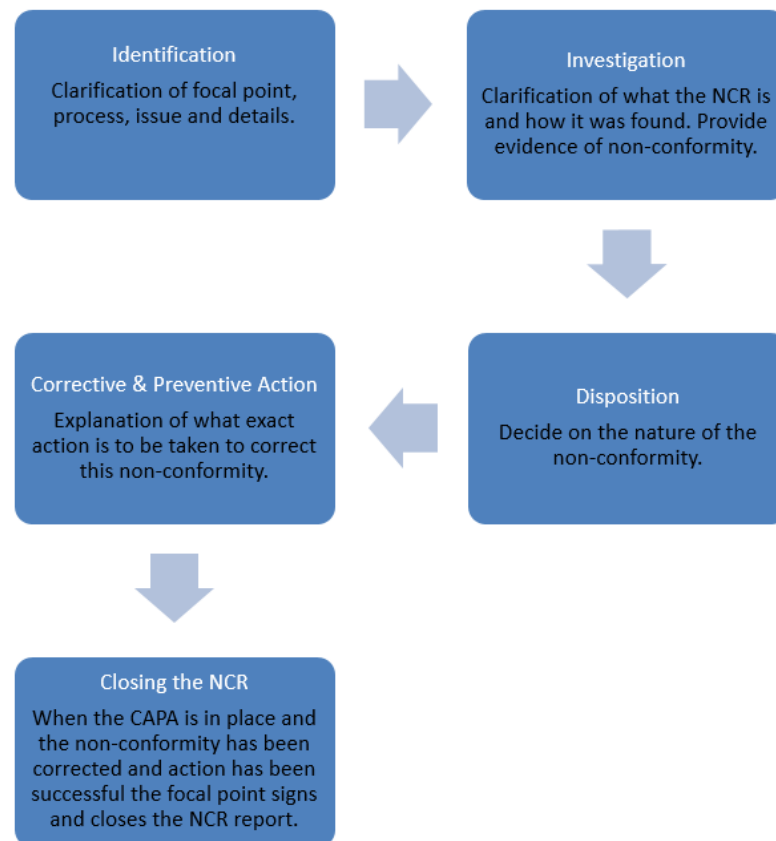
Figure 13. Flowchart of filling in the NCR/CAPA Report, in Handbook for OIMT/GIA Procedures (internal material).

5.1.4 Sub-conclusion

From this section, one can conclude that the decentralized approach of the UNDP towards adapting to the needs of its 'customers' and improving on its performance as an organization, has resulted on progress of knowledge management strategies. KM tools were verified by surveys to be influential in business and personal performance.

While a framework has been set and some tools are available for managers to use and focus on improving processes and performance, some issues still remain in place. Mainly for the complex nature of the UNDP as an organization, it is a challenge for knowledge sharing to be systematically embedded in project cycles, as it is not yet fully institutionalized as a cross-practice exercise. Moreover, the organizational complexity also results in a challenge to measure efficiency in processes. Therefore, performance indicators are related to a macro perspective of the organizational strategic objectives.

5.2 The CIAS unit

The CIAS unit has currently 8 Service Lines[14] leading their service portfolio: Infrastructure Services; Crisis Response; Service Delivery; Capacity Building; Advisory & Technical Missions; Benchmarking & Knowledge Management; Intranet & Apps; and Green Energy Solutions. Two of the main products/services that the unit is currently selling/supporting to COs are the OneICTbox and Green Energy Solutions (UNDP Intranet [1], 2016). The OneICTbox is an innovative ICT solution to upgrade the COs ICT infrastructure and drive development with green ICT and cloud-based services. The main product of the Green Energy Solutions is currently the installation of solar PV systems. Furthermore, the unit outsources some processes for the following services: VSAT[15] connectivity, OneICTbox Supply, Green Energy Solutions and Technical Missions. However, the CIAS "*still maintains oversight to ensure conformity to all customer, statutory, and regulatory requirements, wherever applicable*" (CIAS Quality Manual, 2015, internal material).

The unit´s structure[16] comprises the management supported by the CIAS staff in the areas of Finance, IT services including OneICTbox Specialists, Green Energy Solutions, Advisory and Regional ICT Coordinators. The Intranet & Apps service is supported by non-CIAS staff, also in the same office in Copenhagen. The OneICTbox specialists, Advisory and Regional ICT coordinators are the only ones not sitting in the same office, but instead they are spread according to their respective regions for coordination.

---

[14] See Appendix 2
[15] Very small aperture terminal (VSAT) connectivity services is one of the main services provided by the GIA unit, ensuring that all COs can connect to the internet and count on sufficient capacity. (CIAS Quality Manual, 2015, internal material).
[16] See Appendix 3

There are also interns who play important roles in the unit: ICT Business Administrative interns, ICT Green Energy interns and ICT Engineer Interns. The latter are the interns working mainly with the OneICTbox team, configuring the product once the different parts arrive from the vendors, and shipping it to the CO once it is ready. However, the Business and Green Energy interns can be involved in different ad hoc administrative tasks, while the ones with Green Energy titles are mostly involved with the PCMM project and with monitoring of the few solar PV systems already installed (pers. comm., 2016; S. Ryrberg, 2016, pers. comm., 25th July).

5.2.1 The Green Energy Solutions Project

When the Green Energy Solutions (GES) Project came on board of the GIA unit portfolio in 2014, a sustainable environmental standpoint has been integrated to the emphasis on applying '*structures for greater cost efficiency and effectiveness'*. From a broad perspective, this project has a very important role in accomplishing the main goals of the UNDP, as according to G. Demeules (2016, pers. comm., January 29th), installing solar panels in Liberia has caught a lot of attention to the project: "*we had UNICEF, the Irish Embassy and the Department of Defense of Sweden calling us to hear about it*". The Global ICT Advisor mentions how the GES project could be an example that will hopefully support the progress of an industry in West Africa.

When asked why a Green Energy project was assigned to his ICT unit, G. Demeules (2016, pers. comm., January 29th) pointed out to the fact that the GIA is the only unit within the UNDP that actually has technical knowledge from an engineer perspective. He compares the solar panels and Vsat from a technical perspective and defines their concepts as very similar, while also mentioning the 7 Steps Process for Green Energy solutions and argues that he could use this process for the implementation of any other of his ICT products. The 7 steps process occur in the following order: 1- Self-Assessment; 2- Business Case; 3- Procurement & Cost Proposal; 4- Vendor Site Survey; 5- Design; 6- Installation; and 7- Operation and Maintenance (pers. comm., 2016). As mentioned, this process was developed after the unit started the GES project dealing with emergency situations in Sierra Leone, Liberia and Guinea. Currently, 21 Country Office staff members believe a solar PV installation is highly critical for their electrical system, while other 34 consider it not highly, but just critical (CIAS unit, 2016). The development of the

GES project´s maturity is demonstrated by the announcement of G. Demeules (pers. comm., 2015) during the GES monthly meeting in November, 2015:

"The work on Green Energy undertaken by the GIA[17] unit, is now part of the common services for the UN. Common services is part of the United Nations Development Group (UNDG) where all UN agencies collaborate. This means that our Green energy package is now available for all UN agencies".

The team leader added that a second version of the project should take place to improve the package. By that time, the aim of the project was to have all COs with PCMM installation by mid-2016. The goal has, unfortunately, not been achieved yet (pers. comm., 2016).

Collaboration with stakeholders has always been part of the processes of the GES project. Other UN agencies, vendors and external institutions are some of the stakeholders that the CIAS unit keeps a good relationship with, by not only communicating by e-mail and phone calls, but also inviting for face-to-face or Skype meetings involving knowledge sharing and transfer (pers. comm., 2016).

5.2.1.1 Challenges for the implementation of the GES project

The performance of the CIAS unit during the installation of solar panels in the three COs during the Ebola crisis has been influenced by many players. First, it was an emergency situation, which gives managers an unclear view of how things should look like. To stay within the procurement rules of the UNDP, the CIAS unit has 'borrowed' the Long Term Agreement (LTA) of another UN agency to buy pre-packages of solar systems (S. Nyathi, 2016, pers. comm., 29th January). This LTA did not comprise the conditions for solar panel installation in large compounds as the COs need, but instead, it was an LTA for solar solutions in a very small scale for refugee camps, which as S. Nyathi (2016, pers. comm., January 29th) confirms, made the CIAS unit overlook the very important steps that should come before the installation. *"We need the site-survey to know the consumption patterns and the capacity, so we can size our solution properly, and to check if there is need for changing cables, etc. With that information, we can size our solution properly, but not all of this was done"* (S. Nyathi 2016, pers. comm., January 29th).

---

[17] The CIAS unit was until the end of 2015, called Global ICT Advisory Services (GIA) unit.

Another issue was that the vendors got to the CO for installation and realized that consumption was over the capacity of the system, but they decided to install it anyway and see how it would work. The result was a low capacity of the installed batteries and the need to go through the 7 steps process for Guinea, Sierra Leone and Liberia after the design of it (pers. comm., 2016). The same vendors reached an agreement with the CIAS unit after meetings to find consensual knowledge, and worked on rearranging the installations. Currently, these countries are still going through troubleshooting with the assistance of the CIAS and the vendor (A. Andersen, 2016, pers. comm., 25th July).

According to G. Demeules (2016, pers. comm., January 29th), there are three variables that can impact the performance outcomes of solar panel installations:

1- The strategy to show the customer the value of adapting green energy solutions by using tools like the Intranet, social media and all the promotional material available;

2- A clear outline of the procedures to implement the project;

3- And resource mobilization, as most of the COs do not have the possibility to amortize the investment as they have to pay upfront. Thus, the CIAS works on supporting the employment of Power Purchase Agreements (PPAs).

S. Nyathi (2016, pers. comm., July 25th) points out to PPAs as currently being the main challenge for the progress of the GES project, while the unis is collaborating to get establish these agreements so that COs can buy reliable power:

"I should say that the green energy the way they have it now it's a bit of difficult because there's a lot of upfront costs, once off course you know the payment that you have to put on the table to have this in place is very high for most of our COs, so it is not easy."

G. Demeules (2016, pers. comm., January 29th) also pointed out to the challenges present in the initial phase of the project. He mentions that to start, you cannot expect to have a mature team and highly qualified engineers as the OneICTbox team already has. S. Nyathi and him have started the project similarly to a start-up, with the support of the staff, interns, NGOs and other UN organizations to get the project going, and now that they are starting to have business, there comes more revenue, starting a

business cycle. He claims that if you do not have the resources, you need creative budgeting, as collaboration is key. G. Demeules presents the plan of contacting the NGO Engineers without Borders to provide the GES team with some staff for adding on the technical knowledge. "*Eventually, the system will mature and you will have a sustainable system*" (G. Demeules 2016, pers. comm., January 29th).

5.2.1.2 The "PCMM project"

The PCMM project, as called by the Green Energy team, is currently what takes most of the time for the daily tasks of ICT Green Energy interns (pers. comm., 2016). From the data collected from the webinar presentation in July, 30 PCMMs have already been shipped or installed in COs, while 26 have been ordered and 35 are pending on the decision. In the survey by the CIAS unit, 6 respondents answered that the CO had already installed the PCMM, while 17 had ordered or were installing. 36 COs were familiar with the device, while 4 were not familiarized with it. Furthermore, 34% believe the PCMM device is useful, while 27% see it only as average, and 9% do not believe installing a PCMM is very useful. From a broad perspective, the GES project has advanced on achieving its strategic objectives of installing PCMM devices in all COs. The following is a summary of the roll-out status of the PCMM project:

October 2015		February, 2016		July, 2016
•Shipped/Installed: 7 COs •Ordered: 2 COs •Pending: 4 COs	→	•Shipped/Installed: 9 COs •Ordered: 0 COs •Pending: 7 COs	→	•Shipped/Installed: 30 COs •Ordered: 26 COs •Pending: 35 COs
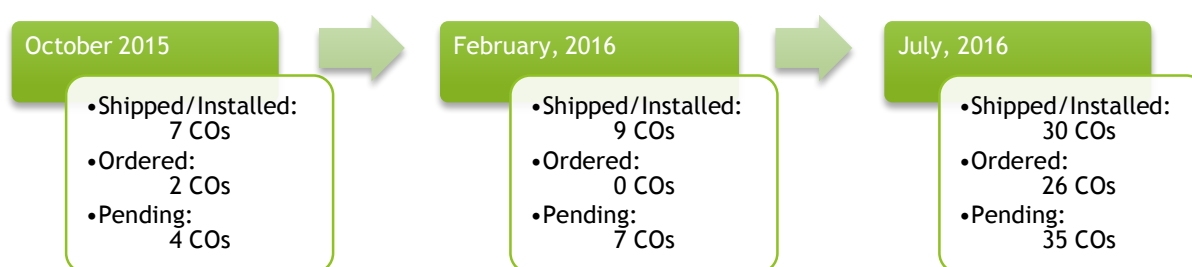
Figure 14. PCMM Project Roll-out Status. (pers. comm., 2016).

GES Interns Team 1 Oct-March – During this period, the unit was cooperating with the Procurement Support Office to establish LTAs with solar power vendors, including vendors of PCMM devices (pers. comm., 2016). The process of getting an LTA approved took many months due to the bureaucratic nature of the UNDP (Tuxen, 2016). The main focus of the green energy team at that moment was to get the LTA for PCMMs, so they could be shipped to all COs. By that time, the COs of Afghanistan and Botsawana

were the ones already going from the Self-assessment step to building a business case in step 2 of the 7 steps process.

The team involved the Team Leader of the CIAS unit, the manager of the GES project, the three Business interns, and a Green Energy intern with a technical background. Later, another Green Energy intern was welcomed (pers. comm., 2016).

GES Interns Team 2 March-July – Team 2 was selected to be full-time with Green energy tasks, taking advantage of the approved LTA, allowing the project to progress. The members of the team had different technical backgrounds. The project had an impressive advance as noticed in Figure 3. Even though the goal of having PCMM installed in all COs was not reached, the fact that the LTA was approved for the PCMM vendors, boosted the contact with COs (pers. comm., 2016). S. Ryrberg (2016, pers. comm., 25th July) responded to how often he is in contact with the COs:

> *"It's almost every day. Because again, different country offices are at different stages with the same step solutions, so we're all going towards implementing solar installations, and some of them are still in the reminder phase, still after four months, five months. Some of them are actually getting ready to get the RFQ, to get the LTAs for the loan approval, so you have different stages".*

A. Andersen (2016, pers. comm., 25th July) has described two situations. The first where the communication with the Kuwait CO has been very successful, where they were very excited about the project, and she adds "*it seems like he understood the project and was well informed just by the emails and whatever ideas we had*". However, she notices that the previous approach to knowledge sharing in the GES project did not seem to result in a good communication with COs:

> *"In general, the start procedure for the PCMM with the ICT managers might not have been that good, because we sent out one email with 20 lines and attached some pictures and articles, and if they might not have time to read this intro email, they might be left alone with the feeling "what is this thing about?" and "why are we doing it?" I think the knowledge sharing from that email might not be that good to capture as many ICT managers as was wanted in the beginning."*

5.2.2 CIAS´s Knowledge Management Processes

With the support of data collected through observations and interviews conducted with staff, the main KM processes of the CIAS unit are outlined in three different categories: knowledge culture, knowledge sharing and knowledge management systems.

5.2.2.1 Knowledge culture

During my role as a total participant in the CIAS unit, I noticed the different kind of motivations people can have to their work in an international organization. As embedded in the UNDP´s approach to development with a focus in attending the needs of the Country offices, mostly every UNDP staff will base their motivation to work, as being the social impact they bring to important social, economic and political issues developing countries struggle with (pers. comm., 2016).

The participants of the interviews in July were asked how they felt motivated by the environment of the CIAS unit to create and share knowledge. D. Tshin (2016, pers. comm., 25th July) noticed:

"It is a dynamic place to work, the environment is really good for that. There is also a high return, there are so many clients, and once we start doing things there is a big impact in the work that we do, and I think that's one of the motivations to do those things and getting things done well, you are impacting around the world".

S. Ryrberg (2016, pers. comm., 25th July) approached his motivation from a group learning perspective:

"Basically, or because none of us were really into the whole electrical system that we had to know about, so there's been a lot of sharing when you find something that you think might be interesting, you share it with the others so that everybody gets better at what they're doing".

E. Edo (2016, pers. comm., 26th July) considered the organizational learning aspect as his motivation to knowledge sharing:

"My basic motivation would be that you see some gaps that need to be filled, you feel like contributing to the shortcomings that the unit has. So wherever I see fit, I want to do something and share it in some way. Like, it could be some documentation, giving feedbacks, comments, doing something about it. We cannot really ignore it when we see room for improvement."

From the perspective of the Green energy team, M. Christofidou (2016, pers. comm., 22nd July) who recently started with the new team, notices the importance of getting to work for some weeks with *Team 2* as she could notice the responsibility they were given as interns, having projects to coordinate on their own, which motivated her to learn from them.

5.2.2.2 Knowledge Sharing

G. Demeules (2016, pers. comm., January 29th) mentions the tools and ways of sharing information that the CIAS unit uses, ranging from wikimanual, webinars, CO library, information nodes, and the social media called Yammer.

When asked about the most useful tool for knowledge sharing used by the CIAS unit, **webinars** were frequently mentioned in the semi-structured interviews. M. Kyaw (2016, pers. comm., July 25th) mentions that the tool is used to share to a large audience information on what they are doing in the CIAS unit and inform on new technologies. D. Tshin (2016, pers. comm., 25th July) who is the project manager for the CIAS E-registry[18] service, adds that he uses webinars for training and communications with clients.

During the two webinars I observed, information regarding technical aspects of the PCMM device were given, after the introduction to the project was given by the Team Leader of the CIAS unit. G. Demeules (2016, pers. comm., 14th July) explained to the ICT managers that their technical background earns them the most qualified position in the UNDP to deal with technical issues. He confirmed the support of the CIAS unit to make the ICT managers experts in solar panels if they are not yet. Furthermore, the Team Leader offered to conduct webinars to other stakeholders in the COs that could have an interest in the project. He also advised COs to engage with donors for funds.

---

[18] E-registry is an online application used to register documents that are received phisycally, extracting metadata from them and simplifying the manual data entry process. It also route and track documents to ensure the appropriate Actioners are notified and asigned to process the documents (UNDP Intranet [1] (2016).

Y. Fall (2016, pers. comm., 25th July) defines webinars as an important tool to showcase the benefits of the GES project to COs. However, S. Ryrberg (2016, pers. comm., 25th July) comments on a communication issue during the webinars:

> "We are doing more and more webinars about it, so it´s improving, but you still get surprised when people show up at the webinars and they have 80 country offices logged on, and then somebody asks, so what exactly is a PCMM?"

S. Nyathi (2016, pers. comm., January 29th) comments on the importance of conducting surveys which indicate areas where the unit should focus on sharing knowledge around when conducting a webinar. Moreover, a session of questions is also conducted in the end of the webinars. This has been appointed by many interview participants as one of the ways to ensure the ICT managers have understood the GES project. Webinars are not focused on the specific contexts of COs. Drawing on this, E. Edo (2016, pers. comm., 26th July) points out:

> *"When you give webinars to so many participants, their level of knowledge differs from person to person, but when you do it on **one-to-one training**, you can provide the training and support from time to time."*

As an important tool for the technicalities of the OneICTbox, trainings can give the ICT managers support from time to time according to their individual and CO profiles, using knowledge sharing to help CO managers and the ICT colleagues in COs (E. Edo, 2016, pers. comm., 26th July; M. Kyaw, 2016, pers. comm., 25th July). G. Demeules (2016, pers. comm., January 29th) points out to the missions taken by CIAS staff when they go physically to the COs to assist on ICT matters. Furthermore, advisory missions also take place in the COs where recommendations on a way to move forward are given.

At the GES monthly meeting in October, 2015, a previous Green energy team member noticed that *"instead of writing **e-mails** to the office, it might be better to call them directly, in order to get information more rapidly"* (pers. comm., 2016). The answers during the interviews regarding the efficiency of e-mails points to the conclusion that e-mails are only efficient when urgent information needs to be shared or obtained. Otherwise, important information can get lost in the messages, as the amount of e-mails staff can receive per day can be really large.

All the staff meets every Tuesday for a meeting where everyone is expected to communicate their achievements and struggles. S. Nyathi (2016, pers. comm., January 29th) points out to the ambition that the managers have in asking the staff during the weekly meetings to give statistics on the metrics they have for each of the 8 key processes, giving it a more systematic approach. He mentions that with statistical trends, he could manage that information into something useful.

Y. Fall (2016, pers. comm., 25th July) states the following when asked if organizational knowledge is also shared between the CIAS unit and the COs:

"Absolutely, I think we need a small improvement, not only sharing technical things with the focal points, but also where we need improvement is communicating with senior manager, maybe having webinar with senior management, taking a location deputy workshops and give them information, if you don't have support from your management the project will never go. What we are calling in project management, we call it the sponsor of your project and if you don't have the sponsor of your management it will never go. Maybe this needs some improvement."

Regarding the expectations for an efficient virtual space for sharing knowledge, the search and tagging issues with documents in the **CO Library** were mentioned time and time again. All staff members use it in a daily basis, searching for documents or uploading them. The problem with tagging documents in a poor way seems to bother all members of the staff (pers. comm., 2016). A. Andersen (2016, pers. comm., 25th July) resumes:

"The thing about the CO library is that you cannot find anything unless you know what you are searching for, and that can be a big problem if you don't know the answer to the question"

The improvement of the **Intranet** design seems to be an important issue as it was quite messy (D. Tshin, 2016 pers. comm., 25th July). The Intranet Revamp project in which I have participated, is a current project of the unit. Some of the interview participants argued they have not used it yet, while the ones who did considered it a big improvement, as it is a bit easier to navigate (S. Nyathi, 2016, pers. comm., July 25th).

M. Kyaw (2016, pers. comm., 25th July) adds an idea regarding further improvement in the knowledge management systems of the unit:

"What I really would like to do would be to build a dedicated website to share the knowledge and to keep our colleagues informed about the project statues and everything. We have a lot of tools, we have our own internal project-tracking tool, we have our own CO library to share, our own monitoring system, but I think we need to combine all these tools together and set up a one central page… We have this social media called yammer, we could at least share some info there but not everyone is subscribed in there, and we are also still not very active in yammer. We try to post information here and there but we don't have daily activity or info to share there. I would like to have a platform we can use to communicate with ICT managers in daily basis and to keep updated about all the projects and technologies and even they can check their operational statuses and their networking devices through the same forum."

5.2.3 Sub-conclusion

Looking into the current KM approaches in the CIAS unit gives a light to the alignment of the unit with the UNDP organizational strategies. The processes were analyzed from an individual, group and organizational approach, according to the different aspects the participants touched upon during the interviews.

From the analysis of the progress of the PCMM project in relation to the goal of installing it in more COs, the bureaucratic process of approving Long Term Agreements (LTA) to be able to ship PCMMs to the COs can be identified as a burden to the progress of the GES project. Even though the LTA is in place and the PCMM project seems to be progressing, one point for better performance of the project was identified. The inclusion of senior management to the knowledge sharing processes between the CIAS and the COs was noticed by one of the interview participants as something that would yield the performance of the GES project, as senior managers work as the sponsors of it.

The Key Performance Indicators (KPIs) suggested by Ahmed et al. (2008), can be used to analyze the performance of the Green energy team. Many indicators of good performance have been identified. There were related cases of collaboration through knowledge sharing among the team and within the CIAS unit, where individual and team learning are supported. The empowerment of interns by their sense of responsibility, and the encouragement for ICT managers to feel capable of engaging with the GES project, demonstrate a suitable leadership style of the Team Leader. Finally, the manager of the GES project seems

to be aware of the importance of reassessment of outputs and performance, by sending a survey for client satisfaction to the COS.

6. Conclusion

This thesis has tried to answer the following research question:

To what extent can knowledge management processes in the CIAS unit improve the performance outcomes of the Green Energy Solutions project?

As indicated by the UNDP KM strategy, KM has proven to be impacting on the organizational structure and knowledge creation and sharing processes. The decentralization of organizational structure and consequent empowerment of Country Offices, is identified as a way to enhance efficient knowledge management approaches. The UNDP seems to be aware that having a practical approach to knowledge, while not neglecting the key role of information and communication systems to KM processes, seems to be essential for organizational learning. However, the introduction of efficient knowledge management tools does not seem to be related to the institutionalization of knowledge management processes as a cross-practice exercise.

According to the framework developed in the toolkit for managing change, aligning the business processes by eliminating duplicate or redundant steps, can contribute significantly to improve organizational performance (UNDP Intranet [2], 2016). Change towards KM is an ongoing process from HQs to COs, and all the communication from the UNDP strategies is towards the COs. Even though the CIAS unit is part of the HQs, the KM strategy framework and the toolkit for change management, should be seen as useful tools for any manager dealing with change. The toolkit is a knowledge sharing process in itself. As reviewed and analyzed in this paper, managers are agents of change. Managers as individuals have to process knowledge from an individual level to group and organizational levels. As pointed out by Burtonshaw-Gunn et al (2009), participative and educative strategies to change in organizations that need to realize new values, processes and behaviors, can be appropriate as it promotes an active involvement of people, increasing their commitment to the change process. The challenges presented by the CO library

seem to be general. As the sharing and transfer of knowledge collected and disseminated to the COs seem to be an important aspect of the CIAS unit performance, it is relevant that more focus is given to the improvement of the tool. However, as the issue has an aspect of individual change, managers might have to use an educative strategy to support this change.

Using multiple advocates for the implementation of a project could be a strategy to change used by managers to enhance organizational learning and enhance the performance of the GES project (Dibella et al., 1998). If the aspect brought by the ICT manager in Senegal regarding the inclusion of senior management to the knowledge sharing of the GES project might be identified as positively related to the performance outcomes of the GES project, then one could conclude that the KM strategy for the project should focus not only how to share knowledge, but also who to share it with. Project performance could be positively related to the integration of senior management to the processes of knowledge sharing. This could also support organizational learning by the use of multiple advocates of the GES project.

Furthermore, the collaboration with external stakeholders in the GES project seem to be an influential aspect to reach the goal of the UN for countries to increase the share of renewables. The interest of external stakeholders in the GES project, and the consequent knowledge sharing of a renewable energy project demonstrate the CIAS unit hitting the target of its strategic objectives. In alignment with the focus of the UNDP´s core business which is programme delivery (S. Nyathi, 2016, pers. comm., 25th July: UNDP, 2014), I propose the UNDP to incorporate the concept of Market Facilitator Organization (MFO) into the GES project strategies. This could encourage a collaboration with the Development Solutions Team, where the latter would analyze the knowledge needed for the global promotion of renewable energy, while collaborating with the COs to align the promotion strategies with the national contexts. Renewable energy approaches to energy supply can benefit from the collaboration with civil society, other IOs, governments, the private sector and other MFOs. The CIAS would be the support for the knowledge base of COs regarding solar PV system installation, through the implementation of the GES project. Moreover, by tackling the project from a broader perspective, the CIAS could engage other management levels of the COs, as proposed by Y. Fall (2016, pers. comm., 25th July).

Based on the literature review and on the results of internal analysis of the UNDP´s KM strategies, a straightforward relation between knowledge management processes and the performance of projects could not be identified. However, as seen throughout the literature review and the analysis, knowledge is an ambiguous concept, resulting in individuals being unaware of the processes it entails.

6.1 Limitations

In relation to the organizational structure of UNDP, the fact that communication with all ICT Managers from the Country Offices and others from Headquarters in New York was not possible, was a limitation to this research. Due to my limitation on access to data regarding the GES project from a Country Office perspective, my data collection was limited to the knowledge management processes in the GIA unit from an internal perspective, lacking a possible larger scale representative sample of the population involved in the processes. Therefore, the findings of this research might lack the ability to be generalized to other studies.

Due to limitations in access to data and to the possible extent of this thesis, an analysis of decision making processes regarding the uptake of the 7 Steps solution from the COs perspective could not be considered. Furthermore, due to the rotation of the Green energy team, it was not possible to analyze an evolution in knowledge management processes in the project, to contrast with the evolution in the performance outcomes from the objectives perspective of the project.

6.2 Final Reflections

Baligh (2006) affirms that performance outcomes are defined by the organizational structure. However, in the case of the UNDP, it seems to be more credible to analyze the organizational targets for indicating performance of an International Organization (IO). With a method for analysis using constant comparison of my data, I generated provisional theories to answer the research question. The comparison allowed me to overcome the lack of literature on knowledge management and performance of IOs from an internal organizational perspective. Furthermore, I was able to understand if the KM processes influence the

performance of the GES project both internally and also more generally from the perspective of the UNDP´s objectives.

Very few studies have attempted to measure the effectiveness of International Organizations on the change of behavior of societal actors regarding environmental improvement. A way of measuring this influence is to look into the patterns of discourse on environmental issues in international politics (Barkin, 2006). The Climate Change Conferences held by the UN in the last decades, and the focus given by the private sector to environmental sustainability could also be given as examples of the change of discourse. Moreover, even though it might be rather challenging to measure it when there are different parts influencing the outcomes of change in environmental discourse, Biermann et al. (2003) affirms that such researches could help solve public debate on the effectiveness of the UN system and its environmental approach.

Accordingly, the UNDP can be analyzed as an example of integrating practice within the promotion of renewable energy, without the aspect of profit to it. The motivations for the GES project from a macro perspective support the debate on the effectiveness of the UN system and its environmental approach, while this research encourages this debate.

6.3 Further Research

According to the delimitation of this thesis, the following are the considerations on how to further improve the literature on knowledge management processes in international organizations and environmental sustainability approach.

It could be interesting to take into consideration a multi-stakeholder analysis to identify the barriers for the support of stakeholders in a project such as the GES. Firstly, it could be interesting to study the process of procurement for choosing the vendors for PCMM devices and solar panels. According to Burtonshaw-Gunn et al (2009: 102), "*within public sector organizations, partner selection has to be conducted in a fully transparent manner; consequently, this is delivered through competition and evaluation of*

competing proposals – with an emphasis on selecting partners through an open process". Alternatively, the stakeholder theory could be used to support an analysis of the importance of stakeholder relations in projects of global organizations.

Secondly, by having the possibility of communication with the ICT managers and other management levels in the COs, it could be relevant to study the relation between ICT management positions and decision making for renewable energy implementation. With a knowledge management theoretical background, this study could bring a deeper perspective from the customers of the CIAS unit. While adding the theory of absorptive capacity, the COs could be studied as a kind of subsidiary of the UNDP HQs in New York. Furthermore, an analysis of the actual implementation of the UNDP KM Strategy Framework could support the study.

Moreover, as the UN does not have the purpose of pursuing owner or investors profit, it could be interesting from a business and Corporate Social Responsibility (CSR) perspective, to look into the motivations for the private sector to create relations with the UNDP in such projects as the GES project. Investigating if the reasons behind it are purely financial or social could add to the discussion on the alignment of morality and profitability in CSR.

Finally, a multiple-case study within the UN agencies targeting internal environmental projects, could show their differences and similarities with the knowledge management processes and the effects of it, increasing the research quality.

7. Bibliography

Ahmed, A., Siantonas, G. and Siantonas N. (2008). The 13 Key Performance Indicator for Highly Effective Teams. *Greenleaf Publishing.*

Argyris, C. (1994). Initiating Change that Perseveres. *Journal of Public Administration Research and Theory: J-PART, Vol. 4, No. 3, pp. 343-355.*

Baligh, H. H. (2006). Organization Structures: Theory and Design, Analysis and Prescription. *Springer Science+Business Media, Duke University, NC, USA.*

Barkin, J. S. (2006). International Organizations: Theories and Institutions. *Palgrave Macmillan, 2006.*

Barney, (1991). Firm Resources and Sustained Competitive Advantages. *Texas A&M University, Journal of management, Vol.17, No 1, 99-120.*

Beigbeder, Y. (1997). The Internal Management of United Nations Organizations. *MacMillan Press, London.*

Biermann, F. and Bauer, S. (2003). Assessing the effectiveness of intergovernmental organisations in international environmental politics. *Elsevier, Global Environmental Change 14 (2004) 189-193.*

Burtonshaw-Gunn, S. and Salameh M. (2009). Essential Tools for Organisational Performance: Tools, Models and Approaches for Managers and Consultants. *Hoboken, GB: Wiley.*

Bogner, W. C. and Bansal, P. (2007). Knowledge Management as the Basis for Sustained High Performance. *Journal of Management Studies 44:1, January 2007.*

Bryman, A., and Bell, E. (2011). Business Research Methods. *Oxford university press.*

Cecez-Kecmanovic, D. (2005). A Sensemaking Theory of Knowledge in Organizations and Its Application. *In Part 1 of "Knowledge Management: Organizational and Technological Dimensions.", pp. 55-74. Physica-Verlag HD.*

Chen, H. H. and Pang, C. (2010). Organizational Forms of Knowledge Management in Photovoltaic Solar Energy Industry. *Knowledge-Based Systems 23 (2010) 924-933.*

CIAS unit (2016). Webinar Presentation: Seven Steps Solar Solution Procedure. *Internal archive, UNDP CIAS unit. Copenhagen, Denmark.*

Chatti, M. A. (2012). Knowledge management: a personal knowledge network perspective. *Journal of Knowledge Management,Vol. 16 Iss 5 pp. 829 - 844.*

Choo, C. W. (1996). The Knowing Organization: How Organizations use Information to Construct Meaning, Create Knowledge and Make Decisions. *International Journal of Information Management, Vol. 16, No 5, pp. 329-340.*

Creswell, J. W. (2014). Research Design: Qualitative, Quantitative and Mixed Methods Approach. *Sage, London.*

Cumming, D. J. and Fischer, E. (2011). Publicly funded business advisory services and entrepreneurial outcomes. *Research Policy 41 (2012) 467–481, Elsevier.*

Dearing, B. (2012). Learning Organizations means Knowledge Creating Company. *The Evolllution, retrieved on August 2nd, 2016. http://evolllution.com/opinions/learning-organization-means-knowledge-creating-company/*

DiBella, A. J. and Nevis, E. C. (1998). How organizations learn: an integrated strategy for building learning capability. *San Francisco, California, Jossey-Bass.*

Easterby-Smith, M., Thorpe, R. and Jackson, P. (2012). Management Research. *Sage, London.*

Easterly, W. (2015). The SDGs Should Stand for Senseless, Dreamy, Garbled. *Retrieved on July 15th, 2016. http://foreignpolicy.com/2015/09/28/the-sdgs-are-utopian-and-worthless-mdgs-development-rise-of-the-rest/*

EY (2016). Our purpose: committed to building a better working world. *Retrieved on August 3rd, 2016. http://www.ey.com/GL/en/About-us*

Flyvbjerg, B. (2001). Making Social Science Matter: Why Social Inquiry Fails and How it can Succeed Again. *Cambridge University Press.*

Forsgren, M. (2008). Theories of the multinational firm: a multidimensional creature in the global economy. *Edgar Elgar Publishing, UK.*

Frost, A. (2014). A Synthesis of Knowledge Management Failure Factors. *www.knowledge-managamenet-tools.net*

Genus, A. (2016). Institutions, Discourses, and the Promotion of Renewable Energy. *WIREs Energy Environ 2016, 5:119–124. doi: 10.1002/wene.169*

Grant, R. M., Almeida, P. and Song, J. (2000). Knowledge and the Multinational Enterprise. *In Millar et. al (2000), International Business, Emerging Issues and Emerging Markets. MacMillan, 2000, 102-129.*

Haas, E. B. (1990). When Knowledge is Power: Three models of change in International Organizations. *University of California Press, California.*

Harvey, F. (2015). Paris Climate Change Agreement: The World´s Greatest Diplomatic Success. *Retrieved on July 16th, 2016. https://www.theguardian.com/environment/2015/dec/13/paris-climate-deal-cop-diplomacy-developing-united-nations*

Helmstadter, E. (2003). The Economics of Knowledge Sharing: A New Institutional Approach. *Edward Elgar Publishing, UK.*

Heshmati, A., Abolhosseini, S. and Jörn, A. (2015). The Development of Renewable Energy Sources and its Significance for the Environment. *Springer*

Hickel, J. (2015). The Problem with Saving the World. *Retrieved on July 15th, 2016. https://www.jacobinmag.com/2015/08/global-poverty-climate-change-sdgs/*

Hill, J. S. (2016). Renewable Energy Project Investment in Emerging Markets Yields Higher Returns. *Retrieved on August 2nd, 2016. http://cleantechnica.com/2016/04/21/renewable-energy-project-investment-emerging-markets-yields-higher-returns/*

Hislop, D. (2013). Knowledge Management in Organizations: A Critical Introduction. *Oxford University Press, 3rd edition.*

Hoffmann, W. (2014). The Economic Competitiveness of Renewable Energy: Pathways to 100% Global Coverage. *Scrivener Publishing, Wiley.*

Hordeski, M. F. (2010). Megatrends for Energy Efficiency and Renewable Energy. *The Fairmont Press, Inc.*

Huseman, R. C. and Goodman, J. P. (1999). Leading With Knowledge: The Nature Of Competition in the 21st Century. *SAGE Publications.*

International Energy Agency (2015). Medium-Term Renewable Energy Market Report 2015. *Retrieved on August 2nd, 2016. https://www.iea.org/Textbase/npsum/MTrenew2015sum.pdf*

ISO 9001 (2015). ISO 9000 – Quality Management. *Retrieved on July 16th, 2016. http://www.iso.org/iso/home/standards/management-standards/iso_9000.htm*

Jansen, W., Steenbakkers, W. and Jagers, H. (2007). New Business Models for the Knowledge Economy. *Gower Publishing.*

Jashapara, A. (2004). Knowledge Management: An Integrated Approach. *Prentice Hall, Pearson Education, 1st edition.*

Jenkins, M., Ambrosini, V. and Collier, N. (2016). Advanced strategic management: A multi-perspective approach. *London, Macmillan Education, 3rd edition.*

Kanbe, M. and Yamamoto, S. (2008). Design Method for a Knowledge Sharing Network. *NTT DATA Research Institute for System Science, Vol. 6 N. 7, July 2008.*

KStoolkit (2016). KS Tools. *Retrieved on July 29th, 2016. http://www.kstoolkit.org/KSTools*

Knudsen, L. G. and Nielsen, B. B. (2009). Antecedents of Procedural Governance in Knowledge-Sharing Alliances. *Springer Science+Business Media.*

Kogut, Z. and Zander, U. (1992). Knowledge of the Firm, Combinative Capabilities, and The Replication of Technology. *Organization Science, Vol. 3, No. 3, pp. 383-397.*

Lasserre, P. (2003). Global Strategic Management. *Palgrave Macmillan.*

Lewis, D. (2001). The Management of Non-Governmental Development Organizations. *Routledge, London.*

Malhotra, Y. (2002). Why Knowledge Management Systems Fail? Enablers and Constraints of Knowledge Management in Human Enterprises. *Handbook on Knowledge Management (edited by C.W. Holsapple), Springer-Verlag, Heidelberg.*

Martinot, E. (2005). Renewables 2005 Global Status Report. *Ren21, Renewable Energy Policy Network for the 21st Century. www.ren21.net*

Martinot, E., Chaurey, A., Lew, D., Moreira, J. R. and Wamukonya, N. (2002). Renewable Energy Markets in Developing Countries. *Annu. Rev. Energy Environ. 2002. 27:309-48*

Michalena, E. and Hills, J. M. (2013). Renewable Energy Governance: Complexities and Challenges. *Springer*.

Mühlen-Schulte, A. (2010). Organising Development: Power and Organisational Reform in the United Nations Development Programme. *Copenhagen Business School. CBS; Doctoral School of Organisation and Management Studies. OMS, PhD Series 2010-37 ; Frederiksberg*

New Energy, (2015). UN sets sights on sustainable energy for all. *Magazine for Renewable Energy. No 5/October 2015, 65570.*

Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science, Vol. 5, No. 1 (Feb., 1994), pp. 14-37.*

Nonaka, I. and Konno, N. (1998). The concept of "Ba": Building a Foundation for Knowledge Creation. *California Management Review, Vol. 40 NO. 3. pp. 40 - 58.*

Peng, M. W., Wang, D. Y. L. and Jiang, Y. (2008). An Institution-Based View of International Business Strategy: A Focus on Emerging Economies. *Journal of International Business Studies, Vol. 39, No. 5 (Jul. - Aug., 2008), pp. 920-936.*

Peters, B.G. (2005). Institutional Theory in Political Science: The 'New Institutionalism'. *Continuum, UK.*

Radnor, Z. and O´Mahoney, J. (2013). The Role of Management Consultancy in Implementing Operations Management in the Public Sector. *International Journal of Operations & Production Management, Vol. 33 Iss 11/12 pp. 1555 – 1578.*

Renwick, D. (2015). Sustainable Development Goals. *Retrieved on July 15th, 2016. http://www.cfr.org/global-governance/sustainable-development-goals/p37051*

Renewable Energy World Editors (2016). Report: Emerging Markets More Attractive than EU, US for Renewable Energy Investment. *Retrieved on August 2nd, 2016. http://www.renewableenergyworld.com/articles/2016/06/report-emerging-markets-more-attractive-*

than-eu-us-for-renewable-energy-investment.html

Richter, R. (2005). The New Institutional Economics: Its Start, Its Meaning, Its Prospects. *European Business Organisation Law Review, Volume / Issue 02 / June 2005, pp 161-200.*

Roby, H. (2013). A Supplementary Dictionary of Renewable Energy and Sustainability. *Oxford University Press.*

Sandberg, J. and Tsoukas, H. (2014). Making Sense of the Sensemaking Perspective: Its Constituents, Limitations and Opportunities for Further Development. *Journal of Organizational behavior 36, S6-S32.*

Saunders, M., Lewis, P. and Thornhill, A. (2016). Research Methods for Business Students. *Pearson Education, London.*

Schröder, M. (2011). Local Climate Governance in China: Hybrid Actors and Market Mechanisms. *Palgrave Macmillan.*

Sturdy, A. (2011). Consultancy´s Consequences? A Critical Assessment on Management Consultancy´s Impact on Management. *British Journal of Management, Vol. 22, 517–530.*

Tabernacki, L. (2012). What´s Good for the Lease is Good for the Vendor. *Retrieved on August 2nd, 2016. http://www.renewableenergyworld.com/articles/2012/03/whats-good-for-the-lease-is-good-for-the-lender.html*

Talbot, C. (2008). Performance Regimes – The Institutional Context of Performance Policies. *International Journal of Public Administration, 31:14, 1569-1591*

TED (2016). Product Details: TED Spyder. *Retrieved on August 1st, 2016. http://www.theenergydetective.com/spyder*

Tuxen, Y. D. (2016). Knowledge Management Systems within Green Energy Solutions Project in the UNDP GIA Unit: an analytical framework to measure its impact on performance outcomes. *Copenhagen Business School.*

Twidell, J. and Weir, T. (2006). Renewable Energy Resources. *Taylor and Francis.*

UNDP (2014). UNDP Knowledge Management Strategy Framework 2014-2017. *United Nations Development Programme, New York. http://www.undp.org/content/undp/en/home/librarypage/capacity-building/knowledge/undp_s-knowledge-management-strategy.html*

UNDP (2016). Sustainable Development. *Retrieved on January 17th, 2016. http://www.undp.org/content/undp/en/home/ourwork/sustainable-development/overview.html*

UNDP Eritrea (2016). Eritrea Kicks Off Low Carbon Solar Systems for Rural Homes in Qnafna. Retrieved in August 12th, 2016. http://www.er.undp.org/content/eritrea/en/home/ourwork/environmentandenergy/successstories/eritrea-kicks-off-low-carbon-solar-systems-for-rural-homes-in-qn.html

UNDP Intranet [1] (2016). CO ICT Advisory Service. *Retrieved on June 9th, 2016, with limited access to staff only. https://intranet.undp.org/unit/bom/oist/ict/gia/SitePages/Home.aspx*

UNDP Intranet [2] (2016). Toolkit for Managing Change. *Retrieved on June 10th, 2016, with limited access to staff only. http://managingchange.undp.org*

USAID (2015). United States Fostering Renewable Energy Generation in Zambia. *Retrieved on August 5th, 2016. https://www.usaid.gov/zambia/ress-releases/united-states-fostering-renewable-energy-generation-zambia*

Weber, K. and Glynn, M. A. (2006). Making sense with Institutions: Context, Thought and Action in Karl Weick´s Theory. *SAGE Publications.*

Weick, K. E. (1988). Enacted Sensemaking in Crisis Situations. *Journal of Management Studies 25:4.*

Weiss, T. G. (2009). What's Wrong with the United Nations and How to Fix It. *Polity Press, Cambridge, UK.*

Wengenmayr, R. and Bührke, T. (2013). Renewable Energy: Sustainable Concepts for the Energy Change. *Wiley-VCH.*

Yin, R. K. (2014). Case Study Research: Design and Methods. *Sage, London.*

8. Appendix

Appendix 1 - The UNDP Organizational Chart

2016 Organisational Chart

Office of the Ombudsman — Mame Diagne, Helmut Buss	**Administrator** — Helen Clark	**Bureau for External Relations and Advocacy** — Michael O'Neill / **Representation Offices**
Human Development Report Office — Selim Jahan	**Associate Administrator** — Tegegnework Gettu	**Bureau for Management Support** — Jens Wandel / **Global Services Solution Centres**
Independent Evaluation Office — Indran Naidoo	**Executive Office** — Alberic Kacou	**Bureau for Policy & Programme Support** — Magdy Martinez-Soliman / **Global Policy Centres**

Regional Bureau for Africa — Abdoulaye Mar Dieye; Regional Bureau for Asia and the Pacific — Haoliang Xu; Regional Bureau for Arab States — Sima Bahous; Regional Bureau for Europe and the CIS — Cihan Sultanoglu; Regional Bureau for Latin America and the Caribbean — Jessica Faieta

Office of Audit and Investigations — Helge Osttveiten; Ethics Office — Peter Liria; UN Office for South-South Cooperation — Jorge Chediek; United Nations Volunteers — Richard Dictus; United Nations Capital Development Fund — Judith Karl

Africa Regional Hub — Addis Ababa; Asia Pacific Regional Hub — Bangkok; Arab States Regional Hub — Amman; Europe & CIS Regional Hub — Istanbul; Latin America & Caribbean Regional Hub — Panama

Crisis Response Unit — Izumi Nakamitsu

Country Offices

2016 UNDP Organizational Chart

Appendix 2 – Transcript of Interviews.

Please see attached document with interviews.

Appendix 3 – The 8 Service Lines

Service Lines

1 Infrastructure Services	2 Crisis Response	3 Service Delivery	4 Capacity Building
5 Advisory & Technical missions	6 Benchmarking & Knowleadge	7 Intranet & Apps	8 Green Energy Solutions

Appendix 4 – OIMT Organigram – Copenhagen and CIAS

OIMT Organogram – Copenhagen & GIA

Global ICT Advisor
Core Resources
Gerald Bernodes

1 Infrastructure Services
2 Crisis Response
3 Service Delivery
4 Capacity Building
5 Advisory & Technical missions
6 Benchmarking & Knowledge Management
7 Intranet & Apps
8 Green Energy Solutions

Finance & Administration
Core Resources
Andrius Sugintas

Global Connectivity Support
Core Resources
Moe Kyaw

Global ICT Specialist
Core Resources
Matthias Nyalitsi

Global ICT Specialist
Core Resources
Jarle Heitkaid

Business Team
Finance & Admin Assistant
IC (RSS 100%)
Elena Bergmoll

Interns
Federica Ochoain
Benjamin Idowu
Michele Sodano
Gregor Trankle

Engineering Team
Telecoms Associate
Core Resources
Blessing Kobasa

One/CTBox Specialist
Individual Contractor
Mik Winh Aysing

One/CTBox Specialist
Individual Contractor
Elias Edo

Interns
Santosh Bhandari
Andrey Lukov

One/CTBox Specialists
ICT Associate
FTA (RSS 25%)
Botswana CO
Victor Burdaff

ICT Associate
FTA (RSS 25%)
Bolivia CO
Mauricio Marquez

ICT Associate
FTA (RSS 25%)
Kyrgyzstan CO
Pavel Mitichyan

Green Energy Team
Intranet Consultant
Pro Bono
Monika Isorgmsen

Green Energy Technician
JPO
Vacant

Interns
Anette Andersen
Edoardo Bosco
Matthew Mawhoney
Samuel Rejrberg

Programme & Project Support
Regional ICT Coordinators

ICT Manager Senegal CO
(RBA)
FTA (RSS 50%)
Yemni all

ICT Manager Panama RSC
(RBLAC)
RSS (50%)
Fernando Villalobos

CO ICT Manager UNDP Guatemala
FTA (RSS 50%)
Cesar A. Quan

ICT Manager Bangkok RSC
(RBAP)
FTA (RSS 50%)
Tanya Saejurasakul

ICT Manager RBAS - New York
FTA (RSS 0%)
Pierre Namouche

ICT Manager Istanbul RSC (RBEC)
FTA (RSS 50%)
Pavel Metes

Service Compliance Manager
Olivier Smush

ICT Specialist, Applications Delivery
Daniél Tobin

ICT Specialist
Vladimil Baronin

Network Operating Stsgem Technician
Keith Jarrett

Legend
- - - Not reporting 100% to OIMT (Primary supervisor in local office)
—— Reports 100% to OIMT
Staff stationed in Copenhagen
Staff stationed outside Copenhagen

Staff Breakdown
6 Core resources
9 RSS
3 Individual Contractors
8 Interns
1 Pro Bono Consultant

20 Copenhagen Staff
10 Rest of World Staff