Sustainable post-disaster reconstruction projects in remote locations, and the fit with a conceptual design management model for remote sites

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Abstract

Reconstruction projects, such as those conducted in Sudan since 2004, need an effective multidisciplinary planning and management framework, capable of responding to transitional and long-term reconstruction requirements. When these sites are in remote locations, the planning and management issues compound further. A preliminary multi-disciplinary framework that design managers can then use to develop better management and design practices, in the context of humanitarian aid and reconstruction projects in remote locations, are discussed in this paper.
The future framework will be developed from a validation of a conceptual design management model for remote sites using Sudanese case study data collected from semi-structured interviews, with selected key design decision-makers working in West Darfur, Sudan. The model was developed from a series of commercially -based case studies in the eco-tourism and Antarctic science sectors. This paper identifies how well the collected Sudanese data matched, or added to, the original design management model, in terms of the four key factors of *value generation; knowledge integration; process integration and timely decision-making.* The paper also investigates whether, and how, that model may be developed into a relevant multi-disciplinary framework for reconstruction projects in a non-profit and / or humanitarian aid context. The analysis of the semi-structured interviews, suggests that the original conceptual design management model for remote sites is relevant in a non-profit and/or humanitarian aid context. In addition, the model allows for a blending of traditional and modern management methods. The impact of this aspect of the framework would need to be developed further by future applications of the model and by practitioners in post -disaster reconstruction.

Keywords: *design; management; framework; remote; sustainable*

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INTRODUCTION

Project management is concerned with managing the overall project but is primarily concerned with managing the construction stages of the project. Design management is concerned with the management of the design process, and the designers, across all of the design stages and consultant specialists, leading to the commencement of the construction stages. Design management within the disciplines of the built environment is a complex process concerned with *value generation; integration of specialist knowledge; critical timing of key decisions; process integration,* and managing the overall design process across all affected disciplines.

The design process has become more complex and fragmented over the last few years, resulting in an increasing need for a shared understanding of the project objectives amongst the stakeholders. This becomes increasingly difficult when there is fragmentation, differing political and cultural agendas, and differing expectations of the project outcomes. What is valued in the project, impacts upon how decisions are made on design issues. In the design management field the integration of those who have knowledge that contributes to the design, construction and management, is critical to developing and achieving value on projects (Kestle & London, 2002).

The added dimension of remote site projects, increases the complexity, and makes early decision-making; knowledge integration; logistical implementation planning and implementation, absolutely critical and central to the potential success, or failure, of the project. The project team has to not only address the traditional management problems, but also those that specifically occur as a result of the remote locations of these often environmentally, and politically sensitive sites.

Remotely located sites range from islands several kilometres from the mainland, to thousands of kilometres from major urban concentrations, such as various Pacific Islands, mountainous areas, and deserts. These sites are typically located within previously undeveloped and environmentally sensitive regions (Kestle, London et al, 2002).

In this paper ‘remote sites’ refers, in particular, to West Darfur in the Sudan, and to:

1. the difficulty of physical access to the site in terms of geographical location, as Darfur is in a desertified region which lacks roads

2. the significant distance to the site from continuously available logistical support

3. the hostility of the environment in terms of seasonally strong winds, and a wide temperature range

4. the lack of local materials and specialist labour – virtually all resources needing to be trucked or air-freighted to the site(s)

5. remote site projects such as the West Darfur Humanitarian Aid Project in the Sudan require unique management processes, mainly because of the environmental, political , cultural and geographical considerations.

THE CONCEPTUAL DESIGN MANAGEMENT MODEL

The conceptual design management model was originally developed in terms of reviewing and synthesizing theoretical published 'production principles' and 'sociological factors' associated with design management, and lean design management. The model was then developed further by reviewing the 'characteristics of remote site projects' from historical case studies in Australia (Fraser Island), New Zealand (Tongariro National Park and Antarctica (Scientific Bases, and the Dry Valleys of the Ross Sea Region).

Design management is fundamentally concerned with value generation, however understanding what constitutes value is a difficult process, particularly where there are numerous stakeholders involved on a project. One of the main challenges is developing a shared understanding of what is valued on the project and identifying, and then agreeing the objectives for a project with the stakeholders. What constitutes value on the project impacts upon how the critical decisions are made on the design and management issues. Further, integration of those who have knowledge that can contribute to the design, construction and management is critical to developing and achieving value on projects, (Kestle & London, 2002).

Much of the lean thinking research falls into the tactical category rather than strategic and theoretical. That is, until the work of researchers Koskela,(1997) and Seymour,(1999). Seymour (1999) suggested a proposal for implementing lean construction at the organisational level rather than just at the operational level. This work was then followed up two years later, by Seymour and Rooke (2001), using an ethnomethodological approach in terms of setting up an organisational culture that established how people may perform their sitework activities in a visibly orderly manner, by changing their mindset, for instance. Similar findings were published by Howell and Ballard (1998), stating that changes of the mental model needed to be made (Kestle & London, 2002).The lean design principle of 'flow' is relevant from a sociological and environmental viewpoint, as it tends to be focussed on a more holistic approach for theoretical and project development work. In additon, remote sites which are frequently environmentally sensitive, need a more holistic approach.

The thinking and principles associated with lean design management, made a significant contribution in terms of informing the development of the Process Integration factor for the conceptual design management model for remote sites (Kestle & London, 2002).

The key factors of design management for remote sites were therefore established as being - 'value generation', 'knowledge integration', 'process integration' and 'timely decision-making'.

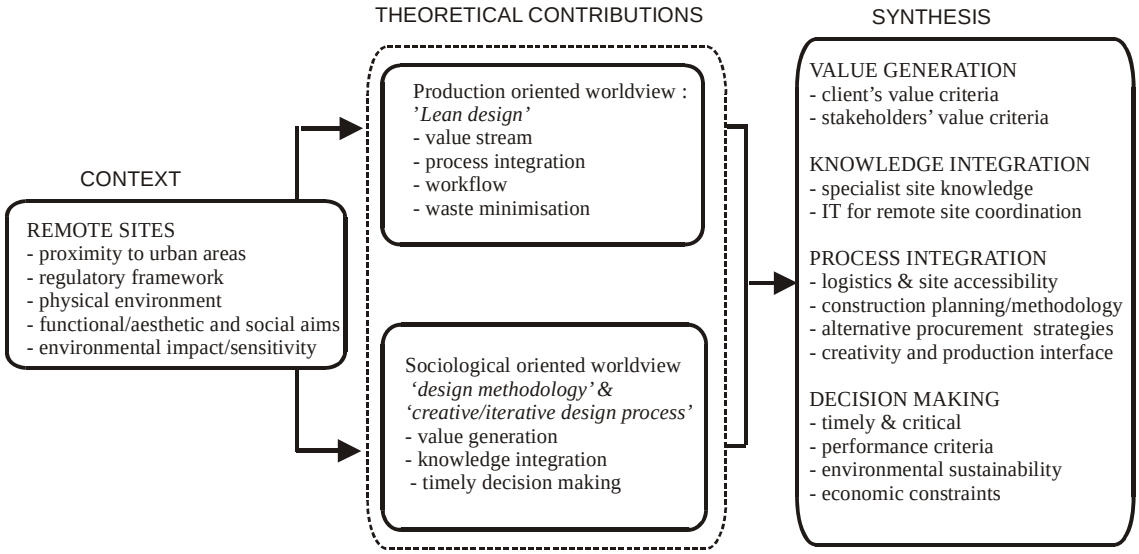

Figure 1. Conceptual Design Management Model for Remote Sites
(Kestle & London, 2002)

Value generation - refers to the value that the client and stakeholders place on the project and site. Value will vary according to the differing clients' and stakeholders' expectations of the projects. Value generation on projects and sites set within an environmentally sensitive context, is primarily concerned with the environmental protection of the site.

Knowledge integration – is a complex process concerned with endeavouring to capture, and then integrate, the specialist knowledge of all those personnel involved on a particular project, prior to and during the project phases. Knowledge capital can be either explicit or tacit knowledge, the latter being the knowledge gained from experiencing previous projects, but which remains undocumented. Explicit knowledge is that knowledge that has been documented in some way, and which can be read, or reviewed in operations manuals, or books or project reports and databases.

Knowledge integration, to be successful, requires that all key personnel on the project be involved with the in-depth pre-design briefing, detailed pre-planning, followed by regular monitoring and review of the design and construction processes, as the project progresses.

Specialist knowledge associated with designing for, and working on, remote and often hostile sites is essential on these remote site projects, to ensure the best design solutions and end results, even though frequently working with non-negotiable timelines.

Essentially this means that the project that the client has commissioned is delivered on time and to budget, irrespective of the fact that the site is for example, remotely located, and in a climatically hostile environment.

How this knowledge is integrated, and effectively managed varies from cryptic handwritten memos from verbal conversations, to hardcopy documentation, to specialist IT software programmes installed in the project personnels' offices.

Process integration – involves the timely and cost-effective co-ordination and planning of a range of processes across the total project, such as construction planning methodology, logistics, information management, and design / production interface management. In certain instances this may require alternative procurement strategies, for example, design-manage or alliancing arrangements.
Logistical planning and implementation is complex, as well as critical, for remote sites. The timing, costs and restrictions associated with shipping, or air-freighting building components, add to the complexities of the logistical aspects of a design management model for these remote sites (Kestle & London, 2002).

Timely decision making - refers in the main to financial and design decisions, which are critical to the successful management of the design and construction of remote site projects. These decisions are made within the context of frequently non-negotiable windows of buildability, fixed budgetary constraints, and the need for environmentally sensitive development of these remote, and often hostile sites.
The developed exploratory conceptual design management model aims to respond to the need for well integrated specialist design and construction processes. The model has already been examined using three historical case studies, using data from previously conducted research and published secondary data. (Kestle & London, 2002). Case study methodology has been identified and adopted as the primary method for validating and developing the design management model and associated typology, as it involves empirical enquiry that investigates a phenomenon within a real-life context (Kestle & London, 2003).

The testing of the conceptual model's validity, in terms of the realities of managing remote site projects, has commenced. The Cape Roberts Drilling Project in Antarctica (1995-2001), has been examined and retrospectively reviewed, as a result of the data collected from semi- structured interviews conducted with nine of the key personnel on the project. The collected data was tested against the conceptual model under the four factors of value generation; knowledge integration; process integration and timely decision-making, involved reviewing the responses specific to the Cape Roberts Antarctic Drilling project. The results were extensive and generally consistent across all of the selected interviewees. The personnel interviewed unequivocally supported the four key factors of the design management model, as being valid for Antarctic remote sites generally, and accurately represented their experiences on the Cape Roberts Drilling project. The testing and validation of the conceptual design management model for remote sites, in terms of representing the realities of managing the Cape Roberts Drilling Project in Antarctica has been published (Kestle & Storey, 2005).

PRESENT MANAGEMENT SITUATION IN HUMANITARIAN AGENCIES.

There appear to be significant gaps in the understanding of disaster management within the humanitarian aid community. Fitz-Gerald et al (2002), reported that *"The humanitarian aid community is also a 'slow follower' in the adoption of management tools and techniques. In some ways this can be explained or defended on the basis*

that humanitarian aid is delivered in an environment where no two situations are the same. Consequently there is no single model that can be applied and the absence of effective lessons-learned mechanisms that ensure positive and negative experiences are addressed throughout all levels of the organisation encourages reinvention with each deployment."

Therefore, humanitarian aid organizations are not only slow learners, but also do not have the basis for a learning culture thus giving credibility to the adage that *"a humanitarian worker is only as good as their last assignment".*

In addition, the United Nations High Commissioner for Refugees (UNHCR) guide lines for example are circumspect and state that (UNHCR, 1999) "*There is no single blueprint for refugee emergency management; each refugee emergency is unique. However, experience shows that emergencies tend to evolve according to certain recognizable and documented patterns."*

Thus, the management process applied to each disaster is different, but disasters themselves do have discernable patterns. One would expect there to be a link between the management process and the disaster pattern but this and the identity of the patterns is not explicitly explained. The Handbook works by setting up desired outcomes and then leaves it for the reader to select the management processes required to achieve those outcomes.

The UNHCR Handbook does goes on to say that … *"While emergency management shares many of the characteristics of good management in general, there are a number of distinguishing features:*

- *The lives and well-being of people are at stake;*
- *Reaction time is short;*
- *Risk factors are high and consequences of mistakes or delays can be disastrous;*
- *There is great uncertainty;*
- *Investment in contingency planning and other preparedness activities is crucial;*
- *Staff and managers may be under particularly high stress because of, for example, security problems and harsh living conditions;*
- *There is no single obvious right answer".* (UNHCR,1999).

Thus, the present literature tends to be strong on objectives but weak on how that is achieved and what management processes could be used. Moreover, it suggests that each disaster is different and that there perhaps is no single answer. This paper sets out to ascertain whether that is the case and what if anything can be 'borrowed' from management research in related areas.

THE RESEARCH QUESTION

The aim of this paper, is to test the validity of the conceptual model's four key factors by focussing on selected aspects, only, of the data collected, from the Sudanese project, in order to answer the following question:

"How well do the four key factors of the conceptual design management model for remote sites represent the realities of managing projects such as the West Darfur Humanitarian Aid Project in Sudan ?".

CONTEXT

Darfur consists of 3 states and occupies the western area of Sudan. It is a large area of approximately 256,000 square kilometres with an estimated population of 5 million people made up from a complex tribal mix. Large parts of Darfur are prone to drought and desertification that intensifies demands on its more fertile lands. In recent decades, areas of Darfur have been subject to sporadic inter-tribal clashes over the use of such resources.

From early 2003, fighting intensified in the region following the emergence of two armed groups, the Sudan Liberation Army (SLA) and later the Justice and Equality Movement (JEM), and the commencement by them of hostilities against the Government (Human Rights Report, 2004).

Following a string of SLA victories in the first months of 2003, the Government sponsored a militia composed of a loose collection of fighters, apparently of Arab background, from the Darfur region. This militia become known as the 'Janjaweed' or men on horse back. In certain areas of Darfur, the Janjaweed have supported the regular armed forces in attacking, and targeting civilian populations suspected of supporting the rebellion, while in other locations it appears that the Janjaweed have played the primary role in such attacks with the military in support.

The humanitarian fallout of this situation in Darfur (and the border regions of Chad) was an estimated one million Internally Displaced Persons/People (IDPs) by May 2004, (compared with 250,000 in September 2003) with over half of these (some 570,000) being located in West Darfur. The rest were divided between North and South Darfur (290, 000 and 140, 000, respectively). By July 2004, this had increased to 601,096 in camps in West Darfur (based on estimates from the UN Agency OCHA Organisation for Humanitarian Aid).

Such a large displacement of people also impacts on the 'host' community. Scarcity of water, firewood and animal feed before the crisis inflamed tensions and fighting. Against such a back drop UN Aid Agencies and NGO's work to get aid into remote locations.

The organisation and inter-relation of players within the aid community is complex and this is shown in figures 2 and 3 below (Willitts-King & Harvey, 2005) . Figure 3 shows the more operational / field relationships that can exist (Manfield, 2001). It underlines the complexity of the organizational structure that aid is provided through. Moreover, the legal and political status of those to whom aid is directed in conflict

situations is critical (compared to natural disasters), in the determination of what aid assistance can or cannot be given.
Thus, with this context interviews of key people involved in both UNHCR, OCHA, and several International NGO's was undertaken, and the same methodology as used earlier by Kestle & Storey, (2005), was applied.

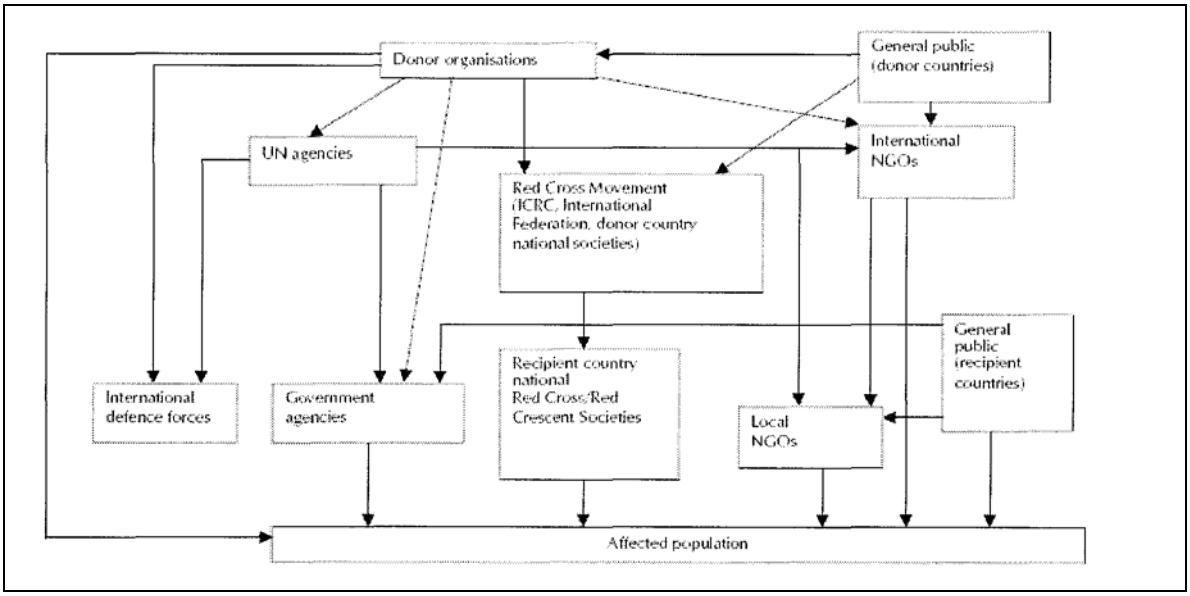

Figure 2: The Relief Response

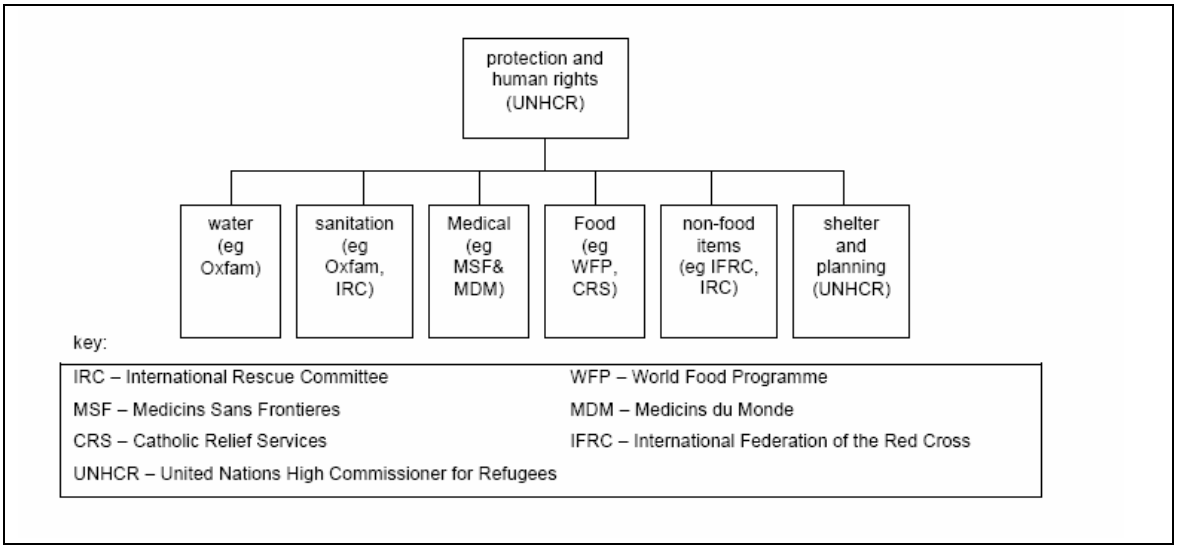

Figure 3: Field and Sectorial Organisation

METHODOLOGY

The selection of this case study at West Darfur, in Sudan, was made on its ability to represent the phenomenon of remote site design management. The West Darfur Humanitarian Aid Project in Sudan, was considered to be a remote site project as

there was a lack of continuously available logistical support; the site was difficult to access in terms of geographical location, and the site enjoys a hostile local climate. There was also a lack of specialized local labour, and materials. All of the major resources, had to be trucked, or air-freighted into to the camp site(s).

Case study methodology is considered an enquiring and exploratory method that provides rich and descriptive data for analysis (Yin,1994), therefore Interviews were conducted over a period of two months, in 2004. Seventeen senior, middle management, and operational staff were interviewed in terms of their official roles on the West Darfur Humanitarian Aid Project in Sudan, to give a rigorous and representative cross-section of the personnel involved on the project. For the purposes of this paper, the focus was specifically on data collected from eight key interviewees. The aim was to establish whether there was support for the four key factors of the conceptual design management model for remote sites. The four key factors were, *'value generation', knowledge integration', 'process integration' and 'timely decision making'.* The data were then transcribed, collated and analysed in terms of the paper's research question.

ANALYSIS OF THE 'KEY FACTOR' FINDINGS

Testing the collected data against the conceptual model under the four factors of value generation; knowledge integration; process integration and timely decision making, involved reviewing the responses specific to the West Darfur Humanitarian Project in Sudan. The results were generally consistent across all of the selected interviewees, though some of the respondents appeared to have more autonomy than others, in terms of playing a real part in the decision-making processes.

The personnel interviewed supported the four key factors of the design management model, as being valid for humanitarian aid project sites generally, and as being representative of their experiences, or those that were needed, on projects such as the West Darfur Humanitarian Aid Project in Sudan. The following key points were drawn from the collected data.

Value Generation on the West Darfur Humanitarian Aid Project in Sudan, was singularly concerned with making a difference to the lives of the beneficiaries of the aid, the Internally Displaced People (IDP's). Provision of basic shelter and the necessaries of life, being at the core of the project's aims.

Therefore Value Generation as perceived or needing to be realized on the West Darfur Humanitarian Aid Project, in Sudan was:

- the effectiveness, and therefore the value was measured on the project, by what was achieved, how many people (IDP's) have been saved and fed; what the mortality rate was. Value was measured quantitatively.
- about keeping a reliable, continuous supply line of food to the displaced people, from a distant donor to the NGO's in the field.

- about making a difference to the living conditions, in terms of emergency water and sanitary assessments in the 'Field', acting on the recommendations, and their timely implementation
- measured in how many built outputs will be achieved, and then seeing the re-collection of people; putting the 'village' back together again.

Knowledge Integration as perceived or needing to be realized on the West Darfur Humanitarian Aid Project, in Sudan was:

- that there are definite gaps in the knowledge integration process. No-one wants to trespass on others' areas. This is perceived as a possible hinderance to finding the best solution(s).
- that there's a problem with the planning and the reality.The very specialised personnel who come in, cannot do what they are best at, as they have to follow a particular plan, and therefore one does not necessarily see the desired or potential 'results on the ground'.
- that there are consultants, who are not in the UN system, who need to be advised of the potential pitfalls, when involved on these types of projects.
- that there are basically, informal and formal systems of knowledge integration.
- the gaps in specialist knowledge, in terms of the experiences of the people in the field, versus those in the office - they were not always in-line at times.
- that sometimes there is too much specialised knowledge on a project , and what is needed is a more holistic approach.
- a good knowledge of the IDP's cultural and value systems is needed, before commencing the on-site work.
- the high turnover rate of people in these roles, so things were not recorded as much as they could have been. Important though, to understand the context of the project.

Process Integration as perceived or needing to be realized on the West Darfur Humanitarian Aid Project, in Sudan was:

- to try and understand how the IDP's think, and will act / respond, and then to try and set up the best processes and systems.
- in trying to achieve co-ordination at the camp level, and engage in meaningful and useful relationship-building with the International, and IDP Communities. Knowing the other agencies' plans, means better facilitation.
- that little could have been achieved without the Sudanese people and their expertise. They had valuable connections and networks within the community.
- about co-ordination of the various groups, on this project, and helping working groups focus on the task in hand.
- to make sure that assessments are correct. That a thorough, logical and sensible solution to the assessment findings is made. Then prepare a plan to address the challenges within the timeframe and the budget.

Timely Decision- Making

The worst case scenario of late, or ineffectual decisions, on remote site projects, such as the West Darfur Humanitarian Aid Project in Sudan, would be the lack of

basic shelter, and the necessaries of life, potentially resulting in increased mortality rates.There are also political implications and drivers associated with these environmentally sensitive sites that can, and do impact on the decision-making process.
Therefore, 'Timely Decision-Making' as perceived, or needing to be realized on the West Darfur Humanitarian Aid Project, in Sudan was:

- that decision-making on this project was quite reactive and prescriptive. The detailed, and bigger picture decisions were fed from the 'Field' back to central, where the tailoring occurred, and the decisions, and plans, were fine tuned.
- a tiered system of decision-making. Consultative decisions were made. The people with the on-the-ground, or with the bigger picture knowledge, worked together to work out the best answers, and decide what was feasible.
- that decision-making involved a group of managers, one manager for each of the programmes, and it was essentially de-centralised.
- that at the organisational level, the decision-making was decentralised. There were considerable levels of co-ordination between West Darfur, Khartoum and the agency's head office. The staff were given almost total autonomy in the 'Field', and dedicated organisational finance personnel to work with.

There was consensus amongst the respondents, that the clients were the IDP's on the West Darfur Humanitarian Aid Project in Sudan, and the agencies' aim was "to make a difference". Measuring the 'differences' made is problematic, as it involves both a level of quantitative, clinical monitoring, and also a range of qualitative, cultural, and psycho-social observations and measurements.
How then do these aid agencies know when they have made an acceptable 'difference' in their clients' lives? And has the 'plan' been achieved once implemented? Has the value been generated?

One of the notable outcomes, from the collected data, was the diversity of views held by the respondents as to who they considered to be the stakeholders of the project, and what contributed to value generation on this project. A range of views also emerged in terms of the preferred and actual process integration in practice on the project, and whether the respondents had to slavishly follow the plan from 'Central' or that local decision-making opportunities existed on the project.
There was recurring criticism of the centralised decision-making process of some of the agencies, and how this hindered progress, timely communications, and the potential for on-the-ground, and informed and improved / relevant, local decisions being able to be made. Others believed, that they had some autonomy in terms of the decision-making, having had the authority delegated to them by their agency(s).
This lack of consistency of decision – making and delegated authority, across the range of agencies, and the ever-changing personnel in the Field and offices, was challenging, frustrating and disorientating for a number of the respondents.
The respondents, almost unanimously, (7/8), noted that, there were significant gaps in terms of specialist knowledge and knowledge integration on the West Darfur Humanitarian Aid project.

This resulted from a range of contributing factors, in their view, being:

1. mis-matches between the knowledge and experience of personnel in the agency offices, and that of the personnel specifically brought in for the on-the-ground work associated with the project.
2. no-one wanted to trespass (or offend) other agencies' areas of responsibility, which in reality probably puts limits on achieving the much needed knowledge integration, on these projects.
3. too little time being spent on the pre-planning stage(s). Realistic strategies and implementation plans and processes are regarded as essential, even though these are emergency projects.
4. continually changing staff, in all areas, means that record keeping, as well as status and improvement report writing (by the specialist consultants in particular), should be an essential part of the central and local portfolio resource pool and the pre-briefing / training of affected personnel.

A commonly, and strongly held view was that there was insufficient pre-briefing and associated training, before going into the 'Field'. There was consensus amongst the respondents, that there was a significant lack of effective and timely communication equipment, and systems available for project staff, in the Field and in the offices at the start of the 'in Field' project work.
Reliable and timely communications are considered to be critical on these remote sites, yet mis-communications do occur at times, between the various stakeholders, on and off site, caused perhaps by different interpretations of the issues, or decisions being made remotely from the site itself, and from each other (Kestle & Storey, 2005).

APPLICATION AND DEVELOPMENT POTENTIAL OF THE MODEL TO A MULTI-DISCIPLINARY FRAMEWORK

The first stage of the conceptual design management model validation work, involved a retrospective historical case study of the Cape Roberts Antarctic Drilling Project, conducted in 2003/4 and subsequently published, (Kestle & Storey, 2005). The next stage of the validation process involved the collection and analysis of data in 2004, for a case study related to West Darfur Humanitarian Aid Project in Sudan. Therefore the research question, for this paper was specifically concerned with whether the four key factors of the conceptual design management model for remote sites represented the realities of managing projects such as the West Darfur Humanitarian Aid Project in Sudan.

The analysis of the selected data findings from the semi-structured interviews on the Sudanese Humanitarian Aid project, suggests that the original conceptual design management model for remote sites (Kestle & London, 2002), is relevant in a non-profit and / or humanitarian aid context. The conceptual model allows for a blending of traditional and modern management methods, and the impact of this aspect of

the framework, needs to be developed further, by future applications of the model, by practitioners in the post -disaster reconstruction field.

Following on from this paper's particular research question, and the associated data collection and analysis, the next question becomes, *"Could a project planning framework based on relatively conventional issues of remoteness and sustainability, be applied to such a context ?*" If such research could be used and extended into, what must be considered, an 'extreme' context, then there would be the potential to provide aid workers with guidance in a situation of apparent 'chaos'.The validation of the conceptual design management model for remote sites, supports a further stage of this research, being the development of a project planning framework specifically for humanitarian aid projects. The proposed humanitarian aid framework would be developed from the conceptual design management model for remote sites (Kestle & London, 2002), and the analysis of the total case study data collected in 2004. The development process would need to ensure that the significant 'gaps' identified by the respondents, and interpreted from the data collected the West Darfur Humanitarian Aid Project in Sudan, are addressed. These 'gaps', and a proposal for a project planning framework will be the subject of future research papers.

CONCLUSIONS

The primary aim of this paper was to focus on selected aspects only of the total case study data collected, in order to answer the question of *"How well do the four key factors of the conceptual design management model for remote sites represent the realities of designing and managing projects such as the West Darfur Humanitarian Aid Project in Sudan?".*The detailed answers to the question are to be found in the analysis of the selected data. The respondents / interviewees supported the four key factors of the design management model, as being valid for humanitarian aid project sites generally, and as being representative of their experiences, or those that were needed, on projects such as the West Darfur Humanitarian Aid Project in Sudan. The selected data findings validate, and support the conceptual design management model for remote sites, which lends significant support to the model and to the associated typology for remote sites. Further analysis of all of the data collected from the West Darfur Humanitarian Aid Project in Sudan interviewees, will provide further insights into the lessons learned and this will have implications for the management and operational personnel involved on future remote site projects In particular, and as a further stage of this research, the development of a project planning framework specifically developed for humanitarian aid projects, on remote sites is planned. Moreover, it is also interesting that the recent major management changes signal by the UN based on what happened in West Darfur also makes this research timely (Humanitarian Response Review, 2005), (IASC, 2005). The Humanitarian Response Review and the consequent adoption and roll out of the Cluster approach in all humanitarian aid situations (including refugee, IDP conflict and IDP natural disaster) as the management frame work runs contrary to what has been suggested in this paper.

Perhaps the old saying mentioned earlier in this paper that "a humanitarian worker is only as good as their last assignment" will still hold true for the future?

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