Learning from previous humanitarian operations, a Business Process Reengineering approach

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ABSTRACT

Uncertainty and risks are part of humanitarians' daily routine. Most of the time, infrastructures are damaged or non-existent, the political climate is highly volatile, communication means are insufficient, and so on. Therefore, humanitarian organizations often have to find original methods to implement their supply chains. They may also face recurrent problems, that requires them to change the way they operate. And yet, as they lack the time and resources to reflect on the lessons learnt, most of their best practices and issues are neither captured nor communicated. The aim of the study is thus to propose a framework to capitalize humanitarians' knowledge and know-how, to analyze both gaps and best practices and learn from one operation to another. To this end, we propose a framework derived from traditional Enterprise Modelling tools, adapted to fit relief chains' specificities. Field applications are then given to illustrate our approach and its beneficial effects.

Keywords

Humanitarian Logistics, Relief Chains, Enterprise Modelling, Knowledge Management.

INTRODUCTION

Every day, in many countries, humanitarian workers face uncertainties, foreseeable or not, with regard to demand and supply; they have to cope with the complexity of the environment due to the politically volatile climate, the damages suffered by the local infrastructures, the multiplicity of stakeholders having various incentives, etc. Humanitarian logisticians already developed tools and methods to overcome the complex situations they face. Yet, due to the "pressure to forego any time consuming administrative process in order to focus on the actual distribution of aid" (Kopczak, 2004), few are clearly defined and communicated. Thus, humanitarians still lack practical best practise models that can be used by different organisations in order to improve their supply chain management. The purpose of this article is to propose tools to capitalize humanitarians' knowledge and know-how and help them better manage the issues they face thanks to an Enterprise Modelling approach.

According to (Vernadat, 1996), there are five major motivations for Enterprise Modelling : management of system complexity, better management of all types of processes, capitalization of enterprise knowledge and know-how, Business Process Reengineering (BPR) and enterprise integration. Those motivations have already been expressed by many a humanitarian worker. They all agree that "there is a need to build capacity in preparedness… to work hard during disasters but to work even harder between disasters" (Logan, operation manager, International Federation of the Red Cross –IFRC– in Samii, Van Wassenhove, 2002). Through an Enterprise Modelling approach, the present article proposes tools to understand, to analyse, evaluate and then improve the performances of relief chains. Firstly, some hypothesis are given to explain to which extend a humanitarian supply chain (HSC) can be assimilated to a commercial supply chain (CSC) and what has to be adapted in order to be able to use an Enterprise Modelling approach to study a HSC. Secondly, a specific Enterprise Modelling approach to diagnose humanitarians operations is exposed. Eventually , two applications of our approach are detailed, one on a sudden onset disaster (Yogyakarta Earthquake, 2006) and another on a slow onset disaster (Sudan, 2004).

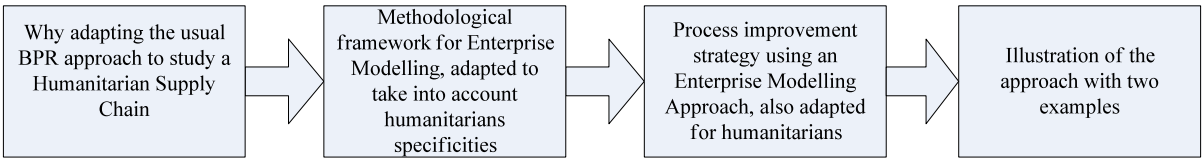


Figure 1. Our approach

WHY AND HOW ADAPTING THE USUAL BPR APPROACH?

Enterprise vs. humanitarian operations

Commonly adopted definitions, like "customer" or "supply chain" are clear for all logisticians. All? No – one small area of indomitable logisticians still holds out against the community… Humanitarian supply chains' specificities are such, that it is not easy for them to agree on and stick to definitions. Take ten humanitarian logisticians and ask them to agree on a clear definition of a "customer". Is it only the end beneficiary, or should the definition include the ones who pay for the service, i.e. donors ?. It may take much longer than expected to get a consensus. A brief overview of humanitarian supply chains' specificities and their impact on the use of an Enterprise Modelling approach is therefore needed prior to any attempt at using such method.

	Commercial supply chain	Humanitarian supply chain	So what?
Supply chain definition /Range	From supplier's supplier to customer's customer	From donors and suppliers to beneficiaries	Use neither "customer" nor "supplier" without specifying its exact meaning
Shelf Life	Some years, but tends to shorten	Some weeks to some months in total, mounting and dismantling included. Project oriented. Depends on type of crises (sudden-onset or slow-onset disasters)	Clear definitions of crises typologies are needed prior to the use of the Enterprise Modelling approach in order to define the scope of the study
Customer definition	End user = Buyer	End user (Beneficiary) [1] Buyer (donor). Demand is highly uncertain	Management of demand uncertainty need to be studied for both beneficiaries and donors. Management of supply uncertainty is to be studied for both donors and suppliers
Supplier	Supplier only, known in advance generally, 2 or 3 in average	Supplier and/or donor uncertain and multiple	
Financial flows	Bilateral and known	Unilateral (from donor to beneficiary) and uncertain	
Actors	Known, with aligned incentives	Multiplicity in nature, but scarcity in numbers + misaligned incentives	Network integration is not achieved by same means or difficulties. Precisions regarding the scope, coverage and level of detail of the study are essential due to the various and multiple complexities faced by humanitarians.
Information flow	Generally well structured.	High importance of the media; Means of communications often reduced (no internet access on field, etc.)	
Human flows	Limited usually	People flows + knowledge transfer	Management of processes is especially difficult for humanitarians
Environment	More and more volatile	Highly volatile and unstable	

Table 1. Main differences between humanitarians and commercial supply chains and their impact

Those differences have thus many impacts on the use of usual Enterprise Modelling framework and process improvement strategies. The following paragraphs detail the adaptations, that are needed.

Usual framework for Enterprise Modelling

Since 2001, a shared framework for Enterprise Modelling is available (CEN ENV 40003, 2001). In this norm, and in its successor (ISO 19439, 2006), three axis are given, to drive the analysis.

- The Genericity, which defines the level of detail associated with the model. There are three of them :
  - The generic model, which is "the modelling level, that contains generic modelling language constructs for expressing descriptions which can be used, to generate models at the partial and particular Levels"
  - The partial Level, "a description of typical enterprise domains for general use or belonging to particular industry segments, comprising a set of related modelling language constructs"
  - The particular Model, "a model of a particular, specific enterprise domain"
- The Model Life-cycle, which is "the set of distinguishable phases and steps an entity may go through from its creation until it cease to exist"
- The View, "a structured representation which is a selective perception of an enterprise model." Model views are used to emphasize the aspects, that are relevant to the modeller and the model user's particular interests and context, ie. function, information/decision, resource or organization.

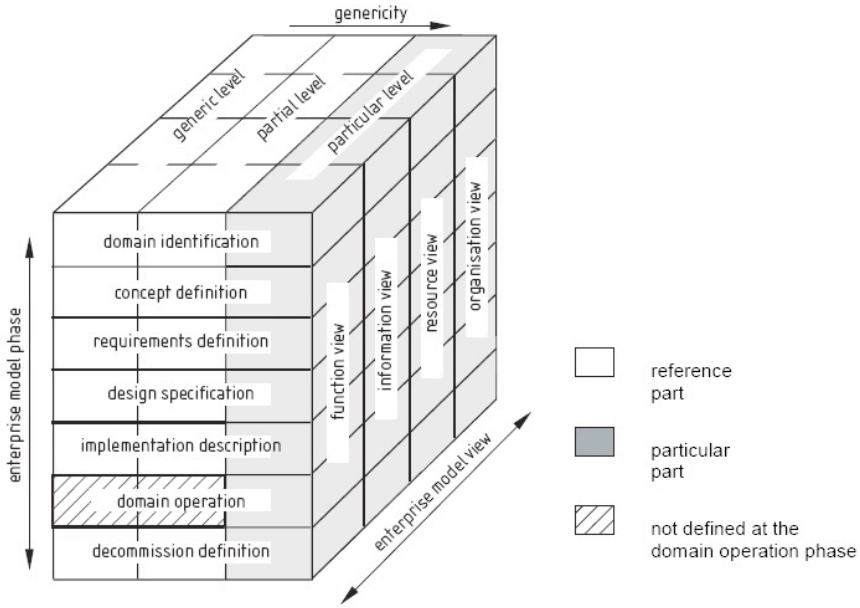


Figure 2. Overview of the framework for Enterprise Modelling (CEN ENV 40003, 2001)

Adaptation of the framework to fit humanitarians' specificities

As seen above, humanitarians supply chains are project oriented. The response varies depending on the typology of crises, the nature and number of the stakeholders, the complexity of the environment, and so on. A brief overview of the various HSC, that can be implemented, is necessary prior to the Enterprise Modelling approach in order to define the scope of the study.

There are two kinds of project environment for implementing humanitarian logistics operations (see Charles, Lauras, Dupont, Tomasini and Van Wassenhove, 2007):

- Slow onset disasters: Droughts, epidemics, famine/food insecurity, population movements, man-made disasters. In this case, the focus is done on capacity building, using national staff, cost savings, low budgets, planning and scheduling, and long time frames.
- Sudden onset disasters: Hurricanes, cyclones and typhoons, earthquakes, floods, volcanic eruptions, technological and man-made disasters. In this case, the focus is done on providing medical assistance, providing food and non food items, launch appeals, to assess globally the needs, using international staff, high budgets and very short time frames.

For each of those types of disasters, the supply chain and the amount of resources needed will also differ depending on the phase of the operation.

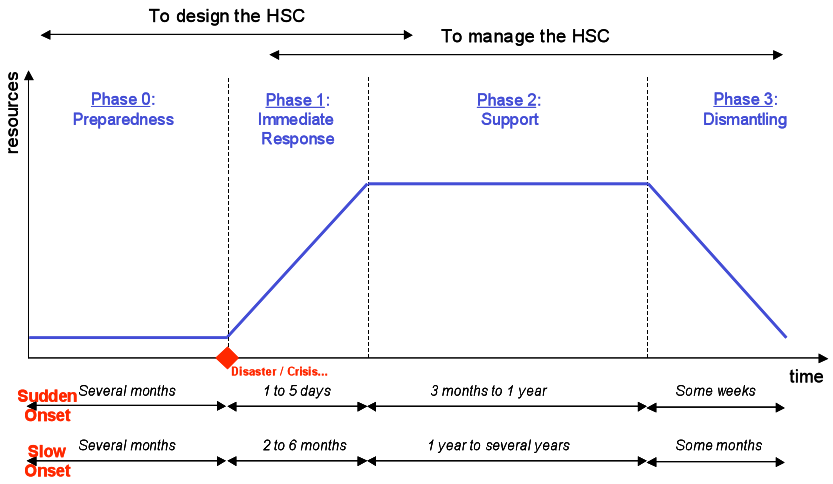


Figure 3. Humanitarian Operation Lifecycle (Charles et al., 2007)

Moreover, the humanitarian distribution channel go through many stakeholders. Those stakeholders are of different nature: international agencies such as the World Food Programme (WFP), International Non-Governmental Organizations (INGOs) such as Care International, Non-Governmental Organizations (NGOs), Implementing Partners, Governments, Military (3rd party service providers), Donors and Private Companies. They have different incentives and means of action. Depending on their presence or not in the field, the response varies drastically. This is even more true that some of them, like local governments or military, often add complexity to the situation.

To summarize, we can say that the framework proposed in the norm ISO 19439 can be applied, but with small modifications. The first one concerns the life-cycle stages. Instead of the seven stages recommended by the norm, humanitarian can focus on the four phases of their supply chain management, i.e. preparedness, immediate response, support and dismantling. This is a limitation of the study. Yet, it enables humanitarians to focus on the most important phases of the operations, limit the number of models and reduce the time and resources needed to undertake such a heavy work. The second modification lies in the genericity. According to the norm, the study should start with generic concepts, then specialize to a specific enterprise. In our case, no shared generic way of managing the supply chain exist. Moreover, the idea is to focus either on specific best practices and generalize them, or on specific gaps and cover them. Consequently, instead of going from the generic level to the particular level, we recommend to go the other way around, namely from the particular level to the generic level. As for the view, the classification given by the norm is valid for humanitarians. The only difference we would recommend concerns the exhaustiveness of the study. According to the norm, all points of view, for all phases of the operation lifecycle should be studied. Yet, again, as it is a time and resource consuming process, and knowing how crucial those two elements are for humanitarian organizations, we suggest to restrict the studies to the most pertinent models, depending on the needs identified. Eventually, in order to take into account the broad diversity of responses, a clear specification of the scope, coverage and level of detail of the study (crisis typology, targeted stakeholders, etc.) is to come with the model.

	ISO 19439	Adaptation for the modelling of humanitarian operations
Modelling levels	"For different life-cycle stages (from requirements definition to design specification to implementation description)"	For different life-cycle stages (from immediate response to dismantling)
Genericity	Specialization, ie. "providing generic concepts which are then specialized to a particular industry sector and finally to a specific enterprise" (from generic to partial, then particular level)	Generalisation, ie. "the progression from one or more particular concepts to a more general concept which represents [the modeller and the model user] shared characteristics or essential qualities"
Views	"Classifying concepts by four areas of concern or modeller viewpoint (function, information, resource and organization)"	

Table 2. Adaptation of the methodological framework to take into account humanitarians specificities

Models, here, are used to propose a framework to capitalize humanitarians knowledge and know-how, to analyze both gaps and best practices and learn from one operation to another. The Enterprise Modelling framework discussed above is thus to be used as a mean to improve processes.

Usual process improvement strategy using an Enterprise Modelling approach

According to Vernadat (1996), here are the steps, that should be included in a process improvement strategy. An illustration of those steps is given in figure 3.

1. Get management commitment to redesign the process
2. Form a cross-functional team
3. Model the existing AS-IS process in detail
4. Identify areas for improvement (simplification based on cost and time analysis)
5. Design an 'ideal' TO-BE process
6. Determine how much of the TO-BE process can actually be implemented with parts of the AS-IS process that must be kept
7. Validate and test the TO-BE process (on the basis of simulation and cost analysis)
8. Propose an implementation plan that will disrupt the organization as little as possible, involve the people affected, and will get the changes in place as quickly as possible
9. Get management commitment fore the implementation plan and install the new process

Monitor the new process for future changes as needed

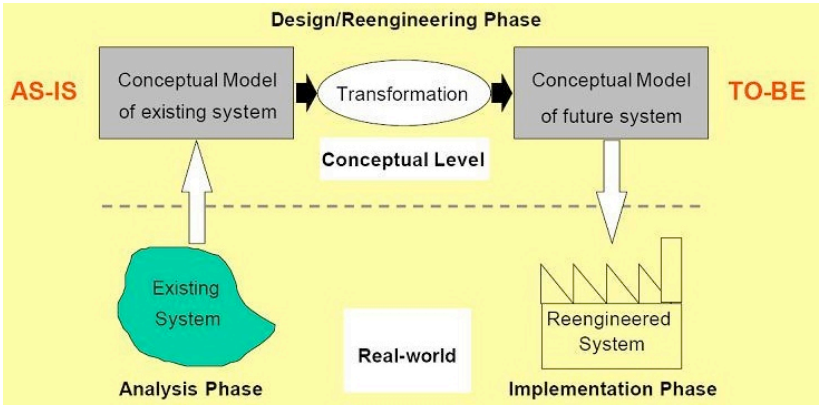


Figure 4. Process improvement strategy (Vernadat, 1996)

This strategy, whereas valid for CSC, requires some adaptations, in order to be applicable for the improvement of HSC. Indeed, what is clearly defined, true and/or relevant for the private sector may not always be such for humanitarian organizations.

Adaptation of the approach to fit humanitarians' specificities

The multiplicity of stakeholders, their wide-ranging incentives and the complexity of most humanitarian situations make it really difficult to get everybody's commitment. Therefore, some of the above mentioned points can be set aside. Points 1 and 9, regarding management commitment, whereas essential if the only aim is improving the process, are not that essential for an evaluation project. As for point 4, "cost and time analysis", it has to be redefined to be relevant for humanitarians. Indeed, costs are far from being the highest priority for humanitarians, whereas time is not just a question of money but often a difference between life and death. In addition, for a given organization, the response process differs depending on the situation (crisis typology, ability of the affected country to face the disaster, volatility of the environment, etc.). And from an organization to another, it can also vary tremendously. Because of those variations, specifying the scope, coverage and level of detail of the Enterprise Modelling approach is essential. Indeed, for example, working on a global model is only relevant for a high level, but has a limited interest for a deeper analysis.

Here is the approach, that is proposed to understand, to analyse, evaluate and then improve the capabilities of humanitarian supply chains.

Take one or many guinea pigs (UNHCR / IFRC / …), one of their interventions (2005 Yogyakarta Earthquake / Sudan food crisis / …) and identify the needs, then

1. Map the activities (decisional view, functional view, organizational view and/or resource view depending on the needs) =AS-IS

Analyze (Are there some recurrent problems in how they operate ? Which best practices can be generalized ? etc.)

If the aim is to fill the gaps identified

2. Propose changes to enable them to better achieve their objectives =TO-BE ('ideal' TO-BE)
4. Determine how much of the TO-BE process can actually be implemented with parts of the AS-IS process that must be kept

If the aim is to generalize best practices

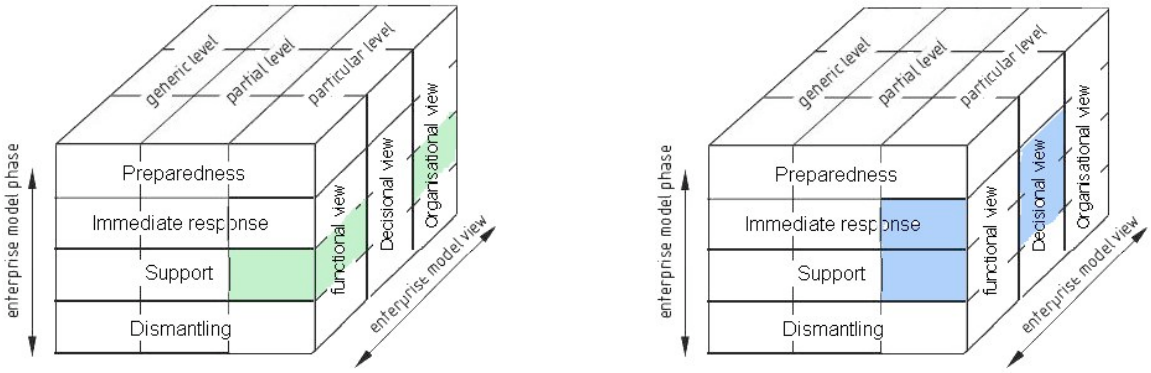
3. Formalize best practices and propose changes, in a more general level, that would make systematic the use of the identified best practices =TO-BE ('ideal' TO-BE)
4. Determine how much of the TO-BE process can actually be implemented with parts of the AS-IS process that must be kept

APPLICATION FOR HUMANITARIAN OPERATIONS

There are two options to study the answer to a given humanitarian crises: either we study the overall response, linking all stakeholder's activities, or we focus on one stakeholder and map only its activities. In the first case, the focus on the decisional view seems more pertinent as it is the most appropriate to study the uncertainties linked to complexity. Furthermore, mapping the functional view for all stakeholders is only feasible if the level of detail of the study is low, which has little interest in our case as it would only list common best practices already known and applied. As for the second case, a cross-analysis of all views is more feasible and pertinent, as the level of detail of the study can be higher, and thus more able to reveal hidden best practices. Consequently, the present article will present two applications of Business Process Reengineering, chosen to illustrate each of those two cases.

The first one focuses on the supply chain implemented by one stakeholder during a sudden onset-disaster : the answer of the International Federation of the Red Cross and Red Crescent Societies (IFRC) to the 2006 Yogyakarta earthquake (Indonesia). There, the functional and organisational views during the support phase are modelled.

As for the second application, it focuses on three different stakeholders during a slow onset disaster, the crisis in Darfur. Decisional models will be given to illustrate the changes that happened between immediate response and support phases. For information, this case has been build thanks to direct inputs from the field, but no final validation by stakeholder has been undertaken.



First application (Yogyakarta) Second application (Darfur)

Figure 5. Illustration of the phases and views modelled in those two applications

The choice of the formalism is here BPMN for the functional view, organisation chart for the organisational view and GRAI grid for the decisional view. Indeed, GRAI is a dedicated formalism for decisional process, as is the organisation chart for the organisational aspect. As for the choice of BPMN, it pays particular attention to both the sequencing of operations and the flows. It also gives the opportunity to study the interfaces, which enable to discuss coordination and synchronisation problems. Other formalisms could have been considered, yet this is not the purpose of the present study to discuss such a choice.

Application for one stakeholder during a sudden onset-disaster

Overview of the situation

In this application, we detail the operations of the International Federation of the Red Cross and Red Crescent Societies (IFRC) during the support phase to a sudden onset-disaster : the 2006 Yogyakarta earthquake. The main entities that operated during the crisis were:

- IFRC head quarters (Geneva), which ensure the strategic coordination for this operation but potentially also for other operations in other places.
- The Regional Logistic Unit (RLU) (Kuala Lumpur), that coordinate regionally the operations. Concretely, it consolidates the needs and controls the pipeline for the field distributions (procurements, central warehousing, etc.). RLU is also used to coordinate shipments, track what is done and potentially do the same for other operations in other places.
- The Logistics Emergency Response Unit (ERUlog), composed of members of the British Red Cross in this case. They were responsible of receipt at air port, storage and shipment execution on the field
- The Relief Response Unit (ERUrelief), composed of members of the American and Spanish Red Cross for this crisis. They were helping with the field distribution organization.
- The Indonesian Red Cross, as local National Society (NS), was responsible for the operations, asking the assistance of the others where it lacked skilled resources and doing itself where it could. Concerning logistics, it was concretely on the field by allowing the distribution (refuges, infrastructures, etc.) and by executing the relief distribution. It also assumed a coordinating role, as it is quite an important NS.
- A last entity was the Disaster Management Unit (DMU, in Panama). This was the "disaster management" reference skill in Red Cross Federation. Consequently, some actors, who were used to responding in America, and thud to work with this DMU, had refereed to them during the crisis response.

The IFRC logistics department identified a coordination and communication issue. Consequently, we have used two models, for the functional and organisational views : a BPMN diagram and an organization chart. Whereas organisation chart are used commonly, and therefore hardly need any technical explanation, BPMN may not be familiar to every logisticians.

Basics of Business Process Modeling Notation (BPMN) to model the functional view

"Business Process Modeling Notation (BPMN) is a standard, graphical modeling representation for business processes" (White and Miers, 2008)

The four basic categories of elements are shown in figure 4.

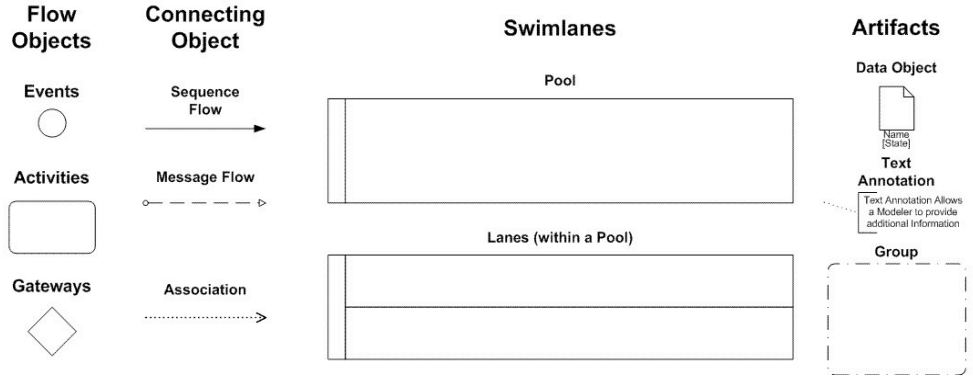


Figure 6. Core set of BPMN elements (OMG, 2008)

According to (White, 2004), An Event is something that "happens" during the course of a business process. An Activity is a generic term for work that company performs. A Gateway is used to control the divergence and convergence of Sequence Flow. Thus, it will determine traditional decisions, as well as the forking, merging, and joining of paths. A Sequence Flow is used to show the order (the sequence) that activities will be performed in a Process. A Message Flow is used to show the flow of messages between two separate Process Participants (business entities or business roles) that send and receive them. In BPMN, two separate Pools in the Diagram will represent the two Participants. An Association is used to associate data, text, and other Artifacts with flow objects. Associations are used to show the inputs and outputs of activities. A Pool represents a Participant in a Process. A Lane is a sub-partition within a Pool and are used to organize and categorize activities.

Functional and organisational models during the operation

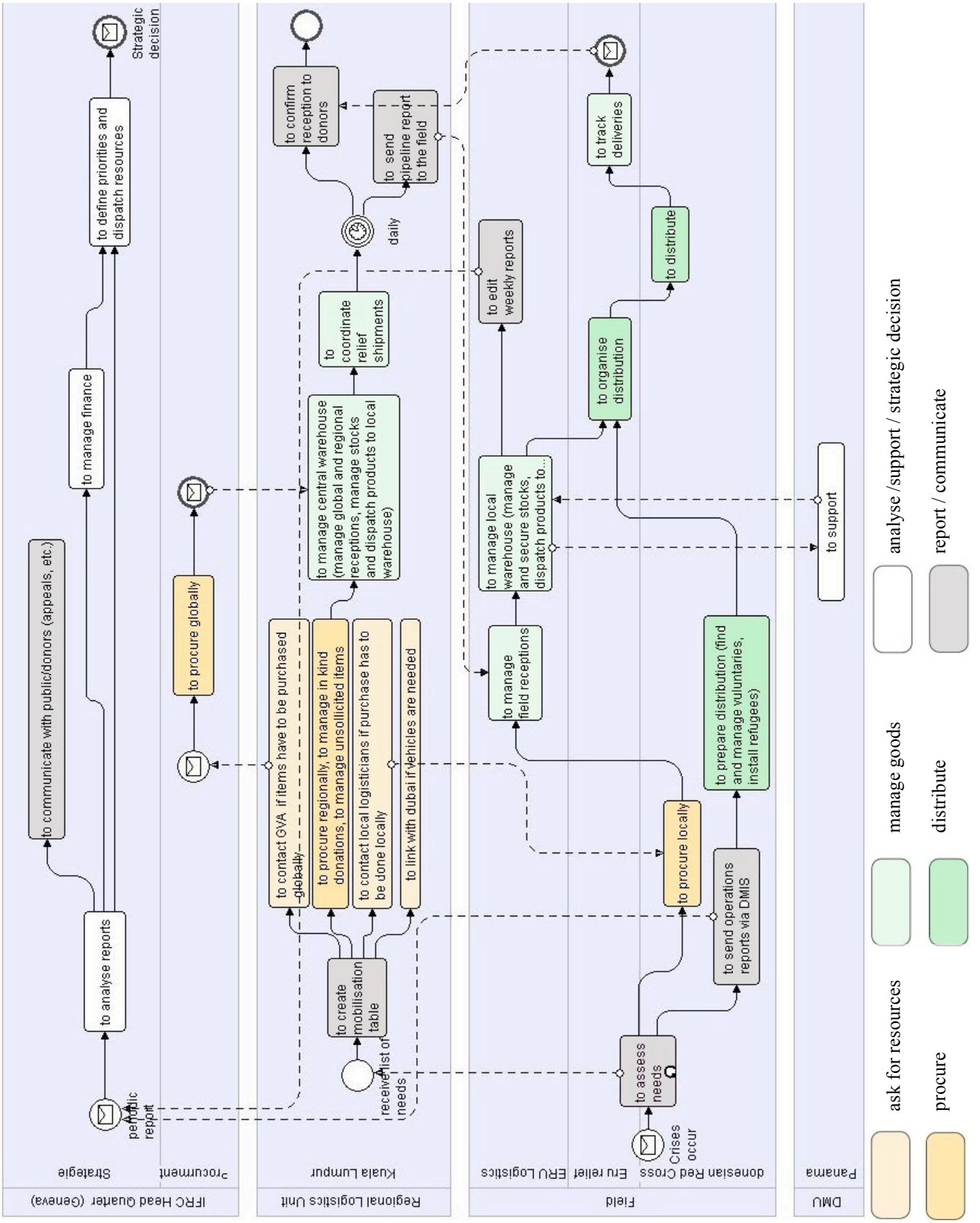


Figure 7. Functional view of the answer of IFRC logistics department to the 2006 Yogyakarta earthquake

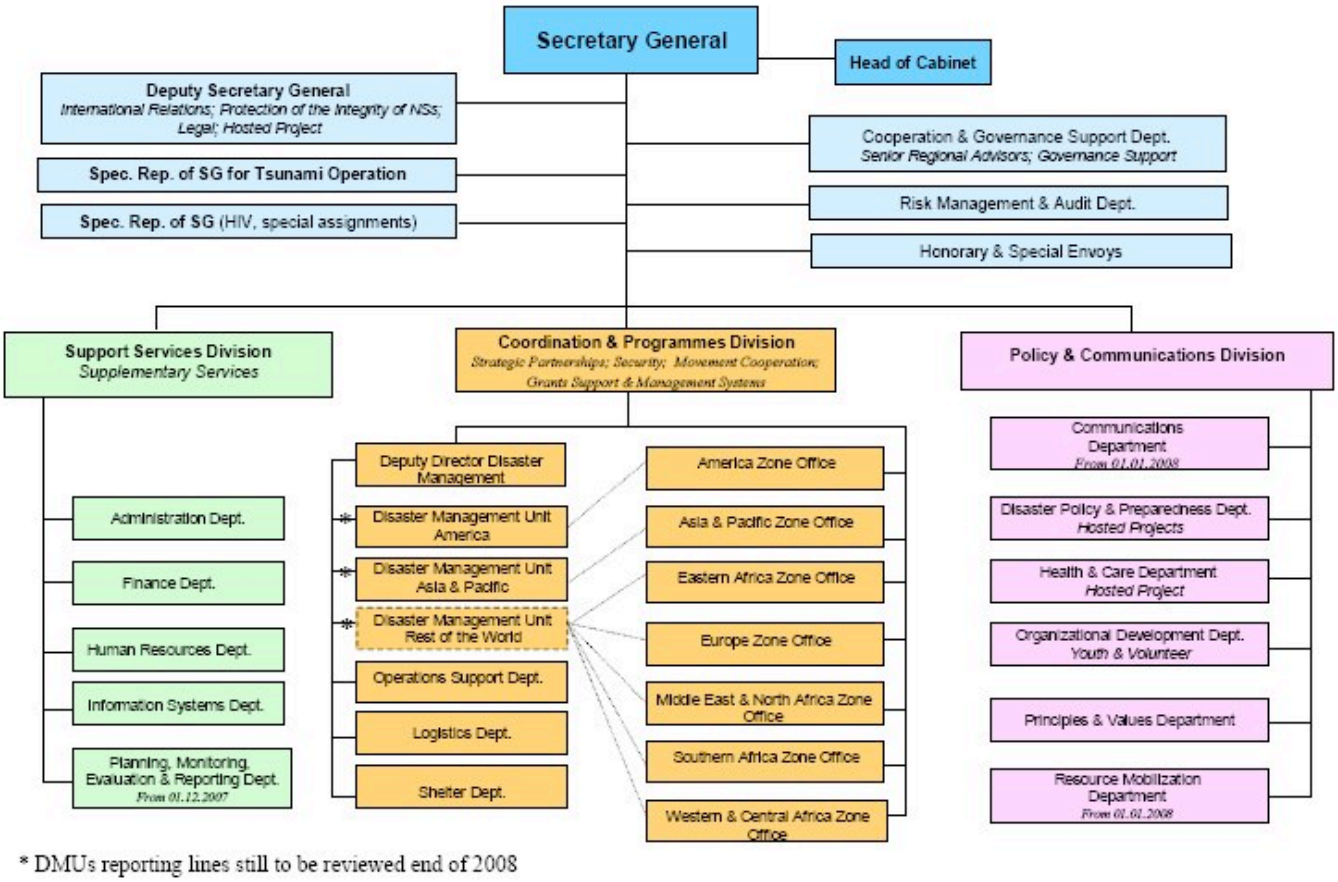


Figure 8. Organizational view of the IFRC secretariat during the answer of IFRC logs dpt to the 2006 Yogyakarta earthquake

Analysis

Those two models enable a first analysis of the operations. The first positive point is the clear definition of nearly everyone's role. The coordination and responsibilities in each geographical level is well identified and hierarchically structured (global coordination in Geneva, regional coordination in RLU and local coordination at field level). The only exception is the DMU, which role and reporting lines are a bit confusing. A cross analysis of the two models shows that the issue comes from an organizational gap. Indeed, its only connections in the BPMN diagram are messages. It isn't linked in a sequence of operations. Moreover, as is mentioned in the organisational chart, DMUs reporting lines are still to be reviewed. DMUs role and reporting lines are thus to be defined to enable better coordination and communication.

Another positive point is the presence of pre-defined document and standards, that allow a quicker and clearer communication. Yet, no systematic information loop exists to keep Geneva up to date on a daily basis. A macroscopic vision of the operations lacks also, which make it more difficult to adjust resources on the field.

Application for three stakeholders during a slow–onset disaster

In this application, we detail the operations of three agencies (UNICEF, WFP and CARE international) working together with implementing partners during the support phase to a slow-onset disaster : the crisis in Darfur. The whole Darfur crises being excessively complex and over a long time period, we focus only on the non-food item (NFI) pipeline and show the situation in 2004. As many slow-onset disasters, humanitarians had limited capacity, skills and resources to assist a large number of people having high levels of need. Furthermore, the accessibility was really poor. Humanitarians had long distances to travel to the area as well as within the area, which cost time and money. In addition, they faced government restrictions (travel, visas, regulations) and limited political support. The three agencies began their response by working independently, delivering the

same items to the same beneficiaries, in parallel. They changed to an integrated decisional process, horizontally coordinated.

–UNICEF assumes the procurement of goods
–WFP becomes the consignee for all in-kind donations
–CARE provides warehousing and distributes to the IPs
–OCHA / UNJLC coordinate operations
To model the decisional view, it is GRAI grids, that have been used.

Basics of GRAI Grids to model the decisional view

According to (Vernadat, 1996), "the grid shows the major flows of decisions and information between the decision centers of the enterprise. It is defined as a two dimensional matrix; the vertical axis is the temporal axis and the horizontal axis is the functional axis"

"Each line in he GRAI grid defines a decision level. Each decision level is characterized by a planning horizon (H), and a period (P) such that H=n.P (n≥1); It groups decision centers having the same planning horizon and similar periods.

The horizon represents the time scale covered by the decision-making". "The period is a fixed duration after which decisions at a given decision level must be re-considered."

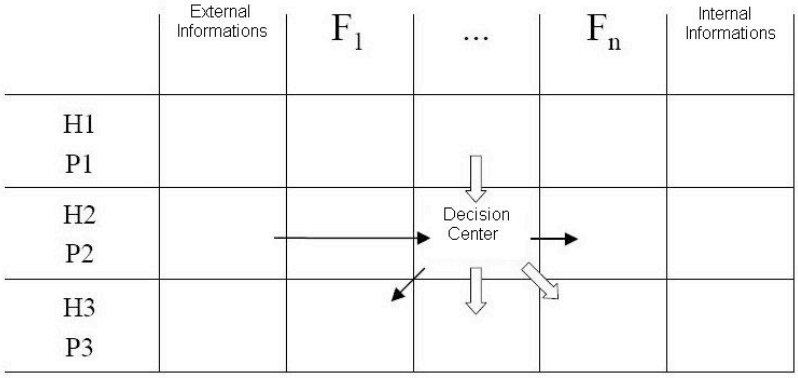


Figure 9. One example of Grai Grid

Decisional models during the operation before the horizontal coordination

PHASE 2		HSC Functions					
Time Horizons and periods	**Internal Information**	**Procure**	**Dispatch**	**Distribute**	**Coordinate**	**Manage Resources**	**External Information**
Evaluation H: 6 months P: 1 month	- Needs forecast	- Plan NFI procurements - Adapt designing of dispatch organization	- Plan load Adapt designing of dispatch organizations		Compile population size and needs - Analyse stocks levels - Identify gaps - Prepare appeal	- Evaluate required skills - Recruit international volunteers - Install support	- Consolidated donations - Media cover - Beneficiary needs
Evaluation H: 1 month P: 1 week	- Field report - Stock movement reports	- Import items - Consign in-kind donations - Procure locally			- Review NFI requests - Prioritise resource allocation	- Update IT - Recruit local employees	- In-kind donations - Procurement capacities - Requests from implementing partners and local authorities
Evaluation H: 1 week P: 1 day	- Procedures	- Permit landing - Rent transfer vehicles	- Manage warehouse - Charter transportation means	- Schedule distribution rounds - Make sure vehicles&drivers are provided	- Coordinate movements of NFIs - Facilitate landing permit and clearance process	- Maintain IT - Assign and pay resources	- Transportation capacities - Needs evaluation - Requests from implementing partners and local authorities
Evaluation H: 1 day P: real time	- Procedures	- Take delivery of goods and clear airport - Deliver to warehouse - Pay invoices and report	- Receive and stock goods - Dispatch goods - Report	- Deliver goods to implementing partners - Report			- Ground evolution - Requests from implementing partners and local authorities
		UNICEF	UNICEF	UNICEF	UNICEF	UNICEF	

Figure 10. Decisional view of UNICEF supply chain during the Sudan crisis, before the horizontal coordination running

Processes are the same for CARE and WFP organizations.

PHASE 2		HSC Functions					
Time Horizons and periods	**Internal Information**	**Procure**	**Dispatch**	**Distribute**	**Coordinate**	**Manage Resources**	**External Information**
Evaluation H: 6 months P: 1 month	- Needs forecast		- Plan load - Adapt designing of dispatch organizations	- Plan load and capacity needs - Adapt designing of final delivery system	- Compile population size and needs - Analyse stocks levels - Identify gaps and assess NFI needs	- Evaluate required skills - Recruit international volunteers - Install support	- Consolidated donations - Media cover - Beneficiary needs
Evaluation H: 1 month P: 1 week	- Field report - Stock movement reports	- Make "orders" for each agency			- Review NFI needs	- Update IT - Recruit local employees	- Procurement capacities of each agency - Requests from local authorities - Beneficiaries needs
Evaluation H: 1 week P: 1 day	- Procedures	- Adapt "orders" for each agency	- Schedule activities (warehouse)	- Schedule distribution rounds - Make sure vehicles&drivers are provided		- Maintain IT - Assign and pay resources	- Transportation capacities - Local authorities constraints
Evaluation H: 1 day P: real time	- Procedures		- Receive and stock goods - Dispatch goods	- Deliver goods to implementing partners - Report			- Ground evolution - Local authorities - Beneficiaries needs
		Implementing Partners	Implementing Partners	Implementing Partners	Implementing Partners	Implementing Partners	

Figure 11. Implementing Partners decisional process for NFIs management

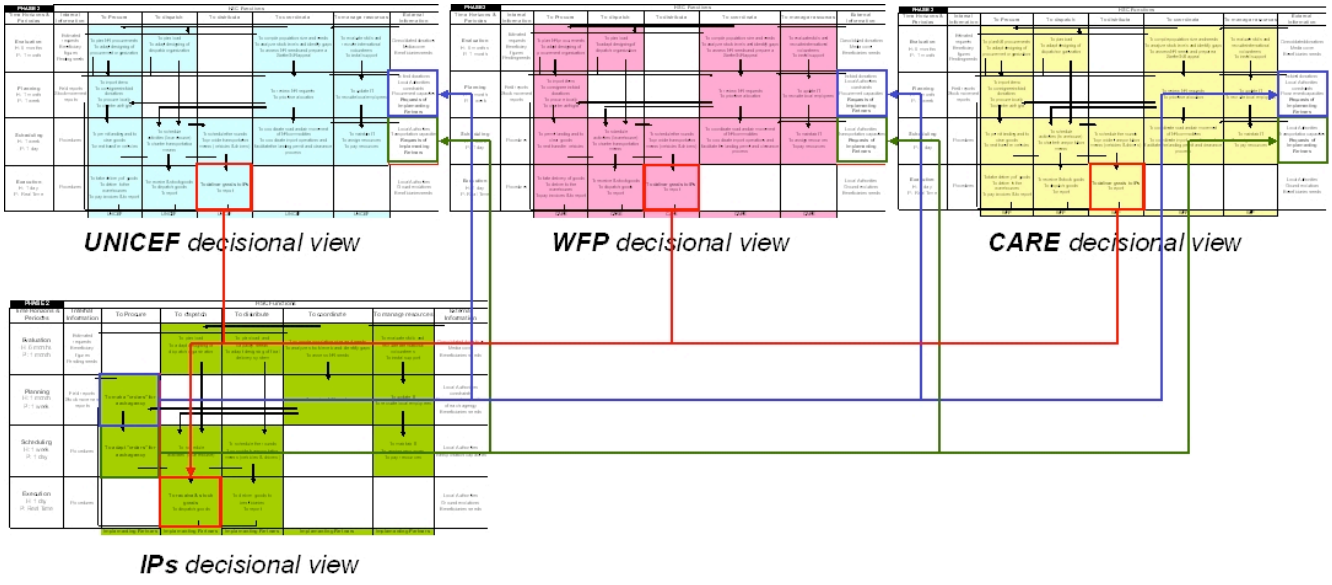


Figure 12. Before horizontal coordination, three independant decisional processes for the same beneficiaries, via the same Implementing Partners

Analysis of the models before the horizontal coordination

Some bottlenecks can be identified through the model, like local authorities constraints, requests of implementing partners and procurement capacities. In addition, the model allows to focus on several problems, as the duplication of efforts, the competition among for the services, or the lack of efficiency (cost control). It also shows clearly how the decisional interactions between are complex and consequently difficult to control (coherence).

Decisional models during the operation before the horizontal coordination

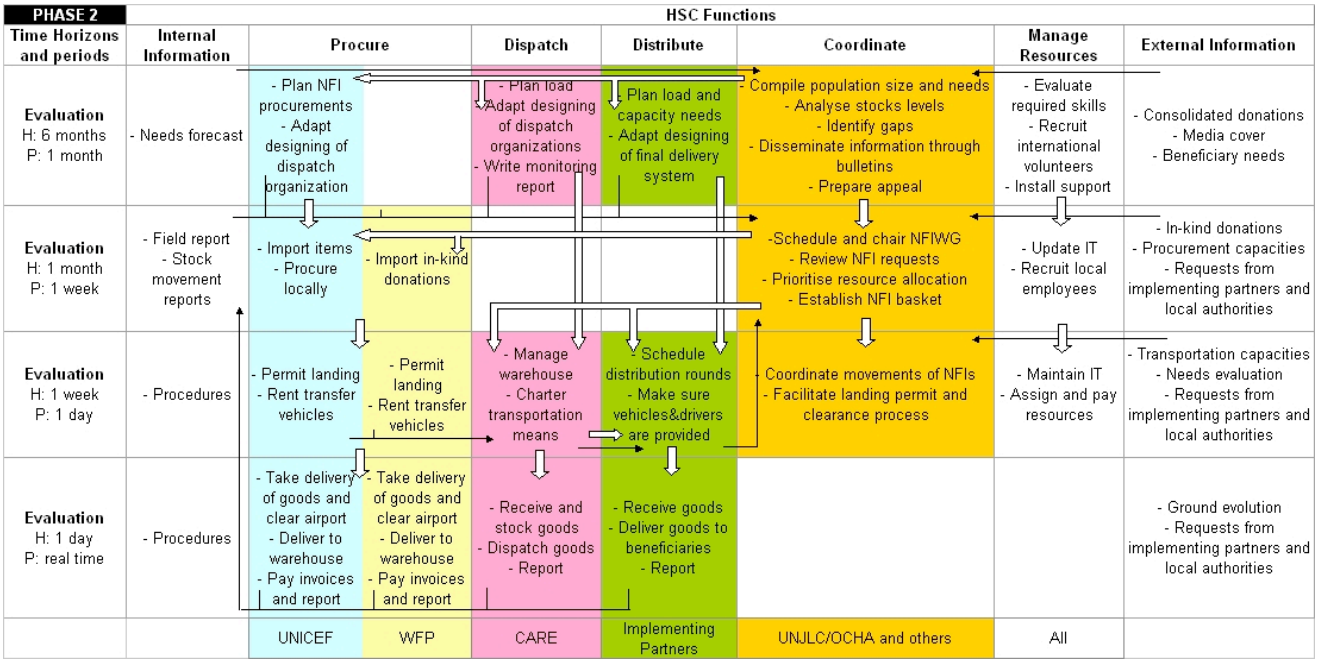


Figure 13. Decisional view during the Sudan crisis, second part of the support phase, once pipelines of stakeholders are merged.

Analysis of the models after the horizontal coordination

The natural benefits of the system are underlined by the model. Economies of scale, minimization of duplication of efforts, reduction of competition among for the services and minimization of the transaction cost to donors and agencies become obvious. Beyond these, the model allows to pump up the volume on the importance of particular decision centres, like the non food items working group (NFIWG) scheduled by UNJLC/OCHA. Indeed, a great number of Inputs and Outputs come in and out of the decision center. Another element underlined by the model is the coherence of the actions realized at a same level. For example, at the scheduling level, all decision centres (except coordination) manage transportation whithout additional need of a particular synchronisation on it. The coherence of the decisions for a particular function is also to be noted. The coordination function, for example, does not make any decision at the execution level.

From these analysis, we could consider potential improvements in terms of organization or decision-making support, to be implemented a the beginning of the crisis, and not monthes or even years after the first aid is given.

CONCLUSION

This article has taken into account humanitarian supply chains specificities to propose a framework inspired on traditional Enterprise Modelling tools. Its aim is to capitalize humanitarians' knowledge and know-how, to analyze both gaps and best practices and learn from one operation to another. Field applications have been detailed to illustrate our approach and its beneficial effects.

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