

A Cooperative System to Support Inventory Leveling Negotiations

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Abstract

In many cases, deviations between product and service real demands and their forecasts are inevitable, creating products and services excesses. To deal with that excess, it is important that logistics professionals elaborate strategies for discovering potential and repressed demands. Traditional techniques to manage inventories do not suffice to reach all expected results. In this context, strategies for products and service excess destination are also promoted, in order to optimize the application of organizational resources.

Negotiation between the part holding excess and the potentially demanding part is a crucial issue in the excess destination activity. It is a process in which two distinct parts search for a consensus among their interests and objectives, trying to satisfy both expectations. For this purpose, it is fundamental to establish mechanisms that stimulate communication and motivation during the negotiation process, as well as the ability for decision-making, conflict management and to reach an agreement. Therefore, cooperation maybe the best form of negotiation. Cooperation will help to establish points in common that favor the negotiation, and information sharing and consensus building plays a key role in this process.

In this work we present a system to support cooperative negotiations aiming at leveling inventory of products and services used by different processes. The system will be used by several Organs within Brazilian Federal Government Defense Ministry, acting as a market for excess capacity of services and goods. The proposed environment will facilitate system users to cooperate towards achieving common objectives in the negotiation.

1 Introduction

The inventories influence the companies rentability in large scale because they absorb a significant investment. For that reason, the carefully inventory management develop the interest of logistics professionals to elaborate strategies that promotes a balance between the management costs and the maintenance of a desired level of costumer service [17, 21]. In many cases, the traditional management techniques are not enough to reach this objective creating products and services excesses. Therefore one of the options is to define strategies for the excesses destinations in order to optimize the organizations resources applications.

An important aspect to be considered whenever you try to destinate the products or services excesses is the negotiation between the interested parts: one in charge of the demand and other in charge of the offer. The negotiation is a process in which distinctive parts try to achieve a consensus among their objectives and interests in order to satisfy their expectations and to reach a compromise [7, 14, 20]. Therefore it is really important to establish mechanisms to promote the communication and motivation during the negotiation process as for the ability to take decisions, administrate conflicts, overcome disagreements and reaching a deal [2].

This research was motivated by a real problem presented by the Brazilian Ministry Defense where the Agencies need an system that makes available information about the excess of products and the capacity of existent services, support the negotiation process between the offering and demanding Agencies also registering the details of the negotiations.

The objective of this paper is to propose a WEB computerized environment that facilitates the negotiation process of products and capacities of services in excess, stimulating the cooperation among their users. The main idea is to apply the concepts of Computer Supported Cooperative Work to the building of this Negotiation Support environment.

The study can be analyzed under two points of view: the logistic point of view and the technological point of view. From the logistic point of view, the elaboration of a cooperative environment to support the decision taking in the negotiation process assumes great importance because of the great difficulty in establishing efficient mechanisms of communication and the sharing of information. Those difficulties can be reduced through this cooperative environment [15, 23, 25]. From the technological point of view, the proposed computing environment involves the integration of distinct research areas: CSCW [1, 8, 16, 22, 26, 27], Negotiation Systems Support (NSS) [9, 12, 18], Electronic Supply Chain Design (e-SCD) [13].

The remainder of this paper is organized as follows: Section 2 discusses some considerations about the inventory and the reasons that can result on an excess of products and services despite the good management of that inventory. As the objective of this research is to propose a model to facilitate the negotiation of these products and services in excess, through a cooperative environment, still on this section, some formal aspects of the negotiation process and a general view of the CSCW will be presented. Section 3 presents the proposals to facilitate the destination of the excesses and a brief description of the real case used as an example for the research. Section 4 discusses the conclusions.

2 Formal Aspects of the Problem

2.1 Inventory

The inventory is essential to the logistics function because it is usually not possible or practical to provide instant production or certain delivery times to costumers. Thus, the two basic functions of the inventory are to provide the production and to maintain sales. The objective of the first function is to guarantee the production without interruption, eliminating the risks of stopping because of supply problems, and enhance the efficiency of the productive process. The second function of the inventory is to attend the demand floating and, as a result, enhance the costumers service level [4, 5,21].

While the functions above induce the adoption of great inventory level, some critics defend the reduction of inventory up to the minimum possible level based on the fact that the costs associated to the inventory management (capital, stocking, moving, and others) turn into expenses that affect the companies profits. Besides that, the company loses the opportunity of other capital investments. On this thought, mechanisms were proposed to reduce the negative effects of inventory on companies finances or reducing the inventory completely with techniques as the Just in Time (JIT) [17, 19, 21], raising their competitiveness.

However, in many situations, it's necessary to keep some quantity of raw materials, supplies and final products inventory to guarantee the production and sales; even if the estimate of the ideal level of stock becomes impossible, given the time variations of resupply in the logistic system and oscillation of demand.

The inventory maintenance can enhance the level of the service offered once the costumers can be attended with products and services immediately [11, 21, 24]. For the

organizations, this characteristic means competitive advantage, avoiding lost sales or even increasing the sales level.

Another advantage on keeping inventory is related to the saving that can be obtained by the acquisition of raw materials, production and transportation when done in large scale. Concerned to acquisition, we can mention the advantage of anticipated acquisition of products with variable prices, guaranteeing the best price [4, 21].

An additional factor that stimulates the creation of inventory, being remarkable in some organizations, is the reserve inventory maintenance to protect against unplanned and unanticipated shocks like labor strikes or natural disasters [21].

After justifying the need of keeping inventory, it is also important to present situations where it is possible to be created exceeding inventory without being a management mistake.

The nature of the demand influences the inventory management directly. For example, a great number of products and services have seasonal demand as in case of the products related to the celebration of Christmas and Easter. After those periods have passed, those products and services can stay for long time in inventory.

Other characteristic that can influence the inventory is the irregular, or erratic, pattern of some product's demand. An example of that behavior, mentioned by Ballou [21], has happened some years ago with some big and small cars sales. Because of the oil crisis in 1973, the increase on fuel prices provoked an increase on small cars sales, compared to bigger ones, getting the producers unprepared for that, resulting in an exceeding inventory. Soon, the worries of the costumers about fuel prices and the crisis got down and the

preferences came towards the bigger models, creating a lack of bigger cars and exceeding inventory of the smaller ones.

In inventory management, besides the demand characteristics, you should consider the “life cycle” of a product. The life of a product, based on the logistics point of view, does not end with its delivery to the customer. Products may become obsolete, damaged, or simply do not work, so they may be returned to the origin to be disposed, repaired or recycled. The management of the products reverse flow is called Reverse Logistic [3, 10]. Once back to the warehouse, depending on their conditions, the recycling can be managed as exceeding destination.

Besides the logistics aspects that may influence the inventory level, you have to consider the psychological aspect. Some managers under stress conditions such as market pressure, for instance, or just because of insecurity in some situations, may establish quantities of final products or acquisition of raw materials beyond the ideal, resulting in excess.

Considering the facts presented, it is extremely necessary to establish strategies to recycle the exceeding inventory, either through the reuse of the inventory inside the own sector of the company or through the negotiation of those products and services with other sectors or other companies that represent compatible demand with the created offer.

The objective of this research is to propose an environment of cooperation to facilitate the negotiation among the users responsible for the supply offer and demand of products and services in order to obtain accurate inventory level. Inside the context of this research, accurate inventory level should be understood as the sufficient inventory quantity of

supplies and raw materials to guarantee production without interruption and final products to ensure the level of service offered, without having excesses.

For a better understanding of the presented proposal, on the following sections, some formal aspects related to the Negotiation Process and about Computer Supported Cooperative Work will be presented.

2.2 Negotiation

The Negotiation is present in the everyday actions of the organizations in several relationships - among managers, employees, suppliers, and costumers. All of these relationships require constant negotiation. Sometimes the skill of the negotiator is responsible for the difference between profits and damages of a project. This is the reason why negotiation is of great importance on the companies development.

Two concepts of Negotiation will be presented as follow:

“Negotiation is the process of reaching objectives (goals) through an agreement in situations where there are common interests and divergent ideas, interests and positions. It is related to communication, shared decision process among the parts and solution to the conflicts” [7].

“Negotiation is the communication process with the propose to achieve a comfortable agreement about different ideas and needs”[6].

In both definitions, the authors remark the great importance of communication in the negotiation process. The decisions have to be taken by the group. In the actual organizations operating in a dynamic market and which are geographically distributed, in order to take decisions in group with the participation of all parts, the negotiation has to be

made faster and in a cooperative way, no matter the location of the negotiators nor the strategy and kind of negotiation adopted.

This way, the technology becomes extremely important attending the necessity of the process and management of data and information related to each situation so they can take the right decision according to organizations objectives. Therefore, it is necessary to develop applications that provide support to the negotiation process promoting the best information management through appropriate resources as the Internet, for instance.

In this context, the E-Negotiation [12] and Negotiation Support Systems (NSS) appears. E-negotiations are negotiation processes that are fully or partially conducted with the use of electronic media (EM), which use digital channels to transport data. EM may support simple communication acts between the participants (e.g., email, chat) or provide tools that allow for complex, multimedia interactions (e.g., e-markets, electronic tables) [12]. In addition to EM, there are several other systems that for some time have been used in decision making and negotiations as the NSS. NSS can be defined as a class of support systems designed to promote computing support to the negotiation process, the search of consensus and the conflicts resolution [9, 12, 18].

Those new technologies present great possibilities of information exchange used in the negotiation process, remarking that the great challenge is to use the technology to promote the integration and cooperation among the negotiators involved on it.

Another main point is the way to negotiate. There are two ways which are the bargain of proposals and the solution of problems. In the bargain of proposals, the basic conduct is the exaggeration of advantages and the reduction or the fact of not mentioning the

disadvantages of your proposal. This type of negotiations results in bad quality solutions [2, 20].

In the negotiation based on the solutions of problems, it is necessary to know and follow all the steps of the problem solution and the decision taking, as problem definition, the diagnostic of the situation, elaboration of alternatives, choosing a solution and implanting the decision or deal ([2], [20]).

An example mentioned in Martinelli et. al. [2] where the negotiation through problem solutions seemed to be advantageous is the case of Wal-Mart and Procter&Gamble, that have decided to adopt the approach of problem solutions. As a result a inventory system was created saving millions of dollars for both companies, strengthening the relationship between the two companies and generating business around 3 billion dollars.

As in every process, the negotiation requires some steps that should be observed. However, those steps do not need to be followed in a strict manner, in some cases they can even be suppressed.

Below, the steps of the process will be presented according to the research presented by Fisher [20]: 1) Preparation, 2) Opening, 3) Exploration, 4) Presentation, 5) Clarification, 6) Final Action, 7) Control and Evaluation.

1) Preparation: is the initial planning. The other negotiator is not present yet.

2) Opening: the main objective of the opening is to create a propitious atmosphere for the negotiation. In this step the objective of the negotiation is defined, reminding to remark the mutual benefits that the proposal can bring. After that it's necessary to define how the parts are going to work.

3) Exploration: in this step we try to clear the needs, expectations and motivation.

4) Presentation: it is in this step the exposition of the proposal to each other describing the products, services or ideas, detaching the points that the other part considers the most important and that were discovered during the last step. Next, show the solutions and benefits that the proposal offers to the other negotiator.

5) Clarification: Even if the presentation step had been as clear as possible, there will be doubts to be clarified at this point.

6) Final Action: in this step the business deal is closed.

7) Control and Evaluation: this step is developed without the presence of the other part. After the final action, what is left is to control the agreement and take the necessary actions to realize what has been negotiated. We should still compare the predicted with the realized in the negotiation; analyze the concessions and their consequences and take notes and observations that will be used in the next negotiation.

2.3 Computer Supported Cooperative Work - CSCW

CSCW stands for Computer Supported Cooperative Work and may be defined as the research discipline for the techniques and methodologies for group work and how this technology may help this work.

The word groupware had been used by Peter and Trudy Johnson-Lenz in 1982, but started to be adopted by CSCW community to define the technologies that try to implement CSCW systems [8]. This way, while CSCW is used to determine the research in the group work area and how the computers may support it, groupware has been used to determine the technology (hardware and/or software) created by the research in CSCW [1].

For Ellis *et. al.* [1], the objective of the groupware is to give assistance to the groups in communication, cooperation and coordination of their activities. Those authors define

groupware as “computer systems that assist groups of people involved in one task or common propose through an interface to a shared environment”.

According to Baecker [22], CSCW and groupware represent a paradigm changing on the computer science, because what is detached is the coordination, communication and solutions to problems between human-human instead of human-machine. Baecker also mentions Lynch, Snyder and Vogel (1990) to make a distinction between common software and groupware software [22]:

“... groupware makes the user aware about that he is part of a group, while most other software seeks to hide and protect the users from each other...”

Alternatively, Borges [16] considers that the systems that promote the communication among the members of a group work, as the electronic mail, are groupware systems, because they contribute to a bigger result than the total of individual contributions.

It is necessary to establish the difference between multi-users systems and the ones directed to group work. The first ones, for example the Database Management Systems, can just permit the indirect interaction that goes through the visualization of common objects (data). The direct communication among the users is not present in these systems, a main characteristic for the cooperative work.

Besides that, Databases and Net Servers can mistakenly be considered as groupware because of the fact that they allow sharing of the resources. The main role of those systems is to provide support to the groupware be constructed with the necessary functionalities. Database Systems, for instance, do not consider the needs for communication within a group.

Therefore, tools to support cooperative work include communication mechanisms that allow people to see, listen and send messages to each other; sharing mechanisms that allow people to work in the same work space at the same time or in different moments; and information sharing mechanisms that allow the work of several people on the same information base.

In the first group of CSCW tools you will find message systems that support the asynchronous exchange of text messages among users groups. The electronic mail system, the discussion lists, the bulletin boards and the newsgroups are some examples of this type of application.

The basic difference between the e-mail and the bulletin board is the fact that, in the first one, the communication is made straight to a person being stored in his mailbox up to the moment he decides to check it. In the bulletin board, the user has available information directed to the group.

In another application class, there are some multiuser editors. Members of a group can use editors to jointly compose and edit an object, being a graphic, a text or any other object.

Electronic meeting rooms are other kind of tools that offer hardware and software support to assist face-to-face meetings. Generally those systems include assistance to the meeting preparation, generation of ideas, organization of proposed ideas and decision taking, with several workstations and audio and video equipments.

The applications for conferences allow their participants to exchange information at real time, being used in large scale on the Internet. The most common example is the Chat. The Chat is a synchronous communication tool that just allows text information exchange. On the same line there is also the Instant Messaging that can be understood as the

communication systems that also provide availability awareness. Examples of these kinds of applications are the ICQ and Yahoo Messenger. Still in the same class of applications, there are more advanced systems that allow the exchange of audio and video which are known as the teleconference, videoconference systems.

3 SYSTOC: A Cooperative System to Support Inventory Leveling Negotiation

The motivation to this research came through a real case that was presented by the Brazilian Ministry Defense (MD). The Agencies wish to offer, to other Agencies or departments, products and services they have in excess, avoiding losses and resource wasting.

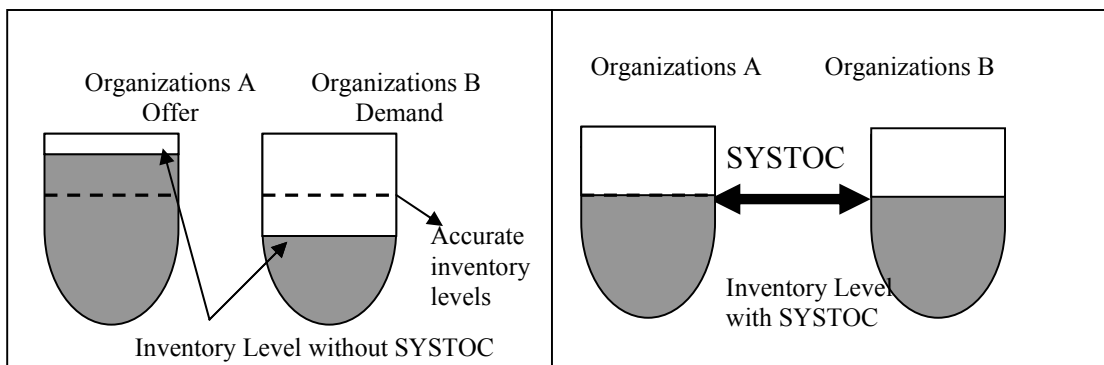
Trying to solve the problem, the MD required the elaboration of a plan to the development of computer environment on the WEB capable to make possible the negotiation of materials and services. The system will also be able to make all physical control of the material transactions done among the Agencies, as well as the corresponding financial credits.

That way, with the system, the Government will be able to optimize the application of its resources, avoiding to acquire of products and services in the market which are available somewhere else, anywhere in the country.

At first, we made an analysis to identify the characteristics and particulars of the matter. After that, based on the specified requirements, a system was proposed. According to the general aspects of the inventory, presented in section 2.1, we can conclude that there are several factors that influence its management, resulting in excesses of products and/or services even if a logistic management mistake has not occurred.

This way, the main objective of the research is to elaborate a system model to support the negotiation process among users in charge of the demand and offer of products and services, stimulating the communication and cooperation among those users in order to reach a common objective, the optimizing of its resources applications. This idea is to motivate a negotiation based on the solutions to problems.

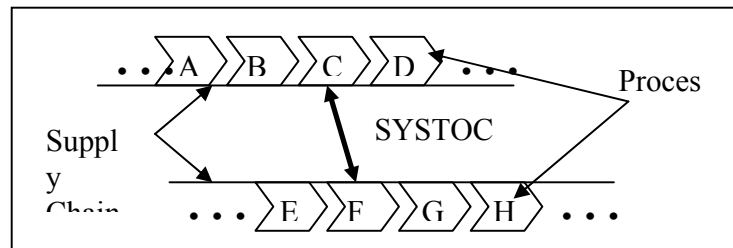
The organizations involved in the system present a lack of balance in their inventory levels. Therefore, the system should act as a tool to promote the balance among those organizations in order to be possible to reach the respective accurate inventory levels. The picture 1 represents this vision of the system:



Picture 1 - SYSTOC vision as a tool to obtain accurate inventory levels

Another important aspect of the case that appears as motivation to the system comes from a concept that allows several companies to improve efficiently, which is the Electronic Supply Chain Design (e-SCD). e-SCD is a supply chain design to integrate and coordinate suppliers, manufacturers, logistic channels, and customers using information technology (IT) [13]. This way, through the information exchange among processes, adjacent or not, in the supply chain, which present demand and offer of compatible products and/or services, it's possible to integrate those processes allowing the inventory reduction in one point of the chain and the attending of the demand in another point. The

picture bellow represents this vision of the system as a tool that facilitates the integration of these processes, once the system promotes the cooperation and the communication among the processes.

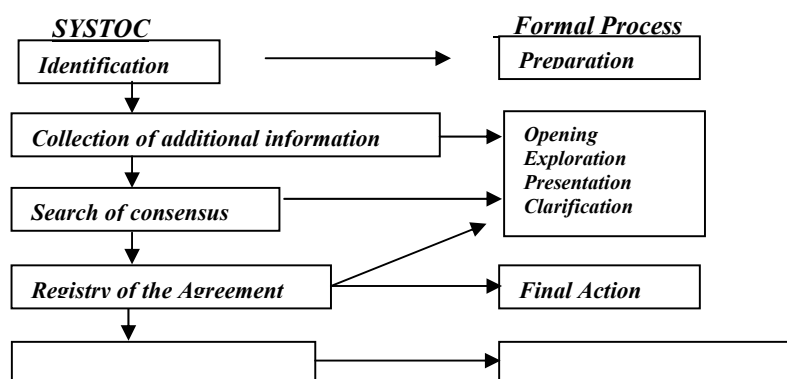


Picture 2 - SYSTOC as a tool for process integration

In the proposed system, the ideas and concepts of Computer Supported Cooperative Work (CSCW) and Negotiation Support Systems (NSS) are adapted to permit the users to have a cooperation environment in order to negotiate and reach accurate inventory levels, optimizing the application of their resources, which is the main objective among those users.

The research has been developed based on the negotiation process steps, which were described in section 2.2. For each step of the process, the objectives were identified and potential uses of CSCW were determined in order to facilitate its execution, reaching the identified objectives.

To facilitate the presentation of the proposed ideas, it was elaborated a new scheme of the negotiation process steps. This new scheme was defined according to the particular characteristics of the scenario where the system was idealized. In picture 3, the proposed negotiation scheme for the SYSTOC is represented, as well as its mapping for the formal process steps.



Picture 3 - Negotiation Steps among SYSTOC users

In the *Identification* step, besides the initial planning as well as in the preparation step, the identification of offers and compatible demands should be realized, that is, identifying offers that should attend the requirements of a certain demand.

In the second step, *Collection of additional information*, the users should start the information exchange (Opening and Exploration), present the proposals (Presentation), clear all possible doubts (Clarification) and confirm the interest on the product or service negotiation.

After confirming the interest of the involved parts, the next step is the *Search of consensus* (Final Action), where the users should reach an agreement regarding to the price, ways of payment and other considerations of the negotiation.

The next step is the *Registry of the Agreement* obtained in order to make the system offer to the users a history of the negotiations. This way, it will be possible to realize the negotiation *Control and Evaluation*, finishing all the process.

The system should present an interface that allows the users to make a register of their supplies and/or demands of products and/or services in order to be possible to provide information about exceeding products and capacities of existent services, helping the identification of the product or classification of the service, promoting and registering the attending of the needs.

The kinds of negotiation that should be done in the system are exchange, acquisition, donation, loan and auctions. Each kind of negotiation presents certain particulars that should be considered. Therefore, generically, we can observe that there are procedures related to these kinds of negotiation that, if efficiently executed, can improve results. These are the common procedures that will be considered in this research.

Next we will present the elaborated proposals. This presentation has been divided into topics. Each one corresponds to a specific function of the system.

3.1 Identification of offers and compatible demands

In the first step of the negotiation process of SYSTOC, the Identification, an initial planning is done. In the context of this research, it's necessary to identify demand(s) compatible with the registered offer(s). In this step of the process, the idea is to permit the identification by the user or by the system itself.

To make possible the automatic matching between these offers and compatible demands, the information related to products and services registered should be inserted in the system carefully. A proposal to facilitate the identification of demands and offers, even by the users or by the system, is to establish a classification of the products and services registered. For each category it's permitted to create a subcategory which hierarchy and granulates should be determined according to the nature of the product and service mentioned.

For example, a user to register a demand of 50 pills of analgesic, the system should present an interface that allows the user to follow, without additional work, the following hierarchy: Health/Medications/Analgesic/Pills.

Besides that, for products and services that can be quantified, the users should specify the exact amount of the product and or service demanded and offered.

However, the way in which this automatic identification will be processed does not belong to the context of this research. What is important is to show how this functionality can contribute to the negotiation process.

Once identified the offers and compatible demands, the system should notify the users in charge of the offer and demand. This way, the negotiations can be stimulated and accelerated by the system.

The proposal is the creation of a virtual user that should play the role of “Negotiation Agent”. From the moment that one of the users involved in the possible identified negotiation registers the entry in the system, a virtual user called “Negotiation Agent” should be displayed on the screen and a notification message will be sent to the user. This option presents a virtual claim and an additional facility for those users who don’t have the habits of accessing their mailbox frequently.

If there is just one compatible offer to a certain demand, the system should identify this crossing data and notify the interested users.

However, a possible situation is the existence of more than one demand to a same offer or more than one offer to something a single demand. In both cases, it can be useful and even necessary that the system defines an evaluation scheme of the possibilities establishing a priority among these users in charge of supply (in case of more than one offer) or users in charge of demand (in case of more than one demand), that is, the system should process a Ranking among them

At this point, the idea of a virtual user can be processed. The “Negotiation Agent” can have the posture of a decision agent facilitating the taking decision process of the users in charge of the offers or demands proposed. It’s important to remark that this decision agent has a passive behavior, that is, the decision will always be taken by the user that has the permission to process this operation, knowing that the virtual user should be the facilitator.

A proposal to prioritize competitive demands is to evaluate them through an analysis of the history of their offers, that is, the system should give benefits to those users that present a larger number of products and service offers. Therefore it is convenient and fair to establish some criteria for this evaluation. These criteria should be evaluated hierarchically if there’s an impasse:

- The balance of between debit and credit of previous successful negotiations.
- The number of previous offers of demanding user that resulted in successful negotiations in the past.
- The number of previous offers of the demanding user

The history evaluation of the offers to determine a priority among the users should be seen as a way to stimulate the product or service offer and the use of the system as a consequence.

Still concerning to these *Ranking*, another possibility is: for each compatible user groups, evaluate the distance between them, the transportation facility for the offered product and/or the facility to execute the service. To make possible to calculate those distances and implement this functionality, the location of the products and/or the registered crew that will execute the service is vital. Besides that, the available transportation services among the registered users should be registered.

3.2 Interaction among system users

In the steps Collection of additional information, Search of Consensus and Registry of the Agreement it is essential to stimulate the communication and cooperation among users to facilitate the information exchange and the development of the negotiation process.

The electronic mail systems can be used to make possible the asynchronous communication among the users of the system.

The available resources in the Instant Messenger tools can be adapted in order to identify the online users and exchange information at real time using a CHAT, promoting an informal communication among these users which is extremely important to the success of the negotiation process.

Another option is the use of the bulletin board tool. On this bulletin board, the users who need a more explicit advertisement of their offers/demands will be able to communicate through a free area and shared by a group, being able to attach, read and answer the available messages. To facilitate the use of the tool, filters can be added in order to help the users select the information by material/service category or by users classification. Other filter options can be added if suggested by the users. This alternative provides the users a graphic facility to highlight the advantages of their proposals, for the products and services offers as well as for their demands.

3.3 Negotiation Process Monitoring

The steps of a negotiation can happen steadily, or not, during the life period of the process. In the Identification, the users identify a possible negotiation according to the presence of offers and compatible demands. Next, the steps additional information Collection, Search of Consensus and Registry of the Agreement occur where the users

initialize an informal communication, present their proposals and objectives, clear possible doubts, confirm the interest in negotiating the product or service and, if possible, reach an agreement.

The idea of the virtual user can be adapted to the whole negotiation process monitoring. The forward messages should provide information about the situation of the negotiation process associated to the user. Based on that, attached to the message, there should come the e-mails of the users associated to the negotiation and links to allow the users direct access to the system at the point where they should place some activity.

As suggested before, the monitoring begins in the identification step, that is, whenever an offer and a compatible demands are identified, the system should participate the users through the messages that will be notified by the virtual user. Bellow is a message model sent to the offering user:

“ This message is a notification to inform that it was identified one demand for your product or service. To collect additional information and to know details of demand, http://bms/link_demand_identify. To cancel offer: http://bms/link_cancel_offer “

Picture 4 – Notification Message - Identification step

As soon as a user, offering or demanding, starts the additional information Collection step, the system should send a message to the users warning them about the beginning of a new negotiation.

If one of the users to interrupt the negotiation, the system broadcast a message to the others informing them about the interruption publishing the reason for the cancellation.

On the other hand, if all the users want to go ahead with the negotiation, the system should send frequent reminding messages to the users until the conclusion of the

negotiation, that is, up to the moment one of the users registers the agreement, concluding the negotiation.

This monitoring, besides promoting a faster negotiation among the users of the system, can be understood as another facilitator to the process once it can identify and stimulate possible negotiations.

4 Conclusion

To specify the requirements of the system requested by the Brazilian Ministry Defense it has been necessary a careful study about the Inventory and its Management. With this study we were able to identify situations where the exceeding inventory is inevitable even if a management mistake has not occurred.

The solution to that problem proposed in this work was the negotiation of these excesses. This is the point where this research gives its major contribution: the elaboration of an cooperative environment to the involved parts in that negotiation, facilitating the decision making.

In the proposed system, the use of CSCW, NSS and e-SCD tools has been analyzed. In this way, we could identify tools that can be appropriately adapted to each step of the negotiation process.

Therefore, this work addresses a new context where information technology (IT) can aggregate value, through the CSCW, providing support to the Negotiation Process among organizations and facilitating process integration on the Supply Chain.

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