Information Technology and Workflow Technology for Enhancement and Strengthening of Companies in Maritime Sector

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Abstract. The relatively recent term of Workflow Management Technology System implies exactly a system related to the main actions on the available information and actions to take, namely the communication of information and coordination of related actions.

Workflow Management Systems are capable to manage and use centralized databases and Database Management Systems and they are either stand-alone systems or embedded in ERPs (Enterprise Resource Planning). They are coordinating information and actions and utilization of respective available resources.

In relationship with these Workflow Management Systems, three main issues are generally arising: at first the awareness (relevancy) of the information, secondly the control of information and thirdly securing (privacy or vulnerability prevention) of transmitting information.

Keywords: database, information, information technology, workflow management systems, crisis situations, maritime company

1. Introduction

Nowadays, we have already entered the quaternary economic age and some of the analysts are saying that we entered the post/industrial service economy or the post-industrial information age, which is characterized by globalization of the economy and digital revolution; the vast majority of the “workers” of this age are those that are involved in the transmission, processing and receiving of information.

Information technology and related microelectronics is perhaps the most important factor of economic growth that has derived substantial political interest and is emerging from latest technological development and evolution. Microelectronics has had the potential to alter substantially both the quantity and the quality of work that is offered on its basis.

According to this new evolution, cooperation has been defined as working together of humans and/ or computer applications, to accomplish common and compatible goals. The present and future cooperation and collaboration have substantially improved in the last three decades by occurring of the new information technologies based on the microelectronics.

The present paper is taking into consideration the information and workflow technology used to manage information in order to enhance and strengthen cooperation in generally and for the strengthening and enhancement of the cooperation in the maritime sector, in particularly.

In the next section of the paper, I will be presented the various types of information and their utility for the maritime sector. In the third section will be presented various issues and advantages which are occurring with regard to the information contained in Database Management Systems (DBMS) and used by the Workflow Management Systems (WfMS) and how these issues can impact on the activity in the maritime sector, but some solutions to the problems are also given.
2. Areas for the utilization of information within the WfMS in the maritime sector

Workflow management system engines are designed to use and manage information pertaining to Database management systems. There are two specific cases of using Workflow Management Systems: the case of using the system in crisis situations and the case of using the system in non/crises situations.

In various crises situations (such as terror attacks on ships or wrecks) the information, its management and communication as well as the coordination of the joint efforts to solve the situation or to attenuate the effects of the respective occurred crisis are essential for such events. In such cases, besides the general conditions above, imposed to the information, other important aspects are related to the rapidity and correctitude of the transmitted information, as well as adequate warning systems related to the occurred situation.

For the case of the non-crisis situations, it is obvious that the general conditions and characteristics imposed to the information prevail. Depending on each type of situation and of information, it will be decided how the respective type of information relates within the WfMS and is able to solve the issues occurred on the subject ship.

There are various types of information acquired in DBMSs that WfMSs are working with, each kind of data serving to a specific area of utilization\(^\text{[1], [2], [3]}\). In the next subsections of this section of the paper some of the most significant types of information will be enumerated and presented from the viewpoint of their importance and utility and of the actions to be taken within the respective WfMS.

2.1. Information in crisis situations

One type of information of paramount importance refers to the management of crisis situations such as acts of terror/ piracy or wreck situations. In these situations, previous information and knowledge for going out of the critical situation, is crucial. The knowledge beforehand of the sea bottom and of the sea condition and sea weather, of the steps to be taken in case of a wreck, the knowledge of the sea areas with pirates or methods to avoid or to deal with the terrorists if necessary, could solve in many cases the crisis situations occurred.

This kind of information is on one hand historic information gathered and stored over time in databases of previous events or is real time information provided by audio equipment and video cameras or other surveillance equipment very useful for the respective situation, on the other. Applying the corresponding methods and techniques, the previous knowledge and information has the potential to solve the respective issue, or to minimize the consequences of such crisis situations.

2.2. Information in situations of medical issues

The information on this kind of situations refers to the frequency of medical issues registered in the maritime sector, which are most likely to occur to members of crew during the voyage and the optimal solving methods of the respective medical issues more often occurred. The action to be taken is that each vessel should be prepared for the medical issues of high frequency and in the cases of rare medical issues the communication and cooperation methods with medical personnel on other vessels or on the shore if necessary, is to be applied. This is to be done using the existing Information Technology, that is to say the video communication with the shore or with other ships on sea having medical personnel or medical knowledge onboard.

2.3. Information about the crew of the subject vessel

This type of information is essential for the operation of the vessel in safe and good conditions, so that the entire personnel on the ship is mastering the stuff he should know but also that the entire crew is fit to perform the duties and tasks necessary to be carried out on the ship. When a certain rate of human errors is exceeded then the identification of the responsible crew members is required and the actions to be taken are referring either to the training or to the replacing of the respective personnel of the ship.
2.4. *Information with regard to the shipbuilding and ship repair of the subject vessel*

The information history of this type of data referring to the shipbuilding and ship repair history of the subject vessel is very useful, since it is recording the defects incurred onboard of the vessel. Hence, one can conclude about the quality and cost of components supplied by various suppliers but also about the quality and cost of the manpower employed in order to build or repair the subject vessel of the company.

Based on this type of information the owner of the vessel or his representatives can decide about one component supplier or another, about a certain shipyard to build or to repair the ship or another and this is fostering the competition between various suppliers of products and services and their own competitiveness but also their capacity to innovate in order to satisfy more and more demanding client companies.

2.5. *Information regarding harbour operators and harbour services offered to the subject vessel*

The history of the interaction with various operators in different harbors, their behavior towards the vessel’s personnel, the quality of the services offered, their costs and their rapidity in delivery of the respective services are all influencing the decision about choosing one or another harbor operator. This decision is influencing not only the owner of the subject vessel and respectively his representatives, but eventually also the quality delivered to the clients of the owner who requested the services of sea transportation.

2.6. *Information regarding the clients’ demand and the complexity of the demand*

The phenomenon of globalization and internationalization of markets has as result an ever increasing complexity of demand, the clients becoming continuously more sophisticated and more experimented in regard to the products and services they require and receive. Information about the satisfaction level of the clients is nowadays crucial for survival of businesses in such a competitive environment created by globalization. Based on this information from clients, the owner or his representatives can decide about what is to be improved in the future and the wish to improve could lead even to innovations in the business or in the business model. This information is gathered with the help of the technology, but as a consequence the technology itself could be in future improved using the data acquired with the utilization of present technology. This type of sources of innovation using the technology leads also to the creation of competitive advantages which are essential for the survival of the respective company, but also of its suppliers.

3. **Conclusions. Issues and advantages regarding the information within DBMS and WfMS**

The information is in generally exposed to various influences which can either cause the serious impairment of the respective information or it can cause a beneficial multiplying effect.

Some of the bad influences on information are due to the behaviour of the men, such as can be found in [6]. It is well known that in generally, the behaviour of a person is a function of the respective person and of the environment. The second variable of the function of behaviour, that is to say the environment is of paramount importance for the maritime sector, since it is known that the seamanship is sometimes a very difficult and stressful job to do, on the one hand because on the sea the weekly break is affected and on the other hand because of the distance between the seaman and his family.

The subject personnel on the ship can thus try to manipulate, from different reasons, some information which should be known from the rest of the crew. The information can refer, for example, to errors in the activity on the ship of some of the crew members. This happens because the persons in generally and the crew members in particularly in our case, are usually trying to avoid punishment and are trying to receive reward. Therefore, seeking the reward and trying to avoid punishment, some of the crew members are manipulating crucial information on the ship, using various manipulation techniques.
such as: hiding information, not handing over timely the information or even falsifying the information. The manipulated information can be restored in its proper form, partially with the help of the technology using, for example, fixed of mobile video cameras, or other available surveillance techniques. This information can be historic or real time information which is either already stored and can be accessed or it can be received instantaneously.

The elimination or the reduction of some serious risks due to available information in DBMS or the real time information in cases of preventing and managing crisis situation such as acts of terror or wreck situations, the use of information and technology in medical issues with high frequency or in rare medical cases is to be made by taking the actions according to the respective WiMS.

The existence of any company and of a maritime company in particularly, can be endangered twofold: firstly through the increase of its costs and secondly through the decrease of its sales. Besides the above solutions, other good influences are regarding the information pertaining to this very existence of the sea transportation companies, as follows:

Information about the quality and the costs incurred on the sea or in harbours regarding the suppliers of the maritime company, for the “production” of the transportation services on the sea, the costs and the quality of the ships being built or repaired in different shipyards as another category of suppliers for the maritime company are both fostering the competition between and the competitiveness of the respective suppliers and also leads to a better cooperation between different suppliers being part of a certain physical or virtual conglomerate of suppliers, for the best of all the members of the respective conglomerate, as in [5]. The quality of the services received by the maritime company and the related cost efficiency are thus, both increasing. Moreover, the suppliers found together in this competition will increase themselves their productivity and their differential advantages with benefits for the entire maritime business industry.

Information about the clients of the company and their level of satisfaction, the complexity of their demand and their level of sophistication or experimentation, all this information is critical information for the survival and the success of the respective maritime company.

As in [4], it is well known that an unsatisfied client is producing five times more losses for the maritime company than the amount of benefit from one satisfied client. It is also known the fact that the fake news are spreading five times faster than the real news. Hence, the means to satisfy all the clients and to optimally fight the false information is essential for the best interest of the company. Based on the information available, the company can better understand each client in the first instance, and then it can intend to innovate for better serving the company’s’ clients.

Throughout the paper is transpiring the importance of awareness and of the control of the information presented. The availability but also the security of information are to be managed according to the nature of each kind of information and according to the hierarchy on the respective ship, since some of the above information should be known permanently to all crew, some information is to be known depending on the rank in the hierarchy on the vessel and some other information should be kept secret, because could either endanger the lives of the crew or could economically harm the maritime company itself.

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