

## The Efficacy of Usage Information Technology and Communication in Risk Management of Ports

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**Abstract:** This study was carried out in order to examine new technologies and performance of these technologies for providing on-time services in a safety environment to reduce and manage marine and port activities in major ports of the world. Today with respect to role and importance of commercial ports in economy, the ports are trying to increase their operational capacity through satisfaction of customer and attracting ship lines investors, the owner of goods and ports by making value added services. True understanding of all components of marketing particularly about important role of customers, is a positive step towards success and efficacy of marketing. But what is called risk of ports actually is the danger of customers loss, current customers' loss and not attracting of new customer the use and applying of risk management techniques as well as ICT and IT systems have plenty of effect on planning and decision making in multilateral environment. IT has increasingly been effecting on function and efficacy of organizations, public and private firms. Today the use of IT in risk management has an impact on kind of organizing automation activities in organizations and managing the cycle of making mechanical systems.

**Keywords:** Knowledge management, (Radio Frequency Identification) RFID, risk, vessel traffic services

### INTRODUCTION

Risk management is an essential management which made it possible decision making based on level of danger and it utilizes in the middle of IT personnel in all over the world. Risk generally means negative effect of vulnerability and attention to probability of its happening and the effects of it in process as of a system. In terms of quality, risk means expected loss of an occurrence, in engineering, risk means the result of multiplying of likelihood of an occurrence in the loss of its happening (Choi *et al.*, 2006). Thus, the level of low, high and medium risk and its consequences must be identified in order to overcome it. Risk management is a process of identification, evaluation and cause to reduction of risk to acceptable level which needs aiming. The goal of implementing risk management is to enable organization to reach following results (Lee, 2008):

- Further security for processing and storages systems in transferring information
- Management enforcement for justification and optimizing IT expenses
- Confirming the systems

Risk management has 4 stages:

- Analyzing the risk
- Evaluating of risk
- Risk control

- Survey of information after enforcing risk management

Rick of ports defines as the danger of sources loss, market loss, current customers loss and not attracting of new customers. These troubles caused important ports in the world utilizes IT techniques and communications to increase customers' satisfaction designed procedure and model posed for the ports as a perspective to enhance their operational capacity as you can see in (Fig. 1). The ports fully pay special attention to apply finance and by this view try to increase their share in global transportation and making new markets for themselves. By this view they tried to recognize customers' needs and decrease their costs with less risk (Williyams *et al.*, 2007; Lee, 2008).

In the next parts we will discuss about new technologies which some famous ports are using them.

### METHODOLOGY

**RFID application in ports:** The RFID (Radio Frequency Identification) in ports or identifying system which uses radio frequency is a wireless system and it can exchange data between a label on the good and main system, in fact it reads and registers the prices.

Labels are identification tools on the goods which we want to detect and readers are devices which can identify the labels and register the data. With respect to function

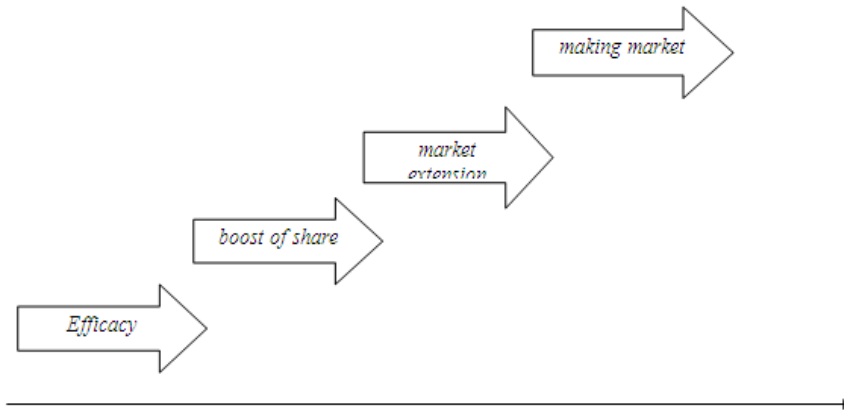


Fig. 1: Success model of ports

of systems which are based on changing radio frequency and electromagnetic waves, in order to amplify the signals in an environment we use some aeriels (Lee, 2008; <http://rojects.cs.dal.ca/panda/images/olapcolour.gif>; [www.navcen.uscg.gov/mwv/vts/vts\\_home.htm](http://www.navcen.uscg.gov/mwv/vts/vts_home.htm)). Some applications of this technology are: automatic registrations of containers, equipments. Trucks ... and determining the place of them at ports. The capability of navigating the container any time with the help of satellite.

The control of peoples' access to containers and equipments. With the use of RFID you can control traffic of personnel at port ([www.wisegeek.com/what-is-a-portable-pilot-unit.htm](http://www.wisegeek.com/what-is-a-portable-pilot-unit.htm)). Things like legal or illegal access, legal or illegal area in which individual or automobiles are some other things controlled by software and in the case of violation, the operator receives caution. With respect to large scale of embarking and preservation area, physical control of personnel in terms of having access to containers is difficult. In some cases the content of containers are put in danger. With instant inspection of personnel suspicious activities would be recognized. Software's can register the time of conducts between personals. Thus, shortly after committing misconduct, they can enforce the law.

The probability of error in such situations is not ignorable. Automation of this procedure with the use of RFID can be done ([www.adb.org/Evaluation/Linking-to-Results/default.asp](http://www.adb.org/Evaluation/Linking-to-Results/default.asp)). Labels are put on the container and the management determines each container with particular specification should be located in the area. To find container which wrongly located is very time consuming and bard and if the content of container would be perishable, the time spending to find it may cause to destruction of the content.

In some cases control of the content is necessary, so putting RFID labels which have temperature pressure and moisture sensor is an ideal solution. RFID is very economical in management container in terms of cost and time and RFID enables the management of port to identify

events that cause disorder and finding a solution ([www.adb.org/Evaluation/Linking-to-Results/default.asp](http://www.adb.org/Evaluation/Linking-to-Results/default.asp)).

**Characteristic electronic system:** By creating a characteristic system of bar code on containers which is controllable by RFID, identification and registration of containers hastened and even scan devices can identify containers from far distances. This system causes giving services to the owner of goods accelerated and looking for a specific container among several containers would be easier. Also this system provides input data for comprehensive system of management ([http://projects.cs.dal.ca/panda/images/olap\\_colour.gif](http://projects.cs.dal.ca/panda/images/olap_colour.gif)).

Right now many ports benefit strong infrastructure for developing IT. For instance posan could have suitable growth on this way. At posan port RFID, GPS (Global Positioning System), OCR (Optical Character Recognition), GCT (Global Communication Technology) are used (Lee, 2008; [www.adb.org/Evaluation/Linking-to-Results/default.asp](http://www.adb.org/Evaluation/Linking-to-Results/default.asp)). At gates and storages CCTVs and OCR can identify containers and trucks. At any point at the port GPS and RFID can control vesselstraffic. By wireless system containers can be controlled. Additionally, RFIDs can receive and transfer other kinds of information like moisture, temperature and pressure. Right now Homburg port entirely covered by wireless system and all communication has become possible through it. Wireless system is used to survey containers and other means of transportations. With the help of this equipment determination of temperature, moisture and situation is possible. At Homburg port all operators are equipped with hand-held processor which transferring of all data from port to control center id done by that.

With the use of RFID and its capability, one can analyze current risk and reduce them. Thus, with having a comprehensive system would reduce dangers like fire,

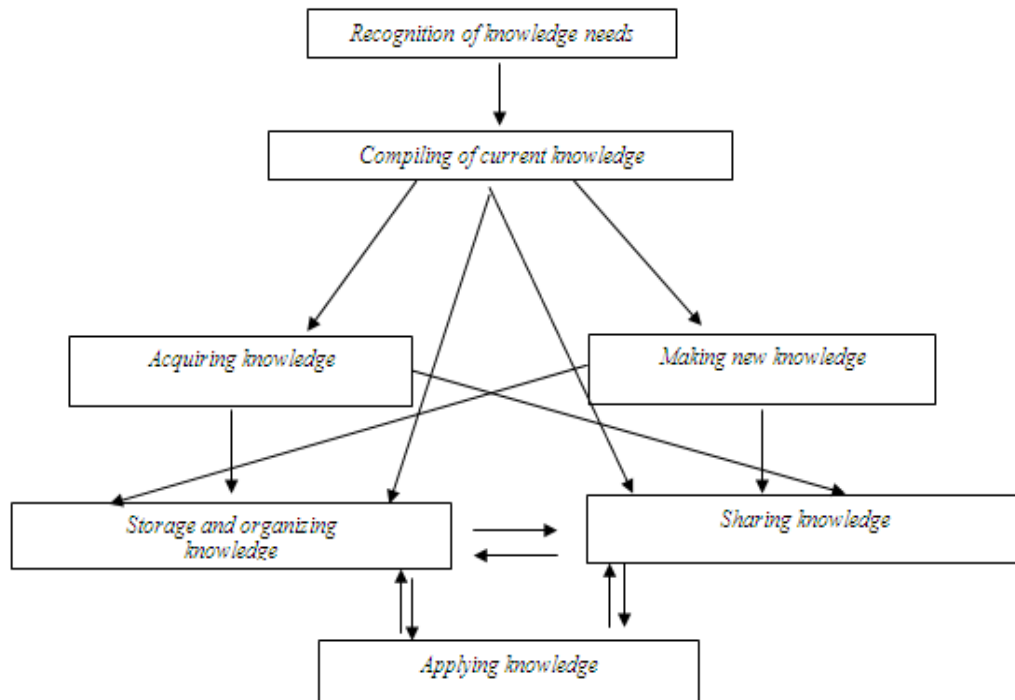


Fig. 2: Theoretical framework of knowledge management process

robbery, decay, injuries by using RFID. Thus, with having a comprehensive system of an ([www.navcen.uscg.gov/mwv/vts/vts\\_home.htm](http://www.navcen.uscg.gov/mwv/vts/vts_home.htm)).

**Smart railroad system:** Right now there is a smart railroad system at Jabal Ali in United Arab Emirates which is operated based on GPS, the system is capable to navigate the equipment quickly in the area of port and ascertain the cranes are in best position. Signals which sent and received from GPS make it possible to use system automatically and it can navigate from place to place (Lee, 2008).

**Knowledge management:** Knowledge management means analyzing accessible properties and the knowledge that use in a process and by which planning and enforcing controls in order to reach organizations goals. Rotterdam in Netherlands is one of many ports which utilized this kind of management to control the risks. Netherlands economy is passing industrial stage and moving to knowledge oriented economy, in such an economy value added activates increased and by that port will be the main element of economy and by the end of 2020 the project will have finished ([www.navcen.uscg.gov/mwv/vts/vts\\_home.htm](http://www.navcen.uscg.gov/mwv/vts/vts_home.htm); [www.wisegeek.com/what-is-a-portable-pilot-unit.htm](http://www.wisegeek.com/what-is-a-portable-pilot-unit.htm)). Full implementation of project involves making cooperation between port and active organization and firms, special training for active

personnel in special parts of port enhance the level of knowledge between personnel, designing knowledge plan or map for organizations and active firms and last not least making accessible the knowledge at port (Fig. 2).

Also Rotterdam port follows other important goal by implementing the project like, attraction of investigation firms and organizations for cooperation, promotion of applying new technological tools at port for communication, training new managers through universities, promotion the efficacy of training program, reduction of the time which spent for training experts and promotion of entrepreneurship tendency among personnel (Choi *et al.*, 2006; Lee, 2008). Knowledge management is based on 4 principles: leadership, organizing, technology and training. If you take a look closely, you will see Rotterdam port plans based on mentioned principles and there is special attention to investigation and training of students at university.

**Directing management of entering adrift to the port:** Nowadays directing entering a drift to the port is one of sensitive duty at the port. The guide at a port is one who standing at bridge and by the use of his knowledge tries to direct the ships and tugs. Since waterway may change in its route and ships might run aground, this part at port (directing the ships) is very sensitive. Right now in order to reduce the risk while directing the ships, the use of technological tools have become necessary. PPU is one of

them and in fact is a program to guide the ships enters the port safely. It is a portable computer which is used on deck and helps in decision making towards entrance and exit of ships. This system by utilizing GPS, DGPS instantly identifies the place and position of ships and other adrift. Other usages of this device are measuring stream, frost over the seas and determining depth of water at sea (Lee, 2008; [www.adb.org/Evaluation/Linking-to-Results/default.asp](http://www.adb.org/Evaluation/Linking-to-Results/default.asp)).

## RESULTS

Information technology revolutionized the way of communication. The news and actual use of information technology made everyone astonished. Moving towards information technology and electronic commerce to organize, improve and enhance the rank of economic activities is a very clear procedure. No manager rejects the need for applying IT and advanced technologies at organizations in our country (Choi *et al.*, 2006; Lee, 2008; Williyams *et al.*, 2007).

About PLC technology we can say that it is just at beginning point and investigation is very important at this point (Williyams *et al.*, 2007). Wining systems are those that act based on first step on this way and don't hesitate in applying new technologies. With respect to our geopolitics position in Iran and having access to sea and shores, we can apply this plan and by that enhance the rank of our position and benefit the advantages of system and reduce expenditures. Among important factors reduce expenditures (Choi *et al.*, 2006). Among important factors to attract investors and success in marketing Safety, reduction of risk and the speed of turning activates are 3 important factors which we can reach them by applying IT (information technologies) and take a giant step at marketing and special kind of that which called virus

marketing means kind of bandy soothing around marketing. Other experiences of some other ports can be used ([www.wisegeek.com/what-is-a-portable-pilot-unit.htm](http://www.wisegeek.com/what-is-a-portable-pilot-unit.htm)). What is important today for ports as an international chain is reduction of commerce risk and creating an environment based on confidence and trust in order to attract investors. Finally it can be said that the known ports of the world try to manage their commercial risk by exorbitant investments, in order to reduce negative effects and preventing disadvantages of losing markets and their growth inability; and un this path they have taken important actions for providing appropriate and safe picture of their ports, by using new information and communicative technologies. Therefore it can be acquired the highest effectiveness in economic and service activities and anything about advantages of user and supplier in Iranian ports by using information technologies (Lee, 2008; [www.skyetek.com/Portals/0/Images/solutions/Smart-Container\\_diagram\\_title.jpg](http://www.skyetek.com/Portals/0/Images/solutions/Smart-Container_diagram_title.jpg); [www.adb.org/Evaluation/Linking-to-Results/default.asp](http://www.adb.org/Evaluation/Linking-to-Results/default.asp)).

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