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SIMULATION OF LOGISTICS AND TRANSPORT PROCESSES

INTELLECTUAL OUTPUT N°1

DESCRIPTION OF THE MAIN TASK FOR THE REFERENCE JOB PROFILES

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Table of Contents

Table of Contents	. 2
1. INTRODUCTION	. 3
1.1 CONTENTS OF THE REPORT	. 3
1.2 JOB PROFILES, SIMULATION MODULES/TOOLS, DEVELOPING PARTNER	. 3
1.3 THE SIMULTRA SUPPLY CHAIN	. 4
2. DESCRIPTION OF THE MAIN TASK FOR THE REFERENCE JOB PROFILES	. 5
2.1 WAREHOUSE TECHNICIAN/EMPLOYEE	. 5
2.2 SUPPLY CHAIN DESIGNER/PLANNER	11
2.3 CONTAINER TERMINAL RESOURCE PLANNER	14
2.4 TRANSPORT CLERK	17
2.5 INLAND TERMINAL CLERK	20
2.6 CLERK FOR CUSTOMS PRACTICES	26
3. THE SIMULATION MODULE – FIRST DRAFT	31
3.1 LOGISTICS WAREHOUSE MODULE	31
3.2 SUPPLY CHAIN MODULE	39
3.3 PORT OPERATIONS MODULE	41
3.4 ROAD TRANSPORT MODULE	44
3.5 INTERMODAL PLATFORM MODULE	46
3.6 CUSTOMS PRACTICES MODULE	49





1. INTRODUCTION

1.1 CONTENTS OF THE REPORT

The document includes six specific reports realized by the SIMULTRA's project partners and referred to the description of the main task performed by the job profiles identified as relevant for the project objectives, i.e. the creation of simulators for logistics and transport operational processes.

The Output 1 represents the first and fundamental step for the realization of the project results. The description of the main task and all its features is indeed a pillar for developing a tool that has to simulate such task, as well as the process in which it is included, the documentation, the working environment, the communication modes, the actors involved, the timeline of activities.

Moreover, each single report provides also details and information on the job profiles identified as reference for the project, therefore are described the role, the position in the company, the set of Knowledge, Skills and Competences and other main information.

An additional section to what initially expected by this output, includes a first design of the simulation module and its main features (virtual environment, starting parameters, time and score of the game and other) that is preparatory for the realization of the Storyboard of each Simulator, therefore the precise and detailed description of the simulated environment and process.

Thus, the Output 1 and the sub-reports that are included, are useful not only for the SIMULTRA aims, but also for all those stakeholders that wish to implement, for example, a training for the concerned job profiles, as well as practical exercises, or any other training and research initiative.

1.2 JOB PROFILES, SIMULATION MODULES/TOOLS, DEVELOPING PARTNER

The following table summarizes the six job profiles identified and selected by the SIMULTRA's PPs as relevant for the Logistics and Transport sector. Each job profile is referred to a process/task that will be simulated through a simulation tool or interactive software. All the job profiles considered together represent an overall qualification, the one of the *Technician of Integrated Logistics*.

The job profiles and the tools are mainly referred to occupations and qualifications that are European level are generally belonging to the 4th and 5th EQF level, nevertheless few activities and profiles can be referred also the 6th EQF level (or experienced workers with a 4th and 5th EQF qualification), according to the countries' specifications. The tools are anyway mainly oriented and designed for training 4th and 5th EQF level learners, so for medium-high skilled qualifications, but thanks to different stage of difficulty can be in some cases useful also for high-skilled qualifications.

SIMULATION MODULE	REFERENCE JOB/PROFESSION	LEADER PARTNER
Supply Chain	Supply Chain Designer / Planner	U. ANTWERP
Port Operations	Container Terminal Resource Planner	U. ANTWERP
Logistics Warehouse	Warehouse Technician/Employee	CIFPA
Intermodal platform	Inland Terminal Clerk	ITL (CEPIM)
Customs Practices	Clerk for Customs Practices	ITL (CEPIM)
Road Transport	Transport clerk	AFT

Table 1. JOB PROFILES, SIMULATION MODULES, LEADER PARTNER





The names of the job profiles are not exactly the same of those indicated in the Application Form. This is due to the fact that the analysis of the process, implemented with sectoral specific companies, has shown that a slightly different terminology was more appropriate. Nevertheless, this small change does not impact on the process to be simulated, neither on the type of job that is simulated. Indeed, simulation modules keep the same name as indicated in the Application Form.

Although the project partners collaborate in all the project activities, the decisions are shared among the working group and ITL supervises all the implementation, each simulation modules have a developing leader, selected according to the competence, the experience and the reference operational field.

1.3 THE SIMULTRA SUPPLY CHAIN

Finally, it is important to underline that the six SIMULTRA's simulators have been identified in order to recreate the whole Supply Chain of a container imported by a European company/enterprise from an Extra-EU country.

Two different scenarios for the Supply Chain are included:

- Scenario n°1: the container transporting goods produced by a Chinese manufacturer is shipped from the Shanghai Port (China) to the port of Antwerp (Belgium). Afterwards, the container is transported by train to the Freight Village of Parma (Italy), where warehousing operations and customs clearance procedures are performed.
- Scenario n°2: the container transporting goods produced by a Chinese manufacturer is shipped from the Shanghai Port (China) to the port of Antwerp (Belgium). Afterwards, the container is transported by road to the Logistic Park of Zaragoza (Spain), where warehousing operations and customs clearance procedures are performed.

The two scenarios are therefore different for the type of inland transport used for transporting the container from the Port of Antwerp to the customer region/area, on one hand Italy/Romagna, on the other hand Spain/Aragon Region.

Nevertheless, it must be mentioned that the simulators will be not featured according to the geographic position, they will be "general" and therefore applicable to all the countries. Their modular structure will allow to create other and complex (more or less) Supply Chains, composing the various module together according to the aims of the training initiative.





2. DESCRIPTION OF THE MAIN TASK FOR THE REFERENCE JOB PROFILES

2.1 WAREHOUSE TECHNICIAN/EMPLOYEE

FEATURES OF THE JOB/PROFESSION

Title of the job/profession	Warehouse Technician/Employee (in some countries also Warehouse Manager, e.g. Spain)
Position (in the company)	The warehouse technician/employee depends hierarchically on the warehouse supervisor/manager. The warehouse technician has no dependents. It is placed at the same level as the administrative of the storage and reception services and the responsible for reception and shipment of goods.
Role (in the company)	He develops his functions on his own behalf and on behalf of others, organizing and managing the warehouse or storage service in companies of any sector that have a warehouse and / or logistics department, ensuring the level and quality of warehouse management within the logistics chain.
Main daily tasks	 Selection of handling equipment. Selection of locations: ABC Criterion Volume and geometric shape Criterion Receipt and registration of goods. (Labeling and coding) Storage Movement between locations and shipment of goods. Stock management: establish in WMS the possibility of security stock, minimum and maximum. (Communication to purchases department of need for reprovisioning) Inventory control (Inventory). Data management of suppliers, products and customers Statistics (turnover rates, coverage index, obsolescence, breakage, average stocks, other indices).
Qualification Level (EQF)	EQF 3: vocational qualification, EQF 4: technical qualification - Secondary School EQF 5: vocational qualification – Higher Technical Institutes (in some countries)
Main Competences	General Competence:To organize and control the operations and flows of merchandise of the warehouse, in accordance with established procedures and current regulations, and ensuring the quality and optimization of the network of warehouses and / or logistics chain.Competence Unit 1:To organize the warehouse according to the criteria and levels of activity planned.Competence Unit 2:To manage and coordinate the warehouse operations.
	<u>Competence Unit 3</u> : To collaborate in the optimization of the logistics chain with the criteria established by the organization





Type of company/ companies	In all productive, private and public sectors, and specifically in activities auxiliary to the transport of storage-distribution and logistics operators.
Sub-Sector/ Operational Field	Commerce Sector in the warehouses of wholesale companies, central of purchases of big and average surfaces, deposits and intermediate warehouses as well as small stores of points of sale in big and average surfaces.

Table 2: WAREHOUSE TECHNICIAN/EMPLOYEE - THE FEATURES OF THE PROFESSION

ANALYSIS AND DESCRIPTION OF THE MAIN TASK TO BE SIMULATED

	The workplace is a traditional warehouse with internal access to other workshops / warehouses and office area with the following characteristics:
	 Gates for entry and exit of goods from the outside with automated opening. ì Ventilation by extra-triflers.
	 Natural light (large roof skylights) and artificial light.
	Fan heaters
Working	 Equipped with Cantilever, conventional, compact and gravity shelves for the storage of any type and volume of merchandise. All locations are already identified with barcodes
Environment /	Picking area for small material
Job Place	 Handling equipment to transport, store and dispatch the goods: Conventional electric truck, retractable forklift, electric stacker, manual stacker, other equipment.
	Pallet wrapping machine
	Strapping equipment
	 Management area with table and chair equipped with: bar code readers, logistic terminal, Zebra label printer, portable computer with WMS software and portable projection equipment for wider viewing of the WMS software.
	Pallets of different sizes labelled with barcode
	<u>Contact with internal agents:</u> The WMS system allows communication with internal agents of the company (purchases, reception and dispatch department, manufacturing, quality, etc.).
	Contact with external agents: the contact with external agents (suppliers and clients)
Communication Tools	<u>Communication of goods receipts:</u> Communication through the WMS application by the merchandise reception department.
	<u>Communication for internal movement of merchandise</u> : Communication through the application of WMS by different departments: shipping, manufacturing, quality, etc.
	<u>Communication for goods shipments</u> : Communication through the application of the WMS by the shipping department.





Operational Tools	 WMS software Internal access to documents about quality, procedures, instructions, safety and hygiene standards, etc. Access to calculator Access to basic office tools (word processing, etc.) Communication with printer to print documentation and labels. Communication with barcode reader.
Internal Interactions (Internal Staff)	The internal interactions correspond to those referred to in the section on communication tools. Below are described in more depth: 1. Communication with receipt of merchandise: Although the goods coming from abroad can be received directly by the Department of Warehouses (logistics companies and small stores), there's the possibility that the goods reception department receives the merchandise and inform the Department of warehouses about the entrance to the goods dock from external suppliers so that this first physically moves the merchandise to the warehouse and once there it stores (usual practice) or derives it to another internal department of the company (sporadic practice). The good reception department receives the physical delivery note (on paper) performs the reading of the external entry code of the merchandise and communicates is registered in the WMS and is communicated automatically and / or manually to the department of warehouses. 2. Communication with dispatch of goods: Generally, in warehouses or small logistics companies the warehouse technician/employee can perform the dispatch function although in many cases must incorporate the option that the shipping department be responsible for issuing the goods. In this case, the warehouse Technician/Employee moves the goods to the dispatch area and communicates through the WMS that the goods are ready to be processed by the shipping department. The merchandise has already printed the internal coding done by the Warehouse Technician/Employee. These operations are common. 3. Communication with other internal departments. The goods located in warehouses can be directly received from abroad (suppliers) or can also be received (or moved) from (to) departments or internal areas of the company (quality, manufacturing, etc) so it is necessary the communication between departments. This communication must be integrated in the WMS in such a way that the transfer is registered through the bar codes of the different departments.
External Interactions (External Staff)	The contact with external agents (suppliers and clients) is not conceived in the simulator since in reality it is carried out through other complementary departments.





Detailed description of the operations / activities	1.	Entry of a merchandise that has to be processed by the department of reception of merchandise. This department will communicate it to the Technician/Employee through the transfer of the entry ticket (including list of products) through the WMS.
	2.	Selection of handling equipment: Before performing the movement of the merchandise, the operator must select the appropriate handling equipment according to size, weight, location, etc.
	3.	Selection of locations: The choice of the location of goods will be established according to several criteria: physical state, durability or expiration, dangerousness, degree of rotation and the function they perform within the logistics flow, shape, size or density.
	4.	Receipt and registration of goods. (Labeling and coding): The merchandise from the external supplier is received by the merchandise reception department. This department enters the coding in the WMS manually or by reading the barcode. The WMS system also supports the possibility of additional communication to the warehouse management department by means of a specific tool. The Technician/Employee codes the merchandise with its own code (only for new merchandise not registered) and prints the barcodes (in the case that the external supplier does not have the coding of our warehouse integrated) In the case of merchandise coming from internal departments (manufacturing, quality, internal returns, etc.) the entry is direct without the intermediation of the department of reception of goods and is always proceeded to the coding and printing of the codes
	5.	Storage: Once the previous activities have been completed and the goods already coded, they will be stored. The registration is produced by reading the code of the location on the shelf and assigning to that location the code of a certain merchandise. The assignment can be done manually without the need to read the location.
	6.	Movement between locations: Due to the space restrictions, storage locations and the characteristics of the different stored products, internal movements can be made to achieve a better redistribution and optimization of the warehouse. The Technician/Employee will read the stored product code and assign it a new location. The old location must be registered as empty.
	7.	Shipment of goods: It may be due to a requirement of an internal department (manufacturing, quality, maintenance, etc.) or to an external order of material. In the case of <u>internal order</u> , the Technician/Employee prepares the order and takes it directly to the department that requires it. The product is removed from the location where it was stored and the movement is registered to the corresponding department. In the case of <u>external order</u> the Technician/Employee moves the goods to the dispatch area and communicates through the WMS that the goods are ready to be processed by the shipping department
	8.	Stock management: establish in WMS the possibility of security stock, minimum and maximum. (Communication to purchases of need for re-provisioning).
	9.	Inventory control (Inventory): Inventory control is performed through permanent inventory, that is, all movements (entries and exits) of all articles, products, countries, etc., that the company has stored are recorded. A file is made for each item or referral and the units that enter are registered when comparing the





	merchandise received with the delivery note of the supplier and the outputs with the delivery note.
	The control can be done in 2 possible ways:
	 Printing of stock control sheets, visual inspection, annotation in the card and manual data entry in WMS. Introduction of stocks through the barcode reader in the WMS.
	10. Data management of suppliers, products: The WMS system will have an integrated database with the most relevant data on suppliers, customers and products subject to storage. From these databases the printing of the product encodings will be allowed.
	These databases have to be updates by the Technician/Employee. (specially products to be stored).
	11. Statistics: It is necessary to obtain a series of parameters to control the efficiency of our warehouse. The following parameters will be obtained:
	 1. Turnover rates 2. Coverage index 3. Obsolescence 4. Breakage, 5. Average stocks, 6. Others.
Description of the scope and/or the process	The overall process in which is included the activity is the storage and distribution of goods provided by a manufacturing company (if the Warehouse is the one of a Logistic Operator providing a service) or coming from the production department (if the warehouse is the one of the same manufacturing company).
Useful regulations or documents	Delivery note of the merchandise provided by the supplier Quality manuals Equipment instruction manuals Documentation on Occupational Health and Safety& Related regulations Documentation on shelves Warehouse Layout Documentation on specific printers Documentation on Bar code reader device Delivery notes of the stored merchandise Order sheet Documentation on stock needs of the different stored products Stock control sheets Documentation about suppliers, clients and products from internal departments (production, purchases and sales.) Reports on: Turnover rates, Coverage index, Obsolescence, Breakage, Average stocks, Others





	Possible receipt of merchandise that does not comply with what was specified in delivery \rightarrow Return to the supplier.
	Possibility of selected machine not available or damaged> Self-maintenance or notification to handling-equipment technical service.
	Possibility of ideal location not available. $ ightarrow$ Search for alternatives
Possible	Possibility of bar code reader failure $ ightarrow$ manual entry of product codes and locations
Possible unforeseen events	When receiving an order there is no available merchandise -> The order is registered and placed as a priority in the list of orders to be prepared.
	Breakage of stock: Registration of the same in the WMS and urgent communication to purchasing department
	The stocks of a given product do not coincide with the stock control performed -> Update of the stock level in WMS and communication to the quality department to deal with the incidence
	Incoming goods
INPUT data and	Product Lists/Package Lists
information	Transport Documents
	WMS system filled-in with products and stock data
	Reports on stock and warehouse activities
OUTPUT type	Products stored in the appropriate shelves
	Track and Trace parameters available
Complexity levels and elements	Complexity levels and elements are mainly related to some possible errors in the documentation, or a missing coherence between the goods and the documents, but also the unavailability of an ideal location for the packages, the breakage of stock, the failure of the barcode reader.

Table 3: WAREHOUSE TECHNICIAN/EMPLOYEE - ANALYSIS AND DESCRIPTION OF THE MAIN TASK





2.2 SUPPLY CHAIN DESIGNER/PLANNER

FEATURES OF THE JOB/PROFESSION

The following table gives the main features of the profession. These main features are a summary of the different features which were collected during the interviews. The results of the different interviews are given in Appendix A. Based on the information collected from the different interviews, it was difficult to generate an average description of the features of the profession. The job features differ quite a lot between the different interviewees. Therefore, the features of one of the interviewees is chosen as a representative one. This one is given in Table 4.

Title of the job/profession	Commodity Buyer and Segment Owner (Sea FCL / Sea LCL / Contract Logistics) In general: SUPPLY CHAIN DESIGNER/PLANNER Function: Supply chain planning & development (AB Volvo) Segment development for segments (Sea FCL/Sea LCL/Contract Logistics)
Position (in the company)	Superior: headquarter manager (global) Subordinates: Executing staff
Role (in the company)	 There are 8 different segments in the SC Volvo. The responsibilities of the interviewee's role are in segments 4 & 5: 1. Road FTL & LTL (Transport Material & Transport Parts; Inbound) 2. Road High & Heavy (Transport Products (Trucks & Machines); Outbound) 3. Air freight (Forwarders & Integrators) 4. Contract logistics (Cross dock, Packaging Terminals, Logistic Centres, Warehouses) 5. Sea Container (FCL / LCL) 6. Sea Ro-Ro 7. Customs 8. Shortsea & rail
Main daily tasks	 Develop the segment Sourcing plan (frequency of sourcing, scope of sourcing (local vs global), contract lengths) Rate structure Carrier portfolio Carrier performance management TMS / System solution for segment (booking, track & trace) Capacity management The whole strategy is set on segment level (8 segments) and then you activate the sourcing plans per segment. For each sourcing, the time plan is pre-determined. When you start a sourcing project, you approach all the internal users/stakeholders and you ask them about their lanes and requirements. All possible network designs are included in the project and the final network will be decided at the end of the project based on cost & lead-time





Qualification Level (EQF)	University level of Education EQF: 6-7
Main Competences (KSC)	Project management skills Analytical skills (working with lots of data) Communication skill (internal / external) Negotiation skills (with the providers) Knowledge of the market & strategy: How do you want to buy your segment
Type of company /companies	This job can be found in every company that produces something and is shipping globally. E.g.: • Volvo • Atlas Copco • Caterpillar • Phillips • Sony • General Electric
Sub-Sector/ Operational Field	Logistics Purchasing Supply Chain planning Contract logistics Sea Container (FCL/LCL)

Table 4: SUPPLY CHAIN DESIGNER/PLANNER - THE FEATURES OF THE PROFESSION

ANALYSIS AND DESCRIPTION OF THE MAIN TASK TO BE SIMULATED

While in Table 5 the analysis and description of the main task are given. This overview is based on the different interview results.

Working Env. / Job Place	Office and work trips to negotiate prices with large shipping companies
Detailed description of the operations / activities	An email /order will get in to order for a certain year: "to ship x number of containers from port Y to port Z within a certain budget (there is an overall budget, not per booking). Secondly, quotations are asked for (RFQ) from the shipping lines in order to see at which price they offer to ship the containers. A decision will be taken based on four following elements: 1. Freight rate 2. Terminal Handling Charges (THC) 3. Bunker Adjustment Factor (BAF) 4. Currency Adjustment Factor (CAF) Besides the booking of slots for the maritime transport also the same process is done for the hinterland transport. There, a mode choice between intermodal rail and road transport has to be made. Elements which are included in the mode choice are: 1. Transport cost 2. Transport time 3. Transport reliability





Communication Tools	Email, Telephone, personal contact
Operational Tools	Computer and software programs (including Excel)
Internal Interactions (Internal Staff)	Interactions with management from the headquarters (setting the overall goals = how many trade lanes need to be booked and at which budget) + interactions with support staff in the daily execution of the tasks.
External Interactions (External Staff)	Interactions with shipping companies for the purchase of the different trade lanes.
Description of the scope and/or the process	Booking trade lanes from a port in the Far East (Shanghai) to Europe (Antwerp) plus the hinterland transport from Antwerp to Parma (Italy) and Zaragoza (Spain). For the trade lanes between the ports use can be made of different shipping companies and for the hinterland transport the choice has to be made between
	road and rail transport.
or documents	Not Applicable
Possible unforeseen events	 There are several different unforeseen events possible: Internal effects: Changes in demand within the company Changes in freight rate (maritime and hinterland) (external) Changes in shipping routes (other calling pattern) External effects: Pirate attacks (delays) Possible bankruptcies of shipping lines
INPUT data and information	Email with a list of trade lanes (between ports A and B) which have to be booked for a given year. For that, a budget is made available.
OUTPUT type	 An overview of the resources (money) allocated to the different trade lanes. A list of different contracts with shipping lines A list of different contracts with rail transport companies A list of different contracts with road transport companies An overview of resources allocated and the total resources made available. (how much did we spend already)
Complexity levels and elements	 There are different complexity levels available: Small deviation of current freight rates developments, lead time and no external effects Larger deviations of current freight rates, lead times and having external effects (i.e. bankruptcies).

 Table 5: SUPPLY CHAIN DESIGNER/PLANNER - ANALYSIS AND DESCRIPTION OF THE MAIN TASK





2.3 CONTAINER TERMINAL RESOURCE PLANNER

Table 6 gives the main features of the profession. These main features are a summary of the different features which were collected during the interviews. The results of the different interviews are given in Appendix A. Based on the information collected from the different interviews, it was difficult to generate an average description of the features of the profession. The job features differ quite a lot between the different interviewees. Therefore, the features of one of the interviewees is chosen as a representative one. This one is given in Table 6.

Title of the job/profession	Container Terminal Resource Planner / Terminal Resource Planner Operations Managers
Position (in the company)	Superior: Terminal Manager, Director Manager Subordinates: Planning Manager, Blue collar workers
Role (in the company)	Planning of vessels Execution of the plan (maintenance and general management)
Main daily tasks	Planning of vessels: e.g. how many cranes are planned (plus dockworkers and straddle carriers) on which vessel. This is done either for 24 hours (short term plan) or for 5-7 days.
	Whatever is planned to be executed in the next three shifts. Assistance on the spot (e.g. assistance to Dockers)
	Meeting with dock workers
	Going outside of the terminal to check safety of dockworkers (e.g. safety clothing)
Qualification Level (EQF)	At least a bachelor degree. Preferably in transport and logistics. Thus EQF: 6-7.
Main Competences (KSC)	Ability to work under stress Communication skills (talking with Dockers) Decision-making skills Leadership skills
Type of company/companies	All maritime companies Logistics Warehousing Shipping agencies/forwarding
Sub-Sector/ Operational Field	Transport and Logistics.

Table 6: CONTAINER TERMINAL RESOURCE PLANNER - THE FEATURES OF THE PROFESSION





ANALYSIS AND DESCRIPTION OF THE MAIN TASK

Table 7 gives the analysis and description of the main task. This overview is based on the different interview results (see for detailed results the appendix).

Working Environment / Job Place	The main working environment is in an office with a view on the main terminal. However, not all operations can be viewed.
	Berth planning
	 Analyse the berthing options: arrival, operations and departure
	 Analyse the operations options: cargo volumes, type of operations, BBK discharge/loading, type of vessel, unlashing/lashing requirements
	Resource planning
Detailed description of the operations /	 Analyse upcoming operations and determine the necessary blue-collar resources (how much, when, where)
activities	 Order necessary resources through the rostering department
	Follow up of the ongoing operations
	 Monitor productivity - KPI's
	 Manage unexpected operational changes and challenges: volume increases/decreases, equipment failures
	 Manage incidents
Communication Tools	Telephone, email
Operational Tools	Cost calculators, TOS – terminal operating system (sea side of the terminal) and GOS – gate operating system (road transport).
Internal Interactions (Internal Staff)	Face to face, telephone
External Interactions (External Staff)	Mail and personal meetings
Description of the scope and/or the process	Allocation of resources (container cranes, AGVs, straddle carriers and dock workers) for deep-sea container vessels and inland barges. Also, trucks and trains need to be handled.
	Local white-collar labour regulations: company COA's
	Local blue-collar labour regulations
Useful regulations or	IMO regulations e.g. IMDG, VGM
documents	Road transport regulations
	Cargo securing regulations
	Safety regulations especially in relation with the physical execution of operations
Possible unforeseen events	Delay of vessels





	Last minute changes of handled containers
	Changes in hinterland transport
INPUT data and information	An announcement of a vessel arriving at the terminal will come in via a message. In this message the ETA of the vessel is given along with the number of TEU to be offloaded and loaded within a given time frame.
OUTPUT type	 The assignment of: Container cranes Straddle carriers or AGVs Dock workers on a container vessel that needs to be handled at the terminal. The resources allocated to load intermodal trains on the terminal.
Complexity levels and elements	As a first level, only one vessel at once has to be handled and only small deviations are taken into account. At a second stage, multiple vessels will come to the terminal and the possible delays and variations in handlings or breakdowns will increase.

Table 7: CONTAINER TERMINAL RESOURCE PLANNER - ANALYSIS AND DESCRIPTION OF THE MAIN TASK





2.4 TRANSPORT CLERK

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Title of the job/ profession	Transport Clerk
Position (in the company)	Reports to the local agency director (large companies), the responsible of transport operations (medium companies) or to the CEO (small companies) Manages truck drivers
Role (in the company)	Monitors the operational activities Allocates the means to accomplish the transportation orders received Communicates with Truck drivers, the customers, the authorities and other internal department (commercial, HR)
Main daily tasks	Plans the activity following the transportation orders Follows the operations of transport Deals with operational hazards Communicates with drivers and customers Edits KPI's about the activity and finds solutions to improve them
Qualification Level (EQF)	In theory 5 EQF: higher technical qualification is opening to this kind of job position. But concretely, the most of candidates have and 6 EQF: short degree.
Main Competences (KSC)	 KNOWLEDGE: a) Transport Operations: Scope of offer in Transport operations; Type of goods; Means of transport; Outsourcing; Pricing; Transport contracts; Laws and regulations in transport b) Execution Exploitation software (WMS, TMS); Documents linked to transport; Social and company's rules; Operational logistics c) Operation's Follow-Up Types of malfunctions; Responsibility of carrier and agent; Pre-Billing; Professional ethics d) Quality and safety approach Quality Approach; Safety rules in Transport and Logistics; Staff Security rules; Security regulations; Sustainable development SKILLS: a) The implementation of a transport operation: Gather the customer needs in terms of transport; Identify the best mean of transport in order to comply with the customer's demand; Choose to outsource or not the operations of transport; Carry out the operations of transport; Manage the flow of goods b) Follow-up of a transport operation: Control the execution of transport operations; Treat malfunctions and complaints; Close the transport folder c) Compliance with quality, safety and security procedures and environmental constraints: Implement quality, safety and security procedures; Identify environmental constraints. d) Customs clearance of goods





	 Prepare the documents for customs clearance; Follow the operations of customs clearance; Close the file of customs clearance. e) Relationship with partners: Communicate with internal partners (logistics); Communicate with external partners (customers, customs, authorities, partners)
	 General COMPETENCES for performing transport clerk's tasks: Ability to organize pool of drivers/trucks/trailers Ability to interact with different kinds of persons Ability to calculate a transport offer price Ability to use a transportation management software Ability to deal with hazards and litigations Ability to keep written proofs (price acceptance, litigations)
Type of company/ companies	Transport companies of different sizes
Sub-Sector/ Operational Field	Transport operations

Table 8: TRANSPORT CLERK - THE FEATURES OF THE PROFESSION

ANALYSIS AND DESCRIPTION OF THE MAIN TASK

Working Environment / Job Place	The transport clerk works in an office with other persons or has an individual office. He works sit at the desk, the office has no particular view.
Communication Tools	The transport clerk uses a computer and a phone as main tools. The computer allows him to have all the planning (both material and human), the transportation orders (contractual demands: a transport every week, or punctual demands: one shot transport). He can use a Transport Management System to perform his duties or not. The phone allows him to communicate internally (colleagues, drivers) and externally (customers, contractors, customs, authorities).
Operational Tools	He can use a handbook and a pencil or/ and his computer (word, excel, access, TMS, freight exchange platforms)
Internal Interactions (Internal Staff)	The transport clerk mainly interacts with the truck drivers. He assigns them their daily missions and communicate with them on this topic. Follows their activities and intervenes for treating malfunctions. He also interacts with the technical staff (mechanics) and, when applies, warehousing staff in order to have the right goods in the right truck.
External Interactions (External Staff)	The transport clerk interacts several times a day with his contractors: he takes the orders and confirms the ability to perform the transport or not. He also interacts with the contractors when there are malfunctions: for instance, delays of loading in the contractor's warehouse, or delays of the truck for delivery.





Detailed description of the operations / activities	The transport clerk constructs the planning of human and material means in order to realize transport operations. His work is to maximize the use of every mean complying with internal rules and the law. For instance, when he has a punctual demand of transport has therefore no order for the return of the truck at the headquarters, he tries to find an order in a freight exchange platform. He follows the operations of transport, intervenes on any malfunction (delays, technical issues, denials of delivery) He communicates with truck drivers, contractors, authorities. He might define the price of the transport to the client, therefore has to have a precise knowledge of costs in each particular demand of transport.
Description of the scope and/or the process	The transport company is the link between the different sites of a supply chain. It allows the goods to move from the supplier to the final customer. Whether integrated or outsourced, transport is crucial in the Supply Chain. The transport clerk is a key actor of the transport company. He matches the transport demand with the company's capacities, and optimizes the means at the maximum respecting company's rules and the law.
Useful regulations or documents	International and national regulations Commercial contracts Consignment notes, CMR Internal rules
Possible unforeseen events	Delays in the loading place Delays due to traffic Technical Malfunctions Delivery Denied
INPUT data and information	For a considered day, the transport clerk has the planning scheduled for the day, and follows the transport operations. He treats the malfunctions in the execution of transport and communicates towards his contractors. Another part of his daily tasks is to take into account the transports demands, and tries to find a way to accept to perform the transport. If he doesn't have the means to do with the companies means, he tries to outsource the transport on a freight exchange platform.
OUTPUT type	All transport orders are delivered on time Maximum use of material and human resources Compliance with international, national and internal rules Performing transport activities making benefits
Complexity levels and elements	Having different kinds of transport activities (parcels, pallets, liquids, bulk) Complex transport schemes Customers particularities (opening times, type of trailer)

Table 9: TRANSPORT CLERK - ANALYSIS AND DESCRIPTION OF THE MAIN TASK





2.5 INLAND TERMINAL CLERK

Title of the job/profession	OPERATIONAL OFFICE CLERK of a Rail-Road Inland Terminal Shortly: INLAND TERMINAL CLERK
Position (in the company)	He/she coordinates handling operators and it is supervised by the Terminal Manager (with experience he/she may have the position of the Terminal Manager)
Role (in the company)	He/she is the person in charge of the implementation (management if he/she is the Terminal Manager) of the terminal operations. He/she manages the trains/trucks arriving or departing from the rail-road terminal. He is in contact with external actors (customers, freight forwarders, rail or transport operators), he/she plans and monitor activities of the terminal operators.
Main daily tasks	Manages the arrival/departure of trains in the Intermodal Terminal Manages the load/unload of containers on the incoming/outgoing trains Manages the storage of containers in the Intermodal Platform
Qualification Level (EQF)	4 EQF, 5 EQF
Main Competences (KSC)	 Knowledge: Types and characteristics of trains/wagons Types and characteristics of UTIs Rail-Road Terminal Layout Safety Rules for Rail and Road Transport Transport Documentation Use of ICT Tools and Platform Management Software Skills, he/she is able to: schedule activities of goods arrival/departure coordinate terminal operations (e.g. load, unload,); preparation of documents and use Microsoft Office suite or Management Softwares organise contacts with the Competence, he/she is competent to: relate with external actors understand KPI and action for complying with them compying with safety rules
Type of company/ companies	Multimodal Transport Operator, Rail-Road Terminal Operator
Sub-Sector/ Operational Field	Intermodal Transport

Table 10: INLAND TERMINAL CLERK - THE FEATURES OF THE PROFESSION





ANALYSIS AND DESCRIPTION OF THE MAIN TASK:

Working	The Operation Office Clerk performs the operations merely in the office inside the rail- road terminal. Depending on the proximity to the trucks' platform or rail tracks, he/she can monitor the operations from a window or physically moves himself to the platforms.
	The Inland Terminal Clerk works in an office, but his/her actions/instructions are referred to another "working environment", i.e. the rail-road inland terminal. The infrastructeres are: Entrance Gates (different for train and trucks); Manoeuvre areas and paths for trucks; Stowing areas for UTI; Rail tracks for L/U; Maintenance Area for Reach Stackers
	On the Terminal/Platform Management Software he/she can see all the data and info related to the trains and the terminal/tracks.
	Depending on the size of the rail-road terminal, the Clerk may work close to the handling operators and monitor the correct execution of the activities, as well as performing specific checks (also for security) on the activities, the trains, the stowing areas.
Place	Stowing Areas:
	Containers and other UTIs are stowed in dedicated areas named Storage Yards. The main distinction is of two types: • Yards for the Storage of Maritime UTIs • Yards for the Storage of Inland UTIs
	<u>Stowing Inland UTIs:</u> according to the Customer and the Terminal needs. The Customer may ask the need of seprating UTIs according to the goods or the destination or other drivers. The Terminal may storage the UTIs according to operational issues (distance from tracks-gates-amount of UTI's). The "logic" is similar to the one of a logistics warehouse.
	<u>Stowing Inland UTIs</u> : the "logic" is the one of a maritime rail-road terminal. The main distinction is among full and empty Containers. The second factor is the owner (Maritime Company), the third is the size and type of container. The hold may have different heights. The max height is defined according to the location of the terminal, the terrain and seismic characteristics
Communication Tools	E-mail, Radio, Phone/Smartphone, Paper, Terminal Management Software (Not all the MS can communicate, therefore sometimes communication may occur by email)
Operational Tools	Software for accounting, Terminal Management Software, Notebook/Ipad connected to the local LAN or WiFi, printers, papers.
Internal Interactions (Internal Staff)	He/she relates with handling operators/reach staker drivers (loading/unloading instructions), with the terminal manager (terminal planning and management), with the sales department (new services, customers, trains, containers), with the other clerks operating at the terminal (coordination and organization of activities), rail network companies/maneuverers when internal (incoming and outgoing trains)





External Interactions (External Staff)	He/she relates with the truck drivers (loading/unloading instructions, transport documents), customers (booking of services), rail companies (incoming and outgoing trains), rail network companies/maneuverers when external (incoming and outgoing trains), other MTO or Freight Forwarders, staff of the Intermodal Terminals from which a train is arriving/departing (often indirectly, i.e. through the Platform Management Systems)
	OP1: Train entrance, acceptance and document preparation
	The Clerk coordinates with the railway maneuverer operator and indicates the track on which the train has to stop. On the Management System the Clerk can see the train and cargo characteristics - TRAIN LIST
	<u>OP2</u> : Train Taking-Over
	 The Clerk/Manager update the MS with the effective MAD and checks the correspondence between the train and the train list, verifying: wagon serial number, container serial number, combination wagon – container, security seal He/She adds notes if something is not coherent.
	Afterwards, he/she updates the MS with the effective train list, he/she does the train taking-over (Goods Entrance)
	By e-mail, the clerks informs the Customer of the arrived UTI and provide the unloading time.
	The Clerk receives the stowing list by the Customer. The List gives information on how to stock the UTI.
	<u>OP3</u> : Train Unloading
Detailed description of the	The Clerk provides the stowing list to the reach stackers drivers (paper or radio/phone communication) in order to start unloading the UTI Once completed the unloading operations, and the train is empty, the reach stackers drivers inform (by radio) the Clerk/Manager about the end of the operations
activities	<u>OP4</u> : Booking request & Train Booking list
	By email, the Clerk/Manager receives from the customer a booking for the arrival of a truck at the terminal and fill-in the List of Incoming Trucks Once the trucks arrive at the terminal, the Clerk prepares a train booking list: association of a container to a departing train number
	OP5: Train Preparation
	The Clerk prepares a Loading List matching the Wagon List and Train Booking List (checking the twist of wagons are coherent with the UTI to be loaded, as well as the max weight of Wagons) The Clerk provides the Loading List to the Reach Stackers Drivers (or crane operator) and launches the loading operations
	<u>OP6</u> : Truck Check-In
	Once a truck arrives at the terminal, the Clerk/Manager carry out the check-in comparing the booking information with the real data of the truck: Truck Plate n°, driver name, container serial number and integrity of the safety seal. Once completed the check-in update the MS, draft the Registration/Interchange document notifying the taking-over of the goods of the customer. The Clerk informs the driver about where to unload the goods into the terminal and update the reach stacker driver (indeed the UTI was not on the Loading List vet)





	UP7: Loading of the Train The Reach Stacker Drivers load the train according to the Loading List. They picks-up
	the UTI by the Stowing Areas or the incoming trucks using the Layout of the Terminal and the indications provided by the Inland Terminal Clerk/Manager. Once loaded all the containers, the Reach Stacker Drivers inform the Clerk about the end of the operation
	OP8: End of operations and Departure of the train
	The Clerks physically checks the appropriate loading of the train (integrity and correct positioning of twist) and all the safety seals He/she filles-in the HLR into the MS and print the train list
Description of the scope and/or the process	The overall process is the one of a container travelling from a point A to a point B, in which the largest part of the transport is performed by train from a rail-road terminal (inside a Port or in the inland) to another inland terminal. Last mile transportation is performed by truck to the final customer at the point B.
Useful regulations or documents	 <u>RAIL PLAN</u>: it includes the scheduling of incoming and outgoing trains at the rail-road terminal. It is updated every 12 or 6 months, or differently in case of other needs. It includes, for all the days of a period: MAD (Mise à disposition): arrival time of trains at the Terminal HLR (Heure Limite de Remise): departure time of trains from the Terminal MAD and HLR are the most important KPI for an intermodal terminal, as they may negatively impact on the following transport/logistics chain. The RAIL PLAN is drafted according to the request of the Customer, the availability of Train Paths on the National Railway Network, the existing Rail Plan, the availability of locomotives of the Maneuverer. Each scheduled train has a length and total weight, a train path and a destination agreed with customer
	 <u>TRAIN LIST</u>: includes the following information: date of arrival, train number, train path* list of wagons, each with serial number, type of wagon, length, net weight list of container: each with serial number, seal number (if not empty), type, size, gross weight, customer; Combination wagon – container number (code) *Train Path: the section of the capacity of the railway infrastructure used by a train to travel between two locations in a given time period
	 <u>BOOKING REQUEST</u> for the truck arriving at the terminal includes: day and time of arrival, plate of the truck and name of the driver, serial number, type, size and gross weight of the container, empty or full container, seal number (if full), type of goods and indication if it is dangerous, mode of transport from the terminal (road or rail), day and time of departure (train number).
	 <u>LOADING LIST:</u> it includes: Date and number of the departing train, Wagon list (serial number) Container list (serial number)





	 The matching between wagons and containers (pay attention to not overcome the capacity of the wagons)
	 <u>REGISTRATION/INTERCHANGE DOCUMENT:</u> Customer name Container serial number, type, size (meters or feet), gross weight, empty or full; Transport modality from the origin (road or rail)
	 Documents can be distinguee among: Documents accompanying the journey/trip/travel Documents accompanying the goods/freight/cargo
	The railway travel document is the Consignment Note (LdV), a document accompanying the trip of a train. The Clerk/Manager provide the Customer the needed Annexes for filling-in the CN, otherwise is prepared by the Clerk as additional service. Annexes are: container and wagons list. The road travel document is the Transport Document (DdT) and usually is prepared by the road haulier. Generally, documents accompanying the goods are within the container and are not managed by the terminal. As additional service the Clerk may transfer them according to the requests of the customer. The truck driver provide them to the clerk at the check-in. the latter put them in an envelope and gives it to the Maneuverer at the departing time. The Maneuverer will give it to the train operator/driver, and the latter to the clerk of the terminal at the destination of the train. It will be then opened and every document will be matched with the outgoing container
Possible unforeseen events	Change of planned scheduling of train arrival or departure / truck arrival or departure. Train acceptance incorrect information in case of inconsistence between list of: train or wagon or container. Corrupted seal, missing wagons, train / wagon / container don't corrspond at all, notice of " not to do an operation".
INPUT data and information	RAIL PLAN TRAIN LIST BOOKING REQUEST TRANSPORT DOCUMENT STOWING LIST
OUTPUT type	Track available at the terminal at the: MAD (Mise à disposition): Time and date of train arrival to the Terminal Train release at the: HLR (Heure Limite de Remise): Time and Date of train departure TRAIN LIST correctly filled
	TRAINS and WAGONS charactersitchs coherent with rules for transport and safety





Complexity levels and elements	 Variable of the operational scenario into an intermodal terminal. 1. Late arrival of the train -> rescheduling of arrivals 2. Acceptance of the vehicle without complete documents 3. Arrival of the wagons other than those declared in the wagons list 4. Vehicles delayed and failed to load a wagon 5. Technical stop of full wagons at the arrival station 6. Arrival of an empty train 7. Arrival and departure by truck 8. Train reservation list has containers that are not compatible with wagon list
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Table 11: INLAND TERMINAL CLERK - ANALYSIS AND DESCRIPTION OF THE MAIN TASK



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2.6 CLERK FOR CUSTOMS PRACTICES

Title of the job/profession	CLERK FOR CUSTOMS PRACTICES of a MTO/Transport Operator Shortly: CLERK FOR CUSTOMS PRACTICES
Position (in the company)	He/she autonomous in the execution of his/her daily tasks. He relates with external actors and the with Sales Department (Transport Services) of the MTO/Transport Operator. He/She refers to a supervisors of the Customs Practices Office.
Role (in the company)	He/she plays a key role in the operational scenario involving custom operations. He/she is the person involved in the process of customs clearance of goods referred to a Transport Service provided by the MTO/Transport Operator and organized by a Freight Forwarder for a Customer importing goods from an Extra EU country.
Main daily tasks	He follows the custom operations, and in particular of the customs clearance operations. N.B. He/She does not prepare/produce any document, he/she just manage the exchange of document produced by the other actors of the process and relates with such actors.
Qualification Level (EQF)	4 EQF, 5 EQF
Main Competences (KSC)	Knowledge He/She knows: the Transport Laws and the Customs regulations, Inconterms, Customs and Transport Documents, Transport Modes and means, Containers and other Loading Units Skills He/She is able to read and understand customs documentation, he/she apply to customs regulations, he/she able to manage documentation of the customs clereance process Competences He/She is competent to relate with the other actors of the process, to coordinates with other actors, to understand the timline of the process
Type of company/companies	Multimodal Transport Operator, Transport Operator (Road, Rail, Intermodal, Maritime), Freight Forwarder, Logistics Operator,
Sub-Sector/Operational Field	Customs Operations/Transport Administration

Table 12: CLERK FOR CUSTOMS PRACTICES - THE FEATURES OF THE PROFESSION





ANALYSIS AND DESCRIPTION OF THE MAIN TASK:

	The CLERK FOR CUSTOMS PRACTICES operates from its office with the support of a notebook or equivalent equipment, connected to the local LAN or Wi-Fi. He receives e-mails or phone calls depending on the operation and type of contact, principally e-mails. He relates with other clerks/officers of Freight Forwarding companies, manufacturing companies, Transport Companies, Customs Agents.
	The office is typically an open space where other clerks work and follow different customs clearance operations. Basically, the physical premise of the CLERK FOR CUSTOMS PRACTICES is inside the intermodal area (logistics node) close to the warehouse where freights are temporarily stored during the customs clearance procedure.
	N.B. The Clerk for Customs Practice of a Transport Operator works in an office. But being his/her actions/instructions referred to the transport and logistics supply chain, in wide meaning another "working environment" can be intended as the same Supply Chain he/she is operating on.
	Another important "environment" to which the activity refers are the several warehouse / parking areas in which the goods can be in temporary storage:
Working Environment / Job Place	A3 Warehouse: Maximum storage time: 90 days After 90 days, goods are stored in an A4 Warehouse, or customs cleared, or they exit from the warehouse in order to be customs cleared by another Customs. Usually, it is used when: a document is missing (or wrong), for quality control, temporarily exempted from duties and VAT
	A4 Warehouse: Goods are limitless stored, temporarily exempted from Duties and VAT unless they are Customs Cleared The cargo can be Customs Cleared entirely or partially The Rate/Cost for temporary storage in A4 is higher of the one in A3
	A3 Apron/Parking Area: Goods cannot be unload and remain into the container (for example in the Fast Corridor Procedure) Goods are waiting for controls, temporarily exempted from TAX and VAT Once the goods are unloaded they are also checks and cleared by the Customs Agent Maximum storage period: 90 days
Detailed description of the operations / activities	START The Customer agrees a shipping service with a Freight Forwarder and provides (by e-mail) all the needed documentation for importing the goods, such as: (Multimodal) Transport Document; "Pro-Forma" Invoice; Packing List of goods arriving at the Port. The Freight Forwarder agrees a Transport Service with the MTO/Transport Operator/Logistic Operator, for goods arriving from an Extra-EU country and that has to be customs cleared in a A3/A4 Warehouse or A3 apron of the MTO/Transport Operator/Logistic Operator.
	OP1 Initially (weeks before the arrival of the container), the Freight Forwarder provides several information to the Clerk for Customs Practices of a Transport





Operator (MTO), being the MTO the owner of the A3/A4 warehouse (where the customs clearance of goods will take place) or of the A3 apron/area in which the container will be stored. By E-mail: ETA (Estimated Time (and date) of Arrival of the container at the port), container code and type and seal number, shipment number/code, list of costumers owning the goods and associated packages, packages weight & type of goods, name of the Shipping Company, port of origin and destination.
$\frac{OP2}{The day before the arrival of the container at the Port, the Freight Forwarder notifies the Transport Operator (MTO) the "real" date and time of arrival (ATA) of the ship at the dock.By E-mail (FF → MTO): Actual Time of Arrival (ATA) and docking time, reminder for checking the integrity of the safety seal of the container, provides instructions for unloading and customs clearance of goods and indication of the warehouse in which goods have to be stored (MTO or Customer).$
OP3 Once the container is stored at the port (A3 area), the Transport Operator (MTO) provides to the Customs Agent (by e-mail) all the information for the customs clearance procedures, in order to allow the Customs Agent to prepare the T1 document (DAT/TAD - Transit Accompanying Document). The information provided (by email) by the Clerk for customs practices of an MTO are: ATA and docking time, container code and type and seal number, shipment number/code, list of costumers owning the goods and associated packages, packages weight & type of goods, name of the Shipping Company, port of origin and destination.
OP4 The Customs Agent prepares the T1 Document (also DAT) in order to release the container from the A3 area of the Port in which is temporary stored and to carry out the customs clearance operations afterwards in an authorized warehouse, the one indicated by the Customer to the Freight Forwarder.
The container is picked-up by the Transport Operator (Rail Company/Road driver if the transport is by road), using the Waybill (produced by the TO or by the MTO) and the T1
OP5 The Transport Operator and the Customs Agent agree (by email) on the arrival time of the container at the designated and authorized warehouse.
OP6 The Transport Operator (MTO) informs the Freight Forwarder that the container has arrived at the warehouse. The MTO waits the confirmation for unloading the goods into the A3 warehouse. In case of A3 apron/area, the goods are not unloaded from the container. Once the MTO got the confirmation from the Freight Forwarder, the MTO unloads the goods and checks the correspondence between the packages and the Packing List provided by the customer to the FF.
OP7 Once verified the correctness of the Packing List, the MTO stamps the waybill to the Rail Company (or to the driver), marking on it: the number of the safety seal, the date of arrival, the arrival time of the truck at the A3 warehouse (or A3 parking area), and the time at which it has been released.





	The MTO keeps a copy of the Waybill, another copy is sent to the Customs Agent.
	OP8 The Transport Operator informs (by email) the Freight Forwarder that the goods have been unloaded and stored in the A3 warehouse, the safety seal is integer and send the stamped Waybill. The Freight Forwarder informs the Customer (by email) of the proper unload of goods in the A3 warehouse, and the Customer provides indications on the procedures for the customs clearance of goods (to cleared immediately or afterwards fully or partially)
	The goods can be cleared also afterwards, therefore they are stored in temporary warehouses (A3, A4 if partially and after 90 days), where there is suspension of taxes and fees (therefore the goods are still in a "foreign" status").
	<u>OP9</u> For ending the Import process of the goods, the Customer has to pay the duties
	and the VAT. The duty is the fee that is requested by the Customs if the goods are imported from an Extra-EU country with which not specific trade agreements. While the circulation of goods within the EU is free of charge. The VAT is instead applied (by the State) on all the goods introduced into a country of the EU.
	The Transport Operator and the Customs Agent have a bank account (with surety) for guaranteeing the payment of duties and VAT. They usually pay for the customer and then invoice the cost for the service.
Communication Tools	E-mail, Phone, Paper or Digital Documents
Operational Tools	Notebook or equivalent equipment (connected to the local LAN or Wi-Fi), printer and scanner. <i>Customs Procedures Software (Fast Corridor)</i> * *only in few countries and companies activated the service, and its functioning is quite new and specific for the different EU countries.
Internal Interactions (Internal Staff)	He/she related with the Sales Department of the company because it oversees the definition new contracts for Transport Service performed by the MTO. Moreover, the Clerk for customs practices gives instructions to the other company's staff (handling and warehouse operators and officers) on the goods arriving at the rail-road inland terminal or at the logistics warehouse, and to be customs cleared afterwards.
	Several actors are involved in the process:
External Interactions	The FREIGHT FORWARDER is the one organizing all the transport chain from the location A to the location B. It has a contract with Customer/Importer. He relates with all the transport operator involved, as well as with Customs Agent and it is the only one communicating with Customer.
(External Staff)	The CUSTOMER a manufacturing, service or retail company importing goods from an extra-EU country.
	The CUSTOMS AGENT, is the person in charge of preparing the official Customs documentation, to be provided to the Customs Authority. He's the "responsible" of the Customs Clearance Operations for the Customs.





Description of the scope and/or the process	The operational scenario describes the customs clearance operations of Extra UE freight, which is imported by a Customer through a Freight Forwarder, cleared by the Customs Officer to an intermodal terminal, stored and collected by a logistics operator to the final delivery (usually Customer destination).
Useful regulations or documents	Transport Documents (produced by the Importer) Proforma invoice (produced by the Importer) Packing List (produced by the Importer) T1 Document (also DAT) (produced by the Customs Agent) Waybill (produced by the Freight Forwarder/Transport Company) Bill for introduction (produced by the Customs Agent) Bill for full extraction of goods (produced by the Customs Agent) Bill for partial extraction of goods (produced by the Customs Agent) Delivery Order (by the FF) Telematic Receipt for the sending of the Bill for Extraction of goods (by the Cus. Ag. to the Customs)
Possible unforeseen events	Missing information in the sent-out documents, missing information, or late arrival of the information Problems with seal of the container Delayed operations at the port or late arrival of the ship The check unveils inconsistences Some documents are not correct or some information are missing at the moment of the customs clearance of goods
INPUT data and information	Notification of a Transport Service to be performed Information about the container and goods arrival, and on the procedures for customs clearance of goods
OUTPUT type	Goods cleared and delivered to the Customer/Transport Operator in charge of the last mile transportation
Complexity levels and elements	Partial extraction of goods by the A4 warehouse Specific Checks by the Customs Authority

Table 13: CLERK FOR CUSTOMS PRACTICES - ANALYSIS AND DESCRIPTION OF THE MAIN TASK





3. THE SIMULATION MODULE - FIRST DRAFT

3.1 LOGISTICS WAREHOUSE MODULE

a) Description of the virtual environment

The virtual environment of the simulator is a totally interactive environment and configured with a main menu from which you can access the different specific menus to perform the specified operations. From the main screen you will access the two simulation options: Real mode and Game mode.

Some of the main screens are shown and described below:

MAIN MENU



From the main menu you have access to the other specific screens.

CURRENT STOCK LEVEL SCREEN



Figure 2: CURRENT STOCK LEVEL SCREEN





From this screen you can consult and analyze the stock level of the products. It will be the reference screen for the specific practices (Game Mode): Stock Control.

STOCKS MOVEMENT SCREEN

Stock Moves	a	0*)
Create or Import		
Click to create a stock movement. This menu gives you the full traceability of inventory operations on a specific product. You can filter on the product to see all the past or future movements for the product.		

Figure 3: STOCKS MOVEMENT SCREEN

From this screen you can record material movements between warehouses, entrances to warehouses and shipments to customers of internal departments and external customers. Specific screen for practices (Game mode):

- Movement between locations
- Expedition of goods
- Merchandise entry

PULL RULES SCREEN

Pull Rules		QI	0~)
Create or Import			1-2 of 2 📃 🗌
Name	Action	Picking Type	
WH: Stock -> Customers	Move From Another Location	Your Company.: Delivery Orders	
WH: Stock -> Customers MTO	Move From Another Location	Your Company.: Delivery Orders	

Figure 4: PULL RULES SCREEN

Specific screen to set the PULL rules

OPERATIONS SCREEN

All Operations		Q	0~)
Create or Import.			1-3 of 3 📃 🗌
Picking Type Name	Warehouse	Reference Sequence	
Receipts	Your Company.	Your Company. Sequence in	
Internal Transfers	Your Company.	Your Company. Sequence internal	
Delivery Orders	Your Company.	Your Company. Sequence out	

Figure 5: OPERATIONS SCREEN

Specific screen where the operations made by the player are recorded.





LOCATIONS SCREEN

Locations	(Q 💟 Internal X) O 👻
Create or Import	1-1 of 1 📃 🔲
Location Name	Location Type
Physical Locations / WH / Stock	Internal Location

Figure 6: LOCATIONS SCREEN

From this screen, we can easily locate the locations of the products / goods stored

REORDERING RULES

Reorde	ring Rules	(9	0~)
Create	or Import		
1	Click to add a reordering rule. You can define your minimum stock rules, so that Odoo will automatically create draft manufacturing orders or request for quotations according to the stock level. Once the virtual stock of a product (= stock on hand minus all confirmed orders and reservations) is below the minimum quantity, Odoo will generate a procurement request to increase the stock up to the maximum quantity.		

Figure 7: REORDERING SCREEN

From this screen you can define the minimum stock rules. The simulator automatically creates draft manufacturing orders or request for quotations according to the stock level. Once the virtual stock of a product (= stock on hand minus all confirmed orders and reservations) is below the minimum quantity, the simulator will generate a procurement request to increase the stock up to the maximum quantity.

WAREHOUSES SCREEN

Warehouses / Your Company	у.						
Edit Create			More 🕶				= 1
						C Routes	
	Your Com	pany.				²	
	Short Name	WH		Address	Your Company.		

Figure 8: WAREHOUSES SCREEN

Screen containing warehouses data and information about the company





PRODUCTS SCREEN

Products / Test Product					
Edit Create		,	More -		
	Can be Sold		ales Variants	1.0 On Hand Moves Reordering Rule Reordering Rule	
	Product Type Sale Price	Stockable Product	Active EAN13 Barcode Internal Reference	⊗ REF001	
	A precise description				

Figure 9: PRODUCTS SCREEN

Screen containing products/goods information

SUPPLIERS/CUSTOMERS SCREEN

Incoterms		(Q	0-)
Create or Import		1-15	5 of 15
Code	Name		
EXW EXW	EX WORKS		
E FCA	FREE CARRIER		
E FAS	FREE ALONGSIDE SHIP		
FOB	FREE ON BOARD		
CFR CFR	COST AND FREIGHT		
CIF CIF	COST, INSURANCE AND FREIGHT		
СРТ СРТ	CARRIAGE PAID TO		
CIP	CARRIAGE AND INSURANCE PAID TO		
DAF DAF	DELIVERED AT FRONTIER		
DES DES	DELIVERED EX SHIP		
DEQ DEQ	DELIVERED EX QUAY		
DDU DDU	DELIVERED DUTY UNPAID		
DAT DAT	DELIVERED AT TERMINAL		
DAP	DELIVERED AT PLACE		
DDP	DELIVERED DUTY PAID		

Figure 10: SUPPLIERS / CUSTOMERS SCREEN

Screen containing supplier's/costumers' information

INVENTORY ADJUSTEMENTS SCREEN

Invento	ry Adjustments	QI	0~)
Create	orImport		
1	Click to start an inventory.		
	Periodical Inventories are used to count the number of products available per location. You can use it once a year when you do the general inventory or whenever you need it, to adapt the current inventory level of a product.		

Figure 11: INVENTORY ADJUSTEMENTS SCREEN

Periodical Inventories are used to count the number of products available per location. From this screen you can use either once a year when you do the general inventory or whenever you need it, to adapt the current inventory level of a product. It will be the reference screen for the specific practices (Game Mode) of Inventory Control.





COMUNICATIONS TOOLS

- a. Integrated WMS tool for internal communication with other departments. (Goods receipt of merchandise, purchases, dispatch of goods) These communications will be registered for further processing.
- b. Integrated tool in the WMS to warn the internal departments about a change of location of a certain product.

OPERATIONAL TOOLS

- 1. WMS software
- 2. Internal access to documents about quality, procedures, instructions, safety and hygiene standards, etc.
- 3. Communication with printer to print documentation (in this case stock control sheets)
- 4. Bar code reader device.
- 5. Calculator
- 6. Integrated WMS tool for statistics

INTERNAL INTERACTIONS

- 1. Transfer of information (delivery note) from the reception of merchandise department to the warehouses management department through the WMS.
- 2. Possible communication through the integrated tool in the WMS to warn the internal departments about a change of location of a certain product.
- 3. Transfer of information (delivery note and order sheet) and communication between warehouses department with other internal departments and dispatch of goods through the WMS.
- 4. Communication to purchases of need for re-provisioning.
- 5. Transfer of information (Inventory control) to other departments through the WMS
- 6. Transfer of information about suppliers, clients and products from internal departments (production, purchases and sales.)

EXTERNAL INTERACTIONS

- 1. External interaction occurs between supplier and receipt department.
- 2. Notification to handling-equipment technical service.

b) <u>Description of input/starting parameters</u>

The orders are generally in the form of a delivery note of goods entry, order of supply from other internal warehouse or department of the company or order of delivery from the purchasing department. The fields that must configure an order or delivery note are the following:

- 1. Control number assigned for the entire process.
- 2. Date
- 3. Worker's code.
- 4. Warehouse number
- 5. Product code assigned.
- 6. Location code
- 7. Number of units
- 8. Issuance number





- 9. Signature of the authorized and responsible
- 10. Dimensions of the package / merchandise in centimeters
- 11. Observations
- 12. Others

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Figure 12: TEMPLATE DELIVERY SLIP OF GOODS / EXPEDITION ORDER

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The entries will be displayed:

a) In pdf format for the Technician/Employee proceed to the introduction of the data in the system (In the case of entries from external suppliers)

b) In electronic format automatically registered in the system (in the case of movements or internal requirements)

c) <u>Description-List of actions of the user in the simulation game (Game/Play Mode)</u>:

List of actions in game mode:

- *Initial Action*: The simulation begins with the entry of a merchandise that will be processed by the department of reception of merchandise. This department will communicate it to the Technician/Employee through the transfer of the entry ticket (including list of products) through the WMS.
- *Action 1.* Selection of handling equipment: Before performing the movement of the merchandise, the operator must select the appropriate handling equipment according to size, weight, location, etc.
- Action 2. Selection of locations: The choice of the location of goods will be established according to several criteria: physical state, durability or expiration, dangerousness, degree of rotation and the function they perform within the logistics flow, shape, size or density.
- Action 3. Receipt and registration of goods. (Labelling and coding): The merchandise from the external supplier is received by the merchandise reception department. This department enters the coding in the WMS manually or by reading the barcode. The WMS system also supports the possibility of additional communication to the warehouse management department by means of a specific tool.

The Technician/Employee codes the merchandise with its own code (only for new merchandise not registered) and prints the barcodes (in the case that the external supplier does not have the coding of our warehouse integrated) In the case of merchandise coming from internal departments (manufacturing, quality, internal returns, etc.) the entry is direct without the intermediation of the department of reception of goods and is always proceeded to the coding and printing of the codes.





- Action 4. Storage: Once the previous activities have been completed and the goods already coded, they will be stored. The registration is produced by reading the code of the location on the shelf and assigning to that location the code of a certain merchandise. The assignment can be manually done without the need to read the location.
- Action 5. Movement between locations: Due to the space restrictions, storage locations and the characteristics of the different stored products, internal movements can be made to achieve a better redistribution and optimization of the warehouse. The Technician/Employee will read the stored product code and assign it a new location. The old location must be registered as empty.
- Action 6. Shipment of goods: It may be due to a requirement of an internal department (manufacturing, quality, maintenance, etc.) or to an external order of material. In the case of internal order, the Technician/Employee prepares the order and takes it directly to the department that requires it. The product is removed from the location where it was stored and the movement is registered to the corresponding department. In the case of external order, the Technician/Employee moves the goods to the dispatch area and communicates through the WMS that the goods are ready to be processed by the shipping department.
- Action 7. Stock management: establish in WMS the possibility of security stock, minimum and maximum. (Communication to purchases of need for re-provisioning).
- Action 8. Inventory control: is performed through permanent inventory, that is, all movements (entries and exits) of all articles, products, countries, etc., that the company has stored are recorded. A file is made for each item or referral and the units that enter are registered when comparing the merchandise received with the delivery note of the supplier and the outputs with the delivery note. The control can be done in 2 possible ways:
- 1. Printing of stock control sheets, visual inspection, annotation in the card and manual data entry in WMS.
- 2. Introduction of stocks through the barcode reader in the WMS.
 - Action 9. Data management of suppliers, products and customers: The WMS system will have an integrated database with the most relevant data on suppliers, customers and products subject to storage. From these databases, the printing of the product encodings will be allowed.

These databases have to be updates by the Technician/Employee. (Specially products to be stored)

- *Ending Action. Statistics*: It is necessary to obtain a series of parameters to control the efficiency of our warehouse. The following parameters will be obtained:
- 1. Turnover rates
- 2. Coverage index
- 3. Obsolescence
- 4. Breakage,
- 5. Average stocks,
- 6. Others.

d) Variables/unexpected events/factors changing the situation.

Possible receipt of merchandise that does not comply with what was specified in delivery: In this case, the merchandise will be returned to the supplier.

Possibility of selected machine not available or damaged: Depending of the failure or damage the operator of the machine will carry out Self-maintenance or notification to handling-equipment technical service. *Possibility of ideal location not available*: The Technician/Employee will search for alternatives.





Possibility of bar code reader failure: In this case, the entry of product codes and locations will be done manually.

When receiving an order there is no available merchandise: The order is registered and placed as a priority in the list of orders to be prepared.

Breakage of stock: It will be necessary the registration of the same in the WMS and urgent communication to purchasing department

The stocks of a given product do not agree with the stock control performed: Update of the stock level in WMS and communication to the quality department to deal with the incidence.

e) <u>Description of the Outcome/Score of the game</u>

The scores will be valued from 0 to 100 points, the points will be obtained as the proposed items are completed. For the scores, the following will be considered:

- Execution time
- Number of communications
- Made mistakes
- Successful execution
- Access to manuals and help
- Others

f) Game levels /stages

The game is presented with two general possibilities:

1. Real mode without any practices or defined levels. The students and teacher can use the software to carry out real warehouse management.

2. Game mode. There are 10 practices with different levels of difficulty in some of them.

g) <u>Virtual/game/simulation time and link with real time</u>

Note: In real mode there is no limit time.

h) Knowledge/Skills/Competences for playing the game

Knowledge

- Functions and characteristics of WMS
- Primary and Secondary Loading Units
- Warehouse Layout
- Warehouse Management logics and techniques

Skill

- He/she's able to use and fill-in data and info into a WMS
- He/she's able to check incoming goods and order lists
- He/she's able to set and use warehouse's parameters

Competence

- He/she's able to understand the warehouse logic and processes
- He/she's to read the documentation related to warehouse processes

SIMULTRA PROJECT 2017-1-IT01-KA202-006140

IO n° 1: DESCRIPTION OF THE MAIN TASK FOR THE REFERENCE JOB PROFILES





3.2 SUPPLY CHAIN MODULE

a) <u>Description of the virtual environment</u>

When the game starts, the main route of the supply chain will be shown on a map. Also, a popup screen will be included, which will show an email message which will display the main order (Figure 1)



Figure 13: MAIN SCREENS FOR THE SUPPLY CHAIN JOB

b) Description of input/starting parameters

The main input will come from an email message with a list of trade lanes (between ports A and B) which have to be booked for a given year. For this trade lane the total costs (EUR/TEU) need to be determined along with the total transport time (days).

In the game, the different cost elements are listed which need to be determined. Not all values of these cost elements are filled in (or are set at zero). It is up to the person who is playing the game to collect the necessary cost elements. These could be:

- fuel cost for vessels,
- handling charges in a deep-sea port,
- dwell times (including customs time),
- hinterland transport cost.

c) <u>Description-List of actions of the user in the simulation game (Game/Play Mode)</u>:

The interface will be made available to the student who is playing the game. The main task is to calculate the total transport cost. The tool will allow doing that. However, not all input fields will be filled in automatically. Therefore, data need to be looked up and inserted in the model (think about the shipping cost for maritime transport, handling charges in the ports, dwell times in terminals (due to customs) etc.). During the game, a link is given to where the data might be found. This data has to be given in and the final outcomes of the calculations will be checked with the data that has already been collected (and validated).

d) <u>Variables/unexpected events/factors changing the situation.</u>

There are several different unforeseen events possible:

- Internal effects:
 - Changes in shipping routes (other calling pattern of ports in Europe)

SIMULTRA PROJECT 2017-1-IT01-KA202-006140 IO n° 1: DESCRIPTION OF THE MAIN TASK FOR THE REFERENCE JOB PROFILES





- External effects:

• Delays during the transport (@sea, @port or @hinterland)

e) <u>Description of the Outcome/Score of the game</u>

If the deviations are too large, a message will appear explaining that a certain parameter was wrong. After the new data is inserted, a new calculation will be made and if the correct (within a certain error range, to be defined) values come out, the interface indicates a match. This way, the player gets an idea of typical chain cost component values (order of magnitude), and (s)he also learns where to find typical data.

f) Game levels /stages

The stages of the game, the different levels of difficulty will be set considering:

- number of parameters that the user has to manage
- The type/availability of the parameters included in the game.

For a higher difficulty level, also several different chains can be calculated. In this game, a logistics chain with the same origin and destination is used, but different ports in Europe can be used. The main purpose of this game is to show that also a choice between different ports can be made, and what the impact on costs are.

g) <u>Virtual/game/simulation time and link with real time</u>

The game time will be a simulated transport chain. So, one turn will be equal to 40 to 50 days. In total one complete year will be played. So, in total, 8 to 9 turns have to be completed before the game is done.

h) Knowledge/Skills/Competences for playing the game

Knowledge

When playing the game, the game player should obtain the following knowledge¹:

- Terminology related to ports, vessel, IWT, Rail Transport and Road Transport
- Terminology related to Loading Units
- Characteristics and Types of Layouts of supply chain networks

Skill

The main skills² needed to play the game are:

- The user is able to collect the necessary date to calculate the chain cost
- The user is able to assess and interpreted the total chain cost

Competence

With respect to the competences³, the following are required:

- The user is competent to calculate the supply chain cost
- The user is competent understand the overall supply chain process

² The ability to perform tasks and solve problems.

¹ The outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of study or work,

³ The ability to apply learning outcomes adequately in a defined context (education, work, personal or professional development).





3.3 PORT OPERATIONS MODULE

a) <u>Description of the virtual environment</u>

When the game starts with an overview of the container terminal. Also, a popup screen will be included which will show an email which will display the main order (see **Figure**).



Figure 14: MAIN SCREENS FOR THE CONTAINER TERMINAL RESOURCE PLANNER⁴ - Source: van Hassel (2011)

In the picture/graphic, the number of container cranes assigned to a vessel, the number of AGVs or straddle carriers and the dockworkers can be displayed.

b) Description of input/starting parameters

An announcement of a vessel arriving at the terminal will come in via a message. In this message the ETA of the vessel is given along with the number of TEU to be offloaded and loaded within a given time frame. In another form the number of resources planned for a given ship needs to be given in. These are:

- Number of container cranes
- Number of straddle carriers
- Number of dockworkers

If more vessels will arrive at the terminal then all these vessels need to be handled. The resources that are already being used cannot be used for another vessel. So, the resources to be used are limited.

c) <u>Description-List of actions of the user in the simulation game (Game/Play Mode):</u>

In this game, the total handling time and the terminal operating cost for handling a vessel will be calculated. The number of container cranes, dockworkers and straddle carriers needed to handle a given vessel, with a given number of containers to be unloaded, need to be determined. If too little resources are allocated, the waiting time will be very high and not acceptable for the shipowner. If too much resources are allocated, the

SIMULTRA PROJECT 2017-1-IT01-KA202-006140 IO n° 1: DESCRIPTION OF THE MAIN TASK FOR THE REFERENCE JOB PROFILES

⁴ This picture is taken from another project and could be used as an example of what we want to show in this game.





downtime of the vessel will be small, but the cost for the terminal operator will be high. So, an optimum need to be determined. In the game a maximum number of container cranes and straddle carriers are given. Also, some container cranes can be used as backups (so to be used in case of a breakdown of one of the cranes).

d) Variables/unexpected events/factors changing the situation.

Variations that are taken into account are variations in the handling time of container cranes. This means that that the handling rate can be smaller or a bit larger than anticipated. This means that this element need to be taken in consideration when making a planning.

Also, a variation of the actual arrival time of the container ships at the terminal will be included. This means that also this effect needs to be considered in the planning.

e) <u>Description of the Outcome/Score of the game</u>

The player needs to determine how many resources are needed to handle the vessel. If too little resources are allocated (and the maximum allowable handling time is exceeded) then a message will be given that the shipowner is not happy and the task needs to be redone. Also, when the costs are too high (too many resource are in idle condition), the terminal manager will complain and the task need to be redone.

f) Game levels /stages

In a next level of this game, the maximum allowable downtime of the vessel will also be given. So, based on this, the player needs to determine how many resources are needed to handle the vessel. If too little resources it allocated (and the maximum allowable time is exceeded) then a message will be given that the shipowner is not happy and the task needs to be redone. Also, when the costs are too high, the terminal manager will complain and the task need to be redone. In this version of the game, also variations in the handling time of container cranes are taken into account (so the handling rate can be smaller or a bit larger than anticipated). The purpose here is also to learn the players that the larger the deviations, the more safety factors need to be included in the implementation of the resources of the container terminal.

g) <u>Virtual/game/simulation time and link with real time</u>

The game will work from vessel arrival to vessel departure. So, each "turn" will represent a ship arrival. After the parameters are being set, the vessel will be handled accordingly. When the vessel is being handled the turn is over and the results of the cost and handling time will be given.

If multiple vessels will arrive, then if a second vessel will arrive before the first one finished, then first the inputs will be given for the second vessel.

This means that a time calculator is needed in the tool where the "actual time" will be calculated. In total a period of 4 days will be played (52 simulated hours).

h) Knowledge/Skills/Competences for playing the game

Knowledge

When playing the game, the game player should obtain the following knowledge⁵:

• Terminology related to container vessel, Inland navigation and container terminals

⁵ The outcome of the assimilation of information through learning. Knowledge is the body of facts, principles, theories and practices that is related to a field of study or work,





- Terminology related to loading units
- Characteristics and layouts of container terminals

Skill

The main skills⁶ needed to play the game are:

- The user is able to assess and interpreted the terminal cost
- The user is able to take uncertainty into account.

Competence

With respect to the competences⁷, the following are required:

- The user is competent to calculate the container terminal handling cost
- The user is competent to calculate the container terminal handling time
- The user is competent understand the container terminal process

⁶ The ability to perform tasks and solve problems.

⁷ The ability to apply learning outcomes adequately in a defined context (education, work, personal or professional development).





3.4 ROAD TRANSPORT MODULE

a) Description of the virtual environment

Globally the action will take place in the office where all the transport clerks are working. We will see the desk of the transport clerk, a computer with 3 screens (One for TMS, one for webmail, one for geolocation), a phone, a document older.

b) Description of input/starting parameters

The very starts of the game will be a phone call by a costumer. Player will have to interact with him in order to determine his needs. He will use tools such as a TMS for checking and booking physical and material means, as well as he will use his webmail to interact with the client for confirming the order.

Therefore, we will globally see each tool that a transport clerk uses in his everyday tasks.

c) <u>Description-List of actions of the user in the simulation game (Game/Play Mode)</u>:

The idea is to present all the activities the transport clerk in road transport performs in order to succeed in his missions.

We have divided the software in 5 "steps":

1) Receiving the transport order

The player receives a phone call from a customer. He has to ask the right questions in order to determine the real needs of the client.

2) Processing the order.

Based on the answers he has obtained from the customer, player has to determine which means (both material and human) he has at his disposal in order to achieve the mission.

a. Choose of vehicle

Among a list of vehicles, player will have to choose the right ones (truck + trailer) in order to achieve the transport mission.

b. Choose of driver

Amon a list of drivers, player will have to choose the right one in order to achieve the transport mission.

3) Price communication

Based on his previous choices, now player knows he has the means in order to perform the mission. Next step is to communicate to the client a price for the mission, and obtain his approval.

4) Registering the order in the exploitation software (TMS)

Once the approval obtained from the client for the mission, player books material and human means in the Transport Management System, in order to confirm that they are booked for the duration of the mission.

5) Hazards and litigations treatment.

During the execution of the transport mission, a hazard will occur, and player will have to have the right reflexes in order to treat the hazard. The mission will be completed only if he had the right behaviour dealing with the hazard.

d) <u>Variables/unexpected events/factors changing the situation.</u>

The variable will occur in the step "Hazards and litigations treatment". This step corresponds to the following of transport operation, and an unexpected even will occur during transport, demanding for action from the user. The pedagogic aim is to make sure the transport clerk has the right reflexes in the case of hazards, which will happen several times a day in his future professional life.





e) <u>Description of the Outcome/Score of the game</u>

We have decided that user will have, for each one of the steps, 3 rounds to try. The total amount of points for each step will be defined.

At the first try, for each good answer user will get 1 point.

At the second try, for each good answer user will get 0.5 points.

At the third try, user will get 0.25 points.

At the end of the third attempt, there will be a grade over 100 given to the user.

Once the fifth step completed, user will get his average score for the global use and a reminder of his grades for every step.

f) Game levels /stages

We can imagine a duration for each step (to be defined). User will have a limited time to answer. We can imagine that for more advanced users those times are shorter.

g) <u>Virtual/game/simulation time and link with real time</u>

It is in the 5th step that we will need to have defined a link with real time. Indeed, in this step the transport clerk follows the operation of transport, and will have the chance to see the evolution of the truck on a road map. We still have to define the ratio.

h) Knowledge/Skills/Competences for playing the game

Knowledge

- Knowledge of rules of goods transportation
- Knowledge of planning a transport mission (availability of human and material means)
- Knowledge of how to interact with a client

Skill

- He/she is able to ask the right questions in order to plan a transport mission
- He/she is able to calculate a price offer for a client
- He/she is able to deal with hazards

Competence

- He/she competent to understand the variable of a transport mission
- He/she is competent to interact with a truck driver
- He/she is competent to coordinate a transport mission





3.5 INTERMODAL PLATFORM MODULE

a) Description of the virtual environment

The user's screen displays:

- The Intermodal Platform/Terminal (isometric view)
- On the lower bar, the available documents that can be selected and visualized
- A window for communications
- A clock



Figure 15: MAIN SCREENS FOR THE INTERMODAL PLATFORM MODULE

b) Description of input/starting parameters

To play the game, the user has to read and use information provided by some main reference document:

- Train List: includes the train number, the list of wagons and containers (for each wagon), the size, the gross and net weight of containers, the customer/owner
- Terminal Layout: shows the allocation/organization of areas according to the type of service (maritime and inland) and the customers
- Train/Rail Plan: it's the scheduling of trains for the year
- Stowing List: information on where to stow UTIs and in which order (ADDITIONAL)
- c) <u>Description-List of actions of the user in the simulation game (Game/Play Mode)</u>:

For the UNLOADING OF AN INCOMING TRAIN the user has to carry out the following actions:

- 1. Select the track on which the train has to stop using the terminal layout and the train list (and/or visualizing the train)
- 2. Indicate the MAD, once the train is on the appropriate track. Therefore he/she has to know what is the MAD and when has to be read on the clock
- 3. Follow the check of the train and approve, if everything is ok, the incoming goods
- 4. Select and move containers to the appropriate area according to the layout and the train cargo/containers (using the train list)

For the LOADING OF AN OUTGOING TRAIN the user has to carry out the following actions:

1. According to the train number, the size of containers and twist, he selects the containers stored in the platform and load them on the train





- 2. When truck drivers arrive at the terminal, he/she checks the information between the booking list and the real info and data of incoming trucks
- 3. He/she indicates to the road driver to position for unloading the container, taking into account the train number, the size of container and twist, the layout of the terminal
- 4. He/she indicates to the terminal operator the wagon and the position on which the container has to be loaded, taking into account the position of the twists
- d) <u>Variables/unexpected events/factors changing the situation.</u>

A variable for the game is the Stowing List, that may be provided to the user and that imposes to stow the UTIs according to a specific order.

Another variable is the need to change the position of the twists of the wagons in order that is possible to unload the containers, as well as a not-coherent booking with the real information of truck.

The integrity of the safety seal is not confirmed.

Might be asked to calculate the total terminal capacity and the dispatching parameters

e) <u>Description of the Outcome/Score of the game</u>

OPTION 1: SCORE = ACTION PERFORMED APPROPRIATELY

70 actions (for example) need to be performed by the user, in order to perfectly complete the game. Each time an action is wrong, the user is informed and he/she does not get any score, and the correct action is automatically carried out by the Simulator. In this case, at the end he will get a final score, that is the assessment of his/her performance

OPTION 2: SCORE = STAGE COMPLETED IN THE EXPECTED TIME

Each time the user does a wrong action, the simulator inform him and give the chance to repeat the action, nevertheless a penalty in term of time is applied to the clock (like in the real if you double the movement of a container), so the user has less time to complete the stage. Therefore, here there's no score, but the assessment is related to ability to complete in time (or not) the stage.

TOTAL NUMBER OF USER'S ACTIONS

Load/Unload of 20 containers per each train: 40 actions Indicate the MAD and the HLR: 2 actions Select the track: 1 action Check the booking list vs the real info provided by the driver: 10 actions Indicate the position to UNLOAD the incoming container: 10 actions Sending Communications to the Customer: 2/3 actions

f) Game levels /stages

OPTION 1

Basic Level: no time limit (in national language) Level 1: 16 minutes (in national language) Level 2: 12 minutes and some unexpected events (in national language)

Level 3: 12 minutes and some unexpected events (in English)

OPTION 2

Basic Level: unloading operations – 10 minutes (in national language) Basic Level: loading operations – 10 minutes (in national language) Level 1: 16 minutes L/U (in national language)





Level 2: 12 minutes for L/U and some unexpected events (in national language) Level 3: 12 minutes for L/U and some unexpected events (in English

g) <u>Virtual/game/simulation time and link with real time</u>

Four (4) hours in the game equals to 12 minutes in the reality

h) Knowledge/Skills/Competences for playing the game

Knowledge

- \circ $\,$ The layout of a Terminal and logic of stowing areas
- o The main documents (Train List, Rail Plan, Transport Document, Stowing List)
- The characteristics of trains, wagons and UTIs

Skill

- $\circ~$ He/she is able to select the appropriate track according to the layout and the train list
- o He/she is able to calculate the capacity of a train
- $\circ~$ He/she is able to select the correct stowing area for the UTI

Competence

- $\circ~$ He's competent to read the transport documentation
- $\circ~$ He/she is able to coordinate Loading and Unloading operations
- i) Other details

TRAIN CAPACITY

The train will be composed by 10 wagons on which 60 TEUs can be loaded, therefore around 20 containers will be transported by the train.

CONTAINERS TYPE and SIZE

3 sizes of container are considered: 1 TEUs (20 feet), 1,5 TEUs (30 feet) and 2 TEUs (40 feet).

Two types of containers are considered: INLAND Containers and MARITIME containers

STORAGE AREAS

An area for each customer (4), of which two related to INLAND containers and two to MARITIME containers. Moreover, other two areas: REPAIR and EMPTY will be considered. Also, the n° of levels of containers will be taken into account. Graphically, containers' owner/customer will be identified by different colours

A WALK IN THE PLATFORM

The chance for the user to walk in the intermodal platform and check several information





3.6 CUSTOMS PRACTICES MODULE

a) Description of the virtual environment

The user screen shows:

- In the four corners, the 4 actors of the process that are communicating, carrying out operations and exchanging documents and information
- In the middle of the screen, the document that has been selected and need to be checked or filledin in some section and sent to one of the actors
- On the lower bar, the available documents, that can be selected, visualized and sent
- A window for approving (or not) the reference document



Figure 16: MAIN SCREENS FOR THE CUSTOMS PRACTICES MODULE

b) Description of input/starting parameters

Notification by the Freight Forwarder of a Transport Service to be operated by the MTO/Transport Operator. A set of information is provided, among which: ETA (Estimated Time (and date) of Arrival of the container at the port), container code and type and seal number, shipment number/code, list of costumers owning the goods and associated packages, packages weight & type of goods, name of the Shipping Company, port of origin and destination, first indications on the Clearance Procedure for the goods.

c) <u>Description-List of actions of the user in the simulation game (Game/Play Mode)</u>:

The first and initial action of the user is to select the role/actor that he/she want to represent in the game:

- 1. Freight Forwarder
- 2. Transport Operator
- 3. Customer
- 4. Customs Agent.

According to the role, clearly, the actions that the user will have to perform are different in terms of timeline, documentation and communications.

For example, if in the game 2, the user decides to represent the Transport Operator:

1. One month before the User (TO) receives information about the shipment from the FF, so he/she needs to check if all the information and documents have been provided, otherwise he has to ask for additional information/documents





- 2. The day before the arrival of the ship, the User receives a confirmation of the info concerning the shipment, as before he/she needs to check the appropriateness of the info provided by the FF
- 3. The User has then to forward information to the Customs Agent and wait for the confirmation that the DAT document has been issued by the CA. Once issued the DAT, the TO can extract the container from the A3 area and can transport it to the warehouse
- 4. Once the container is arrived at the warehouse selected by the Customer, the User before starting the unloading will have to wait the confirmation by the FF.
- 5. After the confirmation the User pushing on an action button can start the unloading and check of the goods, using the packing list. So, he will need to provide packing list to the warehouse operator
- 6. Once he/she get the confirmation from the warehouse operator that everything is ok, the OT can «stamp» the driver's waybill and write on it the seal n°, the arrival date and time, as well as the release time.
- 7. He will confirm to the FF the unloading and coherency of the goods and will sent the waybill to the FF (stamped and with the same information as before)
- 8. The User will be informed by the FF on the procedure for the Customs clearance of the goods, therefore he will receive from the CS a Customs Bill for introduction of the goods in A3 or A4 warehouse, or in A3 area and he will select the appropriate action to be carried out by warehouse operators
- 9. The User might also receive from the CA a Customs Bill for the extraction of the goods and therefore their Customs Clearance. He will now contact the FF in order to agree the conditions for the delivery of goods to the client.
- d) <u>Variables/unexpected events/factors changing the situation.</u>

The documents are not filled-in correctly therefore information needs to be modified, or the documents are not filled-in.

A specific check requiring more information/documentation is performed by the Customs Authority. The Customs Clearance procedures cannot be completed as some documents are missing or not correct, therefore it is necessary to change the temporary warehouse in which are stored.

e) <u>Description of the Outcome/Score of the game</u>

The Outcome of the game is the appropriate completion of the procedure for the Custom Clearance of the goods. Therefore, is the correct exchange and provision, among the actors of all the documentation and all the information, at the right time and in the right order.

The score is calculated basing on the number of the correct answers/actions carried-out by the user. Each time that the user makes a mistake, the error is notified and automatically corrected. A counter will be shown on the user screen. It may be considered a "bonus" if the user carries out the action rapidly.

f) Game levels /stages

A first discriminating for the difficulty levels may be the use of English.

A second possibility is to grant access to 3 different roles: customer, freight forwarder and clerk of a MTO, and to unlock the customs agent only at a later stage, once the first 3 screens are over. In this case the role of the customs agent will have to be made a little more complicated.

Another option is to insert fewer multiple-choice questions, so in fact to drive the user a little less, and let him make his own choices at the right time, only indicating at what point in the transport process he is (maybe this option is more difficult in terms of programming). Alternatively, it may be considered to require the user to complete several documents, which is in fact also perhaps the greatest difficulty of the game.





g) <u>Virtual/game/simulation time and link with real time</u>

In this game the time is not very relevant, it is the order of the activity performed along the process that is relevant, nevertheless on the screen there will be clock, and, more important, there will be a calendar so the user can understand which kind of action is ongoing (e.g. arrival of the ship at the dock).

h) Knowledge/Skills/Competences for playing the game

Knowledge

- \circ ~ The documentation related to Customs Procedures and Clearance of goods
- The Customs regulations
- \circ The Customs procedures, the actors involved, the role and responsibilities

Skill

- \circ $\;$ He/she is able to read, check appropriateness and fill-in the documentation
- \circ $\,$ He/she is able to follow the process and exchange the right document
- He/she is able to apply Customs regulations and manage Clearance procedures

Competence

- He/she to understand the role in the process
- He/she to understand the documentation
- o He/she to understand the timeline of the process
- \circ $\;$ He/she to relate with the other actors of the process