TRANSPORT PLANNING AUTHORITY
MINISTRY OF TRANSPORT
THE ARAB REPUBLIC OF EGYPT

No.

MiNTS – MISR NATIONAL TRANSPORT STUDY

THE COMPREHENSIVE STUDY ON THE MASTER PLAN FOR NATIONWIDE TRANSPORT SYSTEM IN THE ARAB REPUBLIC OF EGYPT

FINAL REPORT

TECHNICAL REPORT 12

PROJECT PRIORITIZATION

March 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

ORIENTAL CONSULTANTS CO., LTD.
ALMEC CORPORATION
KATAHIRA & ENGINEERS INTERNATIONAL

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CHAPTER 1: INTRODUCTION

1.1. BACKGROUND

The Japan International Cooperation Agency (JICA) and the Transport Planning Authority of the Ministry of Transport are cooperating in the conduct of the *Comprehensive Study on The Master Plan for Nationwide Transport System in the Arab Republic of Egypt* (MiNTS – Misr National Transport Study), based upon agreements finalized during July, 2009[1]. Oriental Consultants Company Limited, headquartered in Tokyo, Japan, is the designated lead consultant for the study. Associated firms are Almec Corporation, Japan and Katahira & Engineers International, Japan. Technical efforts in Egypt were initiated during December, 2009.

1.2. THE MiNTS FRAMEWORK

1.2.1. Study Scope and Objectives

MiNTS is comprehensive in nature, that is, approaches have been designed to mitigate transport problems and contribute to the sustainable development of the nation. Investigative efforts extend over the entirety of the Republic (Figure 1.2.1) with a particular focus being major corridors of movement for both persons and cargo. All major modes of transport are addressed including road, rail, maritime, inland waterway, civil aviation and pipeline. However, the practical master planning focus falls upon those modes falling under the jurisdiction of the Ministry of Transport; that is, the road, rail, maritime and inland waterway sectors.

Five key milestones form the foundation upon which planning efforts are based:

- Establish a nationwide, multi-modal database whose validity rests on a series of focused transport survey and data collection exercises;
- Formulate overall strategies and policies for development of the nationwide transport fabric;
- Develop an integrated, multi-modal transport master plan with years 2017, 2022 and 2027 being short, medium and ultimate planning horizons, respectively;
- Identification, within the master plan framework, of high-priority projects; and,
- Implementation of an effective and productive technology transfer program with Egyptian counterparts.

[1] *Scope of Work - Comprehensive Study on The Master Plan for Nationwide Transport System in the Arab Republic of Egypt*, as mutually agreed upon between the Japan International Cooperation Agency and the Ministry of Transport, Government of Egypt, July 16, 2009.

Source: JICA Study Team

Figure 1.2.1 MiNTS Study Area

The transport strategy embedded within MiNTS must concurrently contribute to an efficient economic structure, strengthen linkages within Egypt as well as with neighboring countries, and provide a base for market-oriented transport activity. Economic expansion and social transformations within Egypt are well underway; continuing improvements in productivity and well-being are expected. As economic growth continues, changes in transport activities and behavior will follow suit. Thus, the foci of transport planning must gradually shift from alleviation of present deficiencies to realization of a transport system founded upon sustainable evolution and integrated, mutually supportive transport solutions. This strategy is particularly valid given the almost 20-year planning horizon adopted by MiNTS.

1.2.2. A Consultative Planning Process

The final structure of MiNTS, and the successful reception thereof, can only be achieved as a direct result of cooperative efforts and close liaison between the Study Team and local experts. Considerable efforts have been expended in gathering information, reviewing previous studies and holding numerous discussions to enhance knowledge of, and sensitivity to, local transport conditions, norms and practices.

The Study Team, housed in the offices of the Transport Planning Authority, Ministry of Transport, is being strongly assisted by its designated counterpart Special Working Group, Coordination Committee and Steering Committee. Thus, continuous and productive technical liaison is being maintained with a number of organizations including the Ministry of Transport and various entities thereof (Office of the Minister, Transport Planning Authority, Egypt National Railways, General Authority for Roads, Bridges and Land Transport, General Authority for River Transport, Maritime Transport Sector); the Ministry of Housing, Utilities and Urban Communities; Ministry of Civil Aviation; Ministry of Agriculture and Land Reclamation;

Ministry of Trade and Industry; Ministry of Industrial Development; Ministry of Interior; Ministry of Local Development; Ministry of Finance; State Ministry of Foreign Affairs, Sector of International Cooperation; Ministry of the Environment; CAPMAS (Central Agency for Public Mobilization and Statistics); as well as various Governorates and entities thereof. Close coordination has also been effected with Universities and various departments within those learned institutions.

Likewise, effective consultations are programmed with various international agencies, funding institutions, donors, and consultant groups in order to obtain an overview of previous, current, and likely future activities and/or involvement in Egypt.

1.2.3. Sustainability and Human Resources Development

The components of the Master Plan diversify beyond the traditional "hardware" concepts associated with infrastructure provision. Additional key elements of the process consist of "software" aspects, that is, available technology, international standards, and modal integration needs (cargo/passenger terminals, logistics chains, transfer points) as well as "humanware" needs. In the latter case, this represents the cultivation of human resources via the designation of training and education programs as well as other requirements for developing expertise. In other words, "sustainability", or the notion that the planning process must allow Egyptian stakeholders to participate in visualizing and shaping their own future. This is of substantial importance in terms of ownership building if MiNTS is to be adopted and used by the people and their elected officials both during, and following, the conduct of MiNTS.

1.3. REPORTING STRUCTURE

The *Final Report* consists of three elements: *The Master Plan* report, *Technical Reports* and *Appendix Reports*.

- *The Master Plan* report is seen as the main document whose intent is to present, in a synoptic sense, main findings of the MiNTS investigations;
- *Technical Reports* represent a series of sector-specific reports which document the technical underpinning of *The Master Plan* document (Table 1.3.1), and,
- *Appendix Reports* represent task-specific or activity-specific documents and other data summaries, some of which have been developed in response to client group requests.

Table 1.3.1 Technical Reporting Structure

Report Number	Subject
1	Road Sector
2	Rail Sector
3	Inland Waterway Transport Sector
4	Maritime Sector
5	Civil Aviation and Pipeline Sectors
6	Demand Simulation and Scenario Testing
7	Organizational and Functional Aspects of the Transport Sector
8	Private Sector Participation
9	Environmental Considerations
10	The MiNTS Vision, Policies and Strategies
11	Transport Survey Findings
12	Project Prioritization
13	Counterpart Training Program

Source: JICA Study Team

CHAPTER 2: OVERVIEW

2.1. BACKGROUND OF THE STUDY

Since 2004 Egypt has been undergoing rapid economic growth at about 7% p.a. during the three fiscal years from 2005-2006 to 2007-2008. This growth was achieved by the rise in domestic consumption through economic reforms such as reduction of customs duty and individual income tax. Along with recent rapid economic growth, the demand for passenger and freight traffic has also been growing dramatically, especially the freight demand. The increase of transport demand as well as the change of origin-destination (OD) patterns has brought about the necessity for developing new ports, airports, roads and industrial parks and containerization.

In response to this situation, the Government of the Arab Republic of Egypt (GOE) has designated 5 general strategies in "The Sixth Five-Year Plan 2007-2012" as follows:

1) Achieving integration and harmony among different internal modes of transport to efficiently meet the increasing demand,
2) Strengthening the private sector role and ownership, and increasing economic efficiency of market-oriented economic units,
3) Achieving better security and safety levels within transportation means, and limiting the environmental negative impacts,
4) Increasing railways efficiency through restructuring the Egyptian National Railways (ENR) to ensure better levels of services and return,
5) Developing maritime ports in compliance with international agreements for maritime safety and raising their competitiveness.

These strategies together with other alternative strategies are to be evaluated through the Study and eventually to establish more effective strategies for the development of the transport sector while ensuring positive impacts to other economic activities.

In the light of the above circumstances, the Government of Egypt officially requested the Government of Japan (GOJ) to extend technical assistance for carrying out the Comprehensive Study on the Master Plan for Nationwide Transport System in the Arab Republic of Egypt (hereinafter referred to as "the Study").

Accordingly, the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of the GOJ's ODA programs, and the Transport Planning Authority of the Ministry of Transport are cooperating in the conduct of the Study (MiNTS – Misr National Transport Study), based upon agreements finalized during July, 2009. Oriental Consultants Company Limited, headquartered in Tokyo, Japan, is the designated lead consultant for the study. Associated firms are Almec Corporation, Japan and Katahira & Engineers International, Japan. Technical efforts in Egypt were initiated during December, 2009.

2.2. STUDY SCOPE AND OBJECTIVES

A basic premise of all investigations is that the MiNTS shall be comprehensive in nature, that is, adopt approaches designed to address overall transport issues and to propose transport strategies for the

sustainable development of the nation. All major modes of transport are to be covered including road, rail, maritime, inland waterway, air and pipeline. However, the practical master planning focus will be those modes falling under the jurisdiction of the Ministry of Transport; that is, the road, rail, maritime and inland waterway sectors.

Study objectives upon which study efforts are based:

- To prepare reliable transport database inclusive of OD tables by mode, which can be utilized to evaluate and/or formulate transport development plans/projects in a scientific manner by conducting nationwide transport surveys
- To re-formulate the overall strategy and policies for nationwide transport system development
- To formulate Master Plan for a nationwide transport system with justification of selected priority/leading projects
- To transfer technologies to Egyptian counterparts

2.3. TECH REPORT 12 TOPICS

The subject of TECH Report 12 relates to the efforts of evaluating and prioritizing the proposed projects. TECH Report 12 discusses respectively:

Chapter 2: The need for multi-criteria analysis;

Chapter 3 : The pilot projects;

Chapter 4: Methodology;

Chapter 5: Testing the model;

Chapter 6: Multi-criteria Analysis;

Chapter 7: Results of the Multi-criteria Analysis;

Chapter 8: Implementation Logic; and

Chapter 9: Conclusions and Recommendations

CHAPTER 3: THE NEED FOR MULTI-CRITERIA ANALYSIS

3.1. THE COMPLESITY OF MODERN LOGISTICS

Modern logistics service providers are organisations supplying either logistical or advanced physical distribution services. Different types of logistics providers are shown in Figure 3.1.1 based on the supply-chain function and how this is reflected in the supply-chain hierarchy.

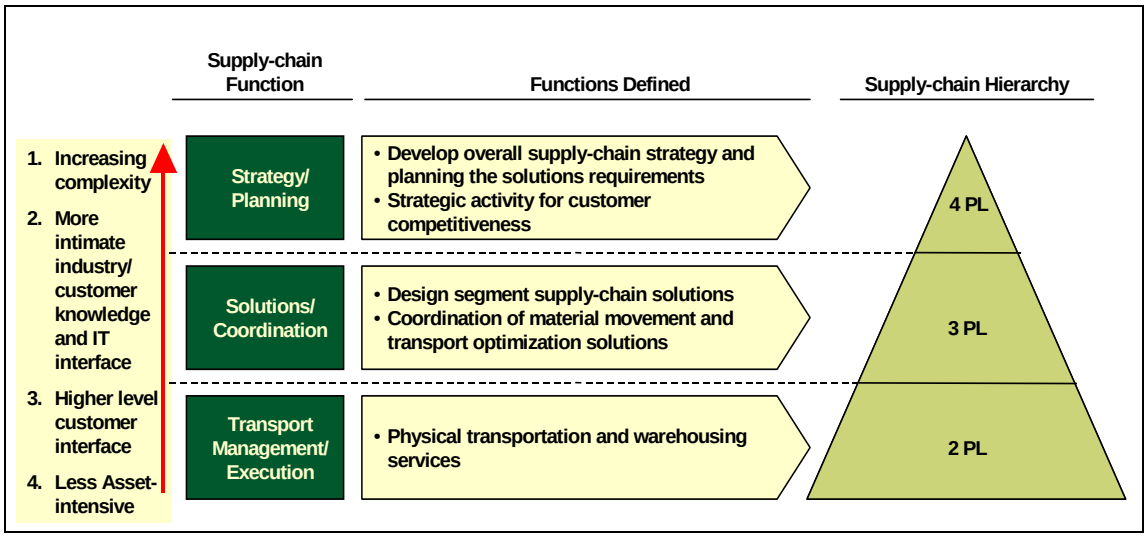


Figure 3.1.1 Supply Chain Function/Hierarchy

Figure 3.1.1 shows at the bottom of the hierarchy pyramid the two party logistics provider (2PL) environment where physical transport and warehousing are discrete business activities and in which there is generally low asset intensity. Basically, this consists of standard transport applications and represents a simple form of physical distribution. Most road transporters, shipping companies and the railways would be classified as 2PLs, as they usually only manage the transport activity. This supply-chain function progresses upwards into the more complex solutions and coordination involved in third party logistics provider (3PL) activities. This operation is based on outsourcing by either a supplier or receiver for an increasing amount of the logistics chain and thus requires greater customer orientation and the employment of significantly greater assets. The 3PLs operate in the logistics sector and in the upper end of the physical distribution market. These are the parties mainly present in the logistics terminals. Finally at the top is the more complex 4PL where an integrator assembles the resources, capabilities and technology of its own organisation and other organisations to design, build and run comprehensive supply chain solutions.

With the introduction of modern logistics in the Egyptian transport system, investment decisions can no longer be taken solely upon the capital value of the investment and the financial and economic return of the investment as it is defined by traditional Cost Benefit Analysis. A more comprehensive evaluation will be necessary that determines the true benefit of planned investments taking into account also non-quantifiable elements that will be essential in facilitating the transformation and modernization of the Egyptian transport sector and increase the attractiveness for the private sector to invest in the system and stimulate using the country as value added platform where transit cargo is not simply transferred but where value is added to the cargo prior to re-shipping the cargo out of Egypt..

3.2. MULTI CRITERIA ANALYSIS: THE APPROPRIATE METHOD

MiNTS has identified a series of problems which need to be addressed, relating not only to infrastructure needs (hardware level), but also to non-infrastructure levels, i.e. the software and humanware levels. These three intervention levels are fully integrated and need simultaneous and integrated attention as suggested in エラー! 参照元が見つかりません。.

At the hardware level and both for passenger and freight transport, the key issue is the ever growing dominance of road cargo transport and the stagnation and even gradual decline of the IWT and rail modes. This is due to a number of reasons including lagging investments, dated infrastructure as well as rolling stock/fleets that have exceeded their practical service life. This situation increases operating costs and reduces revenues and performance. At the societal level, the dominance of road transport has catalyzed increasing congestion problems, considerable safety concerns as well as environmental degradation due to the use of polluting equipment.

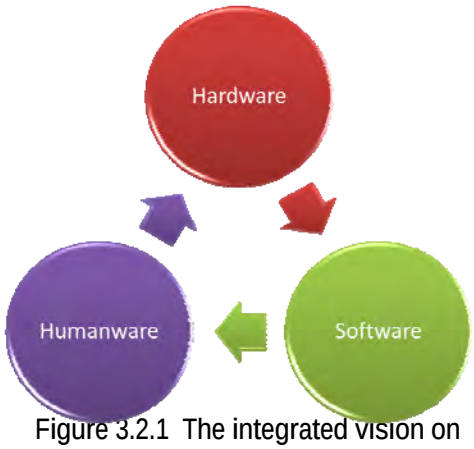


Figure 3.2.1 The integrated vision on sector improvement

The key issue at *the software level* is the lack of modernization of the transport sector as a whole and of the railway and river transport sectors in particular, leading to low performance, poor capacity utilization and weak growth prospects. This created the present situation where the IWT and railway sectors are limited in their capacity to capture new cargo, shift towards new markets, container transport in particular, and efficiently compete with the road sector. The rail and IWT sectors are at present confronted with a wide range of internal hindrances and external impediments related to market access, administrative practices, lack of intermodal systems, the poorly adapted regulatory frameworks and inability to operate in an increasingly competitive and global market

The final of three components is at *the humanware level.* One of the key elements to attend is the problem that the sector suffers from a severe shortage of qualified staff, due to a lack of training programs and human resource development, in particular related to the introduction (and maintenance) of modern technologies in the sector. Qualified personnel to implement and operate a unified, computerized, GIS friendly data system encompassing all transport modes, are a key objective and projects in this field need to be addressed with priority, given they are an urgent prerequisite for efficient transport planning. The humanware factor is therefore a necessary complement to efforts at the software level as it will provide the necessary expertise to efficiently and effectively apply modern software applications.

Any evaluation of a set of investment projects that aim at improving sector performance imperatively has to include projects related to hardware, software and humanware, considering these three groups at equal value.

3.3. THE ADDED VALUE OF MULTI-CRITERIA ANALYSIS

Project evaluation is frequently conducted by means of a Cost-Benefit Analysis (CBA). The evaluation technique is widely recognized as appropriate for appreciating the contribution of a project to long-term sustainable economic development. The CBA identifies the costs and benefits of projects without possible distortions generated by efforts to assess non-quantifiable variables. The Cost Benefit Analysis is a means-end assessment defined by economic circumstances and where the investment is decided upon the conditioned evaluation cycle where input generates a result. As far as components are quantifiable, the CBA (can) incorporate(s) creative thinking by which less-tangible parameters are translated into “quantifiable” decision parameters.

Whatever the level of creativity, the CBA upholds the principle that a final recommendation can only be made on the basis of a numerical (formal) evaluation that uses mathematical algorithms without any distorting interventions in which costs are compared with revenues. The costs include development costs and operations and maintenance costs. Benefits which can be expected by the implementation include but are not exclusively related to savings in travel time and distance, provision of higher quality traffic services and improvement of area attractiveness. The cost benefit analysis thus follows a conventional discounted cash flow methodology, comparing project benefits and project costs.

But as suggested in the European *Guide to cost-benefit analysis of investment projects* (1987), the evaluation methodology will also include an analytical section where non-quantifiable variables are taken into consideration in addition to economic and financial variables which are part of the classic CBA. For the non-quantifiable variables, costs and benefits will be "…*identified, quantified and given a realistic monetary value, if possible. If this is difficult or impossible this costs and benefits should be quantified at least in physical terms for a qualitative appraisal.*" (Guide p 31, *cit*).

The expansion of the classic CBA by means of a Multi Criteria Analysis (MCA) is increasingly needed for high-capital and long-term investment projects with substantial repercussions on economy and society. Therefore, it is important to include in the evaluation the impacts of "external" conditions because the value of projects is no longer defined only by its monetary performance but also by non-quantifiable variables to assess the possible contribution of "external" conditions in addition to revenues, costs, and implementation time.

The key advantage of MCA is that it allows integrating into a comprehensive assessment both quantifiable and non-quantifiable variables, offering therewith a full-scale multi-dimensional appreciation of different development alternatives facilitating at the end its ranking and prioritization. MCA does not intent to replace the financial and economic rationale of a CBA as this could create reliability problems because there would leave the project appreciation process without objectively verifiable indicators. The reason for evaluating candidate projects by means of an MCA is order to be as "creative" as possible in an effort to appreciate a range of strategic variables using an algorithm-based calculation methodology.

In the description on how to execute a MCA, also the allocation of weights to different variables is proposed by which recorded values for each of the non-quantifiable variables should be multiplied. According to the authors of the Guide, the MCA "… methodology is particularly effective when the monetisation of costs and benefits is difficult or even impossible" (Guide to cost-benefit analysis, 1987, p 37, cit). The rank-weighting evaluation method of MCA thus incorporates arguments generally excluded in traditional (numerical) evaluation methods to allow comparing possible investment alternatives against concrete monetary and non-monetary policy objectives, therewith attributing equal importance to hardware software and humanware needs.

CHAPTER 4: THE PILOT PROJECTS

4.1. PROJECT DIVERSIFICATION PREREQUISITE

The study identified a series of problems which need to be addressed in the future.

The evaluation and prioritization of proposed projects that address these problems need to acknowledge that improvements are achieved not only by developing *hardware* (infrastructure) but also by developing and modernizing equipment and operations (the *software* component) because technological innovation is the driving force in modern logistics. Technology defines the competitiveness of the transport system and of logistics and transport services and will stimulate intermodal transport solutions and improve the commercial utilization of the river and railways in addition to road transport. Software measures need to be considered with high priority because they will allow the two ailing sectors to capture new and alternative traffic.

But innovation of the Egyptian transport market needs to be complemented with *humanware* initiatives oriented towards establishing a sustainable regulatory framework and a system of efficient and effective sector governance. Coordination between related ministries and organizations should be enhanced and the present fragmentation in transport planning, implementation and operations, eliminated by reducing the direct or indirect intervention of a myriad of organizations, entities and Ministries with little evidence of efficient, market-responsive overview guidance or control.

The problems of the Egyptian transport sector to be addressed thus relate not only to infrastructure needs (hardware component) but also include intervention at the non-infrastructure levels, i.c. the software and humanware levels:

At the *hardware* level, the key issue is the ever growing dominance of road cargo transport and the stagnation and even gradual decline of the river and rail modes forced to use due to lack of investments old infrastructure and rolling stock/fleets that have exceeded their practical service life span. This situation increases operating costs and reduces revenues and performance. At the societal level, the dominance of road transport with increasing congestion problems and the use of old polluting equipments lead to environmental degradation.

The dominant issue at the *software* level is the lack of modernization leading to low performance, poor capacity utilization and the existence of a wide range of internal hindrances and external impediments related to market access, administrative practices, lack of intermodal systems, inability to operate in a competitive market.

The final of three components, the *humanware*, is imperative to shift transport of cargo and passengers from the road to the alternative transport modes, only possible if and when attending the sector's severe shortage of qualified staff, lack of training and human resource development programs, in particular related to implement and operate a unified data system (ideally computerized and/or GIS friendly) encompassing all transport modes, a prerequisite for efficient transport planning.

The evaluation criteria that will be used in the project analysis and prioritization efforts will reflect the key needs at the level of hardware, software and humanware and will be complemented by other criteria that focus other issues related to for example the environmental contribution of the project.

It is important that the project evaluation indicators, used to assess the priority of the proposed projects, reflect these issues and prioritize projects that bring concrete solutions or improve the current situation and bring the problem closer to being solved.

4.2. THE SELECTED PILOT PROJECTS

Table 1.3.1 lists the recommended pilot projects that emerged out of the MiNTS study.

Table 4.2.1 Recommended pilot projects

CORRIDOR	ID	NAME	PROJECT OUTLINE
INTERMODAL TRANSPORT CORRIDOR	RD-300	3rd Cairo Alex Expressway	connects from Cairo to Borg el Arab in desert area by 6-lanes [New Expressway]
	RD-204	Cairo Alexandria Desert Expressway (Upgrade to 8-lanes)	Committed project is 6-lanes. [Upgrade of Expressway]
	RD-301	3rd Stage Regional Ring Road (Southern Part of Expressway)	forms southern part of Outer Ring Road [New Expressway]
	RD-998	Alexandria Bypass	forms urban ring road connects the Cairo-Alex desert expressway [New Art. Road]
	RW-403	Double Tracking of Bypass Line for Cairo - New Alexandria	for freight line (diesel) with local passenger
	RW-406	Railway Link for 6th of October City	connects from RW-403 and Baharia line via L-1 [New Rail Line]
	RW-407	Railway Link between Robeki to Helwan	forms a part of south ring railway route [New Rail Line]
	RW-412	Improvement of Station Facilities for Freight Services (2stations)	Good intermodal connection & facilities, railway layout/arrangement, warehouse and station office at Qabbary and other station
	RW-420	Railway Link between Sokhna Port to Helwan	New freight railway line for direct link from Sokhna port to 6th of October [New Rail Line]
	L-1	VAL (Value Added Logistics) Center at 6 th of October City	New VAL/ Distribution Center
	IW-1	IWT port for ITC	connects to south ring railway route around Helwan, Tebbin port improvement, includes waterway, navigation and lock operation improvement.
	RW-304	High Speed Railway for Cairo - Alexandria [High/Higher speed Alt-1]	connects to Alex. to Cairo (6th of October, Smart city) along Cairo - Alex. dessert road, directly, average operational speed 200kph, [New HSR]
	IW-5	Waterway Improvement on Cairo – Alexisandoria	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 1.5m x203km).
	PT-1	Establishment of a Multi Purpose Terminal (Containers and General Cargo) at Alexandria Port	to ensure the capacity of future container demand for Alex. and Dekheila, 1) The development of the berths area (55,56,57,58,59,60), 2) Dredging the berths to reach a depth of 14 m instead of 5,6,9,10m, 3) Using the soil resulting from the dredging operations in the establishment of the terminal's yards, 4) The lengths of the berths are expected to reach 1,630m, 5) The area = approx. 290 thousand m2, (proposed by previous JICA study in 1990)
	PT-2	Development of Management and Operation for Multi Purpose Terminal in El Dekheila Port	to ensure future cargo demand in 2027 as an essential port for the window of Intermodal Transport Corridor to conect to railway and road with smooth and well organized, located between berth 91 and 92, A maritime dock composed of 2 berths with total length up to 800m and a depth not less than 14-15m, Storing yards, warehouses and administrative buildings over an area up to 262.370 thousand m2, Water surface of about 162 thousand m2, Breakwater project is under construction.
	PT-3	Dekheira Port: New Container Terminal	to ensure future cargo demand in 2027 as a window of Intermodal Transport Corridor, to access to railway and road with smooth and well organized connection, Breakwater construction project is under implementation
O - ALEXANDR	RD-302	Cairo Alex Agriculture Bypass Kafr El Zayat - Alexandria	bypass road for Tanta to Alex. in south side of agricultural road in 6-lanes [New Art. Road]

CORRIDOR	ID	NAME	PROJECT OUTLINE
	RD-315	Shubra elkhema - Banha Agriculture Road (Expressway)	bypass road for Cairo to Benha in west side, 6-lanes, 100km/h [Upgrade to Expressway]
	RW-400	High Speed Railway for Cairo - Alexandria via Tanta [High/Higher speed Alt-2]	Alternative route of Italian proposal [RW-304 Alt-1], average operational speed 200kph <only for confirming demands compared with RW-304> [New HSR]
	RW-402-1	Improvement of Tracks	1)Track renewal, 2)New track maintenance machines, Cairo - Tanta - Alex.
INLAND DELTA	RD-999	Cairo - Tanta Bypass	bypass road for Cairo to Tanta in east side, 4-lanes, 80km/h [New Art. Road]
	RD-332	Zakaziq – Toukh	bypass road for Benha to Zagazik in south side, 4-lanes, 80km/h [New Art. Road]
	RD-304	Rod El Farag Road	connects from Cairo city to 6th of October, 6-lanes, 80km/h [New Art. Road]
	RD-333	Tanta - Kafr El Sheikh	forms regional road for north bound from Tanta, 4-lanes, 80km/h [Widening]
	RD-334	Al Mahalla - Kafr El Sheikh – Damanhour	connects regional road located on the north side of Tanta, 4-lanes, 80km/h [Widening]
	RD-318	Desouq Fowa Metobas Road	located along Nile river right side near Alex., 4-lanes, 80km/h [Widening]
	RD-319	Imbaba Qalyub Tawfekia Road	located along Nile river left side from Cairo, 4-lanes, 80km/h [Widening]
	RD-320	El-Qanater El-Bagour Shebin El-Koum Tanta Mahalla Matboul Road	In parallel to Cairo - Tanta agricultural road, 4-lanes, 80km/h [Widening]
	RD-200	Belbeis-Banha-El Bagour-El Khatatba Regional Ring Road	forms Northern part of Outer Ring Road, also the role of Mediterranean Corridor, 6-lanes, 100km/h [New Expressway]
	RD-214	Zaqaziq Sinbellaween Road	under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]
	RD-215	Mansoura Talha Dekernes Mataria Road	under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]
	RD-216	Qantara Salheya Faqous Abu Kbeir Hehya Zaqaziq Road	under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]
	RW-301	Single Tracking for Basion City	not in main line between Cairo - Alex. [New Rail Line]
	RW-307	Double Tracking for Qalyoub - El Qnater	not in main line between Cairo - Alex. [Double Tracking]
	RW-308	Triple Tracking for Qalyoub - Benha	connects Cairo - Qalyoub with triple tracks [Triple Tracking]
	RW-401	Improvement of Track Arrangement for Cairo – Qalyub	Cairo and Qalyub Station: Rearrangement of track lines, Qalyub Station: Construction of elevated railway, [Track Improvement]
CAIRO-DAMIETTA / PORT SAID	RD-308	Cairo Ismailia Port Said Road (Expressway)	connects from ring road to Port Said, 6-lanes, 100km/h [Upgrade to Expressway]
	RW-313	Railway Link for 10th of Ramadhan City	connects between Tel el Kebir to Robeki through Logistics Center [New Rail Line]
	RW-302	Single Tracking for Kafr El-Batikh - New Damietta City	Damietta City only [New Rail Line]
	RW-309	Double Tracking for Mansoura – Damietta	connects to Damietta [Double Tracking]
	RW-310	Improvement of Signaling System for Increase of Freight Trains	connects for Tanta - Mansoura - Damietta [Signal Improvement]
	RW-402-2	Improvement of Tracks	1)Track renewal, 2) New track maintenance machines, Damietta, Port Said line
	IW-6	Waterway Improvement on Cairo – Damietta	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 2m x200km).
	PT-4	Damietta Port; Study on Sedimentation problema	detailed study (10mil.LE) is requred to find suitable solution to sedimentation problem. Note that Damietta port authority used about 75mil.LE for annual maitenance for dredging.
	PT-5	Port Said East: Logistic Center	exist the plan by 1st Stage in 2008, not sure the detail
CAIRO - SUEZ	RD-310	Cairo -Suez Road (Expressway)	connects form ring road to Suez, 6-lanes, 100km/h [Upgrade to Expressway]

CORRIDOR	ID	NAME	PROJECT OUTLINE
	RW-300	Double Tracking for Ain Shams – Robeki	from Cairo - Robekki along Cairo - Suez line [Double Tracking]
MEDITERRANEAN	RD-323	Wadi Alnatroum Saloum Road	connects to Libya, in parallel to RD-307 in desert area, 4-lanes, 80km/h [New Art. Road]
	RD-307	Alexandria-Saloum Road	connects to Libya along coastline, 4-lanes, 100km/h [Upgrade to Expressway]
	RD-309	Qantara-Rafah Road	connects to Rafah along coast line, 6-lane, 100kmh [Upgrade to Expressway]
	RD-316	Alamein Road	forms shortcut route from Cairo-Alex. Desert Road to Western Mediterranean Coast Roads, 4-lanes, 80km/h [Upgrade of Art. Road]
	RW-312	Single Tracking for Bir El Abd - Rafah	connects to Rafah along coast line [New Rail Line]
	RW-410	Rehabilitation of Tracks for El-Kab - Bir El Abd	connects to Suez bridge, Port Said East and RW-312 [Track Improvement]
SINAI	RD-311	Suez Ras elnakab Road (Expressway)	connects from Suez to Taba border, 4-lanes, 100km/h [Upgrade to Expressway]
	RD-327	Suez Canal Tunnel Ismailia	New tunnel at Suez Canal to connect RD-328, 4-lanes, 80km/h [New Tunnel]
	RD-328	Alawga Ismailia Road	connects from Ismailia to Alawaga border, 4-lanes, 80km/h [Widening]
UPPER EGYPT	RD-326	Albetrol Malwa Road	forms shortcut route from Borg el Arab to Asyut, 4-lanes, 80km/h [New Art. Road]
	RD-331	Qena Aswan Nile East Bank Road	runs to the east side of Nile river in desert, 4-lanes, 80km/h [New Art. Road]
	RD-312	Cairo - Asyut Desert Western Road (Expressway)	runs to the west side of Nile river in desert, 6-lanes, 100km/h [Upgrade to Expressway]
	RD-313-1	Asyut Aswan Abu simble Desert Western Road (Expressway) Asyut to Aswan	connects from RW-312 in desert, 6-lanes, 100kh/h [Upgrade to Expressway]
	RD-225	El-Belina - Tahta Road	connects from RD-312 to west agricultural road, under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]
	RD-298	Kalabsha Bridge (Koum Ombo) (Aswan)	connects to both side of Nile river [New Bridge]
	RD-299	Abo Tig Bridge and Selim Coast (Asyut)	connects to both side of Nile river [New Bridge]
	RW-999	(High) Speed Railway for Cairo - Aswan [Electrificated]	New line for passenger railway (200kph) stopping at only major cities [New HSR]
	RW-306	Development of Railway Bridge for Lemon - Abbasiya - Tora	runs in southern area of grater Cairo region [Track Improvement]
	RW-402-4	Improvement of Tracks	1) Track renewal, 2) New track maintenance machines on Cairo - Aswan
	RW-412-4	Improvement of Station Facilities for Freight Services (6 stations)	Good intermodal connection & facilities, railway layout/arrangement, warehouse and station office at stations of Imbaba, Beni Suef, Minya, Asyut, Qena and Aswan
	IW-2	IWT port improvement for Upper Egypt	connects roads/ railway smoothly, Asyut and Quena ports port improvement, includes waterway, navigation and lock operation improvement.
	IW-3	Lock Expansion with Comprehensive Lock Operation Improvement	upgrades the present capacity of Asyut Barrage Lock by expansion and improves operation of other locks.
	IW-4	Waterway Improvement on Cairo – Asyut	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 2m x200km).
RED SEA	RD-321	El Ain El Sokhna - Zafarana Road	Northern side of Red Sea coastline, 4-lanes, 80km/h [Widening]
	RD-322	Safaga Baranis Halayeb Road	Southern side of Read Sea coastline, 4-lanes, 80km/h [Widening]
EAST-WEST	RD-324	Eldaba Albetrol Road	connects from Fayoum to Mediterranean sea, 4-lanes, 80km/h [New Art. Road]
	RD-325	ALbetrol Beni Mazar Road	connects RD-324 to Fayoum, 4-lanes, 80km/h [New Art. Road]
	RD-994	Fayoum-Beni Suef Bypass	connects from Fayoum to Nile east side, 4-lanes, 80km/h [New Art. Road]

CORRIDOR	ID	NAME	PROJECT OUTLINE
	RD-995	Wasta Bridge Connection	connects from Fayoum to Nile east side, 2-lanes, 80km/h [New Art. Road]
	RD-997	Helwan-Beni Suef Bridge	connects from Fayoum to Nile east side, 4-lanes, 80km/h [New Bridge]
	RD-314	Zafarana Elkoraymat Road (Expressway)	creates expressway connection from Fayoum, Helwan to Red Sea (Zafarana), 6-lanes, 100km/h [Upgrade to Expressway]
	RD-305	Bahriya Siwa Road	connects from Siwa to Nile river for west section, 2-lanes, 80km/h [New Art. Road]
	RD-306	Bahriya Minya Road	connects from Siwa to Nile river for east section, 2-lanes, 80km/h [New Art. Road]
	RD-996	Minya Bridge	cross the Nile river [New Bridge]
	RD-303	Upper Egypt East Desert Red Sea Road	connects from Asyut to Red Sea (Safaga), 4-lanes, 80km/h [New Art. Road]
	RD-329	Farafra Malwa Road	connects from Farafra to Nile river, 4-lanes, 80km/h [New Art. Road]
	RD-330	El-Dakhla Assyuit Road	connects from Dakhla to Nile river, 4-lanes, 80km/h [New Art. Road]
	RD-226	Qena - Safaga Road	connects from Qena to Safaga for under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]
	RW-303	Single Tracking for Luxor - Hurghada [Electrificated]	for tourists from Hurghada to Luxor to save travel time, max.150kph, [New Rail Line]
	RW-409	Rehabilitation of Tracks for Qena – Safaga	for local passenger and cargo traffic connected to red sea and Quena and Luxur [Rehabilitation]
	RW-408	Rehabilitation of Tracks for Qena – Kharga	for passenger, even the paralleled cargo line from Kharga to Qena are existed [Track Improvement]
	RD-313-2	Asyut Aswan Abu simble Desert Western Road (Expressway) South part from Aswan	connects from Aswan to Abou Sembel, RW-313-1 in desert, 6-lanes, 100kh/h [Upgrade to Expressway]
SUEZ CANAL DEVELOPMENT	RD-317	Ismailia Suez Road (Expressway)	connects from Suez to Ismailia at west side of Suez canal, 6-lanes, 100km/h, connects to RD-308 (upgrade to Expressway from Ismailia to Port Said) [Upgrade to Expressway] Note: Railway projects related this corridor are RW-200 (west side, signal improvement (on-going) and RW-410 (east side, railway rehabilitation)
NATION - WIDE	P-1	Passenger Intermodal Facilities	50 locations nationwide
	L-2	Logistics Centers including improvement of Station Facilities for Freight Services (4 stations)	Logistics Centers 50 locations nationwide and Good intermodal connection & facilities, railway layout/arrangement, warehouse and station office at Cairo-Damietta (Mansura, Damietta), Cairo-Ismailia-Port said (Tel el Kebir, Port Said)
SOFTWARE	SW-1	Egyptian Transport Center (ETC)	has the function of transport related database, planning tools and model development and maintenance, training of transport planner, development of traffic accident database and as National Road Traffic Safety Board
	SW-2	Establishment of Dedicated Transport Fund	researches and arranges the matter of subsidy/carbon tax/envi. incentive tax or subsidy for future earmarked road funds
	SW-3	Development of road function based design and capacity standards	researches and designs effective visible road signs and pavement markings for preventing road accidents in night time and fogging, also rearranged highway standards.
	SW-4	Road safety initiative (3E; Engineer, Education and Enforcement)	examines historical traffic accident data and conducts safety audit, then takes effective countermeasures (hard and soft) for reducing traffic accidents.
	SW-5	Railway Safety Initiative	modernization of railway crossing to automatic system (696, half of crossings in Egypt are improved by ENR funds till 2017) and continued improvement.
	SW-6	Introduction of State of the art railway systems and control	apply modern railway signal control system and improvement of workshop facilities.
	SW-7	Development of IWT management database and Installation of IWT Navigation Information System	provides guaranteed navigation information to any IWT users for waterways, fleets, navigation aids and RIS, and IWT management database including these improvement and development

CORRIDOR	ID	NAME	PROJECT OUTLINE
HUMANWARE	HW-1	Strengthening MOT's responsibility covering all transport modes for integrated multimodal transport system and logistics	includes civil aviation, tourism and the Suez Canal
	HW-2	Training in modern traffic management and control systems	targets to GARBLT officers to regulate the traffic management on roads (traffic safety control and warning system, traffic information provision, facilities).
	HW-3	Training in modern road maintenance techniques	targets to GARBLT officers for improving overload control and asset (roads and bridges) management
	HW-4	Extension of transformation plan	targets to extension of current support to ENR officers capacity development for proper operation and marketing for passenger and freight transport.
	HW-5	Extension of NICHE program	targets to extension of current support to RTA officers capacity development , especially RTA management and operation capacities and strengthening of marketing and logistics knowledge and skill, including utilization of database.

4.3. SPECIAL INTEREST PROJECTS

4.3.1. The Intermodal Transport Corridor

The Intermodal Transport Corridor (ITC) basic alignment is schematized in Figure 4.3.1.

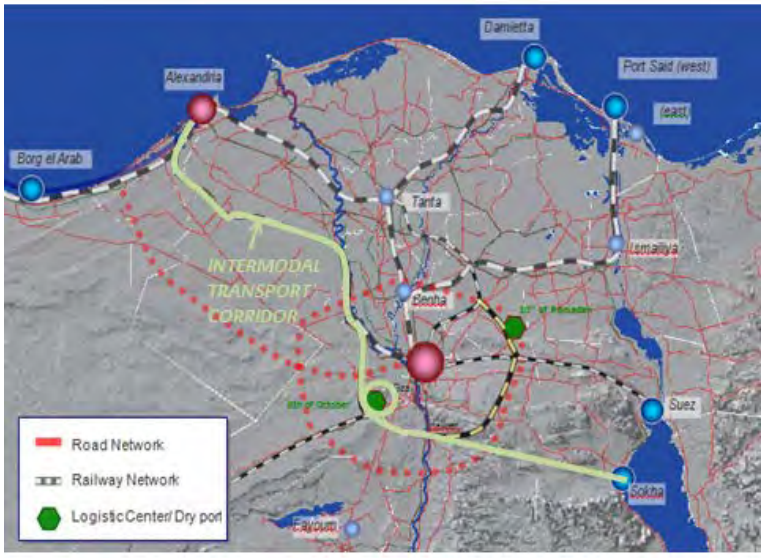


Figure 4.3.1 The proposed Intermodal Transport Corridor

The different development components of the ITC are respectively

- Upgrading (double track electrified) of the Alexandria – Cairo Railway connection, dedicated to freight transport, ensuring a direct connection to the VAL Center
- Development of the VAL Center
- Development of a new double track electrified railway connection to Sokhna port
- Upgrading (double track electrified) of the existing tracks (if any) between the VAL Center and the new connection to Sokhna port
- Outer Ring Road (south section) to link the bonded road transport center (BRTC) to the VAL Center and link the Upper Egypt corridor to the ITC railway corridor (via the VAL Center)

The main objectives of the Intermodal Transport Corridor (ITC) project are:

- Development of the value added logistics center in 6th of October (VAL Center)

- Development of southern outer ring road linking 10th of Ramadan bonded road transport center (BRTC) to the VAL Center and link the Upper Egypt corridor to the main maritime gateways.
- Development of railway container traffic between the VAL Center and Alexandria port, focusing EU trade which will in time be concentrated on the Alexandria – Genua – Koper motorway of the Sea (EU Project ongoing)
- Development of railway container traffic between VAL Center and Ain Soukhna port (Red Sea) where DW Ports has commenced the extension of its container terminal to accommodate 2.5 million TEU

The conceptual thinking behind the ITC corridor development proposal:

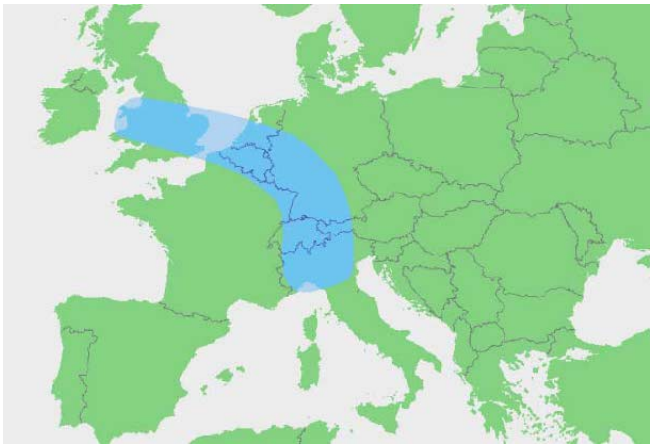
- Concentration of EU – Egypt trade traffic in Alexandria port to benefit from the plan to create the EU-Egypt motorway of the sea
- Alleviate traffic on the highly populated and agricultural Nile delta as traffic to Europe will gradually shift from Damietta and Port Said. Both ports could in time be integrated into a single VAL service port to deal with container traffic will continue to transit via this logistics platform and will service Eastern Mediterranean countries, Turkey and the Black Sea countries.
- Promote Ain Soukhna port as transit point for EU – Asia traffic on the round the world services, shifting a number of port calls from Damietta / Port Said to Soukhna. The railway connection will be acting as land bridge ;
- Link Upper Egypt to the two key maritime gateways ;
- Create new transport activity in Egypt, such as VAL services, 3rd and 4th party logistics services, etc. along the corridor, which will create new employment and generate revenues for the country.

Key additional benefits that can be associated with the project include but are not limited to:

- Alleviation of congestion in the highly populated and agricultural area of the Nile Delta
- Reducing the need for high cost investments in IWT, road and railway infrastructure to efficiently link Damietta and Port Said with the major consumption and production centers in Egypt
- Stimulate a shift from road to rail (environment) and reduce road congestion in the Cairo region and on the Alexandria – Cairo roads (safety)
- Integrate the planned IWT freight traffic on Upper Nile Corridor with the railway corridor of ITC
- Increase the value of the Egyptian railway sector by giving it a high-profile role in modern logistics
- Contribute to a better distribution of population by stimulating employment outside the traditional centers
- Develop efficient freight transport in an area of low population density, reducing the existing pressure on the highly populated areas of Egypt
- Develop economic activity in remote areas via the utilization of secondary linkages via the Upper Delta corridor that has 2 usable branches to the Red Sea area

In the long-term vision, this corridor can generate a better and more logical freight traffic flow and increase the role of Egypt in global traffic. It will on the one hand concentrate EU traffic on the ITC corridor and maintain / increase the Damietta Port Said port area as principal transit hub that links Eastern Europe, Turkey and the Black Sea with the maritime pendulum services (container traffic). The geographical split of European traffic transiting via or originating from Egypt will also be beneficial for Egypt at the same time it will have direct environmental benefits. The ITC corridor will further create a new economic corridor where in addition to VAL and modern logistics services, affiliated high value economic activity becomes possible (computer and car assembly, research centers, technology and other theme parks (such as Design City and Smart Village).

The concept vision for the Egyptian Intermodal Transport Corridor could be compared with the European Bleu Banana corridor, the name for the European area of economic concentration, presented in Figure 4.3.2.



Source: Bleu Plan Notes, nr 14, March 2010

Figure 4.3.2 The Bleu Banana

The growing concentration of container traffic in the ports of Gioia Tauro (Italy) and Masaxllok (Malta), located in the center of the Mediterranean region, is related to its short distance from the European "bleu banana", the principal area of economic and demographic concentration in Europe.

But striving towards the creation of a bleu banana-like corridor is only a (small) part of the reasons for implementing the ITC project. Other more important reasons are because of the dramatic and rapid changes the maritime sector in the Mediterranean is undergoing. For container transport, the decision for calling particular ports in the MEDA region will be made by few major global liner companies. The "pendulum routes", operating predominantly between the Far East, Northern Europe and North America, are the most visible component in maritime traffic in the Mediterranean zone and are influencing if not determining the hub and spoke feeder system in the region.

The continuously growing size of the container vessels (18,000 TEU already on order) has a direct consequence that the operating cost, in particular the fuel cost, becomes a decisive factor and the shortest route principle a guiding strategy. Because of the additional nautical miles to cover for reaching Alexandria port compared to Port Said, the further concentration will make it difficult for Alexandria to become a notable part of future pendulum routes. On the contrary, the attractiveness for Port Said / Damietta and of Ain Soukhna is evident as they are both exactly on the alignment of these routes. Linking Alexandria via a intermodal logistics corridor with Ain Soukhna is the solution to link Alexandria to the future pendulum routes and establish and efficient freight transport and logistics system that serves the European markets at the same time as it increases the competitiveness of the Egyptian transport sector, making it therewith a future partner in European logistics

4.3.2. The Egyptian Transport Center (ETC)

Sustainable passenger and freight transport in Egypt, as proposed in the CREATS and MiNTS studies, requires the development of an intermodal transport system which, to represent a true contribution to the national economy, requires the capacity of providing *contract logistics services*; specialized logistics service providers that offer cost-efficient and customer-tailored logistics solutions that meet the specific needs such as:

- Managing components for final assembly ;
- Kitting and customizing products for different markets;
- Managing warehouses including return logistics (in particular for consumer goods);
- Management and supply of time-critical spare parts; or
- Management of the entire end-to-end supply chain.

Any action towards developing such value added services as part of a modern Egyptian transport system can only be sustainable if infrastructure developments are accompanied / complemented by an efficient transport management and control system that ensures the efficient functioning of the transport system and of its many divisions / services, not only in line with costumer expectations but also and increasingly in accordance with environmental requirements and international rules and regulations.

The most common and wide-spread application of modern transport management are the transport planning tools. In their generic format, these are relatively simple tools that assist and facilitate decision-making processes related to transport infrastructure investments. With the advancements in technology, new planning and management tools are applied, commonly with internet based communication and using GIS technology to optimize representation and geographic localisation/identification. The latest trend in transport system management is to integrate transport planning, management, and control tools into a centralised platform to govern the different aspects of the national transport system.

Similar to many other countries, the Egyptian Ministry of Transport does not have until now a centralized data bank, only data “centres” sponsored by the sectors and these have evolved according to varying quality standards and along differing formats. There also is no central authority responsible for a unified approach to transport planning; nor does there exists a single, nationwide transport model until the advent of MiNTS. A crucial need exists for setting up an Egyptian Transportation Centre (ETC) that can assume responsibility of the implementation of MiNTS as well as of the preservation of the valuable transport policy and planning databases that were collected for CREATS and MiNTS.

The long-term objective of such centre is the realization of integrated transport planning across all modes and services, supported by “cutting edge” methodologies and state-of-the-art technology through the ETC, a centre of excellence that operates without technical support from external resources.

The ETC will become a research and technical centre specialized in post-graduate and tailor-made research, policy research, and technical advisory services in the fields of transportation planning, urban systems, transportation policies, and infrastructure management. The ETC will therewith play a pivotal role in the development of the Egyptian Transport Management and Control Centre which in time will be(come) the key instrument for traffic management and control as well as infrastructure development and maintenance for the government of Egypt.

CHAPTER 5: METHODOLOGY

5.1. KEY CHARACTERISTICS OF THE APPLIED METHODOLOGY

The multi criteria approach is questioned by some experts who argue that using this type of analysis is simply a reaction against the failing of the CBA technique to incorporate intangible items in the actual calculations.

Indeed, the CBA provides detailed information on the many monetary and quantifiable aspects of proposed investments but it (could) overlook(s) an equally wide range of non-quantifiable and / or intangible elements that are equally and sometimes even more relevant in the political decision-making processes. For that reason, an increasing number of experts as does the European Commission expand the classic CBA analysis with a multi-criteria evaluation to compare the various projects against a predefined set of objectives to determine the validity and priority of each project.

The main point of discussion is the use of a weighting system associated with the evaluation criteria. While the advocates of MCA argue that this not only ensures that each criterion is given a suitable and equitable evaluation but also that different projects are measured against one or more specific criteria via sensitivity testing, thus assessing the level to which any particular project contributes in achieving (a) specific objective(s). The MCA approach thus permits that large-scale public investments are guided by costs and (long-term) economic and financial benefits, but not exclusively defined by it. The critics of MCA prefer the exclusive application of the economic rationale in which the preference for one or another project is consistent with maximizing utility that is exclusively defined by economic and financial conditions. They argue that with the economic approach, (public) investments are decided solely upon the conditioned evaluation cycle where input generates a result and given a certain input available, a certain result can be expected. This contrary to the MCA approach where the risk exists to “prefer” certain decision-factors over others through the allocation of weights and that such creative thinking generates itself decisive information.

But considering the diversity in project characteristics, it is imperative that the applied analytical method guarantees that the combination of retained projects and the priority and sequence of implementation will ensure that the contribution of each individual project is maximized without exclusively focusing on the development of (new) infrastructure. The information obtained from a Multi Criteria Analysis will achieve just that and will provide decision-makers with the necessary information to formulate a reasoned decision under consensus conditions for all types of projects, rather than evaluating the creation of again new infrastructure according to exclusively financial and economic rationales which would be obtained when considering sector rehabilitation evaluating these projects using classic CBA.

The proposed project evaluation methodology assesses and ranks the proposed projects on the basis of a range of evaluation indicators and incorporates sensibility testing to appreciate the contribution of each project to achieving specific policy objectives, and this according to different strategies. The key features of the proposed evaluation method are:

The use of *objectively verifiable indicators* to guarantee an evaluation that reduces the risk of data manipulation thanks to the potential to verify the validity of the variables;.

The *allocation of weights to evaluation criteria* based upon a range of variables considered realistic and in line with socio-economic and political policy priorities that guarantees that those projects considered most "important" are given a suitable and equitable evaluation; and

Sensitivity testing of the different alternatives to assess the level to which any particular alternative contributes to the achievement of specific objectives and to identify the true boundaries that projects contribute to improving current situation.

Considering that a comprehensive financial and economic evaluation of the projects will be conducted, key financial and economic criteria are excluded from the multi-criteria analysis. The financial and economic viability of projects will be subjected to a traditional cost benefit analysis (CBA) which is particularly appropriate for this type of assessments.

Rather than focusing on the costs and benefits of the individual projects and therewith evaluate and rank them solely on tangible and quantifiable data, the applied methodology concentrates on the relationship between the decision criteria, the weighting system and the project's strategic objectives.

5.2. THE OBJECTIVELY VERIFIABLE INDICATORS

The objectively verifiable indicators (OVI) used in the multi-criteria evaluation are summarized in Table 5.2.1 and briefly explained hereafter.

5.2.1. Operational Indicators

The operational indicators include (1) person/freight demand, (2) supply utilization, (3) cargo transport facilitation and (4) priority corridor relation. The numeric values are translated into an appreciative value according to following approach:

Demand is related to the hierarchy of services with the perspective of year 2027 demand. The passenger and transported ton values of the model are translated into person and ton movements using (1) number of passengers her hour per direction, adjusted with (2) cargo transport volume per day (expressed in units of 10,000 tonnes per day).

Supply utilization evaluates the ability of supply to match demand. Cargo transport facilitation assesses whether the recommended project contributes to efficiently moving cargo from origin to destination. The evaluation is based upon the percentage of trucks in total traffic.

Table 5.2.1 The MiNTS OVI

OI - Operational Indicators	
OI – 1	Person Demand / Freight Demand
OI – 2	Supply Utilization
OI – 3	Cargo Transport Facilitation
OI – 4	relation to priority corridor
PI - Performance indicators	
PI – 1	System improvement
PI – 2	Enhanced Market Mechanisms
PI – 3	Knowledge Based Management
PI – 4	ICT development / improvement
PI – 5	Equipment modernization
II - Implementation indicators	
II -1	Improved Governance (public sector)
II – 2	Regulatory Framework
II -3	Stakeholder Involvement
II -4	Private sector involvement
II -5	Development Cost
SSI - System Sustainability indicators	
SSI – 1	Environmental Impact
SSI – 2	Transport Safety
SSI - 3	Job creation
SSI - 4	regional economic impact
SSI - 5	Peripheral regions connectivity

The relationship to the priority corridor is quantified via a Boolean value (yes/no) that specifies whether the project is located on the priority corridor, interconnects with the corridor, or has no relationship with / attachment to the priority corridor.

5.2.2. Performance Indicators

Performance indicators are strategic qualitative assessments of the effects of the projects. They particularly refer to elements that increase the performance of the Egyptian transport system without necessarily relating to the capacity of transport infrastructure. The criteria used are (1) transport system improvement (2) enhanced market mechanisms, (3) knowledge based management or more generally expertise building, and (4) information and communication technology development or improvement and, finally (5) equipment modernization

Transport system improvements relate to the contribution of projects in improving the structure of the transport system as a whole to allow either more efficient operations or ensuring better management of traffic.

Enhanced market mechanisms refer to the contribution of the project in increasing the level of commercialization and competitiveness of Egyptian transport service providers. Market mechanisms include in particular initiatives that reduce transport time and costs or increase efficiency and revenues. As for the transport system improvement, these mechanisms can be infrastructure related but also deal with software or expertise building initiatives.

Knowledge based management refers to the introduction of methods and techniques that improve the management, monitoring, and evaluation of transport performance, focusing technology applications and expertise building that lead to transport efficiency improvements and better system management.

ICT and equipment modernization are self-explanatory indicators. It is common knowledge that investments in software and expertise building are factually contributing to improved transport.

5.2.3. Implementation Indicators

Implementation indicators assist to evaluate the overall potential that a recommended project can be realized on the basis of its complexity and maturity. Several sub-indicators are used to determine the implementation potential of the recommended projects. Projects that have a high score can be implemented much earlier than projects with a lower score.

Improved governance of the public sector reflects the contribution of projects to enhance public governance of the transport system. These enhancements can generally be achieved either via reducing the fragmentation of decision-making processes, limiting the direct involvement of various governmental and semi-governmental entities in the functioning of the transport system. But enhancements are also possible by promoting efficient centralization of administrative procedures with a reduction of manual control procedures or also of more accurate and targeted control of the transport system functioning and its structural characteristics, using advanced technology and techniques applied by specialists and technocrats rather than personnel from the public administration.

The legal framework assesses the level of maturity of a project. While some projects require no specific decisions at the regulatory level, others can only be implemented if laws or regulations are changed. These legal requirements could hinder the short-term implementation potential of projects or could contribute to making its realization more complex.

Stakeholder involvement refers to the number of partners involved in the project (decision or execution) which is a strong indicator of the complexity of its implementation. Some projects only need the participation of one public authority while others can only be implemented after approval by and participation of a range of governmental bodies. The more stakeholders involved, the more the implementation potential reduces.

Private sector involvement assesses the level of private sector participation in the project. The level of private involvement is an interesting indicator for the economic and financial value of the project. Private sector involvement can vary in form and structure based upon concrete agreement between the private company and government on operational targets and budgets. Of course, there are projects which are not suited for private sector involvement and remain therefore fully public investments.

Development cost is an important indicator for the (short-term) implementation possibility of projects. The development cost for infrastructure projects is higher than the cost of “soft” projects, the former relating to the cost per kilometer of new infrastructure and the numbers of people moved and the latter relates to the total project investment and expected direct impacts (e.g., reductions in operating cost or critical need of the project before another can be started). The development cost of course is closely related to the other criteria in the implementation potential indicator. The volume of the investment cost can facilitate a decision, but it is not a deciding factor. If political will and stakeholder involvement is high, an expensive project could be

more easily decided than a “cheap soft” project which has could be confronted with a high level of opposition.

5.2.4. System Sustainability Indicators

The last set of indicators relates to environmental, safety and the generation of socio-economic benefits that not always can be calculated / quantified.

The environmental criterion use environmental assessments conducted in the context of the MiNTS study. They include an assessment of the need for an Environmental Impact Study, the need for resettlement, the reduction of CO2 or the contribution to achieving a modal shift.

The criterion dealing with safety appreciates to what level candidate projects contribute to improving the safety of traffic, reflected in the reduction of road accidents, speed limitations and congestion reduction, protection of pedestrians and weaker traffic infrastructure users, etc…

The third criterion is the first of several socio-economic indicators, not always quantifiable, that assesses the contribution of the project to (regional) job creation with a clear preference for projects that show a clear potential to generate long-term employment.

A fourth criterion appreciates the possible impact of projects on regional economic performance, with projects having a concrete contribution to economic growth in the region.

The last, also a socio-economic indicator, is the level a project contributes to link peripheral regions in Egypt to the main urban and economic centers, therewith increasing the potential of these regions to increase living standards and economic activity.

The evaluation of environmental benefits is a complex process and is normally done via Environmental Impact Studies (EIS), either condensed or extended versions. Considering that the MCA approach does not emphasizes one single perspective but proposes a balanced vision that emerges out of a range of indicators, the appreciation of the environmental effects was limited to a number of basic quantifiable indicators, namely:

- The necessity of an EIS as part of the decision process;
- Classification of the project according to the environmental sensibility, both according to the international categorization and the JICA’s ranking
- Resettlement needs;
- CO2 Reduction; and
- Modal Shift to non-road transport modes.

5.3. EVALUATION INDICATORS AND POLITICAL STRATEGY

The objective of using proposed indicators is to ensure that the evaluation and prioritization of the proposed projects/programs contributes to the improvement of identified problems and allocate priority to actions not only at the level of infrastructure creation/rehabilitation but also focuses the enhancement of software and humanware aspects. In addition to the traditional performance indicators, the applied criteria reflect specific hardware, software, or humanware issues that contribute to the overall quality of the future transport network.

The priority and urgency of the recommended projects is defined by their concrete contribution to resolving or improving identified problems in the Egyptian transport sector without necessarily being a high-profile infrastructure development project. But truly assessing that contribution requires the application of a weighting system via which the various projects are investigated from different angles that transcend the economic and financial perception and also consider other political priorities, not always quantifiable. From that perspective, the CBA is too limited and a MCA is necessary.

But it is important to ensure that all strategic dimensions can be incorporated in the MCA. During the MiNTS project, 12 strategies have been agreed which are respectively:

- Integrated and Harmonized Transport Modes;
- Increase of Non-Road Freight Services;
- Promoting of Private Sector Participation;
- Secure and Safety Transport Modes;
- Good governance of MOT for an Integrated Transport System;
- International Gateway Strengthening;
- Integrated Passenger Transport Services;
- Toll road network provision;
- Development of Human Resources;
- Connection to the New Development Zones;
- Modern Transport Techniques; and
- Minimize Environmental Negative Impacts.

Table 5.3.1 Modal Split for freight transport

Mode	Sub mode	'000 Tonnes	%Total	Million Tkm	%Total
Road	Light Truck	213.5	17.7	22.4	10.6
	Medium Truck	216.2	18.0	29.7	14.0
	Heavy Truck	757.5	62.9	152.2	71.9
	Subtotal	1,187.2	98.6	204.3	96.6
Non Road	Rail	11.1	0.9	3.9	1.8
	Inland Waterway	6.0	0.5	3.5	1.6
	Subtotal	17.1	1.4	7.4	3.4
Total		1,204.3	100.0	211.7	100.0

The objectives of the Egyptian authorities, expressed among other ways via the execution of the MiNTS study, is to develop an integrated, multimodal transport master plan over a staged planning horizon to year 2027 in which high-priority projects are identified within a master plan framework. A parallel objective is to implement an effective and productive technology transfer program with Egyptian counterparts so that the dependence of external (foreign) expertise can be reduced and the sector's future fully decided by that Egyptian people. Accentuating the multimodal / intermodal dimension of the master plan is particularly relevant considering the need for integration and the transfer of traffic from the over-dominant road transport mode to alternative modes.

The overall relevance of the evaluation indicators for the above strategies is summarized in Table 5.3.2.

Table 5.3.2 Relationship assessment

		Operational (OI)				Performance (PI)					Implementation (II)					System Sustainability (SSI)				
		OI-1	OI-2	OI-3	OI-4	PI-1	PI-2	PI-3	PI-4	PI-5	II-1	II-2	II-3	II-4	II-5	SSI-1	SSI-2	SSI-3	SSI-4	SSI-5
		Person Demand / Freight Demand	Supply Utilization	Cargo Transport Facilitation	Relation to priority corridor	System improvement	Enhanced Market Mechanisms	Knowledge Based Management	ICT development / improvement	Equipment modernization	Improved Governance (public sector)	Regulatory Framework	Stakeholder involvement	Private sector potential	Development Cost	Environmental Impact	Transport Safety	Job creation	Gateway Center Connectivity	Regional Center Connectivity
1 Integrated and Harmonized Transport Modes	*Achieving integration and harmony among different modes of transport to efficiently meet the increasing demand.*	✓	✓	✓	✓	✓	✓					✓	✓							
2 Increase of Non-Road Freight Services	*Increase the share of railway, and Inland waterway in freight transport.*	✓	✓		✓	✓	✓									✓				
3 Promoting of Private Sector	*Strengthening the private sector role*	✓												✓	✓			✓		
4 Secure and Safety Transport Modes	*Achieving better security and safety levels within transportation means.*							✓	✓	✓		✓	✓				✓			
5 Good governance of MOT for Integrated Transport System	*Restructure of relevant authorities relating to Ministry of Transport to achieve better administrative performance.*					✓					✓	✓	✓				✓			
6 International Gateway Strengthening	*Developing maritime ports and raising their competitiveness.*				✓		✓												✓	
7 Integrated Passenger Transport Services	*Pay more attention to upgrade passenger interchange terminals between inter-city and intra-city movement.*																			✓
8 Toll road network provision	*Expand the road toll network to increase network technical standards and safety considerations, and get revenue for*	✓												✓			✓		✓	✓
9 Development of Human Resources	*Training the staff of transport sectors*							✓			✓						✓			
10 Connection to the New Development Zones	*Connecting the new development zones by suitable transport networks and modes*				✓													✓	✓	✓
11 Modern Transport Technique	*Enhance and introduce modern transport techniques such as logistic centers, dry ports, cargo depots, multimodal transportation,*			✓		✓			✓	✓				✓				✓		
12 Minimize Environmental Negative Impacts	*Minimize environment negative impacts: air pollution, sea and river pollution, noise pollution, visual pollution*					✓										✓				
New Proposed Weighting for Category	Number of Strategies which has relationship to each indicator [A]	*4*	*2*	*2*	*4*	*5*	*3*	*2*	*2*	*2*	*2*	*3*	*3*	*3*	*1*	*2*	*4*	*3*	*3*	*3*
	Sub-Total of strategies for Each category [B]	*12*				*14*					*12*					*15*				

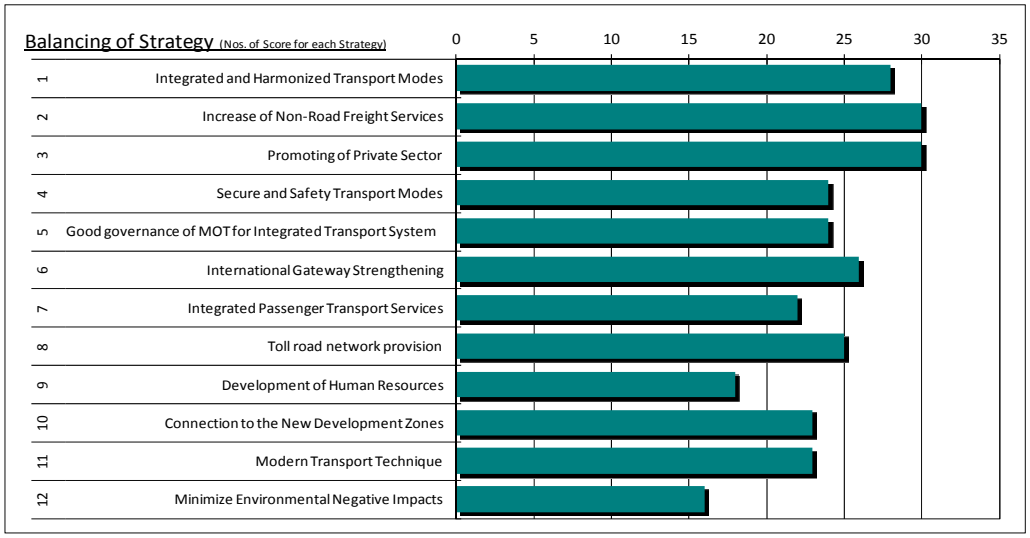
The detailed results of the consistency evaluation of the evaluation criteria as compared to the retained strategic policy objectives are summarized in Table 5.3.3.

Table 5.3.3 Detailed evaluation of relationship between strategic objectives and evaluation criteria

		Operational (OI)				Performance (PI)					Implementation (II)					System Sustainability (SSI)					
		OI-1	OI-2	OI-3	OI-4	PI-1	PI-2	PI-3	PI-4	PI-5	II-1	II-2	II-3	II-4	II-5	SSI-1	SSI-2	SSI-3	SSI-4	SSI-5	Total
		Person Demand / Freight Demand	Supply Utilization	Cargo Transport Facilitation	Relation to priority corridor	System improvement	Enhanced Market Mechanisms	Knowledge Based Management	ICT development / improvement	Equipment modernization	Improved Governance (public sector)	Regulatory Framework	Stakeholder Involvement	Private sector potential	Development Cost	Environmental Impact	Transport Safety	Job creation	Gateway Center Connectivity	Regional Center Connectivity	
Strategy	Original % of Indicator (proposed in Steering Committee Dec, 2011)	**25,0%**				**25,0%**					**25,0%**					**25,0%**					100,0%
		40,0%	20,0%	25,0%	15,0%	40,0%	15,0%	20,0%	10,0%	15,0%	10,0%	10,0%	30,0%	10,0%	40,0%	45,0%	15,0%	5,0%	20,0%	15,0%	
		10,0%	5,0%	6,3%	3,8%	10,0%	3,8%	5,0%	2,5%	3,8%	2,5%	2,5%	7,5%	2,5%	10,0%	11,3%	3,8%	1,3%	5,0%	3,8%	**100,0%**
1 Integrated and Harmonized Transport Modes	*Achieving integration and harmony among different modes of transport to efficiently meet the increasing demand.*	3	3	3	1	2	3	1	1	1	0	1	1	2	1	1	0	2	1	1	**28**
2 Increase of Non-Road Freight Services	*Increase the share of railway, and Inland waterway in freight transport.*	2	3	2	1	1	2	1	1	2	0	1	1	2	3	2	2	1	1	2	**30**
3 Promoting of Private Sector	*Strengthening the private sector role*	1	1	2	2	2	2	1	2	1	1	1	1	3	2	2	2	2	1	1	**30**
4 Secure and Safety Transport Modes	*Achieving better security and safety levels within transportation means.*	0	0	1	0	2	1	2	3	3	1	2	2	0	2	1	3	1	0	0	**24**
5 Good governance of MOT for Integrated Transport System	*Restructure of relevant authorities relating to Ministry of Transport to achieve better administrative performance.*	0	1	2	1	3	2	1	1	0	3	3	3	0	1	1	1	1	0	0	**24**
6 International Gateway Strengthening	*Developing maritime ports and raising their competitiveness.*	1	2	2	2	2	1	1	1	2	0	1	2	3	2	1	0	1	2	0	**26**
7 Integrated Passenger Transport Services	*Pay more attention to upgrade passenger interchange terminals between inter-city and intra-city movement.*	2	2	0	0	2	2	2	1	1	1	1	2	2	1	0	0	1	0	2	**22**
8 Toll road network provision	*Expand the road toll network to increase network technical standards and safety considerations, and get revenue for maintenance and upgrading taken into account the necessity of free of charge alternative network for social dimension.*	3	0	1	2	1	1	1	1	1	0	1	2	3	2	1	1	1	2	1	**25**
9 Development of Human Resources	*Training the staff of transport sectors*	0	1	1	0	2	1	3	2	1	1	0	1	1	0	0	2	2	0	0	**18**
10 Connection to the New Development Zones	*Connecting the new development zones by suitable transport networks and modes*	1	1	1	2	1	2	0	0	1	1	2	1	2	2	1	1	2	0	2	**23**
11 Modern Transport Technique	*Enhance and introduce modern transport techniques such as logistic centers, dry ports, cargo depots, multimodal transportation, unified ticket, IT means*	1	1	2	0	3	1	1	3	2	0	1	1	3	1	1	0	2	0	0	**23**
12 Minimize Environmental Negative Impacts	*Minimize environment negative impacts: air pollution, sea and river pollution, noise pollution, visual pollution*	0	1	1	0	2	0	1	1	1	0	1	1	1	1	3	1	1	0	0	**16**
New Proposed Weighting for Category	Total number of score how much relationship to each indicator [A]	*14*	*16*	*18*	*11*	*23*	*18*	*15*	*17*	*16*	*8*	*15*	*18*	*22*	*18*	*14*	*13*	*17*	*7*	*9*	289
	Sub-Total of strategies for Each category [B]	*59*				*89*					*81*					*60*					289
	(Sub-total/Total)	**20,4%**				**30,8%**					**28,0%**					**20,8%**					100%
Sub-category Weighting	Sub-category Weighting in a Category [A]/[B]	23,7%	27,1%	30,5%	18,6%	25,8%	20,2%	16,9%	19,1%	18,0%	9,9%	18,5%	22,2%	27,2%	22,2%	23,3%	21,7%	28,3%	11,7%	15,0%	
	Sub-category Weighting	4,8%	5,5%	6,2%	3,8%	8,0%	6,2%	5,2%	5,9%	5,5%	2,8%	5,2%	6,2%	7,6%	6,2%	4,8%	4,5%	5,9%	2,4%	3,1%	**100,0%**
Updated before Meeting with MOT		7,5%	3,8%	3,8%	7,5%	9,4%	5,7%	3,8%	3,8%	3,8%	3,8%	5,7%	5,7%	5,7%	1,9%	3,8%	7,5%	5,7%	5,7%	5,7%	**100,0%**

The influence and importance of each strategy as compared to the applied weighting factor was investigated in more detail by applying a ranking form "0" to "3" that measures the strength of the relationship between strategy and evaluation indicator. As can be concluded from the Table 5.3.4, there is a sufficiently strong relationship between the strategic policy objectives for the transport sector reflected in above-listed 12 strategies and the evaluation indicators that are used in the multi-criteria analysis. On average, most parameters individually score above 50% relevance if a relevant relationship was identified between strategy and indicator (see above Table 5.3.1).

Table 5.3.4 Strategy compliance assessment summary



The appreciation of the relationship between strategic objectives and evaluation indicators has been subject to various modifications that emerged from discussions that the JICA expert team had with various representatives from the Egyptian Ministry of Transport and the different transport sub-sectors. The evolution of the appreciations as they emerged after the different discussions is summarized in エラー! 参照元が見つかりません。.

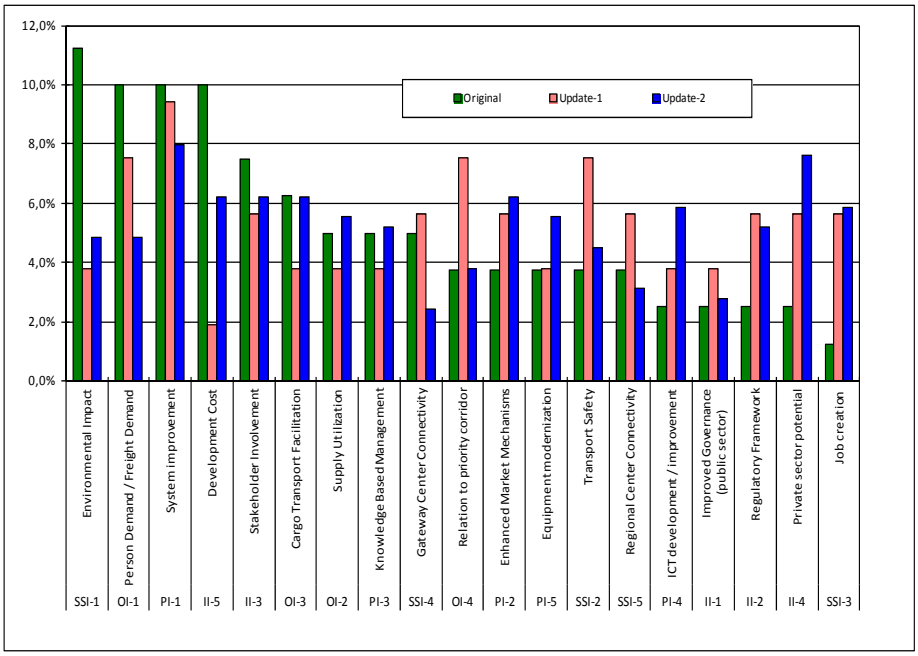


Figure 5.3.1 Evolution of consistency appreciation

As can be concluded from Figure 5.3.1, the initial focus on some key indicators such as environment, demand, or system improvement and related costs (the first indicators in above figure) have shifted towards elements that focus the participation of the private sector, governance and operational efficiency.

Sorting the updated ranking according to the highest importance, as done in Figure 5.3.2, clearly shows this shift in priority.

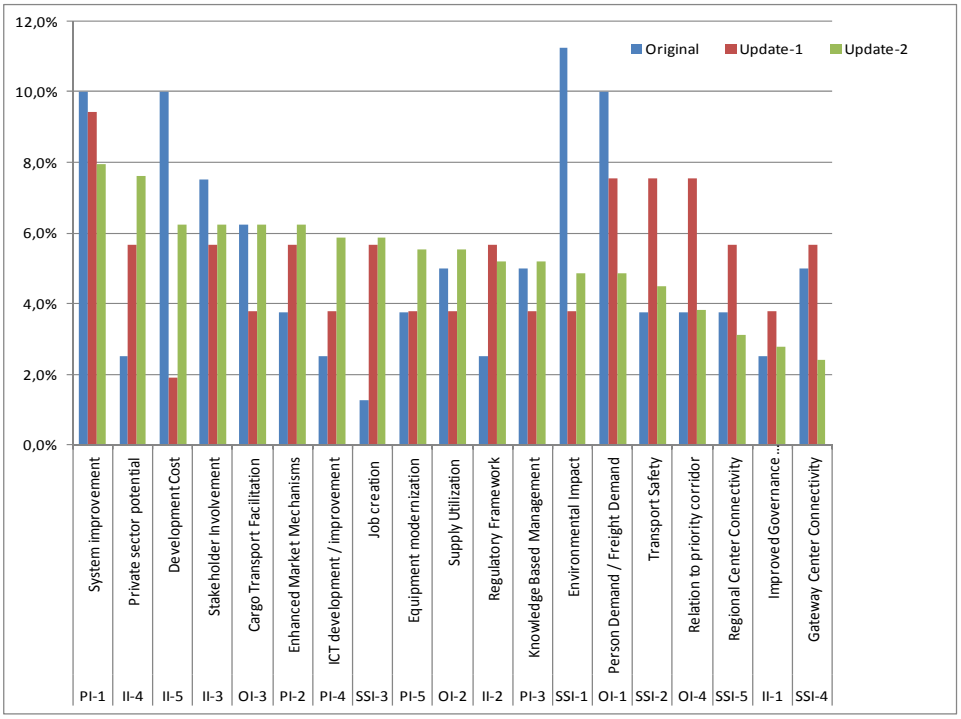


Figure 5.3.2 Sorted weight attribution

The attribution of a higher weight to the new criteria is consistent with the government policy of increasing sector efficiency, stimulate private sector participation, and improve sector governance (stakeholder involvement, facilitation and improved market mechanisms), while environmental issues or actual demand are less relevant when deciding on particular investments. Furthermore, one can observe a more balanced distribution of weights over the different OVI which undoubtedly improves the quality of the MCA.

The weights finally used to assess the priority of the proposed projects are summarized in Table 5.3.5.

Table 5.3.5 Final weight system for MCA

Category	Sub-category	Step-2					Step-3					Sensitivity-1			Sensitivity-2			Sensitivity-3			Sensitivity-4		
		Nos_ Cat	Nos_S ubC	Weight in Categoty	Weight in Sub-categoty	Weight	Nos_ Cat	Nos_S ubC	Weight in Categoty	Weight in Sub-categoty	Weight	Weight in Categoty	Weight in Sub-categoty	Weight	Weight in Categoty	Weight in Sub-categoty	Weight	Weight in Categoty	Weight in Sub-categoty	Weight	Weight in Categoty	Weight in Sub-categoty	Weight
Operational (OI)	Person Demand / Freight Demand	4	4	0,25	0,25	0,06	4	4	0,20	0,24	0,05	0,55	0,24	0,13	0,15	0,24	0,04	0,15	0,24	0,04	0,15	0,24	0,04
	Supply Utilization	4	4	0,25	0,25	0,06	4	4	0,20	0,27	0,06	0,55	0,27	0,15	0,15	0,27	0,04	0,15	0,27	0,04	0,15	0,27	0,04
	Cargo T ransport-Facilitation	4	4	0,25	0,25	0,06	4	4	0,20	0,31	0,06	0,55	0,31	0,17	0,15	0,31	0,05	0,15	0,31	0,05	0,15	0,31	0,05
	Relation to priority corridor	4	4	0,25	0,25	0,06	4	4	0,20	0,19	0,04	0,55	0,19	0,10	0,15	0,19	0,03	0,15	0,19	0,03	0,15	0,19	0,03
Performance (PI)	System improvement	4	5	0,25	0,20	0,05	4	5	0,31	0,26	0,08	0,15	0,26	0,04	0,55	0,26	0,14	0,15	0,26	0,04	0,15	0,26	0,04
	Enhanced Market Mechanisms	4	5	0,25	0,20	0,05	4	5	0,31	0,20	0,06	0,15	0,20	0,03	0,55	0,20	0,11	0,15	0,20	0,03	0,15	0,20	0,03
	Knowledge Based Management	4	5	0,25	0,20	0,05	4	5	0,31	0,17	0,05	0,15	0,17	0,03	0,55	0,17	0,09	0,15	0,17	0,03	0,15	0,17	0,03
	ICT development / improvement	4	5	0,25	0,20	0,05	4	5	0,31	0,19	0,06	0,15	0,19	0,03	0,55	0,19	0,11	0,15	0,19	0,03	0,15	0,19	0,03
	Equipment modernization	4	5	0,25	0,20	0,05	4	5	0,31	0,18	0,06	0,15	0,18	0,03	0,55	0,18	0,10	0,15	0,18	0,03	0,15	0,18	0,03
Implementation (II)	Improved Governance (public sector)	4	5	0,25	0,20	0,05	4	5	0,28	0,10	0,03	0,15	0,10	0,01	0,15	0,10	0,01	0,55	0,10	0,05	0,15	0,10	0,01
	Regulatory Framework	4	5	0,25	0,20	0,05	4	5	0,28	0,19	0,05	0,15	0,19	0,03	0,15	0,19	0,03	0,55	0,19	0,10	0,15	0,19	0,03
	Stakeholder Involvement	4	5	0,25	0,20	0,05	4	5	0,28	0,22	0,06	0,15	0,22	0,03	0,15	0,22	0,03	0,55	0,22	0,12	0,15	0,22	0,03
	Private sector potential	4	5	0,25	0,20	0,05	4	5	0,28	0,27	0,08	0,15	0,27	0,04	0,15	0,27	0,04	0,55	0,27	0,15	0,15	0,27	0,04
	Development Cost	4	5	0,25	0,20	0,05	4	5	0,28	0,22	0,06	0,15	0,22	0,03	0,15	0,22	0,03	0,55	0,22	0,12	0,15	0,22	0,03
System Sustainability	Environmental Impact Tota Envi.I	4	5	0,25	0,20	0,05	4	5	0,21	0,23	0,05	0,15	0,23	0,03	0,15	0,23	0,03	0,15	0,23	0,03	0,55	0,23	0,13
	Transport Safety	4	5	0,25	0,20	0,05	4	5	0,21	0,22	0,05	0,15	0,22	0,03	0,15	0,22	0,03	0,15	0,22	0,03	0,55	0,22	0,12
	Job creation	4	5	0,25	0,20	0,05	4	5	0,21	0,28	0,06	0,15	0,28	0,04	0,15	0,28	0,04	0,15	0,28	0,04	0,55	0,28	0,16
	Gateway Center Connectivity	4	5	0,25	0,20	0,05	4	5	0,21	0,12	0,02	0,15	0,12	0,02	0,15	0,12	0,02	0,15	0,12	0,02	0,55	0,12	0,06
	Regional Center Connectivity	4	5	0,25	0,20	0,05	4	5	0,21	0,15	0,03	0,15	0,15	0,02	0,15	0,15	0,02	0,15	0,15	0,02	0,55	0,15	0,08

5.4. EVALUATION CRITERIA VALUES

Priority and urgency of the proposed projects are defined by their concrete contribution to resolving or improving identified problems in the Egyptian transport system without necessarily being a high-profile infrastructure development project.

To ensure that the priority of projects is clearly defined, the MiNTS multi-criteria analysis of the proposed pilot projects uses as much as possible objectively verifiable indicators with quantifiable values and only applies an expert appreciation when the quantification of the value is impossible.

The approach therewith acknowledges that improving competitiveness is achieved not only by developing hardware (infrastructure) but needs in addition a program of modernizing equipment and operations (the software component) as well as expertise and innovative concepts (the human factor).

The reference values for each of the indicators are presented in Table 5.4.1.

Table 5.4.1 Evaluation indicators and their reference values

Indicators in MiNTS	Scoring Definition				
	"+ +" [=5]	"+" [=4]	"N" [=3]	"-" [=2]	"- -" [=1]
Operational Indicators (OI)					
Person Demand / Freight Demand	> 40.000 pers/hr/dir	30.000 - 40.000 pers/hr/dir	20.000 - 30.000 pers/hr/dir	10.000 - 20.000 pers/hr/dir	<10.000 pers/hr/dir
	> 10,000 tonne/day	3,000 - 10,000 tonne/day	1,000 – 3,000 tonne/day	0 – 1,000 tonne/day	None
Supply Utilization	V/C > 1.5	V/C =1.2 - 1.5	V/C = 1 - 1.2	V/C = 0.8 - 1.0	V/C < 0.8
Cargo Transport Facilitation	Share of trucks > 40%	Share of trucks > 30%	Share of trucks > 15%	Share of trucks > 10%	Share of trucks <10 %
Relation to priority corridor	On corridor	Direct link	No link	XX	XX
Performance Indicators (PI)					
System improvement	Certain / High improvement	Possible / some improvement	No contribution (or irrelevant)	XX	XX
Enhanced Market Mechanisms	Certain / High increase	Possible / some increase	No contribution (or irrelevant)	XX	XX
Knowledge Based Management	High contribution	Contribution	No contribution (or irrelevant)	XX	XX
ICT development / improvement	full ITC project	ITC components	No contribution (or irrelevant)	not foreseen, would improve system	not foreseen although needed
Equipment modernization	HIGH	MEDIUM	LOW	not foreseen, would improve system	not foreseen although needed
Implementation Indicators (II)					
Improved Governance (public sector)	HIGH	MEDIUM	LOW	XX	XX
Regulatory Framework	Legal framework OK	Changes initiated	Irrelevant	Foreseen but not initiated	Not foreseen
Stakeholder Involvement	Single stakeholder	Single stakeholder, complex	Irrelevant	Multiple stakeholders	Multiple stakeholders, complex
Private sector involvement	fully private	majority private	irrelevant (undecided)	minority private	fully public
Development Cost	< 50000 / KM	50000 - 75000 / KM	75000 - 100000 / KM	100000 - 125000 / KM	> 125000 / KM
SSI - System Sustainability indicators					
Environmental Impact	NONE (No EIS required)	LOW (limited EIS needed)	NO IMPACT (irrelevant)	MEDIUM (type of EIS undecided)	HIGH (Full EIS needed)
	Category-A (JICA's C)	Category-BI (JICA's B)	Category-C Full EIA (JICA's A)	XX	XX
	Resettlement: Nothing	A few (< 50 houses)	Some (50 - 100 houses)	Large (100 – 300 houses)	Quite Large (> 300 houses)
	CO2 Reduction: Very High	High	Low	No-impact	Worse
	Modal Shift to Non-Road: High	Medium	Partial	Neutral	Worse
Transport Safety	HIGH SAFETY	LOW SAFETY	NEUTRAL (irrelevant)	REDUCE SAFETY	DANGEROUS
Job creation	HIGH	MEDIUM	LOW	NONE	REDUCTION
regional economic impact	HIGH	MEDIUM	LOW	NONE	XX
Peripheral regions connectivity	HIGH	MEDIUM	LOW	NONE	XX

5.5. MODEL TESTING

The weighting system of the MCA has therefore been tested for consistency and logic prior to the actual multi-criteria analysis. The allocation of weights during the testing phase is arbitrary and does not reflect the weighting system used during the MCA. Following tests were executed to appreciate the consistency of the model:

- All weights receive an equal percentage value and weight of "1" (neutral). This test assesses the impact of attributing a qualitative and / or quantitative appreciation but does not take into account any impact of attributing weights. This test is used as benchmark for assessing the results of the other tests.
- All criteria receive a weight percentage value that is an equal share of their generic criterion while the weights of the generic criteria remain equal. This test evaluates the impact of the individual criteria on the sample projects, given that the percentage weight differs between criteria.
- Each generic criterion receives a variable weight value to reflect a variable importance at the generic level. The weight distribution of the sub-criteria remains unchanged with an equal distribution. This test assesses the impact of attributing different levels of importance to the generic criteria.
- Using the generic settings as in Test 3, different weights will now be allocated to the individual criteria ensuring that their distribution adds up to the weight value at the generic level. This final test will, if proven satisfactory, be the starting point for the formal evaluation and ranking process.
- In this test, different weights will now be allocated to the individual criteria and the value of the generic criteria will be determined by this weighting. The total weight distribution at the generic and detailed level should be 100%. This final test will, if proven satisfactory, be the starting point for the formal evaluation and ranking process.
- Each of the individual tests will lead to a ranking of the sample projects according to attributed weights. The rankings of each individual test will then be combined to generate final ranking of the sample projects. This last test will allow appreciating the overall sustainability of the methodology and give an indication on what can be expected as final ranking of the total set of proposed projects.

The first two tests focused on the consistency at the indicator level, while the thereafter following sensitivity tests focused the robustness of the sub-criteria and the impact on the evaluation criteria of changes at the sub-criteria level.

The different tests proved satisfactory and demonstrated that the model is functioning correctly and criteria are well balanced and appropriate to allow the MCA evaluation of the proposed pilot projects.

Note: The allocation of the weights during the testing phase is totally arbitrary. The final distribution of weights will be given in consultation with sector and Ministry of Transport representatives.

CHAPTER 6: MULTI CRITERIA ANALYSIS

6.1. MCA BASIC RESULTS

The unedited results of the multi-criteria analysis are provided in Table 6.1.1.

Table 6.1.1 Results of the MCA

		Integrated Rank		Run-1 (OI)		Run-2 (PI)		Run-3 (II)		Run-4 (SSI)	
CORRIDOR		Ave. Step1-3	>>>>>	Total Score	Rank	Total Score	Rank	Total Score	Rank	Total Score	Rank
INTERMODAL TRANSPORT CORRIDOR	3rd Cairo Alex Expressway	24,3	25	3,6	42	3,5	27	3,5	39	3,3	29
	Cairo Alexandria Desert Expressway (Upgrade to 8-lanes)	8,3	8	4,3	1	3,7	17	3,6	25	3,5	15
	3rd Stage Regional Ring Road (Southern Part of Expressway)	37,3	36	3,9	16	3,5	29	3,4	54	3,1	62
	Alexandria Bypass	28,7	29	4,0	7	3,5	36	3,6	19	3,0	69
	Double Tracking of Bypass Line for Cairo - New Alexandria	6,7	6	3,9	8	3,8	12	3,6	21	3,7	8
	Railway Link for 6th of October City	3,0	3	3,8	19	3,8	14	4,1	2	3,9	3
	Railway Link between Robeki to Helwan	40,0	39	3,2	68	3,5	33	3,8	8	3,1	55
	Improvement of Station Facilities for Freight Services (2stations)	7,0	7	3,7	27	3,9	6	3,7	14	3,7	7
	Railway Link between Sokhna Port to Helwan	4,7	4	3,9	17	3,7	16	3,8	5	3,8	5
	VAL (Value Added Logistics) Center at 6 th of October City	2,0	2	4,1	4	4,1	3	4,1	1	4,3	2
	IWT port for ITC	15,7	15	3,8	20	3,8	11	3,7	13	3,3	33
	High Speed Railway for Cairo - Alexandria [High/Higher speed Alt-1]	28,3	27	3,3	62	3,6	25	3,2	73	3,8	4
	Waterway Improvement Cairo – Alexandria	86,3	86	3,0	81	3,0	96	3,2	79	3,0	70
	Multi Purpose Terminal (Containers and General Cargo) at Alexandria Port	47,7	50	3,5	48	3,2	75	3,5	35	3,2	48
	Development of Management and Operation for Multi Purpose Terminal in El Dekheila	23,7	24	3,7	29	3,3	59	3,7	12	3,4	18
	Dekheira Port: New Container Terminal	31,3	33	3,7	33	3,3	66	3,6	23	3,4	24
CAIRO - ALEXANDRIA	Cairo Alex Agriculture Bypass Kafr El Zayat - Alexandria	22,0	21	3,9	15	3,4	45	3,6	17	3,3	38
	Shubra elkhema - Banha Agriculture Road (Expressway)	51,0	53	3,9	12	3,4	42	3,5	43	2,9	94
	High Speed Railway for Cairo - Alexandria via Tanta [High/Higher speed Alt-2]	74,3	76	2,8	88	3,4	51	3,0	92	3,3	34
	Improvement of Tracks	61,7	63	3,2	71	3,4	52	3,4	58	3,2	46
INLAND DELTA	Cairo - Tanta Bypass	63,3	65	3,7	26	3,3	68	3,4	53	2,9	91
	Zakaziq – Toukh	54,7	57	3,8	21	3,3	64	3,5	38	2,9	84
	Rod El Farag Road	54,0	55	3,8	22	3,3	63	3,5	36	3,0	80
	Tanta - Kafr El Sheikh	64,7	67	3,6	36	3,3	70	3,4	45	2,9	93
	Al Mahalla - Kafr El Sheikh – Damanhour	46,3	46	3,9	9	3,3	54	3,5	32	3,0	76
	Desouq Fowa Metobas Road	78,7	80	3,4	56	3,2	80	3,3	69	2,8	99
	Imbaba Qalyub Tawfekia Road	54,7	57	3,9	14	3,3	62	3,4	47	2,9	83

		Integrated Rank		Run-1 (OI)		Run-2 (PI)		Run-3 (II)		Run-4 (SSI)	
CORRIDOR		Ave. Step1-3	>>>>>	Total Score	Rank	Total Score	Rank	Total Score	Rank	Total Score	Rank
	El-Qanater El-Bagour Shebin El-Koum Tanta Mahalla Matboul Road	46,3	46	3,9	9	3,3	54	3,5	32	3,0	76
	Belbeis-Banha-El Bagour-El Khatatba Regional Ring Road	43,3	45	4,1	5	3,5	39	3,4	49	2,9	92
	Zaqaziq Sinbellaween Road	56,0	59	3,7	23	3,3	65	3,5	41	2,9	88
	Mansoura Talha Dekernes Mataria Road	72,0	74	3,5	45	3,2	74	3,3	64	2,9	96
	Qantara Salheya Faqous Abu Kbeir Hehya Zaqaziq Road	46,3	46	3,9	9	3,3	54	3,5	32	3,0	76
	Single Tracking for Basion City	83,7	85	3,1	75	3,0	100	3,2	72	2,9	85
	Double Tracking for Qalyoub - El Qnater	81,7	82	2,7	93	3,3	61	3,0	94	3,2	51
	Triple Tracking for Qalyoub – Benha	41,0	43	3,6	40	3,5	28	3,4	57	3,2	44
	Improvement of Track Arrangement for Cairo – Qalyub	33,3	34	3,6	38	3,5	30	3,5	42	3,3	37
CAIRO-DAMIETTA / PORT SAID	Cairo Ismailia Port Said Road (Expressway)	13,7	14	4,1	3	3,6	24	3,6	20	3,3	27
	Railway Link for 10th of Ramadhan City	47,7	50	3,2	67	3,4	44	3,8	9	3,1	57
	Single Tracking for Kafr El-Batikh - New Damietta City	103,0	103	2,4	102	3,0	99	2,8	101	2,7	101
	Double Tracking for Mansoura - Damietta	16,7	16	3,4	51	3,6	22	3,5	31	3,6	9
	Improvement of Signaling System for Increase of Freight Trains	62,7	64	3,1	76	3,5	34	3,1	84	3,2	49
	Improvement of Tracks	54,3	56	3,2	69	3,4	49	3,4	51	3,4	26
	Waterway Improvement on Cairo - Damietta	86,3	86	3,0	81	3,0	96	3,2	79	3,0	70
	Damietta Port; Study on Sedimentation problema	104,0	104	2,7	92	1,9	104	2,7	103	2,9	95
	Port Said East: Logistic Center	69,3	71	3,2	66	3,2	77	3,3	67	3,1	64
CAIRO - SUEZ	Cairo -Suez Road (Expressway)	16,7	16	4,0	6	3,6	26	3,6	24	3,3	32
	Double Tracking for Ain Shams - Robeki	75,7	78	3,0	84	3,4	50	3,2	74	3,1	65
MEDITERRANEAN	Wadi Alnatroum Saloum Road	79,0	81	3,0	78	3,2	81	3,4	52	3,0	75
	Alexandria-Saloum Road	43,0	44	3,4	52	3,4	47	3,3	65	3,2	45
	Qantara-Rafah Road	30,0	32	3,6	43	3,5	38	3,6	29	3,3	41
	Alamein Road	58,7	61	3,5	50	3,3	67	3,6	26	3,0	72
	Single Tracking for Bir El Abd - Rafah	98,0	100	2,4	103	3,1	90	2,8	100	3,0	82
	Rehabilitation of Tracks El-Kab - Bir El Abd	63,7	66	2,7	96	3,3	72	3,2	78	3,4	25
SINAI	Suez Ras elnakab Road (Expressway)	29,3	30	3,5	46	3,5	37	3,6	22	3,3	30
	Suez Canal Tunnel Ismailia	77,0	79	2,9	86	3,3	69	3,3	68	3,1	60
	Alawga Ismailia Road	82,7	83	2,7	95	3,1	89	3,2	76	3,1	61
UPPER EGYPT	Albetrol Malwa Road	93,0	93	2,8	90	3,0	94	3,1	83	2,8	100
	Qena Aswan Nile East Bank Road	82,7	83	3,1	72	3,1	84	3,1	82	3,0	81
	Cairo - Asyut Desert Western Road (Expressway)	25,0	26	3,9	13	3,5	31	3,5	30	3,2	47
	Asyut Aswan Abu simble Desert Western Road (Expressway) Asyut to Aswan	51,0	53	3,6	35	3,4	46	3,4	61	3,1	58
	El-Belina - Tahta Road	91,7	92	3,1	74	3,1	92	3,0	93	2,7	103
	Kalabsha Bridge (Koum Ombo) (Aswan)	65,3	68	3,6	44	3,3	53	3,3	71	2,9	87
	Abo Tig Bridge and Selim Coast (Asyut)	40,7	42	3,7	25	3,4	40	3,4	46	3,1	56
	(High) Speed Railway for Cairo - Aswan [Electrificated]	71,7	73	3,0	79	3,4	48	3,0	90	3,3	36
	Development of Railway Bridge for Lemon - Abbasiya - Tora	96,3	98	2,6	98	3,1	86	2,9	99	2,9	90
	Improvement of Tracks	38,3	37	3,4	55	3,5	32	3,4	60	3,4	20
	Improvement of Station Facilities for Freight Services (6 stations)	18,0	20	3,6	34	3,8	15	3,4	48	3,5	13
	IWT port improvement for Upper Egypt	11,7	13	3,8	18	3,9	8	3,8	11	3,4	19
	Lock Expansion with Comprehensive Lock Operation Improvement	68,3	70	3,3	60	3,1	83	3,4	55	3,1	66
	Waterway Improvement on Cairo - Asyut	47,7	50	3,5	47	3,3	58	3,4	59	3,3	39

		Integrated Rank		Run-1 (OI)		Run-2 (PI)		Run-3 (II)		Run-4 (SSI)	
CORRIDOR		Ave. Step1-3	>>>>>	Total Score	Rank	Total Score	Rank	Total Score	Rank	Total Score	Rank
RED SEA	El Ain El Sokhna - Zafarana Road	35,3	35	3,7	24	3,3	57	3,3	70	3,4	22
	Safaga Baranis Halayeb Road	75,0	77	2,9	85	3,1	85	3,0	89	3,2	52
EAST-WEST	Eldaba Albetrol Road	101,0	101	2,6	99	3,0	102	3,1	85	2,7	102
	ALbetrol Beni Mazar Road	97,7	99	2,5	101	3,0	101	3,2	75	2,8	97
	Fayoum-Beni Suef Bypass	70,3	72	3,1	73	3,2	79	3,4	56	3,0	74
	Wasta Bridge Connection	101,0	101	2,9	87	3,0	103	2,9	97	2,6	104
	Helwan-Beni Suef Bridge	73,7	75	3,4	53	3,2	76	3,3	66	2,9	86
	Zafarana Elkoraymat Road (Expressway)	40,3	40	3,6	41	3,4	41	3,6	28	3,2	54
	Bahriya Siwa Road	96,0	97	2,7	94	3,0	98	2,9	96	2,9	89
	Bahriya Minya Road	86,7	88	3,0	80	3,1	88	3,0	91	3,0	73
	Minya Bridge	94,0	96	2,8	89	3,0	95	3,0	88	2,8	98
	Upper Egypt East Desert Red Sea Road	61,3	62	3,6	37	3,3	70	3,2	77	3,2	53
	Farafra Malwa Road	90,7	91	2,7	97	3,1	93	3,1	87	3,1	67
	El-Dakhla Assyuit Road	89,7	90	2,8	91	3,1	91	3,1	86	3,0	79
	Qena - Safaga Road	58,0	60	3,3	59	3,2	73	3,2	81	3,3	35
	Single Tracking for Luxor - Hurghada [Electrificated]	87,3	89	2,6	100	3,1	82	2,7	102	3,3	42
	Rehabilitation of Tracks for Qena - Safaga	22,7	22	3,5	49	3,5	35	3,4	50	3,6	10
	Rehabilitation of Tracks for Qena - Kharga	93,7	94	2,3	104	3,1	87	2,9	95	3,1	62
	Asyut Aswan Abu simble Desert Western Road (Expressway) South part from Aswan	68,0	69	3,1	77	3,3	60	3,3	62	3,1	59
SUEZ CANAL DEVELOPMENT	Ismailia Suez Road (Expressway)	39,3	38	3,6	39	3,4	43	3,4	44	3,2	50
NATION - WIDE	Passenger Intermodal Facilities	10,7	12	3,7	30	3,8	10	3,6	16	3,6	11
	Logistics Centers including improvement of Station Facilities for Freight Services (4 stations)	8,3	8	3,7	32	3,9	8	3,6	27	3,7	6
SOFTWARE	Egyptian Transport Center (ETC)	1,0	1	4,1	2	4,5	1	4,0	3	4,4	1
	Establishment of Dedicated Transport Fund	93,7	94	3,0	83	3,2	78	2,7	104	3,0	68
	Development of road function based design and capacity standards	28,3	27	3,3	64	3,7	20	3,5	37	3,3	28
	Road safety initiative (3E; Engineer, Education and Enforcement)	17,3	18	3,4	57	3,8	13	3,8	6	3,4	17
	Railway Safety Initiative	22,7	22	3,3	63	3,6	21	3,8	10	3,4	23
	Introduction of State of the art railway systems and control	29,3	30	3,3	65	3,7	19	3,5	40	3,3	31
	Development of IWT management database and Installation of IWT Navigation Information System	40,3	40	3,4	58	3,6	23	3,3	63	3,3	40
HUMANWARE	Strengthening MOT's responsibility covering all transport modes for integrated multimodal transport system & logistics	46,7	49	3,2	70	3,9	5	2,9	98	3,3	43
	Training in modern traffic management and control systems	17,7	19	3,3	61	3,7	18	3,8	7	3,4	21
	Training in modern road maintenance techniques	10,0	11	3,4	54	3,9	7	3,9	4	3,5	16
	Extension of transformation plan	6,3	5	3,7	28	4,2	2	3,7	15	3,5	12
	Extension of NICHE program	9,0	10	3,7	31	4,1	4	3,6	18	3,5	14

The MCA evaluation was made with the hardware, software, and humanware projects combined to ensure that the implementation priority is consistent with the government objectives of modernizing the Egyptian transport sector and is not limited to just creating new (additional) transport infrastructure.

Ranking the results without considering the distinction between hardware, software, and humanware leads to a first integrated priority listing as presented in Table 6.1.2.

Table 6.1.2 Integrated priority listing

PROJECT	RANKING
Egyptian Transport Center (ETC)	1
VAL (Value Added Logistics) Center at 6 th of October City	2
Railway Link for 6th of October City	3
Railway Link between Sokhna Port to Helwan	4
Extension of transformation plan	5
Double Tracking of Bypass Line for Cairo - New Alexandria	6
Improvement of Station Facilities for Freight Services (2stations)	7
Cairo Alexandria Desert Expressway (Upgrade to 8-lanes)	8
Logistics Centers including improvement of Station Facilities for Freight Services (4 stations)	8
Extension of NICHE program	10
Training in modern road maintenance techniques	11
Passenger Intermodal Facilities	12
IWT port improvement for Upper Egypt	13
Cairo Ismailia Port Said Road (Expressway)	14
IWT port for ITC	15
Double Tracking for Mansoura – Damietta	16
Cairo -Suez Road (Expressway)	16
Road safety initiative (3E; Engineer, Education and Enforcement)	18
Training in modern traffic management and control systems	19
Improvement of Station Facilities for Freight Services (6 stations)	20
Cairo Alex Agriculture Bypass Kafr El Zayat - Alexandria	21
Rehabilitation of Tracks for Qena – Safaga	22
Railway Safety Initiative	22
Development of Management and Operation for Multi Purpose Terminal in El Dekheila	24
3rd Cairo Alex Expressway	25
Cairo - Asyut Desert Western Road (Expressway)	26
High Speed Railway for Cairo - Alexandria [High/Higher speed Alt-1]	27
Development of road function based design and capacity standards	27
Alexandria Bypass	29
Suez Ras elnakab Road (Expressway)	30
Introduction of State of the art railway systems and control	30
Qantara-Rafah Road	32
Dekheira Port: New Container Terminal	33
Improvement of Track Arrangement for Cairo – Qalyub	34
El Ain El Sokhna - Zafarana Road	35
3rd Stage Regional Ring Road (Southern Part of Expressway)	36
Improvement of Tracks	37
Ismailia Suez Road (Expressway)	38
Railway Link between Robeki to Helwan	39
Zafarana Elkoraymat Road (Expressway)	40
Development of IWT management database and Installation of IWT Navigation Information System	40
Abo Tig Bridge and Selim Coast (Asyut)	42
Triple Tracking for Qalyoub – Benha	43
Alexandria-Saloum Road	44
Belbeis-Banha-El Bagour-El Khatatba Regional Ring Road	45
Al Mahalla - Kafr El Sheikh – Damanhour	46
El-Qanater El-Bagour Shebin El-Koum Tanta Mahalla Matboul Road	46
Qantara Salheya Faqous Abu Kbeir Hehya Zaqaziq Road	46
Strengthening MOT's responsibility covering all transport modes for integrated multimodal transport system & logistics	49
Multi Purpose Terminal (Containers and General Cargo) at Alexandria Port	50
Railway Link for 10th of Ramadhan City	50
Waterway Improvement on Cairo – Asyut	50
Shubra elkhema - Banha Agriculture Road (Expressway)	53
Asyut Aswan Abu simble Desert Western Road (Expressway)	53
Rod El Farag Road	55
Improvement of Tracks	56
Zakaziq – Toukh	57
Imbaba Qalyub Tawfekia Road	57
Zaqaziq Sinbellaween Road	59
Qena - Safaga Road	60
Alamein Road	61
Upper Egypt East Desert Red Sea Road	62
Improvement of Tracks	63

Improvement of Signaling System for Increase of Freight Trains	64
Cairo - Tanta Bypass	65
Rehabilitation of Tracks El-Kab - Bir El Abd	66
Tanta - Kafr El Sheikh	67
Kalabsha Bridge (Koum Ombo) (Aswan)	68
Asyut Aswan Abu simble Desert Western Road (Expressway) South part from Aswan	69
Lock Expansion with Comprehensive Lock Operation Improvement	70
Port Said East: Logistic Center	71
Fayoum-Beni Suef Bypass	72
(High) Speed Railway for Cairo - Aswan [Electrificated]	73
Mansoura Talha Dekernes Mataria Road	74
Helwan-Beni Suef Bridge	75
High Speed Railway for Cairo - Alexandria via Tanta [High/Higher speed Alt-2]	76
Safaga Baranis Halayeb Road	77
Double Tracking for Ain Shams – Robeki	78
Suez Canal Tunnel Ismailia	79
Desouq Fowa Metobas Road	80
Wadi Alnatroum Saloum Road	81
Double Tracking for Qalyoub - El Qnater	82
Alawga Ismailia Road	83
Qena Aswan Nile East Bank Road	83
Single Tracking for Basion City	85
Waterway Improvement Cairo – Alexandria	86
Waterway Improvement on Cairo – Damietta	86
Bahriya Minya Road	88
Single Tracking for Luxor - Hurghada [Electrificated]	89
El-Dakhla Assyuit Road	90
Farafra Malwa Road	91
El-Belina - Tahta Road	92
Albetrol Malwa Road	93
Rehabilitation of Tracks for Qena – Kharga	94
Establishment of Dedicated Transport Fund	94
Minya Bridge	96
Bahriya Siwa Road	97
Development of Railway Bridge for Lemon - Abbasiya - Tora	98
ALbetrol Beni Mazar Road	99
Single Tracking for Bir El Abd – Rafah	100
Eldaba Albetrol Road	101
Wasta Bridge Connection	101
Single Tracking for Kafr El-Batikh - New Damietta City	103
Damietta Port; Study on Sedimentation problema	104

The thirty most imporant projects are in order of priority:

1. Development of the Egyptian Transport Center (ETC);
2. VAL (Value Added Logistics) Center at 6th of October City;
3. Railway Link for 6th of October City;
4. Railway Link between Sokhna Port to Helwan;
5. Extension of transformation plan,
6. Double Tracking of Bypass Line for Cairo - New Alexandria;
7. Improvement of Station Facilities for Freight Services (2stations);
8. Following two projects have an equal score:
    - i Cairo Alexandria Desert Expressway (Upgrade to 8-lanes);
    - ii Logistics Centers including improvement of Station Facilities for Freight Services (4 stations);
9. Extension of NICHE program;
10. Training in modern road maintenance techniques;
11. Passenger Intermodal Facilities;
12. IWT port improvement for Upper Egypt;

13. Cairo Ismailia Port Said Road (Expressway);
14. IWT port for ITC;
15. Double Tracking for Mansoura – Damietta;
16. Cairo -Suez Road (Expressway);
17. Following two projects have an equal score:
18. Road safety initiative (3E; Engineer, Education and Enforcement);
    i Training in modern traffic management and control systems;
    ii Improvement of Station Facilities for Freight Services (6 stations);
19. Cairo Alex Agriculture Bypass Kafr El Zayat – Alexandria;
20. Rehabilitation of Tracks for Qena – Safaga;
21. Railway Safety Initiative;
22. Development of Management and Operation for Multi Purpose Terminal in El Dekheila;
23. 3rd Cairo Alex Expressway;
24. Cairo - Asyut Desert Western Road (Expressway);
25. High Speed Railway for Cairo - Alexandria [High/Higher speed Alt-1];
26. Development of road function based design and capacity standards;
27. Alexandria Bypass;
28. Following two projects have an equal score:
    i Suez Ras elnakab Road (Expressway); and
    ii Introduction of State of the art railway systems and control.

As can be observed in above listing, the first twenty projects are a mix of hardware, software, and humanware projects while the last ten projects are all infrastructure projects, with the exception of the Railway safety initiative and the introduction of a state of the art system for the railways.

The two railway projects are logically lower in the ranking as they become only truly relevant once the sector has improved its competitiveness and its role in passenger and freight transport has increased. Because all other projects between number 20 and 30 are infrastructure projects, it is logical to conclude that the most important investment decisions to be taken are related to the top 20 projects as ranked above.

6.2. CRITICAL ASSESSMENT OF THE PRIORITY PROJECTS

A more detailed evaluation of the first ten projects clearly shows that there is a need for concrete initiatives at the hardware, software and humanware levels with for each of the three intervention levels following priority:

1. INFRASTRUCTURE DEVELOPMENTS
    a. VAL (Value Added Logistics) Center at 6th of October City;
    b. Railway Link for 6th of October City;
    c. Railway Link between Sokhna Port to Helwan;
    d. Double Tracking of Bypass Line for Cairo - New Alexandria;
    e. Improvement of Station Facilities for Freight Services (2stations);
    f. Cairo Alexandria Desert Expressway (Upgrade to 8-lanes);
    g. Logistics Centers including improvement of Station Facilities for Freight Services (4 stations);
2. SOFTWARE DEVELOPMENTS
    a. Development of the Egyptian Transport Center (ETC);
3. HUMANWARE DEVELOPMENTS
    a. Extension of transformation plan,
    b. Extension of NICHE program.

The 10 priority projects are consistent with the government's objectives of modernizing the transport sector and increasing its efficiency via modernization and intermodal integration. The results clearly focus 3 key components of a modern transport system, namely:

1. Modern governance (Egyptian Transport Center - ETC),
2. Efficient intermodal transport (Intermodal Transport Corridor - ITC, several terminal and station developments), and
3. Adequate expertise (Transformation and NICHE programs).

Each of above projects has been proposed and specifically designed to achieve just that:

1. The Egyptian Transport Center is an essential development to modernize the sector and increase its efficiency because expert knowledge and modern planning and monitoring technology have become indispensible tools for governing an increasingly complex transport and logistics sector;

2. The development of the Intermodal Transport Corridor (ITC) is a high-priority infrastructure development program that aims at creating efficient national and international freight transport flows while simultaneously increasing the competitiveness of the Egyptian transport and logistics sector by creating new market-oriented services. Several of the priority infrastructure investments are directly associated with this program:

    a. The VAL Center at 6th of October City is essential to stimulate the development of intermodal transport, increase freight transport efficiency and open the sector to new services and applications. This project is the central element in the ITC development program which has as priority aim to develop intermodal transport and modern for Egypt new VAL services;

b. The railway link between Alexandria and the VAL Center is an imperative investment for the successful development and exploitation of the VAL Center as it links the center to the key gateway for the traffic susceptible of being treated along the corridor.

c. The same is true for the railway link between Sokhna and Helwan where the need is even higher as planned investments in Sokhna port will create a new prime gateway for Egypt, needing imperatively a railway connection to the main consumption and production center of Egypt.

d. Upgrading the Cairo-Alexandria Desert Expressway to 8-lanes will be necessary to safely accommodate expected road traffic growth. In spite the efforts on the ITC corridor to shift cargo from the road to the railways, the role of road transport will continue to be very important and the upgrading of the key road connection between the two cities is of strategic importance to ensure safe and secure traffic of goods and persons.

3. The extension of the transformation plan is logically high in the ranking because it targets the extension of current support to ENR officers´ capacity development to ensure in the short-term future proper operations and marketing programs for passenger and freight transport. Considering that ENR is planned to become the backbone of Egypt's transport system and the principal replacement for road transport, ensuring modern and appropriate expertise and know-how is urgent and imperative.

4. The extension of the NICHE program has the same priority as the transformation plan and therewith at a similar level of importance. The current support to RTA officers for capacity development, especially RTA management and operation capacities and strengthening of marketing and logistics knowledge and skills, including the utilization of modern databases and other information systems needs to be continued to ensure that the river transport sector one day will become competitive and represent a true alternative for the road transport sector.

The two remaining (infrastructure) projects in the top 10, the improvement of station facilities for passenger transport and the development of logistics centers for freight services score equally high as these are important elements to improve freight and passenger transport and the transfer from one mode to another. The development of the transport and logistics centers will also provide an impetus in developing new modern logistics services, an essential component in the Government's sector modernization program.

Although an integrated view on the project priorities is essential to ensure the optimal sector modernization strategy, the following three tables set priorities for the three distinguished intervention areas, hardware, humanware and software.

Table 6.2.1 Hardware priority listing

HARDWARE PROJECTS	INTEGRATED RANKING
VAL (Value Added Logistics) Center at 6 th of October City	2
Railway Link for 6th of October City	3
Railway Link between Sokhna Port to Helwan	4
Double Tracking of Bypass Line for Cairo - New Alexandria	6
Improvement of Station Facilities for Freight Services (2stations)	7
Cairo Alexandria Desert Expressway (Upgrade to 8-lanes)	8
Logistics Centers including improvement of Station Facilities for Freight Services (4 stations)	8
Passenger Intermodal Facilities	12
IWT port improvement for Upper Egypt	13
Cairo Ismailia Port Said Road (Expressway)	14
IWT port for ITC	15
Double Tracking for Mansoura – Damietta	16
Cairo -Suez Road (Expressway)	16
Improvement of Station Facilities for Freight Services (6 stations)	20
Cairo Alex Agriculture Bypass Kafr El Zayat - Alexandria	21

HARDWARE PROJECTS	INTEGRATED RANKING
Rehabilitation of Tracks for Qena – Safaga	22
Development of Management and Operation for Multi Purpose Terminal in El Dekheila	24
3rd Cairo Alex Expressway	25
Cairo - Asyut Desert Western Road (Expressway)	26
High Speed Railway for Cairo - Alexandria [High/Higher speed Alt-1]	27
Alexandria Bypass	29
Suez Ras elnakab Road (Expressway)	30
Qantara-Rafah Road	32
Dekheira Port: New Container Terminal	33
Improvement of Track Arrangement for Cairo – Qalyub	34
El Ain El Sokhna - Zafarana Road	35
3rd Stage Regional Ring Road (Southern Part of Expressway)	36
Improvement of Tracks	37
Ismailia Suez Road (Expressway)	38
Railway Link between Robeki to Helwan	39
Zafarana Elkoraymat Road (Expressway)	40
Abo Tig Bridge and Selim Coast (Asyut)	42
Triple Tracking for Qalyoub – Benha	43
Alexandria-Saloum Road	44
Belbeis-Banha-El Bagour-El Khatatba Regional Ring Road	45
Al Mahalla - Kafr El Sheikh – Damanhour	46
El-Qanater El-Bagour Shebin El-Koum Tanta Mahalla Matboul Road	46
Qantara Salheya Faqous Abu Kbeir Hehya Zaqaziq Road	46
Multi Purpose Terminal (Containers and General Cargo) at Alexandria Port	50
Railway Link for 10th of Ramadhan City	50
Waterway Improvement on Cairo – Asyut	50
Shubra elkhema - Banha Agriculture Road (Expressway)	53
Asyut Aswan Abu simble Desert Western Road (Expressway) Asyut to Aswan	53
Rod El Farag Road	55
Improvement of Tracks	56
Zakaziq – Toukh	57
Imbaba Qalyub Tawfekia Road	57
Zaqaziq Sinbellaween Road	59
Qena - Safaga Road	60
Alamein Road	61
Upper Egypt East Desert Red Sea Road	62
Improvement of Tracks	63
Improvement of Signaling System for Increase of Freight Trains	64
Cairo - Tanta Bypass	65
Rehabilitation of Tracks El-Kab - Bir El Abd	66
Tanta - Kafr El Sheikh	67
Kalabsha Bridge (Koum Ombo) (Aswan)	68
Asyut Aswan Abu simble Desert Western Road (Expressway) South part from Aswan	69
Lock Expansion with Comprehensive Lock Operation Improvement	70
Port Said East: Logistic Center	71
Fayoum-Beni Suef Bypass	72
(High) Speed Railway for Cairo - Aswan [Electrificated]	73
Mansoura Talha Dekernes Mataria Road	74
Helwan-Beni Suef Bridge	75
High Speed Railway for Cairo - Alexandria via Tanta [High/Higher speed Alt-2]	76
Safaga Baranis Halayeb Road	77
Double Tracking for Ain Shams – Robeki	78
Suez Canal Tunnel Ismailia	79
Desouq Fowa Metobas Road	80
Wadi Alnatroum Saloum Road	81
Double Tracking for Qalyoub - El Qnater	82
Alawga Ismailia Road	83
Qena Aswan Nile East Bank Road	83
Single Tracking for Basion City	85
Waterway Improvement Cairo – Alexandria	86

HARDWARE PROJECTS	INTEGRATED RANKING
Waterway Improvement on Cairo – Damietta	86
Bahriya Minya Road	88
Single Tracking for Luxor - Hurghada [Electrificated]	89
El-Dakhla Assyuit Road	90
Farafra Malwa Road	91
El-Belina - Tahta Road	92
Albetrol Malwa Road	93
Rehabilitation of Tracks for Qena – Kharga	94
Minya Bridge	96
Bahriya Siwa Road	97
Development of Railway Bridge for Lemon - Abbasiya - Tora	98
ALbetrol Beni Mazar Road	99
Single Tracking for Bir El Abd – Rafah	100
Eldaba Albetrol Road	101
Wasta Bridge Connection	101
Single Tracking for Kafr El-Batikh - New Damietta City	103
Damietta Port; Study on Sedimentation problema	104

Taking above ranking, the twenty priority infrastructure projects are :

1. VAL (Value Added Logistics) Center at 6th of October City
2. Railway Link for 6th of October City
3. Railway Link between Sokhna Port to Helwan
4. Double Tracking of Bypass Line for Cairo - New Alexandria
5. Improvement of Station Facilities for Freight Services (2 stations)
6. Cairo Alexandria Desert Expressway (Upgrade to 8-lanes)
7. Logistics Centers & improvement of Station Facilities for Freight Services (4 stations)
8. Passenger Intermodal Facilities
9. IWT port improvement for Upper Egypt
10. Cairo Ismailia Port Said Road (Expressway)
11. IWT port for ITC
12. Double Tracking for Mansoura - Damietta
13. Cairo -Suez Road (Expressway)
14. Improvement of Station Facilities for Freight Services (6 stations)
15. Cairo Alex Agriculture Bypass Kafr El Zayat - Alexandria
16. Rehabilitation of Tracks for Qena - Safaga
17. Development of Management and Operation for Multi Purpose Terminal in El Dekheila
18. 3rd Cairo Alex Expressway
19. Cairo - Asyut Desert Western Road (Expressway)
20. High Speed Railway for Cairo - Alexandria [High/Higher speed Alt-1]

The first twenty investments in above priority infrastructure project listing are fully consistent with the Government's modernization objectives and focus in the first place the development of the Intermodal Transport Corridor, including the maritime terminal development in El Dekheila port and to a lesser extent the inland river port to link the Upper Egypt waterway corridor. The ITC development is amended with various other projects oriented towards efficient and integrated transport of passengers and freight. It is important to notice that the proposed infrastructure investments include projects for each of the transport modes, namely road, railways, river and maritime (terminals).

The software investment priority is listed in Table 6.2.2.

Table 6.2.2 Software priority listing

SOFTWARE PROJECTS	INTEGRATED RANKING
Egyptian Transport Center (ETC)	1
Road safety initiative (3E; Engineer, Education and Enforcement)	18
Railway Safety Initiative	22
Development of road function based design and capacity standards	27
Introduction of state of the art railway systems and control	30
Development of IWT management database and Installation of IWT Navigation Information System	40
Establishment of Dedicated Transport Fund	94

Any modernization of the Egyptian transport sector needs state-of-the-art technology to get detailed insight into the existing conditions and future needs. The proposed ETC is therefore the software project with the highest priority, both in the integrated as the software project ranking. The poor safety record of both the Egyptian road and railway sectors is well-known and software projects to improve safety of travel are therefore second in line and in the integrated listing part of the top 30 of projects. The two first projects are directly oriented towards improving safety, while the third project is an indirect project that will increase road safety via improved technical standards (for road infrastructure). As a road project and considering the dominance of road transport, this project is first in line but relates closely to the next two projects where technology is used to improve railway and river transport efficiency and where safety will also improve thanks to better supervision and control of the transport system.

Finally, humanware project priority is presented in Table 6.2.3.

Table 6.2.3 Humanware priority listing

HUMANWARE PROJECTS	INTEGRATED RANKING
Extension of transformation plan	5
Extension of NICHE program	10
Training in modern road maintenance techniques	11
Training in modern traffic management and control systems	19
Strengthening MOT's responsibility covering all transport modes for integrated multimodal transport system & logistics	49

All proposed humanware development projects are all part of the fifty most important projects, with four out of the five proposed projects listed in the top 20 of priority projects.

CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

Although above table suggests a sequential implementation of the different projects, the proposed software, hardware, and humanware projects can start simultaneously because the implementation time and components that together make up the respective projects differ, allowing an approach as suggested in Figure 7.1.1.

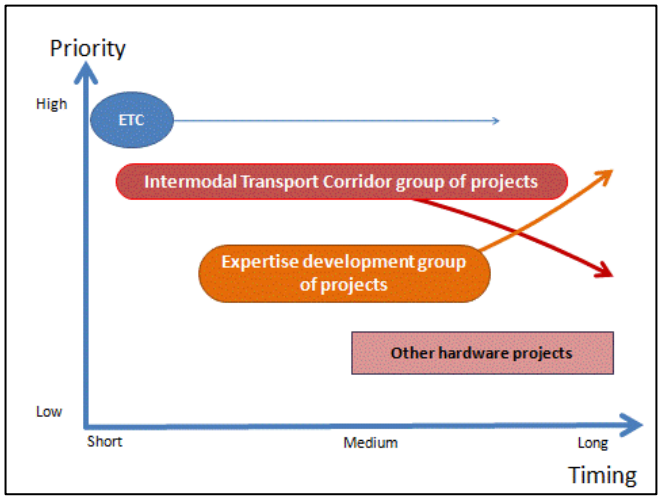


Figure 7.1.1 Consolidated Implementation Logic

The first, urgent, and most important project for the modernization of the Egyptian transport sector is the establishment of the Egyptian Transport Center (ETC) which will be supplied with state-of-the-art software and trained personnel. It will be the key tool for public decision-makers for transport planning and strategy development.

With the ETC expertise and equipment available, the Egyptian government will no longer need expensive external expertise to assess the performance of the transport sector, forecast the future evolution of transport in Egypt which will be key input for the design and amendment of the national transport strategy.

The contribution to the modernization and transformation of the Egyptian transport sector will be continuous and should in the long-term future lead to the creation of a governmental transport management system that will control, manage and govern the sector at the national level.

The second key project of which the implementation should not be delayed is the gradual development of the Intermodal Transport Corridor (ITC).

This project will be spread over a long period of time as it involves different sometimes important infrastructure investments which should be implemented in a sequential order of decreasing importance as suggested in more detail in Figure 7.1.2.

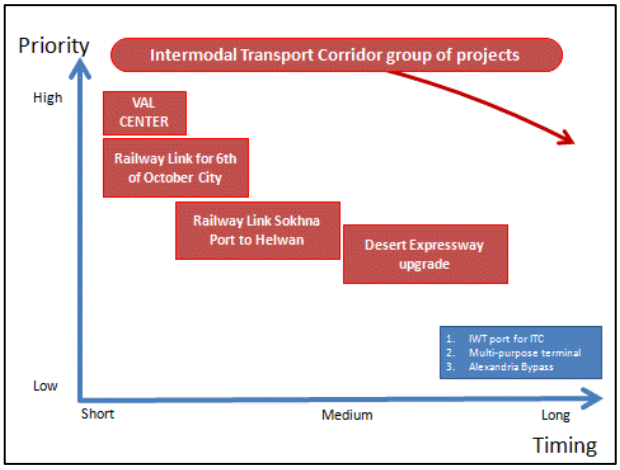


Figure7.1.2 ITC project implementation logic

The construction of the VAL center at 6th of October is undoubtedly the first project of the ITC program that needs to be realized as soon as possible for several reasons:

- It is located at the center of Egyptian consumption and production;
- It will generate benefits as soon as the infrastructure is operational;
- Its development cost is low, and
- The need is immediate.

But to maximize the benefits of this investment and to ensure the center can play in full its role in the envisaged transport corridor, it should be linked to the Alexandria – Cairo railway connection, hence making the link between the center and the railway network an equally important investment.

Once these two projects have been initiated, the other components of the ITC project can be envisaged, with the highest priority in the short- to medium-term attributed to the railway link to the port of Sokhna, the other end of the Alexandria – Cairo – Sokhna corridor.

To a lesser extent, upgrading the Desert Expressway can also be envisaged because road transport will remain a dominant mode of transport for bringing freight from Alexandria port to the Cairo region.

The three remaining projects, although important, are to be envisaged in the long-term, with the IWT port in the Cairo region to link to the ITC corridor as first in line of implementation.

All remaining hardware projects, are developments to be considered in the long-term, and its implementation can be realized in the order as proposed in the multi-criteria analysis. The final timing of the concrete development will most likely be decided based upon budgetary considerations rather than on considerations of priority. Given that these projects all can be considered as amendments to the above priority projects, the concrete implementation of some of these projects could be considered in case of a budgetary surplus, but only if most if not all short- and medium-term projects have been realized.

The third group of projects which should start together with or at latest once the ETC is realized, is the increase of know-how and expertise as well as programs to improve the traffic conditions on the transport infrastructure (maintenance and control applications).

In the group of software projects, the highest priority should be to be attributed to the road sector, followed by the railway sector, corresponding to their respective roles in the transport of freight and passengers in Egypt. Projects in the river transport sector are of a lower priority and will only become truly relevant once river transport has gained its place as third land transport alternative, offering competitive services and

transporting a representative level of cargo which should not be limited to the traditional low-value bulk cargoes.

Although humanware projects are frequently forgotten or their importance ignored or neglected, all proposed humanware development projects are part of the fifty most important projects, with four out of the five proposed projects listed in the top 20 of priority projects. All should therefore be implemented as quickly as possible, certainly considering the small capital investments these projects require.

CHAPTER 8: ECONOMIC ANALYSIS

8.1. METHODOLOGY

The main purpose of the economic analysis is to show the effects of the implementation of master plan, from the point of view of the nation's economic well-being and to estimate a return on the resources invested. For the purpose of economic evaluation, the economic internal rate of return (EIRR), net present value (NPV) and benefit – cost ratio (BC ratio) are demonstrated.

Economic analysis follows a conventional cost benefit analysis of discounted cash flow methodology. The cost benefit analysis is made by comparison between economic benefits and costs.

8.2. BASIC ASSUMPTION

The following basic assumptions are made:

- "With case" and "Without case": there three different five year planning horizons short-term (present to year 2017), mid-term (years 2018 - 2022) and long-term (years 2023 - 2027) have been adapted. The "with case" is set with the projects which are expected to be implemented for that period with transport demand and fuel price strategy in accordance with preferred transport scenario conditions. All projects by mode types are categorized in short, mid and long-terms as shown in Table 8.2.1. The "without case" does not include the new projects foreseen for that stage of the Master Plan, which means that all projects shown in Table 8.2.1 are not implemented in any terms.

- Evaluation period and project life: the economic evaluation period extends to the year of 2037 and each project life is assumed as 30 years from middle year of each five year period. This means the residual value for each project investment is taken into consideration.

- Economic price: Financial costs are converted to economic costs by deducting the tax and subsidies portions, and applying a standard conversion factor (SCF) to the portion of non-trade goods. A value of 0.85 is applied to the local portion of costs in order to adjust the price for this study.

- The discount rate is set as 12 %.

Table 8.2.1 Projects Categorized in Terms

Unit: LE million (Financial Price)

Term	No.	Road	Cost		Rail	Cost		Port	Cost	IWT	Cost	SW	Cost	HW	Cost
			Public	Private		Public	Private								
Short-term(present - 2017)	1	RD-204		1,775	RW-309	625		PT-2	700	IW-1	1,000	L-1	1,000	HW-2	300
	2	RD-300		2,608	RW-401	900		PT-3	1,500	IW-2	1,000	L-2	2,499	HW-3	300
	3	RD-301		3,026	RW-402-4	2,139						P-1	1,125	HW-4	300
	4	RD-302		1,759	RW-403	4,125						SW-1	300	HW-5	300
	5	RD-304	1,455		RW-406	2,400						SW-3	300		
	6	RD-308		3,125	RW-407	2,100						SW-4	300		
	7	RD-309		2,147	RW-409	2,375						SW-5	300		
	8	RD-310		2,500	RW-412	1,025						SW-6	8,957		
	9	RD-311	2,276		RW-412-4	2,813									
	10	RD-312	3,702		RW-420	3,750									
	11	RD-317	1,001												
	12	RD-321	341												
	13	RD-998		1,650											
		sub-total	8,775	18,589	-	22,251	0	-	2,200	-	2,000	-	14,781	-	1,200
Mid-term (2018 - 2022)	1	RD-200		4,375	RW-300	625		PT-1	1,500	IW-3	290	SW-2	300	HW-1	300
	2	RD-214	550		RW-304	2,208	19,872	PT-5	1,500	IW-4	650	SW-7	620		
	3	RD-215	900		RW-307	125									
	4	RD-216	650		RW-308	500									
	5	RD-226	750		RW-310	875									
	6	RD-298	625		RW-313	2,295									
	7	RD-299	344		RW-402-1	627									
	8	RD-303	5,009		RW-402-2	922									
	9	RD-307		4,104	RW-410	2,000									
	10	RD-313-1	4,634												
	11	RD-313-2	3,073												
	12	RD-314	2,264												
	13	RD-315		2,500											
	14	RD-316		855											
	15	RD-318	250												
	16	RD-319	625												
	17	RD-320	688												
	18	RD-322	3,281												
	19	RD-323		3,599											
	20	RD-327	1,163												
	21	RD-332	420												
	22	RD-333	238												
	23	RD-334	452												
	24	RD-994	220												
	25	RD-997	306												
	26	RD-999		2,500											
		sub-total	26,440	17,933	-	10,177	19,872	-	3,000	-	940	-	920	-	300
Long-term(2023 - 2027)	1	RD-225	250		RW-301	300		PT-4	1,000	IW-5	500				
	2	RD-305	2,324		RW-302	105				IW-6	600				
	3	RD-306	1,295		RW-303	5,400									
	4	RD-324	2,492		RW-306	125									
	5	RD-325	1,189		RW-312	1,200									
	6	RD-326	1,600		RW-408	2,875									
	7	RD-328	1,342		RW-999	13,950	125,550								
	8	RD-329	2,675												
	9	RD-330	2,504												
	10	RD-331	2,844												
	11	RD-995	114												
	12	RD-996	388												
		sub-total	19,018	0	-	23,955	125,550	-	1,000	-	1,100	-	0	-	0
		Grand total	54,233	36,522	-	56,383	145,422	-	6,200	-	4,040	-	15,701	-	1,500

Source: JICA study team

8.3. ESTIMATED COSTS

8.3.1. Project Costs

The project costs are included all projects/programs listed in hardware, humanaware as well as software. Foreign and local portions of the project costs are assumed 25% and 75% in total, respectively. And local portions of project costs are converted from financial prices to economic prices by SCF 0.85. The results of project costs with financial and economic prices are summarized in Table 8.3.1. The evaluation input for investment cost is averaged over five years for each five year period.

Table 8.3.1 Project Costs

unit: LE million

Term	Financial Cost	Economic Cost
Mid	79,581	70,628
Long	170,623	151,428
Total	320,000	284,000

Source: JICA study team

8.3.2. Operation and Maintenance Costs

Road maintenance unit costs are added for project roads in accordance with its road length. The unit cost of maintenance has gradually been improved from current 20,000 LE/km expenditure pattern to optimized 82,000 LE/km by year 2037. The maintenance costs of other modes are noted as being included in unit operating costs.

8.4. ECONOMIC BENEFITS

Expected benefits can include direct and indirect benefits. Direct benefits consist of saving of travel time and vehicle operation costs, reduction of traffic accidents and environmental improvement due to CO2 emission. Indirect benefits can include regional economic growth, job creation and income improvement as well as changes of land value. The MiNTS economic analysis quantifies only direct benefits.

Prior to the estimation of benefits, the following basic calculation units are estimated.

- VOC: The results of VOC by vehicle types are summarized in Table 8.4.1. In this analysis, VOC for 50 km/hour is applied as average values for the estimation of benefits, which are 0.70, 0.61 and 1.41 LE for car, shared taxi and bus, respectively.

Table 8.4.1 Vehicle Operation Cost by Vehicle Type

Unit: LE (Economic Price)

Speed (km/hour)	Car	Shared Taxi	Bus
10	1.88	1.48	2.96
20	1.15	0.95	1.97
30	0.90	0.75	1.61
40	0.77	0.65	1.42
50	0.70	0.61	1.41
60	0.69	0.61	1.51
70	0.70	0.63	1.65
80	0.72	0.67	1.84
90	0.76	0.72	2.01

Source: JICA study team

- Travel time: Based on the willingness to pay for travel time savings, value for car, shared taxi, bus and railway is estimated as 17.2, 13.7, 7.3 and 15 LE/hour, respectively.

- Freight cost: Freight costs by mode types are summarized in Table 8.4.2.

Table 8.4.2 Freight Cost by Mode Type

Unit: Cost per ton-km (LE) (Economic Price)

Year 2010 & 2020			
Mode	Packed	Bulk	Container
Road	0.40	0.46	0.43
Railway	0.31	0.36	0.34
IWT	0.27	0.30	0.29
Year 2030			
Mode	Packed	Bulk	Container
Road	0.40	0.46	0.43
Railway	0.22	0.25	0.24
IWT	0.13	0.15	0.15

Source: JICA study team

- The accident cost: The total accident costs in Egypt in 2008 were 12,705 million LE according to WHO. Considering the balance between national and urban transport, a half of the total accident costs are estimated as the annual value of urban transport which is 6,352 million LE.

- The value of carbon tax is 100 LE/ton according to the "Nikkei-JBIC Carbon Quotation Index 2011".

Based on the estimation of basic calculation units, the benefits of VOC, travel time and freight are calculated as shown in Table 8.4.3. Although the benefit of VOC shows negative, benefits in total including travel time and freight produce the economic benefits.

The reduction of accident costs and carbon tax is shown in Table 8.5.1.

Table 8.4.3 Benefits of VOC, Travel Time and Freight

Unit: LE million (Economic Price)

Year	VOC	Travel Time		Freight	Total Benefit
		Road	Railway		
2011	0	0	0	0	0
2012	0	0	0	0	0
2013	-88	3,092	786	125	3,915
2014	-175	6,183	1,571	250	7,830
2015	-263	9,275	2,357	375	11,745
2016	-350	12,367	3,143	500	15,660
2017	-438	15,459	3,929	625	19,575
2018	-421	15,402	4,024	798	19,803
2019	-405	15,346	4,120	971	20,032
2020	-388	15,289	4,216	1,144	20,260
2021	-372	15,233	4,311	1,316	20,488
2022	-355	15,176	4,407	1,489	20,717
2023	-289	13,969	3,714	1,760	19,154
2024	-223	12,761	3,021	2,031	17,591
2025	-156	11,554	2,328	2,303	16,028
2026	-90	10,347	1,635	2,574	14,465
2027	-24	9,139	942	2,845	12,902
2028	-24	9,139	942	2,845	12,902
2029	-24	9,139	942	2,845	12,902
2030	-24	9,139	942	2,845	12,902
2031	-24	9,139	942	2,845	12,902
2032	-24	9,139	942	2,845	12,902
2033	-24	9,139	942	2,845	12,902
2034	-24	9,139	942	2,845	12,902
2035	-24	9,139	942	2,845	12,902
2036	-24	9,139	942	2,845	12,902
2037	-24	9,139	942	2,845	12,902
Total	-4,272	271,982	53,919	47,556	369,185

Source: JICA Study Team

8.5. COST BENEFIT ANALYSIS

Based on the above estimated economic costs and benefits, the annual flows are estimated as shown in Table 8.5.1. The investment, converted to an economic cost of 289 billion LE, is shown as producing direct economic benefits of 13.6 billion LE in year 2027, and a B/C ratio (at 12% discount rate) of 1.10. The economic internal rate of return (EIRR) is estimated at 17.8 percent.

It may therefore be concluded that the MiNTS initiatives are economically viable and worth being implemented in terms of a national economic context.

Table 8.5.1 Economic Analysis Results

Unit: LE million (Economic Price)

Year	Cost			Benefit				Net Cash Flow
	Investment	Maintenance for Road	Total	VOC +Time Cost + Freight	Reduction in Accident	Reduction in Pollution	Total	
2011	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0
2013	12,389	8	12,397	3,915	-3	-92	3,820	-8,577
2014	12,389	16	12,405	7,830	-6	-184	7,639	-4,765
2015	12,389	24	12,413	11,745	-9	-276	11,459	-954
2016	12,389	32	12,421	15,660	-12	-369	15,279	2,858
2017	12,389	40	12,429	19,575	-15	-461	19,099	6,669
2018	14,126	83	14,208	19,803	-7	-357	19,439	5,230
2019	14,126	125	14,251	20,032	0	-253	19,779	5,528
2020	14,126	167	14,293	20,260	8	-149	20,119	5,826
2021	14,126	210	14,335	20,488	16	-45	20,459	6,124
2022	14,126	252	14,378	20,717	23	59	20,799	6,422
2023	30,286	306	30,591	19,154	101	99	19,355	-11,237
2024	30,286	359	30,645	17,591	179	140	17,910	-12,735
2025	30,286	413	30,698	16,028	257	180	16,465	-14,233
2026	30,286	466	30,752	14,465	335	220	15,020	-15,732
2027	30,286	520	30,805	12,902	413	260	13,575	-17,230
2028		555	555	12,902	413	260	13,575	13,020
2029		573	573	12,902	413	260	13,575	13,002
2030		591	591	12,902	413	260	13,575	12,984
2031		609	609	12,902	413	260	13,575	12,966
2032		627	627	12,902	413	260	13,575	12,948
2033		645	645	12,902	413	260	13,575	12,930
2034		663	663	12,902	413	260	13,575	12,912
2035		681	681	12,902	413	260	13,575	12,894
2036		699	699	12,902	413	260	13,575	12,876
2037	-137,981	698	-137,282	12,902	413	260	13,575	150,857
Total	146,020	9,366	155,385	369,185	5,409	1,373	375,968	220,582
NPV	68,714	1,201	81,388	89,941	547	-644	89,845	8,456
B/C	Disscount rate 12%							1.10
EIRR								17.8%

Source: JICA Study Team

Indicator	Results
Economic Internal of Return (EIRR)	17.8 percent
B/C (Benefit/cost ratio, 12 % discount rate)	1.10
NPV (Net present value, 12% discount rate)	8,456 million LE

Source: JICA study team

8.6. SENSITIVE ANALYSIS

The result of sensitivity analysis shows that the "worst case scenario" in Table 8.6.1, defined as experiencing minus 10 percent benefits and plus 10 percent costs, slightly exhibits an EIRR of more or less 12 percent..

Table 8.6.1 Results of Sensitive Analysis

Sensitivity Case	Base Case	Benefits : -10%	Costs: +10%	Benefits: -10% & Costs: +10%
NPV	8,456	-542	422	-8,561
B/C	1.10	0.99	1.00	0.90
EIRR	17.8%	11.7%	12.2%	8.6%

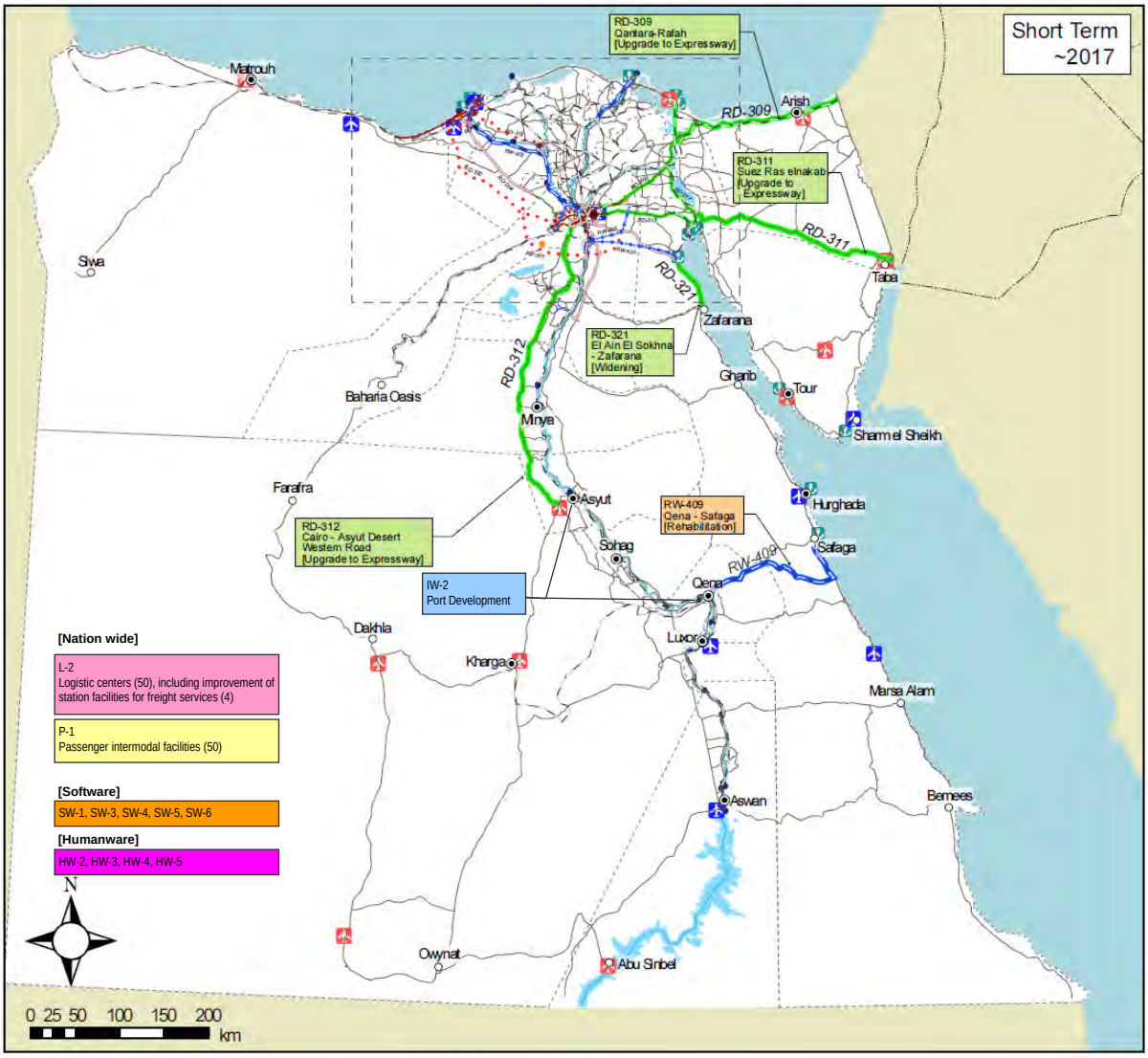
Source: JICA study team

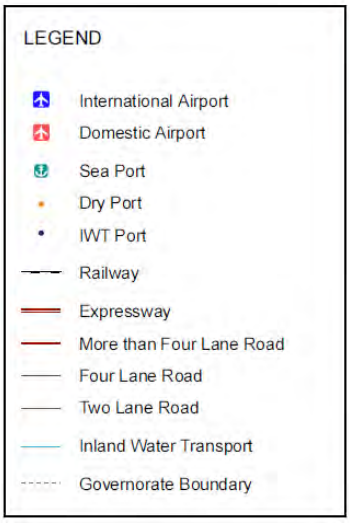
APPENDIX

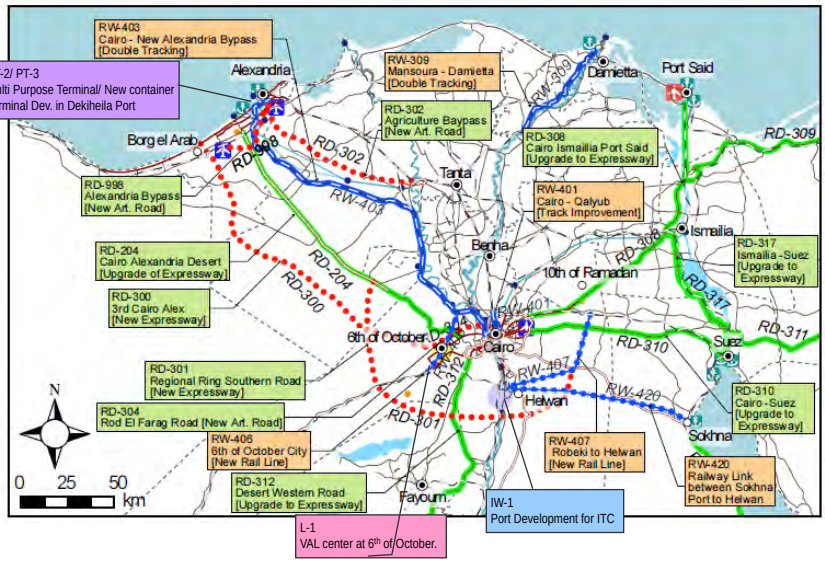
1. PROJECT MAP BY TERMS
2. TIME FRAME OF PROJECT IMPLEMENTATION BY CORRIDOR
3. PROJECT OUTLINE BY CORRIDOR
4. CORRIDOR RANKING

1. PROJECT MAP BY TERMS

Short-Term Projects [Hardware, Software and Humanware Projects]

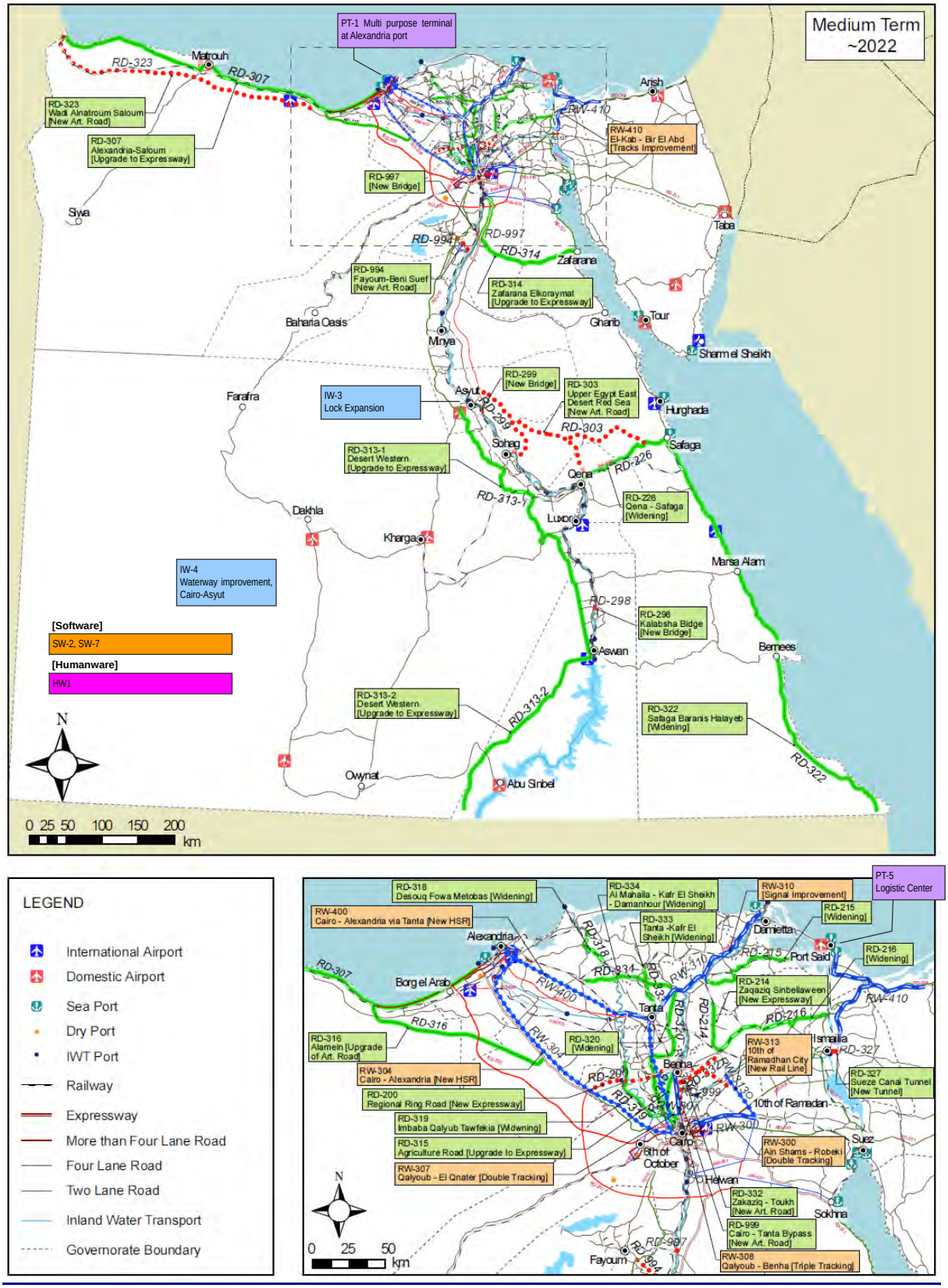






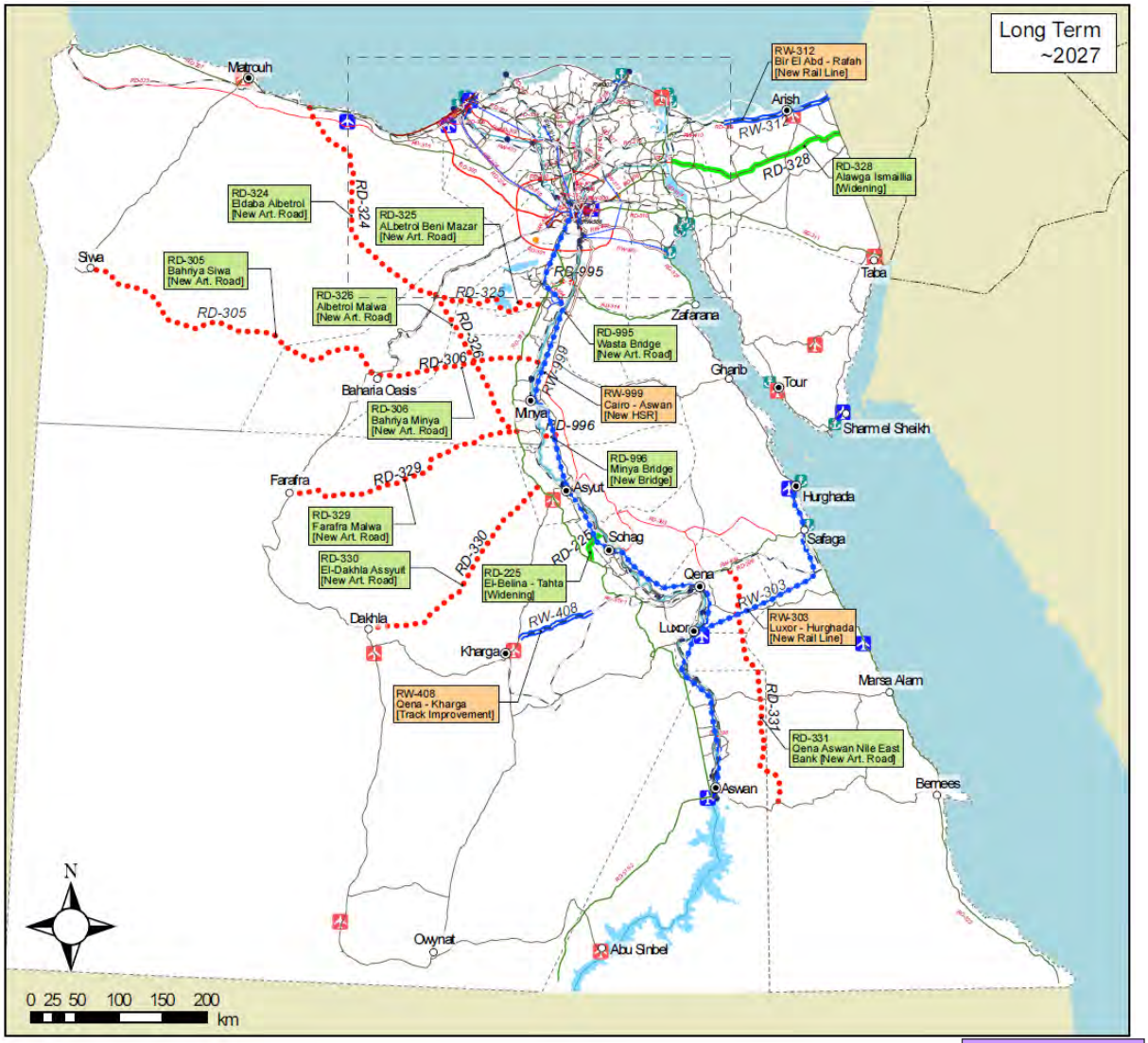
Note: Project details can be referred by project code number in chapter 6, Hardware opportunities, chapter 7, Humanware opportunities and chapter 8, Software opportunities.

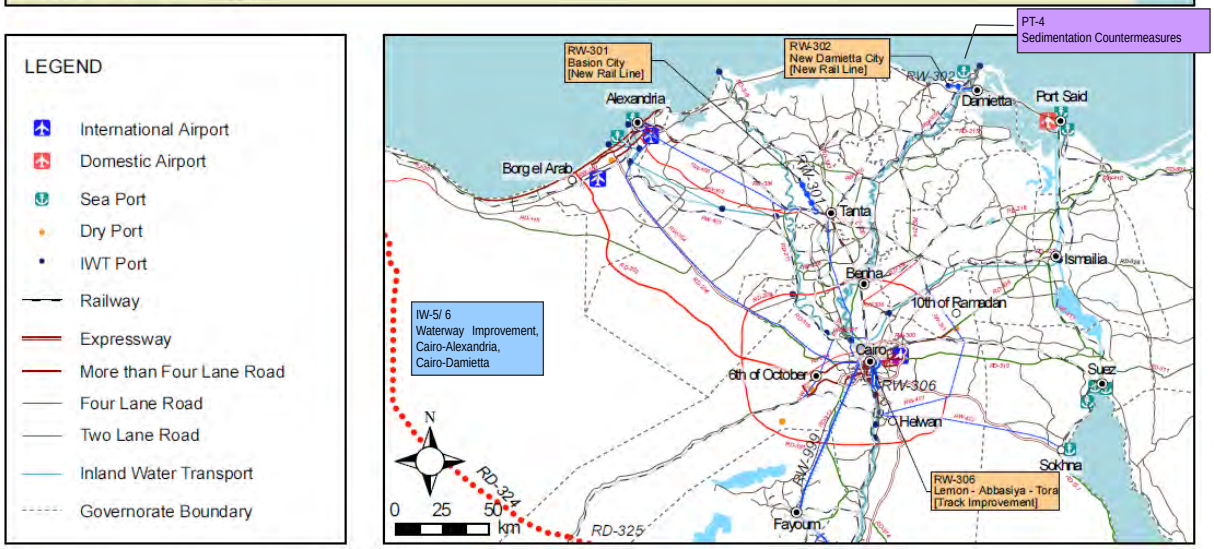
Mid-Term Projects [Hardware, Software and Humanware Projects]



Note: Project details can be referred by project code number in chapter 6, Hardware opportunities, chapter 7, Humanware opportunities and chapter 8, Software opportunities.

Long-Term Projects [Hardware Projects]

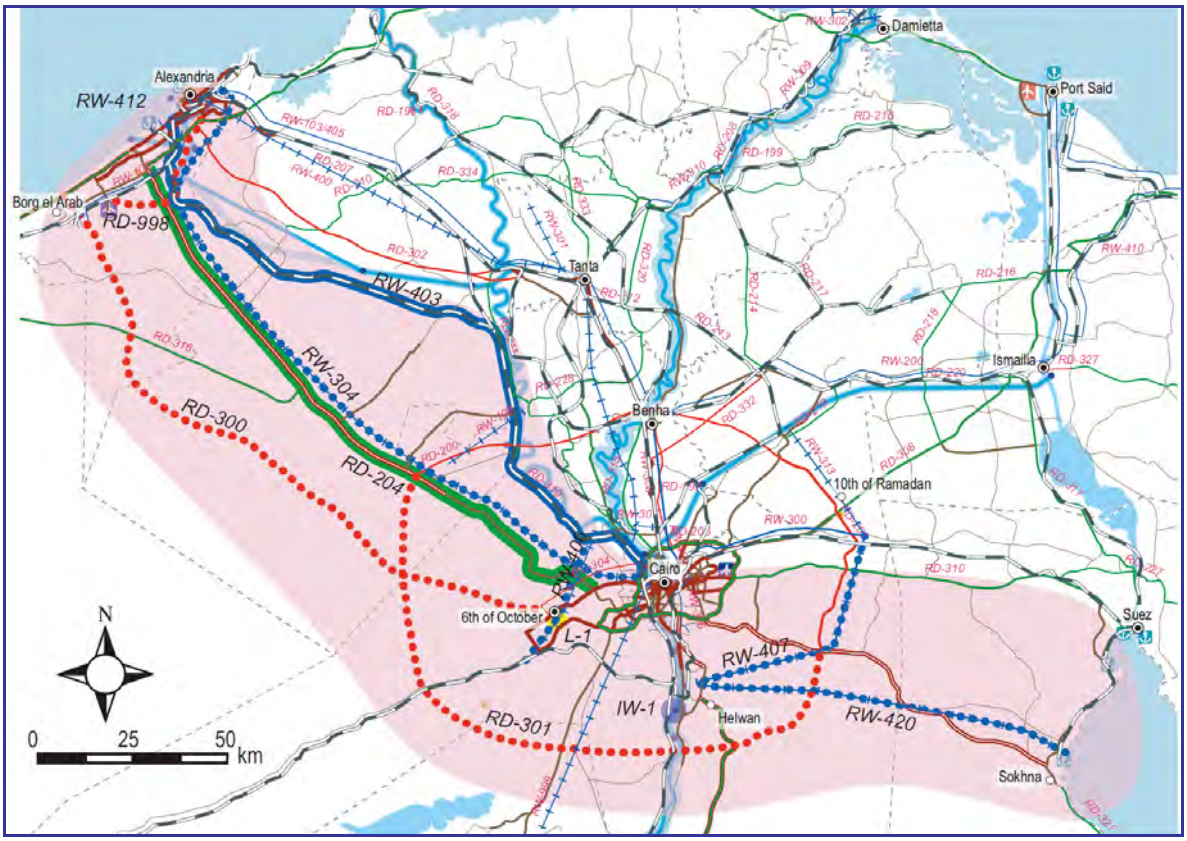




Note: Project details can be referred by project code number in chapter 6, Hardware opportunities.

2. TIME FRAME OF PROJECT IMPLEMENTATION BY CORRIDO

Master Plan for "Intermodal Transport Corridor"

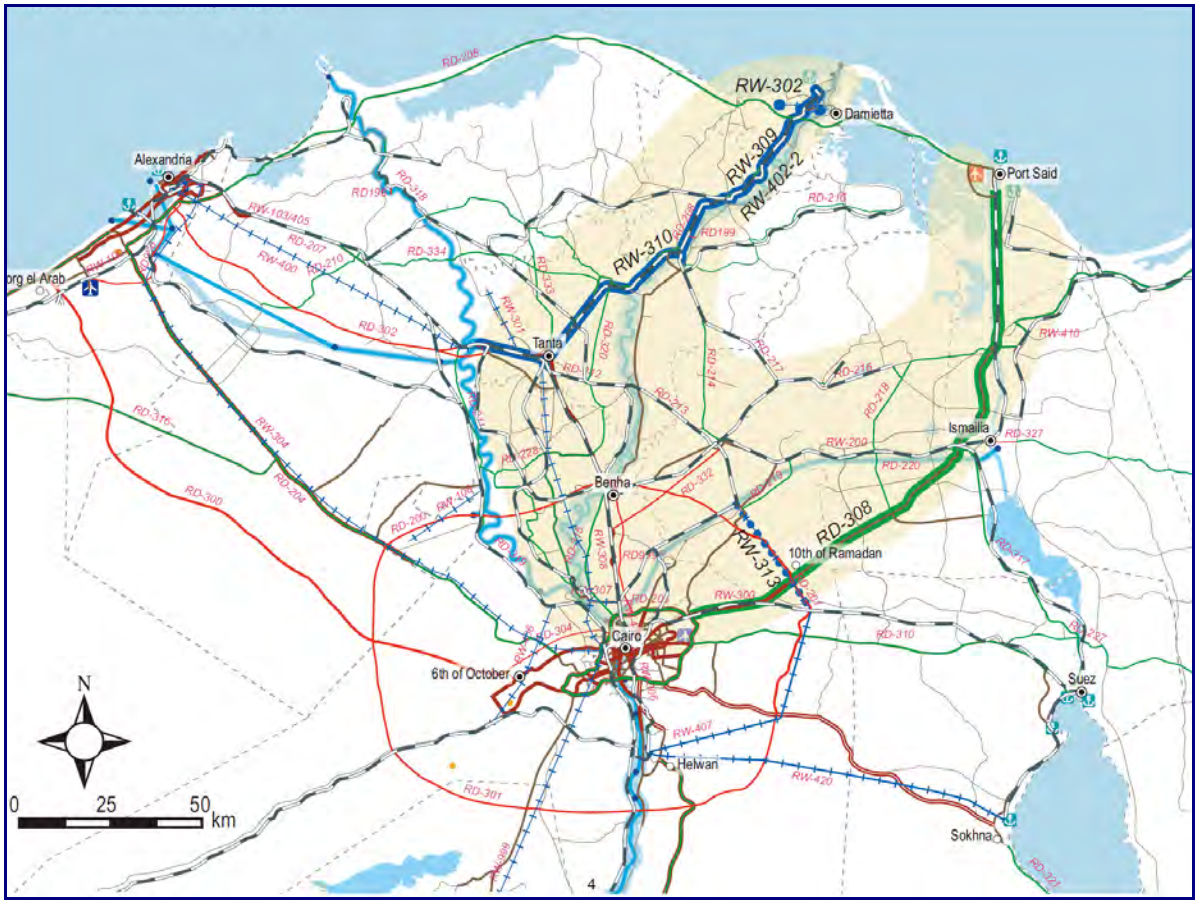


LEGEND Completion

Study Design Construction

ID	NAME	Master Plan		
		Short	Mid	Long
RD-300	3rd Cairo Alex Expressway			
RD-204	Cairo Alexandria Desert Expressway (Upgrade to 8-lanes)			
RD-301	3rd Stage Regional Ring Road (Southern Part of Expressway)			
RD-998	Alexandria Bypass			
RW-403	Double Tracking of Bypass Line for Cairo - New Alexandria			
RW-406	Railway Link for 6th of October City			
RW-407	Railway Link between Robeki to Helwan			
RW-412	Improvement of Station Facilities for Freight Services (2stations)			
RW-420	Railway Link between Sokhna Port to Helwan			
RW-304	High Speed Railway for Cairo - Alexandria [High/Higher speed Alt-1]			
L-1	VAL (Value Added Logistics) Center at 6 th of October City			
IW-1	IWT port for ITC			
IW-5	Waterway Improvement on Cairo - Alexandria			
PT-1	Establishment of a Multi Purpose Terminal (Containers and General Cargo) at Alexandria Port			
PT-2	Development of Management and Operation for Multi Purpose Terminal in El Dekheila Port			
PT-3	Dekheira Port: New Container Terminal			

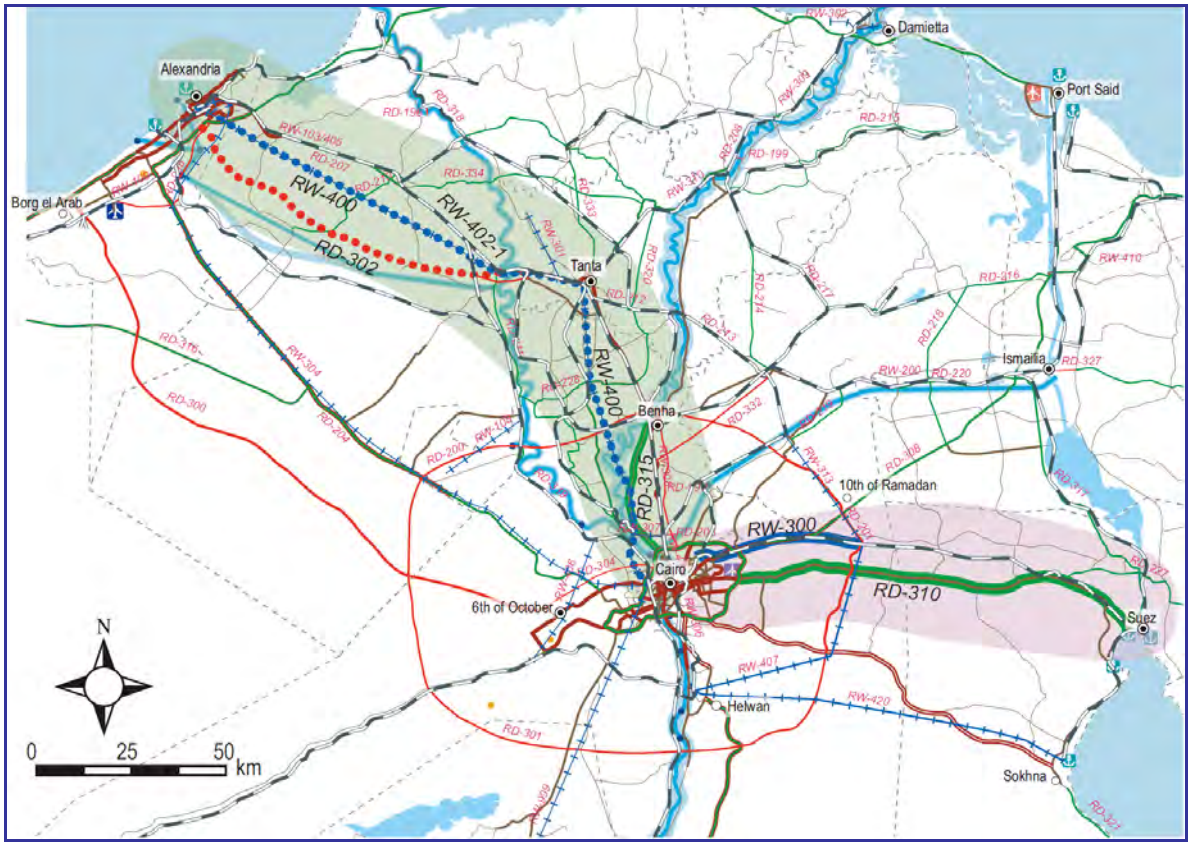
Master Plan for "Cairo-Damietta/Port Said Corridor"



LEGEND
Completion
Study Design | Construction

ID	NAME	Master Plan		
		Short	Mid	Long
RD-308	Cairo Ismailia Port Said Road (Expressway)			
RW-313	Railway Link for 10th of Ramadhan City			
RW-302	Single Tracking for Kafr El-Batikh - New Damietta City			
RW-309	Double Tracking for Mansoura - Damietta			
RW-310	Improvement of Signaling System for Increase of Freight Trains			
RW-402-2	Improvement of Tracks			
IW-6	Waterway Improvement on Cairo - Damietta			
PT-4	Damietta Port; Study on Sedimentation problem			
PT-5	Port Said East: Logistic Center			

Master Plan for "Cairo-Alexandria Corridor and Cairo-Suez Corridor"



LEGEND

Completion

Study Design | Construction

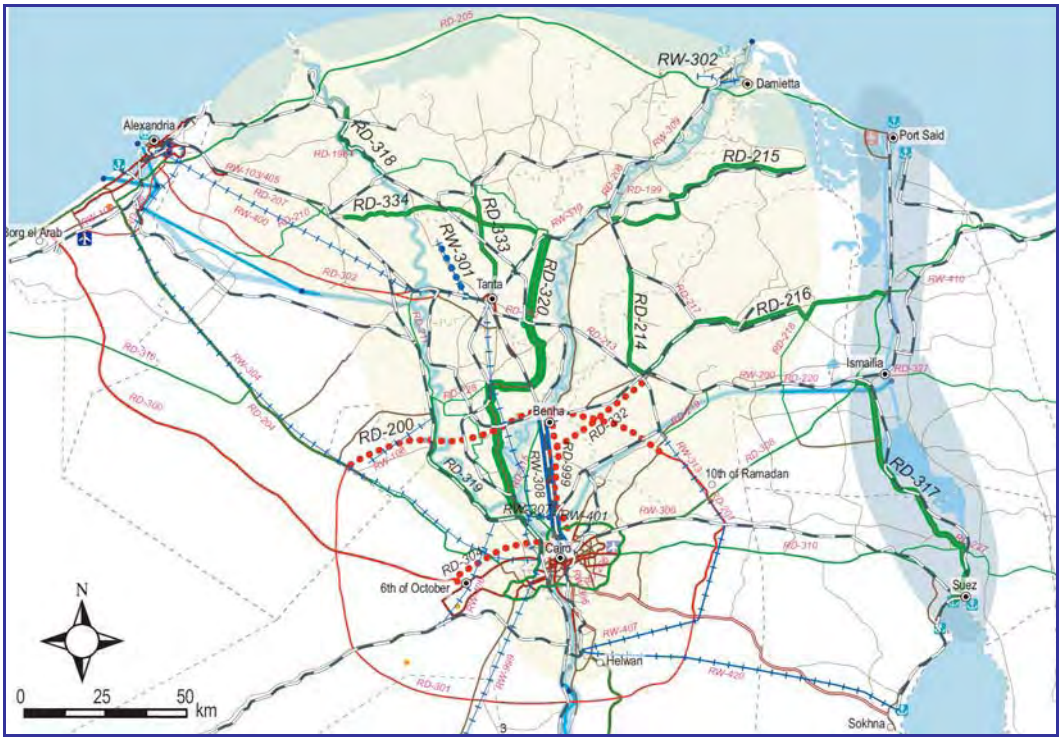
Cairo-Alexandria Corridor

ID	NAME	Short		
		Short	Mid	Long
RD-302	Cairo Alex Agriculture Bypass Kafr El Zayat - Alexandria			
RD-315	Shubra elkhema - Banha Agriculture Road (Expressway)			
RW-402-1	Improvement of Tracks			

Cairo-Suez Corridor

ID	NAME	Master Plan		
		Short	Mid	Long
RD-310	Cairo -Suez Road (Expressway)			
RW-300	Double Tracking for Ain Shams - Robeki			

Master Plan for "Inland Delta and Suez Canal Development Corridor"



LEGEND

Completion

Study Design | Construction

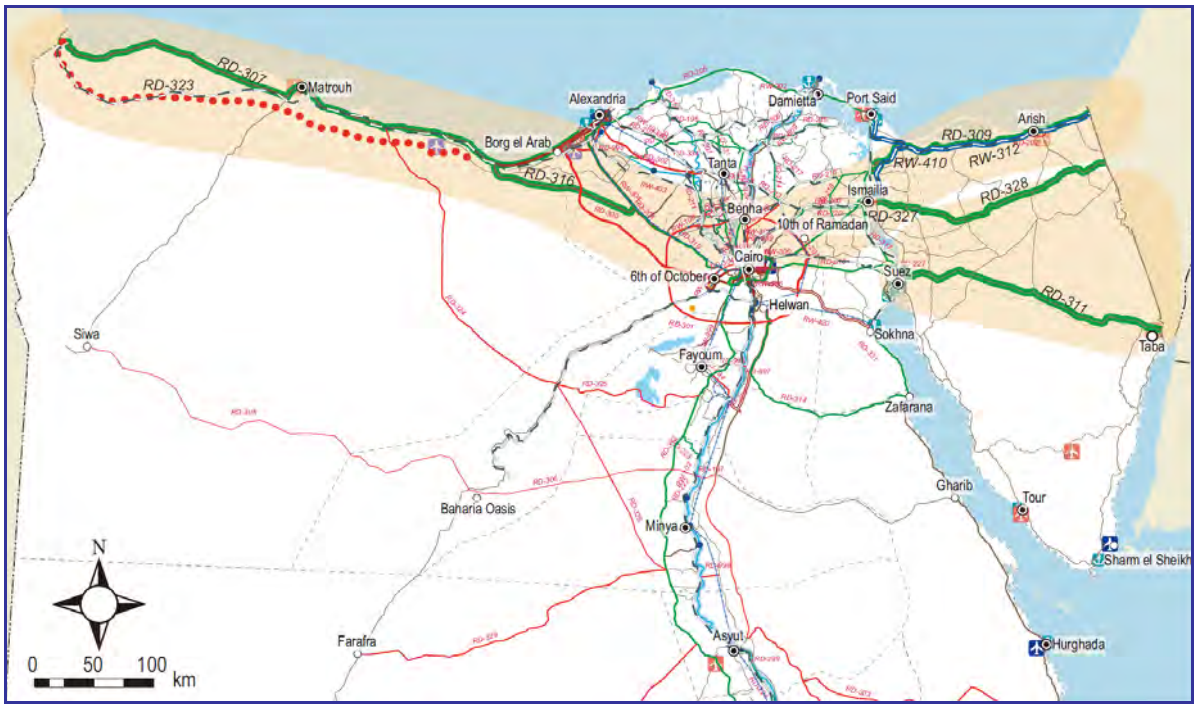
Inland Delta Corridors

ID	NAME	Master Plan		
		Short	Mid	Long
RD-999	Cairo - Tanta Bypass			
RD-332	Zakaziq - Toukh			
RD-304	Rod El Farag Road			
RD-333	Tanta - Kafr El Sheikh			
RD-334	Al Mahalla - Kafr El Sheikh - Damanhour			
RD-318	Desouq Fowa Metobas Road			
RD-319	Imbaba Qalyub Tawfekia Road			
RD-320	El-Qanater El-Bagour Shebin El-Koum Tanta Mahalla Matboul Road			
RD-200	Belbeis-Banha-El Bagour-El Khatatba Regional Ring Road			
RD-214	Zaqaziq Sinbellaween Road			
RD-215	Mansoura Talha Dekernes Mataria Road			
RD-216	Qantara Salheya Faqous Abu Kbeir Hehya Zaqaziq Road			
RW-301	Single Tracking for Basion City			
RW-307	Double Tracking for Qalyoub - El Qnater			
RW-308	Triple Tracking for Qalyoub - Benha			
RW-401	Improvement of Track Arrangement for Cairo - Qalyub			

Suez Canal Development Corridor

RD-317	Ismailia Suez Road (Expressway)			

Master Plan for "Mediterranean Corridor and Sinai Corridor"



LEGEND

Completion

Study Design | Construction

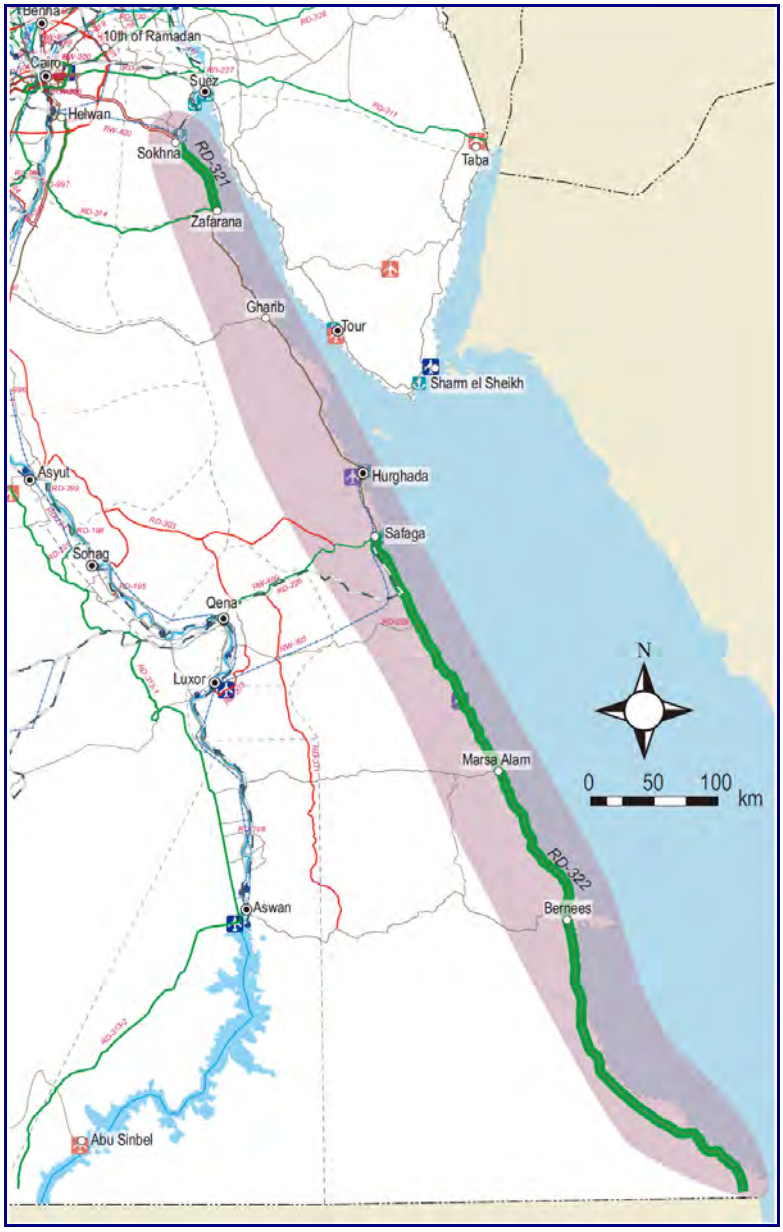
Mediterranean Corridor

ID	NAME	Master Plan		
		Short	Mid	Long
RD-323	Wadi Alnatroum Saloum Road			
RD-307	Alexandria-Saloum Road			
RD-309	Qantara-Rafah Road			
RD-316	Alamein Road			
RW-312	Single Tracking for Bir El Abd - Rafah			
RW-410	Rehabilitation of Tracks for El-Kab - Bir El Abd			

Sinai Corridor

ID	NAME	Master Plan		
		Short	Mid	Long
RD-311	Suez Ras elnakab Road (Expressway)			
RD-327	Suez Canal Tunnel Ismailia			
RD-328	Alawga Ismailia Road			

Master Plan for "Red Sea Corridor"



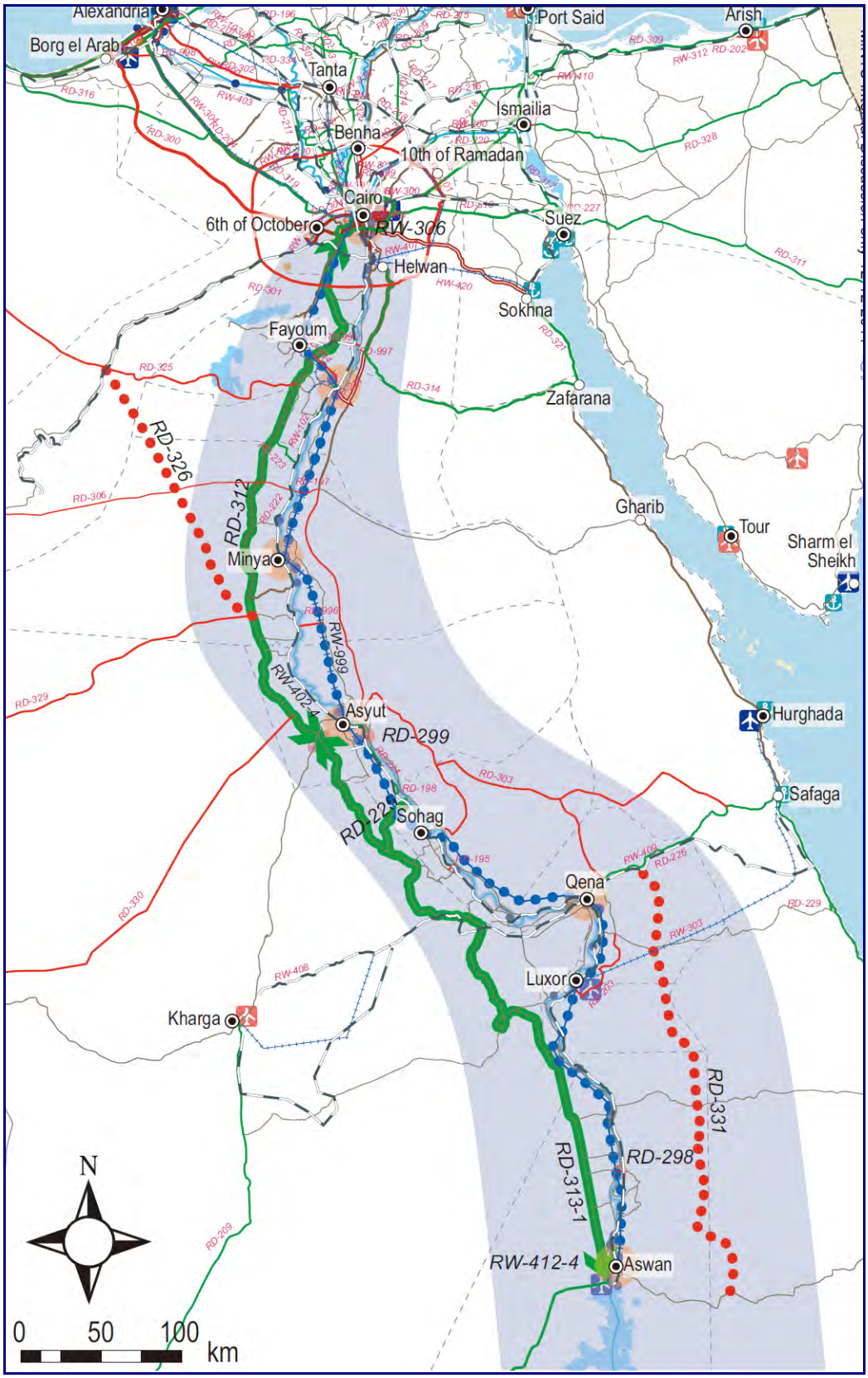
LEGEND

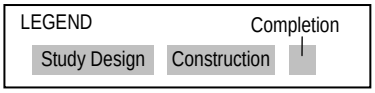
Completion

Study Design | Construction

ID	NAME	Master Plan		
		Short	Mid	Long
RD-321	El Ain El Sokhna - Zafarana Road			
RD-322	Safaga Baranis Halayeb Road			

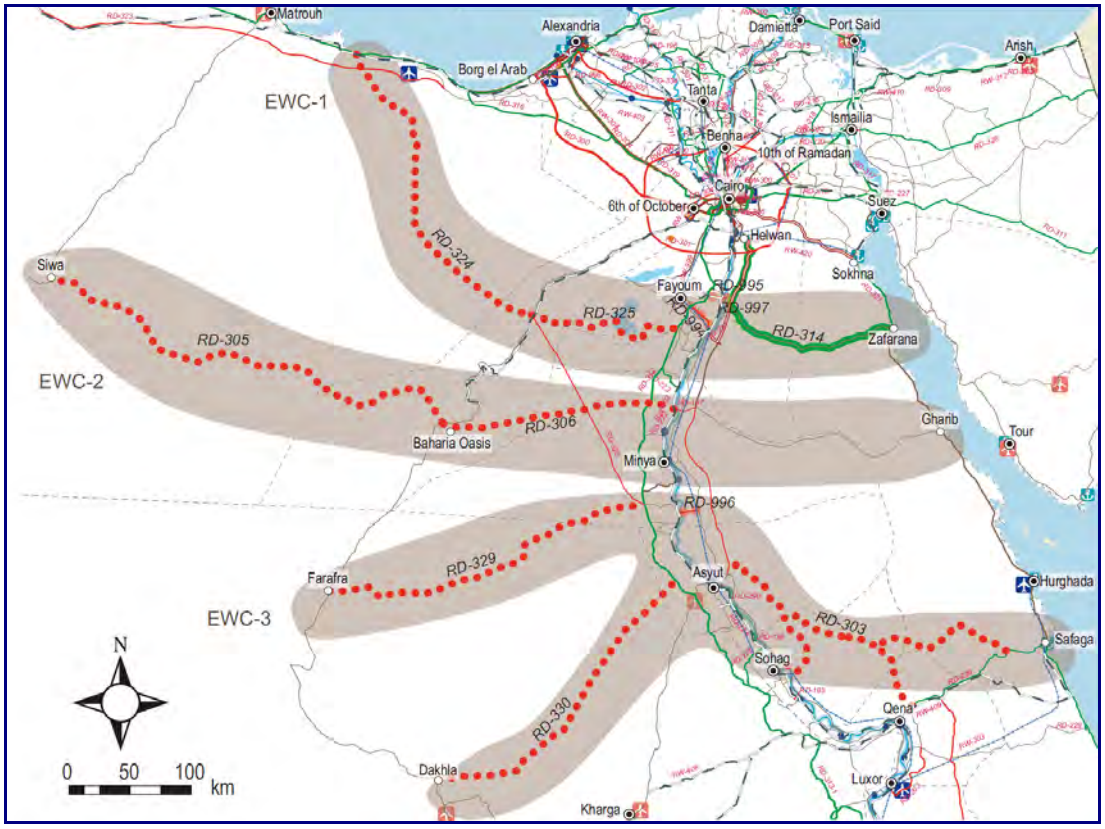
Master Plan for "Upper Egypt Corridor"

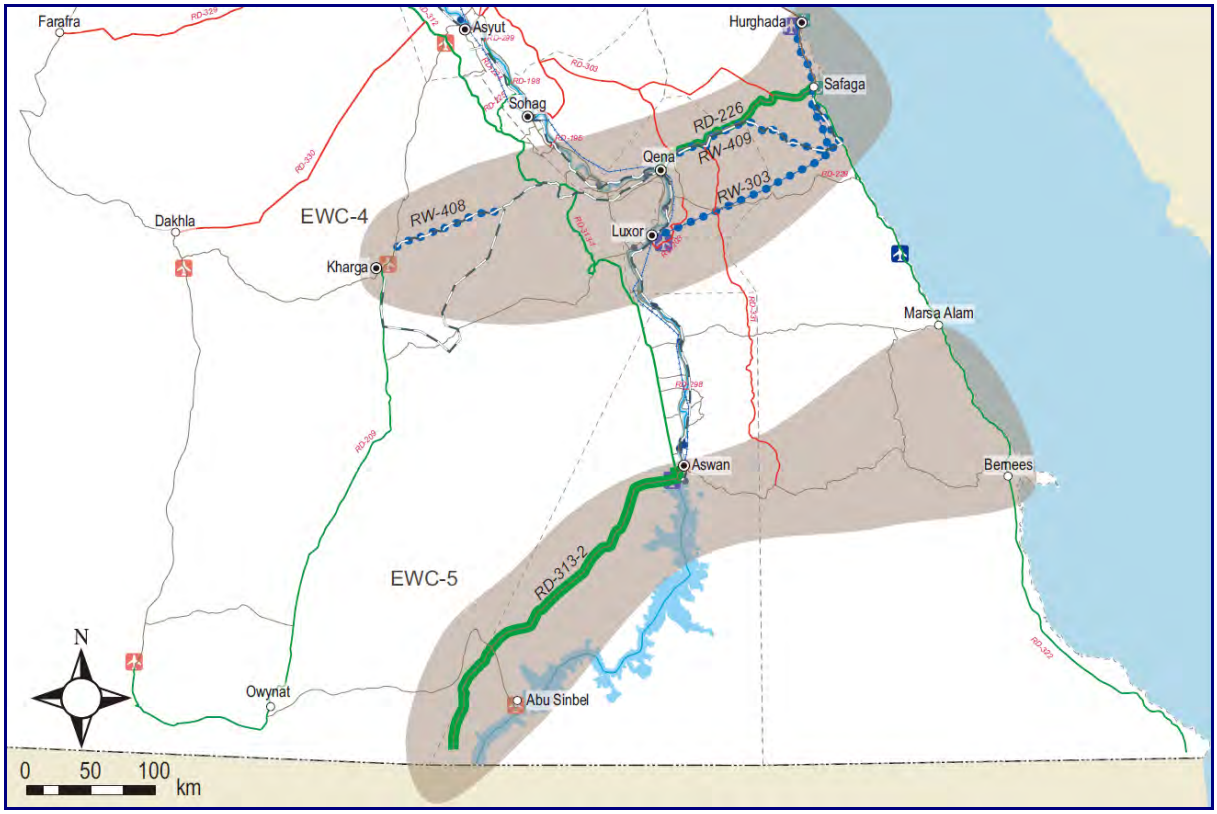


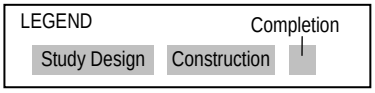


ID	NAME	Master Plan		
		Short	Mid	Long
RD-326	Albetrol Malwa Road			
RD-331	Qena Aswan Nile East Bank Road			
RD-312	Cairo - Asyut Desert Western Road (Expressway)			
RD-313-1	Asyut Aswan Abu simble Desert Western Road (Expressway) Asyut to Aswan			
RD-225	El-Belina - Tahta Road			
RD-298	Kalabsha Bridge (Koum Ombo) (Aswan)			
RD-299	Abo Tig Bridge and Selim Coast (Asyut)			
RW-999	High Speed Railway for Cairo - Aswan [Electrificated] Cairo – Asyut Asyut – Luxor Luxor - Aswan			
RW-306	Development of Railway Bridge for Lemon - Abbasiya - Tora			
RW-402-4	Improvement of Tracks			
RW-412-4	Improvement of Station Facilities for Freight Services (6 stations)			
IW-2	IWT port improvement for Upper Egypt			
IW-3	Lock Expansion with Comprehensive Lock Operation Improvement			
IW-4	Waterway Improvement on Cairo - Asyut			

Master Plan for "East-West Corridors"







East-West Corridor 1

ID	NAME	Master Plan		
		Short	Mid	Long
RD-324	Eldaba Albetrol Road			
RD-325	ALbetrol Beni Mazar Road			
RD-994	Fayoum-Beni Suef Bypass			
RD-995	Wasta Bridge Connection			
RD-997	Helwan-Beni Suef Bridge			
RD-314	Zafarana Elkoraymat Road (Expressway)			

East-West Corridor 2

RD-305	Bahriya Siwa Road			
RD-306	Bahriya Minya Road			

East-West Corridor 3

RD-996	Minya Bridge			
RD-303	Upper Egypt East Desert Red Sea Road			
RD-329	Farafra Malwa Road			
RD-330	El-Dakhla Assyuit Road			

East-West Corridor 4

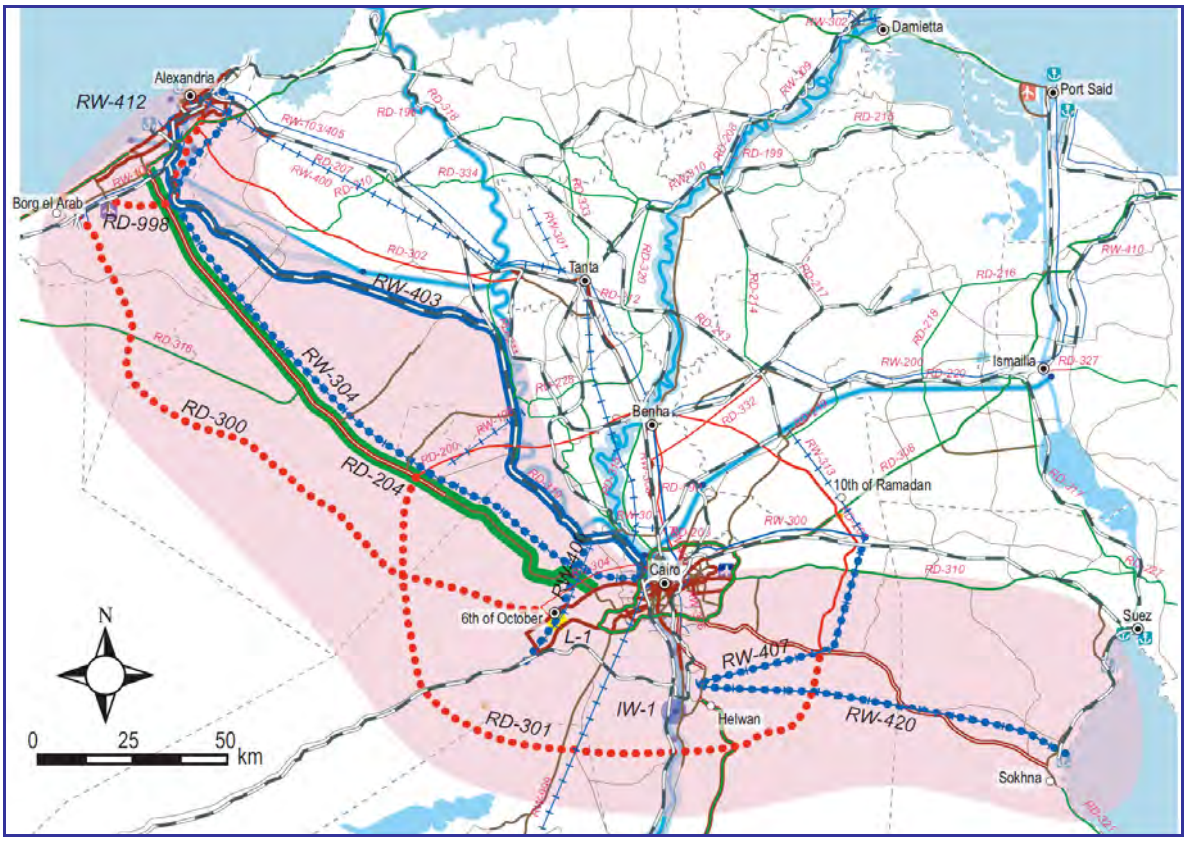
RD-226	Qena - Safaga Road			
RW-303	Single Tracking for Luxor - Hurghada [Electrificated]			
RW-409	Rehabilitation of Tracks for Qena - Safaga			
RW-408	Rehabilitation of Tracks for Qena - Kharga			

East-West Corridor 5

RD-313-2	Asyut Aswan Abu simble Desert Western Road (Expressway) South part from Aswan			

3. PROJECT OUTLINE BY CORRIDOR

Annex 1: Intermodal Transport Corridor



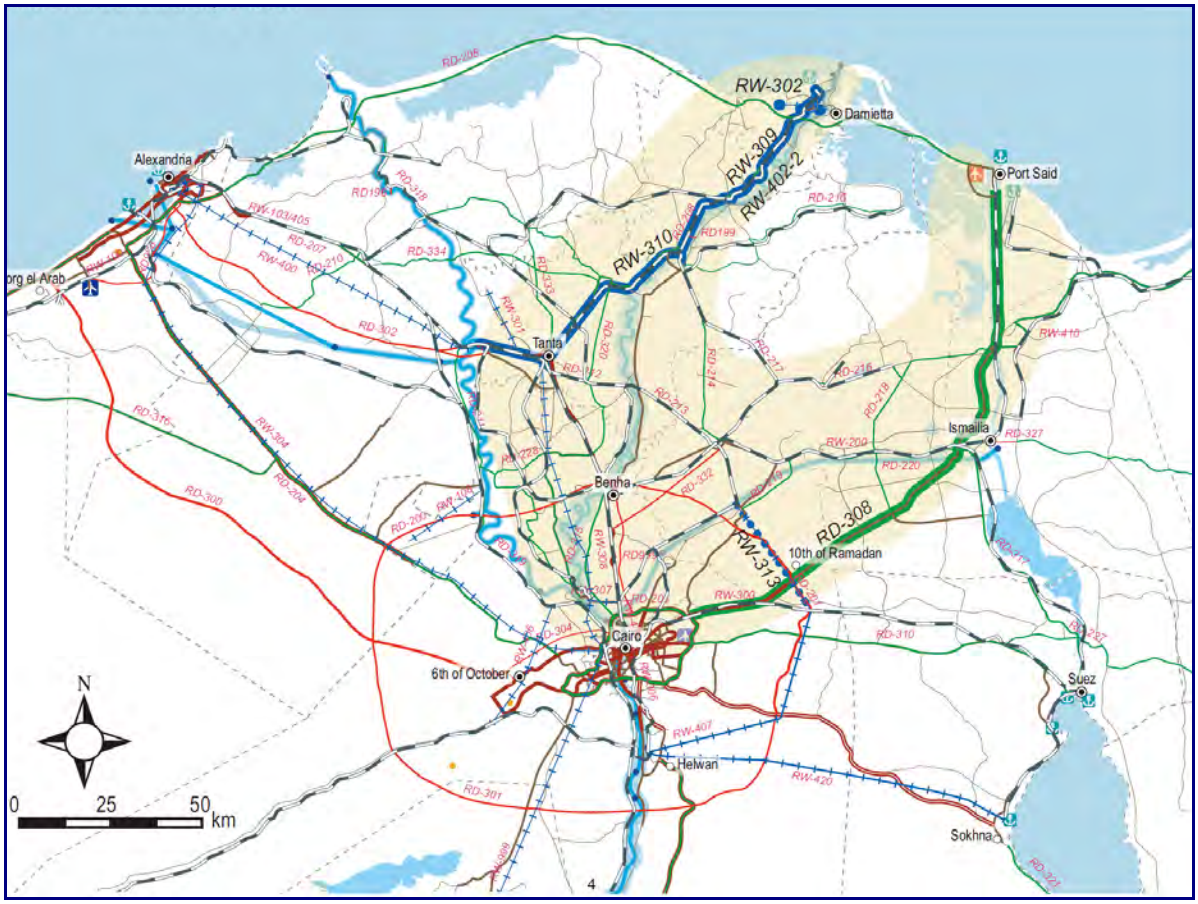
Corridor Project Listing

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-300	3rd Cairo Alex Expressway	connects from Cairo to Borg el Arab in desert area by 6-lanes, 120km/h [New Expressway]	2,608
RD-204	Cairo Alexandria Desert Expressway (Upgrade to 8-lanes)	Committed project is 6-lanes. upgraded to 8-lanes [Upgrade of Expressway]	1,775
RD-301	3rd Stage Regional Ring Road (Southern Part of Expressway)	forms southern part of Outer Ring Road, 6-lanes, 100km/h [New Expressway]	3,026
RD-998	Alexandria Bypass	forms urban ring road connects the Cairo-Alex desert expressway, 4-lanes, 80km/h [New Art. Road]	1,650
RW-403	Double Tracking of Bypass Line for Cairo - New Alexandria	for freight line (diesel) with local passenger	4,125
RW-406	Railway Link for 6th of October City	connects from RW-403 and Baharia line via L-1 [New Rail Line]	2,400
RW-407	Railway Link between Robeki to Helwan	forms a part of south ring railway route [New Rail Line]	2,100
RW-412	Improvement of Station Facilities for Freight Services (2stations)	Good intermodal connection & facilities, railway layout/arrangement, warehouse and station office at Qabbary and other station	1,025
RW-420	Railway Link between Sokhna Port to Helwan	New freight railway line for direct link from Sokhna port to 6th of October [New Rail Line]	3,750
RW-304	High Speed Railway for Cairo - Alexandria [High/Higher speed Alt-1]	connects to Alex. to Cairo (6th of October, Smart city) along Cairo - Alex. dessert road, directly, max.speed 250kph technology, [New HSR]	22,080
L-1	VAL (Value Added Logistics) Center at 6 th of October City	New VAL/ Distribution Center	1,000

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
IW-1	IWT port for ITC	connects to south ring railway route around Helwan, Tebbin port improvement, includes waterway, navigation and lock operation improvement.	1,000
IW-5	Waterway Improvement on Cairo - Alexandria	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 1.5m x203km).	500
PT-1	Establishment of a Multi Purpose Terminal (Containers and General Cargo) at Alexandria Port	to ensure the capacity of future container demand for Alex. and Dekheila, 1) The development of the berths area (55,56,57,58,59,60), 2) Dredging the berths to reach a depth of 14 m instead of 5,6,9,10m, 3) Using the soil resulting from the dredging operations in the establishment of the terminal's yards, 4) The lengths of the berths are expected to reach 1,630m, 5) The area = approx. 290 thousand m2, (proposed by previous JICA study in 1990)	1,500
PT-2	Development of Management and Operation for Multi Purpose Terminal in El Dekheila Port	to ensure future cargo demand in 2027 as an essential port for the window of Intermodal Transport Corridor to connect to railway and road with smooth and well organized, located between berth 91 and 92, A maritime dock composed of 2 berths with total length up to 800m and a depth not less than 14-15m, Storing yards, warehouses and administrative buildings over an area up to 262.370 thousand m2, Water surface of about 162 thousand m2, Breakwater project is under construction.	700
PT-3	Dekheira Port: New Container Terminal	to ensure future cargo demand in 2027 as a window of Intermodal Transport Corridor, to access to railway and road with smooth and well organized connection, Breakwater construction project is under implementation	1,500

Note: RD: Road, RW: Railway, L: Logistics, IW: Inland Waterway Transport, PT, Sea Port

Annex 2: Cairo-Damietta/Port Said Corridor

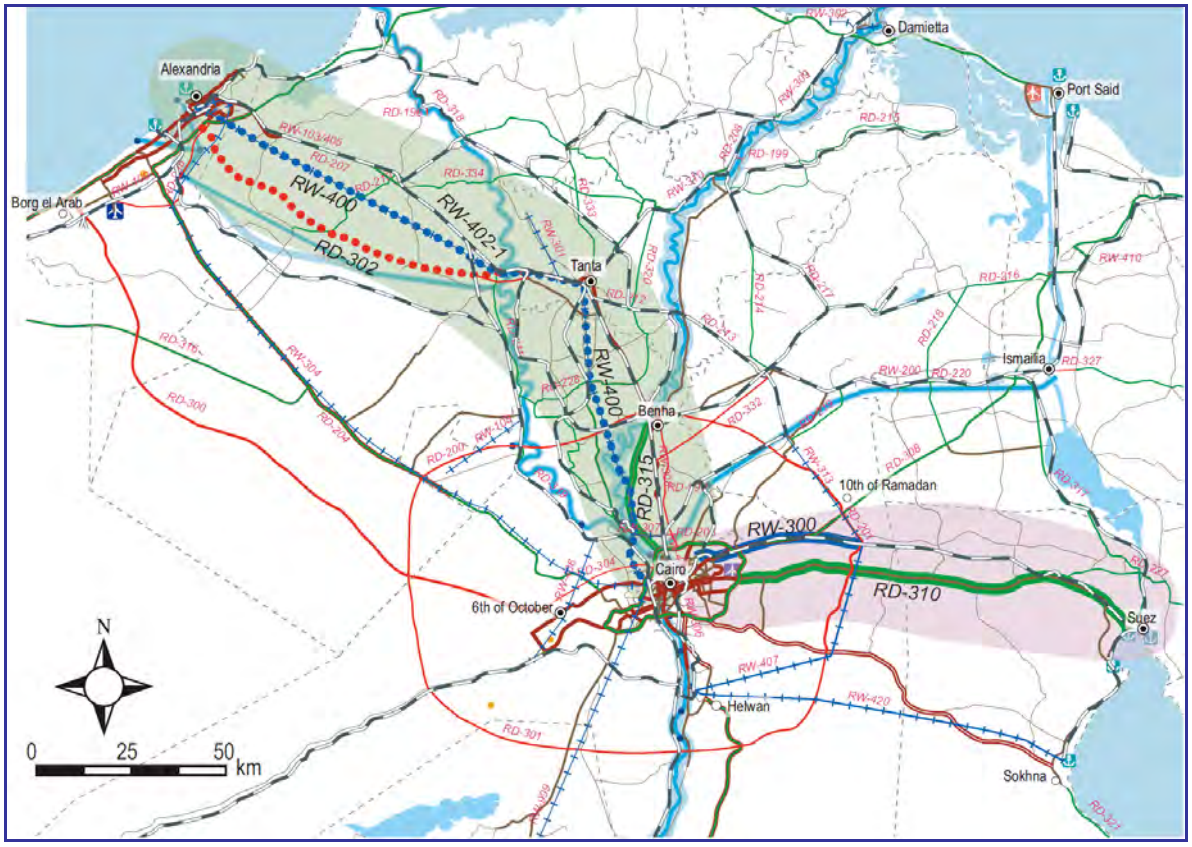


Corridor Project Listing

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-308	Cairo Ismailia Port Said Road (Expressway)	connects from ring road to Port Said, 6-lanes, 100km/h [Upgrade to Expressway]	3,125
RW-313	Railway Link for 10th of Ramadhan City	connects between Tel el Kebir to Robeki through Logistics Center [New Rail Line]	2,295
RW-302	Single Tracking for Kafr El-Batikh - New Damietta City	Damietta City only [New Rail Line]	105
RW-309	Double Tracking for Mansoura - Damietta	connects to Damietta [Double Tracking]	625
RW-310	Improvement of Signaling System for Increase of Freight Trains	connects for Tanta - Mansoura - Damietta [Signal Improvement]	875
RW-402-2	Improvement of Tracks	1)Track renewal, 2) New track maintenance machines, Damietta, Port Said line	922
IW-6	Waterway Improvement on Cairo - Damietta	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 2m x200km).	600
PT-4	Damietta Port; Study on Sedimentation problem	detailed study (10mil.LE) is required to find suitable solution to sedimentation problem. Note that Damietta port authority used about 75mil.LE for annual maintenance for dredging.	1,000
PT-5	Port Said East: Logistic Center	exist the plan by 1st Stage in 2008, for bonded area and distribution center for import/export cargo	1,500

Note: RD: Road, RW: Railway, IW: Inland Waterway Transport, PT, Sea Port

Annex 3: Cairo-Alexandria Corridor and Cairo-Suez Corridor



Project Listing: Cairo-Alexandria Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-302	Cairo Alex Agriculture Bypass Kafr El Zayat - Alexandria	bypass road for Tanta to Alex. in south side of agricultural road in 6-lanes [New Art. Road]	1,759
RD-315	Shubra elkhema - Banha Agriculture Road (Expressway)	bypass road for Cairo to Benha in west side, 6-lanes, 100km/h [Upgrade to Expressway]	2,500
RW-400	High Speed Railway for Cairo - Alexandria via Tanta [High/Higher speed Alt-2]	Alternative route of Italian proposal [RW-304 Alt-1], max. speed 250kph technology <only for confirming demands compared with RW-304> [New HSR]	36,000
RW-402-1	Improvement of Tracks	1)Track renewal, 2)New track maintenance machines, Cairo - Tanta - Alex.	627

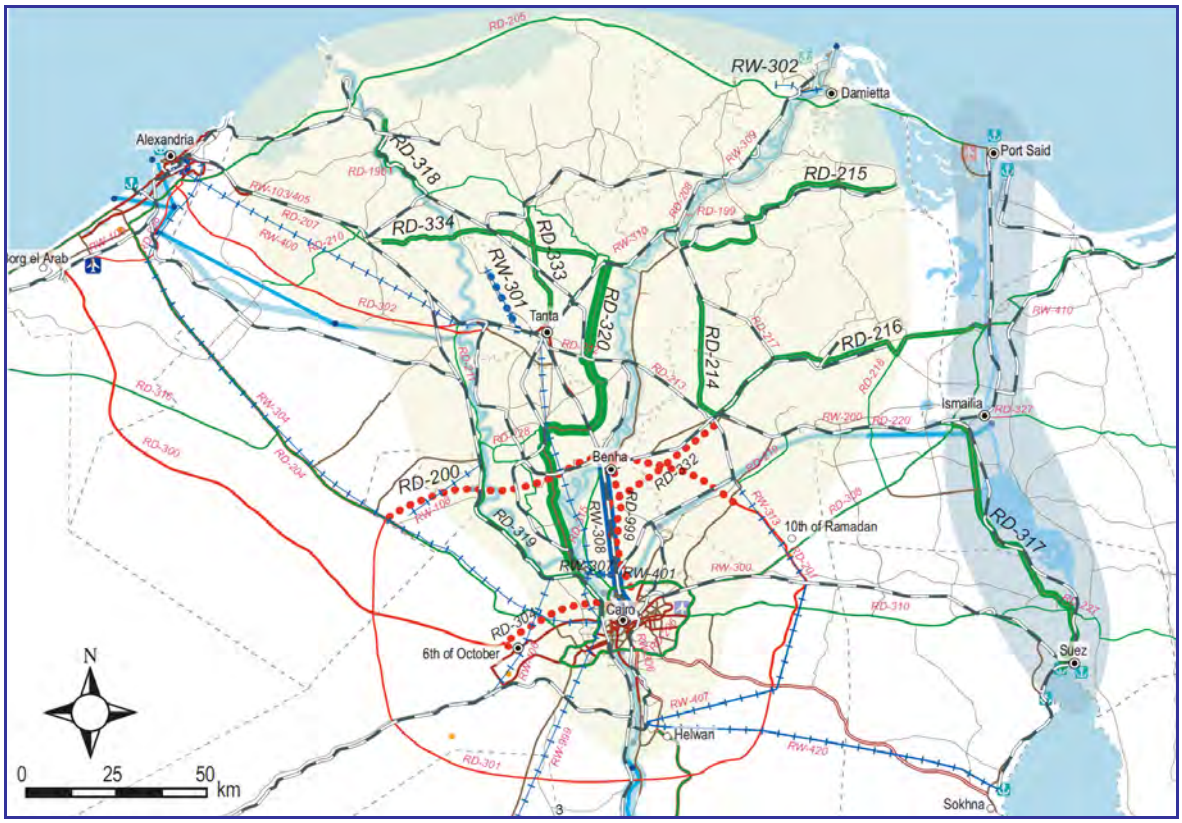
Note: RD: Road, RW: Railway

Project Listing: Cairo-Suez Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-310	Cairo -Suez Road (Expressway)	connects form ring road to Suez, 6-lanes, 100km/h [Upgrade to Expressway]	2,500
RW-300	Double Tracking for Ain Shams - Robeki	from Cairo - Robekki along Cairo - Suez line [Double Tracking]	625

Note: RD: Road, RW: Railway

Annex 4: Inland Delta and Suez Canal Development Corridor



Project Listing: Inland Delta Corridors

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-999	Cairo - Tanta Bypass	bypass road for Cairo to Tanta in east side, 4-lanes, 80km/h [New Art. Road]	2,500
RD-332	Zakaziq - Toukh	bypass road for Benha to Zagazik in south side, 4-lanes, 80km/h [New Art. Road]	420
RD-304	Rod El Farag Road	connects from Cairo city to 6th of October, 6-lanes, 80km/h [New Art. Road]	1,455
RD-333	Tanta - Kafr El Sheikh	forms regional road for north bound from Tanta, 4-lanes, 80km/h [Widening]	238
RD-334	Al Mahalla - Kafr El Sheikh - Damanhour	connects regional road located on the north side of Tanta, 4-lanes, 80km/h [Widening]	452
RD-318	Desouq Fowa Metobas Road	located along Nile river right side near Alex., 4-lanes, 80km/h [Widening]	250
RD-319	Imbaba Qalyub Tawfekia Road	located along Nile river left side from Cairo, 4-lanes, 80km/h [Widening]	625
RD-320	El-Qanater El-Bagour Shebin El-Koum Tanta Mahalla Matboul Road	In parallel to Cairo - Tanta agricultural road, 4-lanes, 80km/h [Widening]	688
RD-200	Belbeis-Banha-El Bagour-El Khatatba Regional Ring Road	forms Northern part of Outer Ring Road, also the role of Mediterranean Corridor, 6-lanes, 100km/h [New Expressway]	4,375
RD-214	Zaqaziq Sinbellaween Road	under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]	550
RD-215	Mansoura Talha Dekernes Mataria Road	under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]	900
RD-216	Qantara Salheya Faqous Abu Kbeir Hehya Zaqaziq Road	under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]	650

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RW-301	Single Tracking for Basion City	not in main line between Cairo - Alex. [New Rail Line]	300
RW-307	Double Tracking for Qalyoub - El Qnater	not in main line between Cairo - Alex. [Double Tracking]	125
RW-308	Triple Tracking for Qalyoub - Benha	connects Cairo - Qalyoub with triple tracks [Triple Tracking]	500
RW-401	Improvement of Track Arrangement for Cairo - Qalyub	Cairo and Qalyub Station: Rearrangement of track lines, Qalyub Station: Construction of elevated railway, [Track Improvement]	900

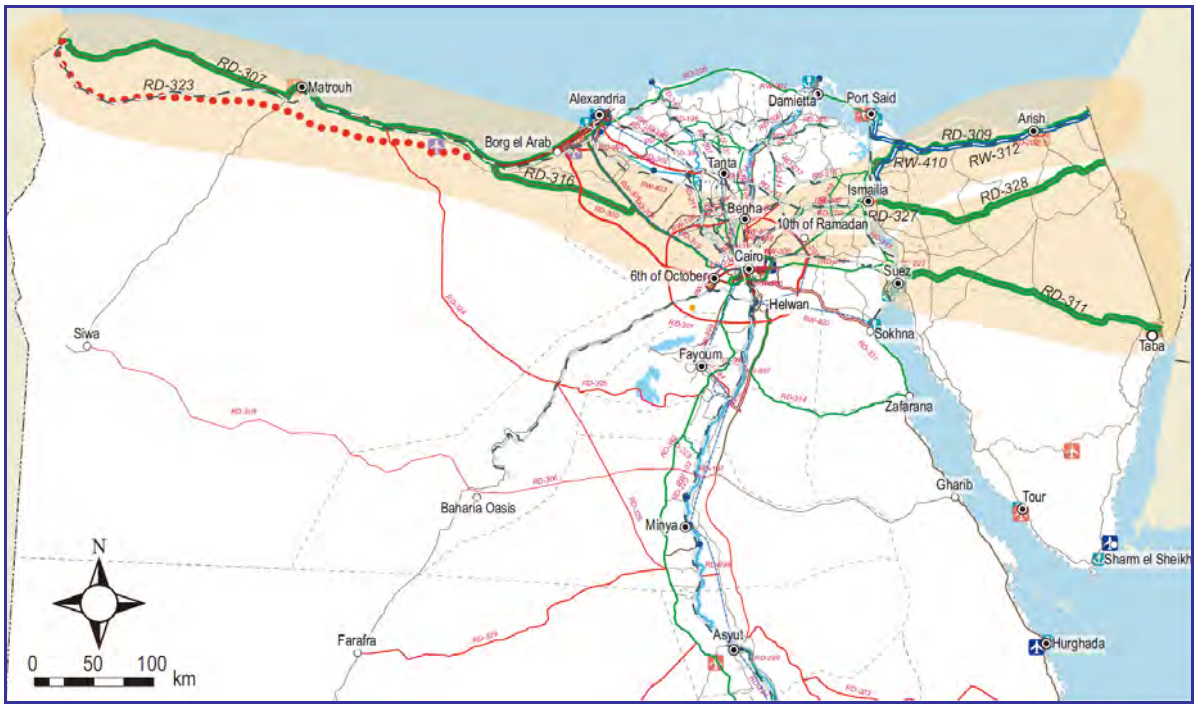
Note: RD: Road, RW: Railway

Project Listing: Suez Canal Development Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-317	Ismailia Suez Road (Expressway)	connects from Suez to Ismailia at west side of Suez canal, 6-lanes, 100km/h, connects to RD-308 (upgrade to Expressway from Ismailia to Port Said) [Upgrade to Expressway] Note: Railway projects related this corridor are RW-200 (west side, signal improvement (on-going) and RW-410 (east side, railway rehabilitation)	1,001

Note: RD: Road

Annex 5: Mediterranean Corridor and Sinai Corridor



Project Listing: Mediterranean Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-323	Wadi Alnatroum Saloum Road	connects to Libya, in parallel to RD-307 in desert area, 4-lanes, 80km/h [New Art. Road]	3,599
RD-307	Alexandria-Saloum Road	connects to Libya along coastline, 4-lanes, 100km/h [Upgrade to Expressway]	4,104
RD-309	Qantara-Rafah Road	connects to Rafah along coast line, 6-lane, 100kmh [Upgrade to Expressway]	2,147
RD-316	Alamein Road	forms shortcut route from Cairo-Alex. Desert Road to Western Mediterranean Coast Roads, 4-lanes, 80km/h [Upgrade of Art. Road]	855
RW-312	Single Tracking for Bir El Abd - Rafah	connects to Rafah along coast line [New Rail Line]	1,200
RW-410	Rehabilitation of Tracks for El-Kab - Bir El Abd	connects to Suez bridge, Port Said East and RW-312 [Track Improvement]	2,000

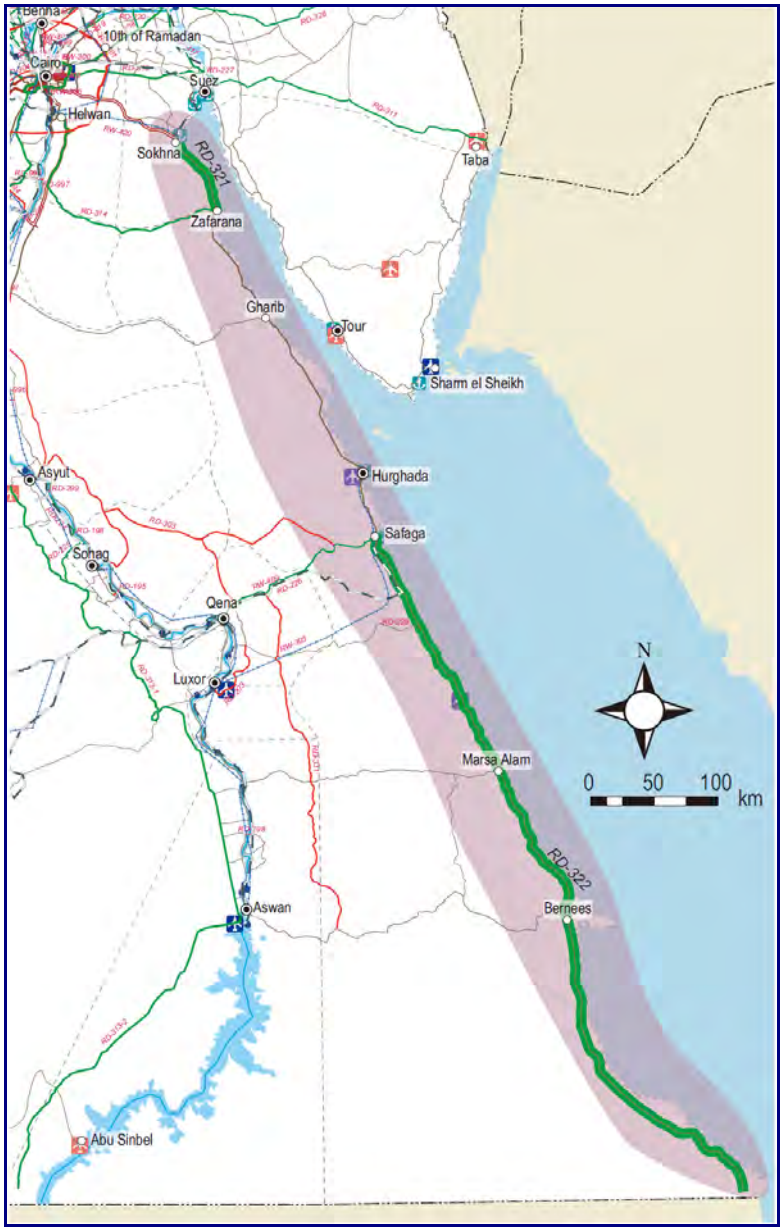
Note: RD: Road, RW: Railway

Project Listing: Sinai Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-311	Suez Ras elnakab Road (Expressway)	connects from Suez to Taba border, 4-lanes, 100km/h [Upgrade to Expressway]	2,276
RD-327	Suez Canal Tunnel Ismailia	New tunnel at Suez Canal to connect RD-328, 4-lanes, 80km/h [New Tunnel]	1,163
RD-328	Alawga Ismailia Road	connects from Ismailia to Alawaga border, 4-lanes, 80km/h [Widening]	1,342

Note: RD: Road

Annex 6: Red Sea Corridor

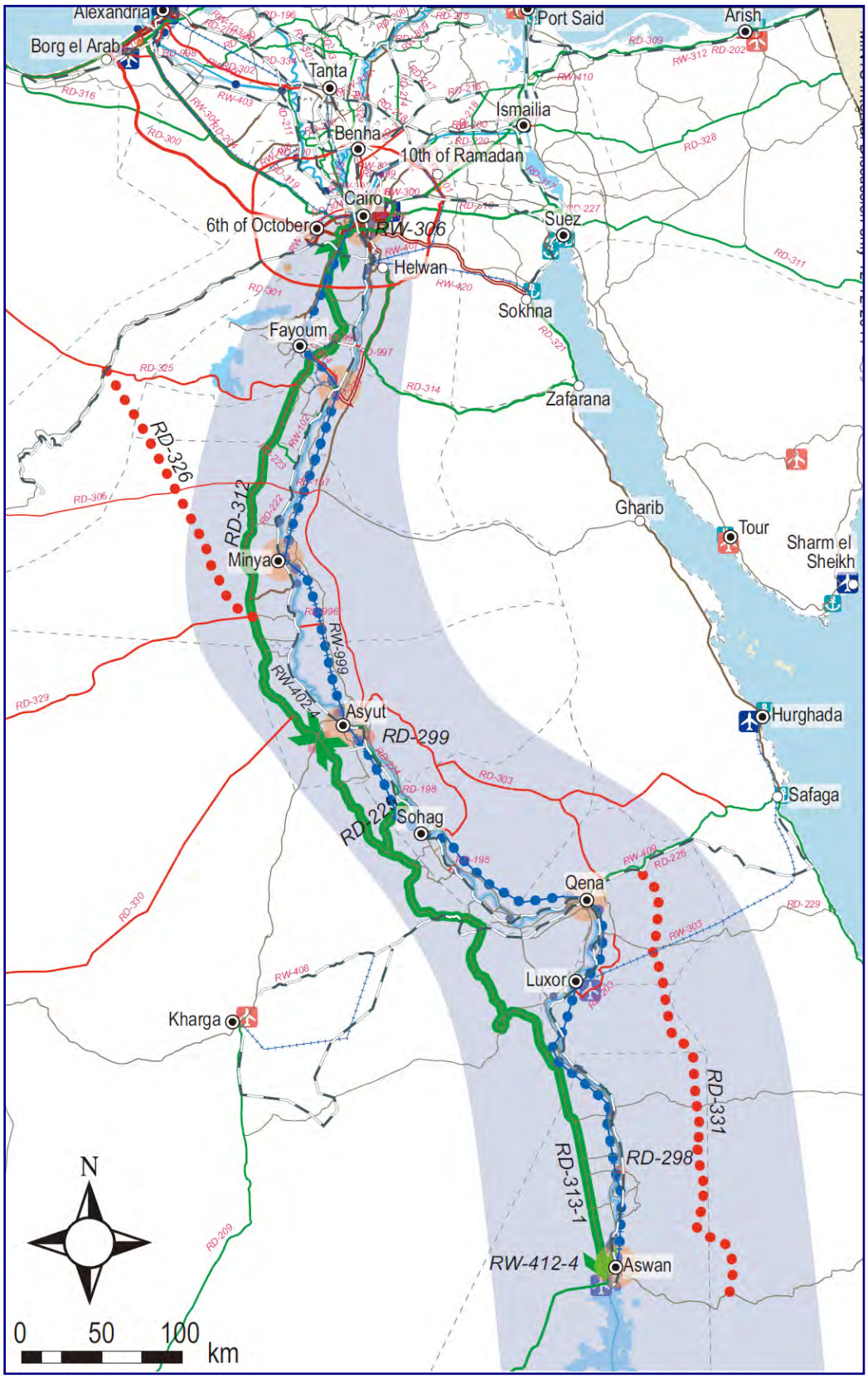


Project Listing: Red Sea Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-321	El Ain El Sokhna - Zafarana Road	Northern side of Red Sea coastline, 4-lanes, 80km/h [Widening]	341
RD-322	Safaga Baranis Halayeb Road	Southern side of Read Sea coastline, 4-lanes, 80km/h [Widening]	3,281

Note: RD: Road

Annex 7: Upper Egypt Corridor

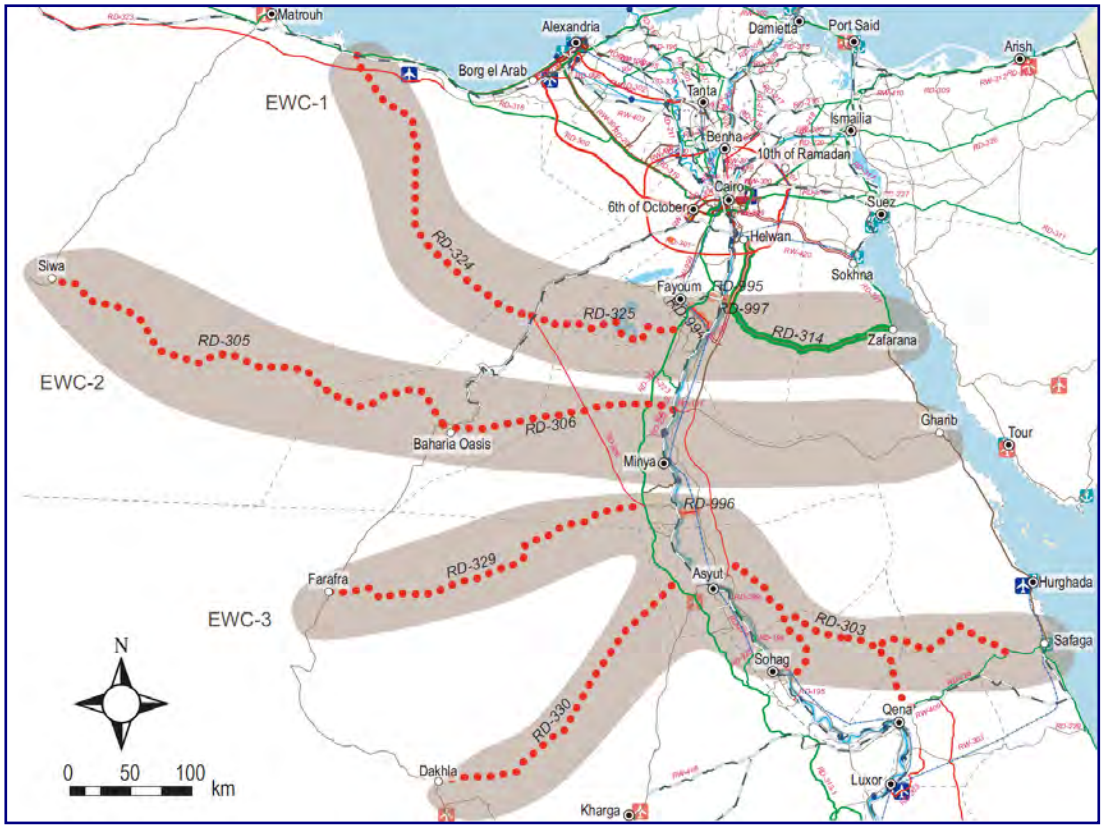


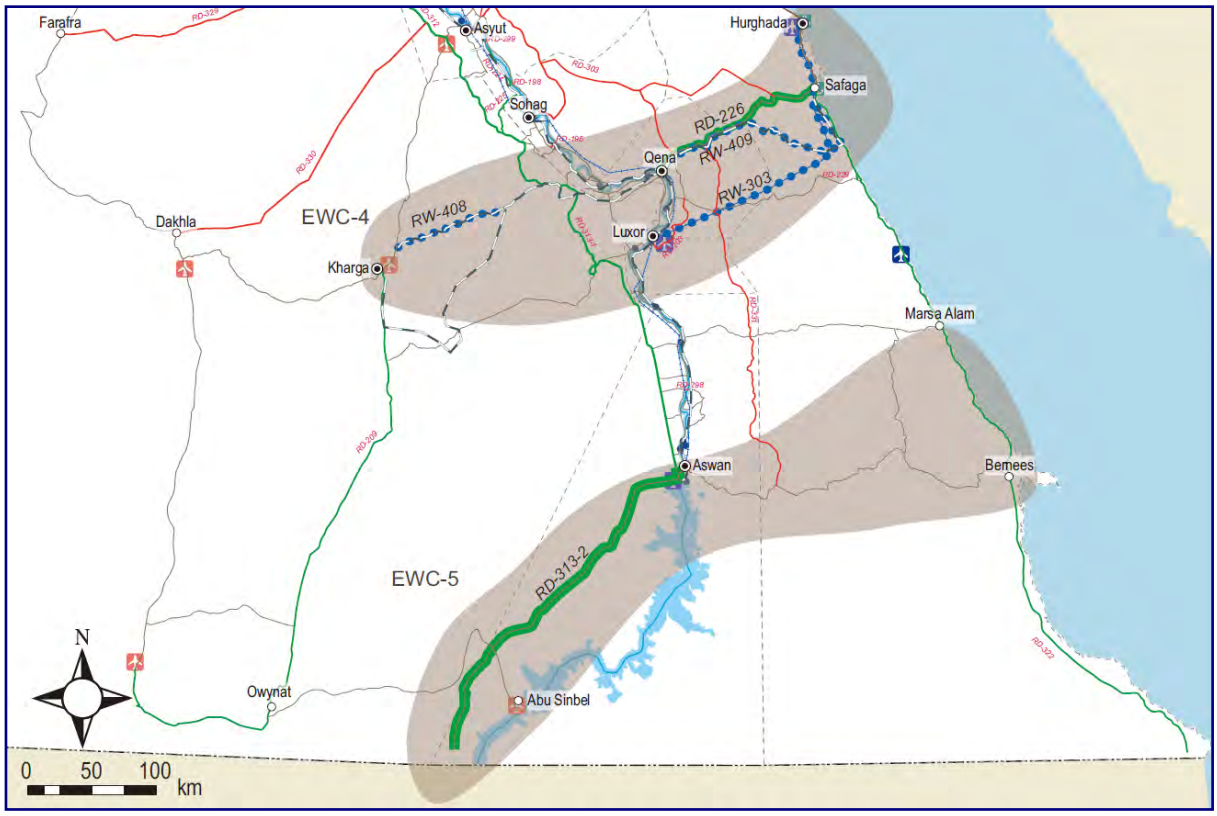
Project Listing: Upper Egypt Corridor

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-326	Albetrol Malwa Road	forms shortcut route from Borg el Arab to Asyut, 4-lanes, 80km/h [New Art. Road]	1,600
RD-331	Qena Aswan Nile East Bank Road	runs to the east side of Nile river in desert, 4-lanes, 80km/h [New Art. Road]	2,844
RD-312	Cairo - Asyut Desert Western Road (Expressway)	runs to the west side of Nile river in desert, 6-lanes, 100km/h [Upgrade to Expressway]	3,702
RD-313-1	Asyut Aswan Abu simble Desert Western Road (Expressway) Asyut to Aswan	connects from RW-312 in desert, 6-lanes, 100kh/h [Upgrade to Expressway]	4,634
RD-225	El-Belina - Tahta Road	connects from RD-312 to west agricultural road, under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]	250
RD-298	Kalabsha Bridge (Koum Ombo) (Aswan)	connects to both side of Nile river [New Bridge]	625
RD-299	Abo Tig Bridge and Selim Coast (Asyut)	connects to both side of Nile river [New Bridge]	344
RW-999	(High) Speed Railway for Cairo - Aswan [Electrificated]	New line for passenger railway (200kph) stopping at only major cities [New HSR]	139,500
RW-306	Development of Railway Bridge for Lemon - Abbasiya - Tora	runs in southern area of grater Cairo region [Track Improvement]	125
RW-402-4	Improvement of Tracks	1) Track renewal, 2) New track maintenance machines on Cairo - Aswan	2,139
RW-412-4	Improvement of Station Facilities for Freight Services (6 stations)	Good intermodal connection & facilities, railway layout/arrangement, warehouse and station office at stations of Imbaba, Beni Suef, Minya, Asyut, Qena and Aswan	2,813
IW-2	IWT port improvement for Upper Egypt	connects roads/ railway smoothly, Asyut and Quena ports port improvement, includes waterway, navigation and lock operation improvement.	1,000
IW-3	Lock Expansion with Comprehensive Lock Operation Improvement	upgrades the present capacity of Asyut Barrage Lock by expansion and improves operation of other locks.	290
IW-4	Waterway Improvement on Cairo - Asyut	aims to dredging for safe navigability preventing from sedimentation (width 40m x dredging depth 2m x200km).	650

Note: RD: Road, RW: Railway, L: Logistics, IW: Inland Waterway Transport

Annex 8: East-West Corridors





Project Listing: East-West Corridor 1

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-324	Eldaba Albetrol Road	connects from Fayoum to Mediterranean sea, 4-lanes, 80km/h [New Art. Road]	2,492
RD-325	ALbetrol Beni Mazar Road	connects RD-324 to Fayoum, 4-lanes, 80km/h [New Art. Road]	1,189
RD-994	Fayoum-Beni Suef Bypass	connects from Fayoum to Nile east side, 4-lanes, 80km/h [New Art. Road]	220
RD-995	Wasta Bridge Connection	connects from Fayoum to Nile east side, 2-lanes, 80km/h [New Art. Road]	114
RD-997	Helwan-Beni Suef Bridge	connects from Fayoum to Nile east side, 4-lanes, 80km/h [New Bridge]	306
RD-314	Zafarana Elkoraymat Road (Expressway)	creates expressway connection from Fayoum, Helwan to Red Sea (Zafarana), 6-lanes, 100km/h [Upgrade to Expressway]	2,264

Project Listing: East-West Corridor 2

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-305	Bahriya Siwa Road	connects from Siwa to Nile river for west section, 2-lanes, 80km/h [New Art. Road]	2,324
RD-306	Bahriya Minya Road	connects from Siwa to Nile river for east section, 2-lanes, 80km/h [New Art. Road]	1,295

Project Listing: East-West Corridor 3

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-996	Minya Bridge	cross the Nile river [New Bridge]	388
RD-303	Upper Egypt East Desert Red Sea Road	connects from Asyut to Red Sea (Safaga), 4-lanes, 80km/h [New Art. Road]	5,009
RD-329	Farafra Malwa Road	connects from Farafra to Nile river, 4-lanes, 80km/h [New Art. Road]	2,675
RD-330	El-Dakhla Assyuit Road	connects from Dakhla to Nile river, 4-lanes, 80km/h [New Art. Road]	2,504

Project Listing: East-West Corridor 4

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-226	Qena - Safaga Road	connects from Qena to Safaga for under GARBLT 5 year plan (2007-2012), 4-lanes, 80km/h [Widening]	750
RW-303	Single Tracking for Luxor - Hurghada [Electrificated]	for tourists from Hurghada to Luxor to save travel time, max.150kph, [New Rail Line]	5,400
RW-409	Rehabilitation of Tracks for Qena - Safaga	for local passenger and cargo traffic connected to red sea and Quena and Luxur [Rehabilitation]	2,375
RW-408	Rehabilitation of Tracks for Qena - Kharga	for passenger, even the paralleled cargo line from Kharga to Qena are existed [Track Improvement]	2,875

Project Listing: East-West Corridor 5

ID	NAME	PROJECT OUTLINE	PROJECT COST (mil. LE)
RD-313-2	Asyut Aswan Abu simble Desert Western Road (Expressway) South part from Aswan	connects from Aswan to Abou Sembel, RW-313-1 in desert, 6-lanes, 100kh/h [Upgrade to Expressway]	3,073

Note: RD: Road, RW: Railway

4. CORRIDOR RANKING

Corridor Name	Average Rank	Corridor Rank
Intermodal Transport	13.0	1
Cairo - Alexandria	24.5	2
Mediterranean	37.8	3
Cairo - Suez	39.5	4
Cairo – Damietta/Port Said	41.7	5
Red Sea	46.0	6
Suez Canal Development	46.3	7
Inland Delta	48.3	8
Upper Egypt	51.8	9
Sinai	54.0	10
East - West	69.0	11

Source: JICA Study Team

Note: Corridor rankings do not mean all projects inclusive of one corridor to be more important than those of other corridor but they only show relative importance among the recommended eleven corridors.

Relationship Matrix between Project to Corridor

		ITC	Cairo - Alex.	Inland Delta	Cairo-Damietta/ Port Said	Cairo - Suez	Mediterranean	Sinai	Upper Egypt	Red Sea	East - West	Suez Canal Development
	Project-ID	1	2	3	4	5	6	7	8	9	10	11
ITC	RD-300	1	2				6					
	RD-204	1	2				6					
	RD-301	1					6					
	RD-998	1	2									
	RW-403	1	2									
	RW-406	1	2									
	RW-407	1										
	RW-412	1										
	RW-420	1										
	L-1	1										
	IW-1	1										
	RW-304	1	2									
	IW-5											
	PT-1											
	PT-2											
	PT-3											
Cairo - Alex.	RD-302		2									
	RD-315		2									
	RW-400		2									
	RW-402-1		2									
Inland Delta	RD-999			3								

		ITC	Cairo - Alex.	Inland Delta	Cairo-Damietta/ Port Said	Cairo - Suez	Mediterranean	Sinai	Upper Egypt	Red Sea	East - West	Suez Canal Development
	Project-ID	1	2	3	4	5	6	7	8	9	10	11
	RD-332			3								
	RD-304			3								
	RD-333			3								
	RD-334			3								
	RD-318			3								
	RD-319			3								
	RD-320			3								
	RD-200			3			6					
	RD-214			3								
	RD-215			3								
	RD-216			3								
	RW-301			3								
	RW-307			3								
	RW-308			3								11
	RW-401			3								
Cairo-Damietta/Port Said	RD-308				4		6					
	RW-313				4							
	RW-302				4							
	RW-309				4							
	RW-310				4							
	RW-402-2				4							
	IW-6											
	PT-4											
	PT-5											
Cairo - Suez	RD-310					5						
	RW-300					5						
Mediterranean	RD-323						6					
	RD-307						6					
	RD-309						6					
	RD-316						6					
	RW-312						6					
	RW-410						6					11
Sinai	RD-311							7				
	RD-327							7				11
	RD-328							7				
Upper Egypt	RD-326								8			
	RD-331								8			
	RD-312								8			
	RD-313-1								8			
	RD-225								8		10	
	RD-298								8			
	RD-299								8			
	RW-999								8			
	RW-306								8			
	RW-402-4								8			
	RW-412-4								8			
	IW-2								8			
	IW-3											
	IW-4											
Red Sea	RD-321									9		
	RD-322									9		
East - West	RD-324										10	
	RD-325										10	

		ITC	Cairo - Alex.	Inland Delta	Cairo-Damietta/ Port Said	Cairo - Suez	Mediterranean	Sinai	Upper Egypt	Red Sea	East - West	Suez Canal Development
	Project-ID	1	2	3	4	5	6	7	8	9	10	11
	RD-994										10	
	RD-995										10	
	RD-997										10	
	RD-314										10	
	RD-305										10	
	RD-306										10	
	RD-996										10	
	RD-303										10	
	RD-329										10	
	RD-330										10	
	RD-226										10	
	RW-303										10	
	RW-409										10	
	RW-408										10	
	RD-313-2										10	
Suez Canal Development	RD-317											11