

TRANSPORTATION EDUCATION WITH SPECIAL REGARD TO GLOBAL ECONOMIC PROSPECTS

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1. OVERVIEW AND RESEARCH METHODOLOGY

The overall aim of this paper is to review first the connection between the transport infrastructure development and the development of the economy. Secondly we try to analyse the connection between the elements of policy-making apparatus in the context of setting proper transport and logistics networks to turn the investments into a scheme of positive effects on the development of regions of a country. The success of the implementation of these policies is heavily dependent on the research capability of the country which, in turn, depends on the educational and training framework. This final argument is our basic tenet throughout this paper.

We aim here institutional and organisational education and training framework providing a research potential in supporting the formulation of the proper transport & logistics policies. During the research process of this paper three complementary methodologies were used. First and foremost we assume that transport is closely interrelated with the rest of the economy which in turn tied up with the developments in the rest of the world at a global scale.

Secondly we assume that as technological developments gain a certain momentum, they affect the organisational structure of the society in such a way that the so-called knowledge society has to be taken as a strong point of reference in all aspects of any study on transport activities as it has been so in the other sectors of the economy and it has to be considered especially at an interdisciplinary context.

Thirdly we also assume that a principal element in analysing the interrelationships between the variables of the economy in a setting where transport and logistics networks play a vital role is the education (and training to a certain extent) vector. Therefore, we put a special emphasis on the role of education in the design and implementation of education policies (in transport and logistics) in our study.

Following this structure, Section 3 provides a brief overview of the present global economic developments in the world economy with a perspective of technological developments forming the main element of relevant structural changes. As research is the main tool of analysing the interaction between technology and structural change, knowledge society is taken as the main stage of the scenario. Research methodology here is based on a qualitative analysis.

Section 4 takes the functioning of the transport and logistics networks in an interactive format and the relationship between transport growth and economic development, respectively. Again, the methodology adopted here is a qualitative approach.

The quantitative analysis applied in this paper is in Section 5 where the impact of transport expansion is attempted to be measured on a regional scale. The drawback here is in the lack of statistical data to carry the analysis on a national scale as a reason of setting the measurement process for selected regions.

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Section 6 focuses attention on the repercussions of the availability or absence of a competent research potential of countries in the context of design and employment of relevant transport and logistics policies. The main theme of the whole paper is dependent on this vector: Research capability of any country to prepare the ground for properly designed policy content and its proper implementation. Here lies the core of our endeavour to write this paper: without a contemporary institutional infrastructure to bring up that manpower, the research apparatus will always be the missing element. This infrastructure is the educational setup in the fields of transport and logistics. The success of a competent manpower (in research) to carry out these tasks properly is heavily dependent on the availability of a well-developed and well-functioning educational setup.

To say just one final word about the main methodological approach of this paper, let us make it clear that we will try to focus our attention mostly on the developing world where neither the level of transportation and logistics networks setup nor the research and educational - training basis are capable to match those of their developed counterparts.

2. LITERATURE REVIEW

Transport as well as logistics has always been the primary activities the humanity has been concerned – though in the case of logistics not so explicitly as of the present. While unprecedented innovations in transportation were taking place following the industrial revolution in the 19th century onwards, none of them like steamboats and railways, and automobiles and aeroplanes, have been the products of the formal educational systems, but have been created by the imaginative entrepreneurs. However nearly 200 years after these developments, the sector which accommodates the basic means of transport and its full-time partner logistics are intermingled with the global economic system to such an extent that it is impossible to either analyse or to design and implement policies to bring solutions to them. With the general approach of the past to transport issues it is apparently impossible to tackle the contemporary problems of environment, urbanisation, traffic jams and the extent of public spending, and others.

Then the importance of education as such at the beginning and multi-disciplinary education in particular later sat high on the agenda of transportation analysis. The literature of the subject area followed the suit. Until the last quarter of the 20th century transportation education has been based exclusively on engineering sciences. Then, as the global economic developments of our time began to take their present shape, it gradually transformed into its contemporary multi-disciplinary format.

The problem here is closely related to the level of development of the countries. As in every field and as always, the rich developed nations pay the required attention to education issues and for the most part it is not a problem to review the literature on the subject of transport education for these countries. On the other hand, for the developing nations the present outlook is not promising – in terms of research efforts to challenge the developmental problems faced. We have been intending to concentrate on the developing side to analyse the relations reflected in the title of this paper. But we faced the problem of finding relevant literature for this part of the globe. However this made us more convinced to say that the loophole here is, though seems paradoxical, the issue of education itself. Without it neither there can be any hope from the knowledge-producing side, the developed, can ever offer any work for the underdog, nor the developing can produce something for themselves as there could not be the potential to do that.

Therefore we believe that this paper should be deemed as a sort of call for further studies to be followed to fill the vacuum / gap existing between the developed and developing sides. In other words, although we are aware that this paper is away from meeting the requirements of the challenge its title aims, we decided to conclude it with the hope of triggering a discussion.

3. GLOBAL ECONOMIC DEVELOPMENTS OF OUR TIME

Although the very term “globalisation” has been and is being popularly used in our times it is not a fact of the present day only. It has been widely used to describe the increasing internationalisation of financial markets and of markets for goods and services. Globalisation refers above all to a dynamic and multidimensional process of economic integration whereby national resources become more and more internationally mobile while national economies become increasingly interdependent. However, some people trace the globalisation movement so back into history as old as that of the beginning of present day capitalism – 16th century. The movement of our time is nevertheless different from that of the past in some significant regards.

a. World Economy

i. Globalisation and Trade

The very concept and process of globalisation is not new in its context. The difference is between the globalisation process of the present and those of the past. Although the trade and technology dimensions have always been there in its relative sense, trade liberalisation and ICT (Information and Communication Technology) have never reached their contemporary levels in the past. In this sense to join the globalisation process today is open to all from the point of market liberalisation and ICT usage, though not at an equal stand as such. *The globalisation of trade in goods and services*, in this sense, is opening up new and increasingly vast markets to every nation on earth.

An important aspect of the development through the globalisation process, in its most orthodox understanding, is the difference of opinion about the character of the development model. Some people appear to be the proponents of a smooth, open-to-all, shared-by-all sort of development model through globalisation. In 2005 Thomas Friedman’s influential best-seller *The World is Flat* has been published. The book was the culmination of the popular arguments contending various technological and institutional changes were to make the world more similar and less differentiated. However, this idea / approach now is being challenged.³ In support of the thesis that the world is not flat but curved, the latest World Development Report of the World Bank reads *“The geographic transformations for economic development can be characterized in three dimensions – density, distance, and division. These three words are not just metaphors for the policy challenges just outlined. They conform closely to the more technical notion of ‘market access’. And they represent the dimensions of economic geography that have to be reshaped if the development challenges are to be met.*

Another issue of importance regarding the globalisation process is its relation to the physical production or real GDP in terms of the rate of growth, or to put it that way whether there is a limit to globalisation movement. Werner Rothengatter refers to the book published by the Club of Rome in 1972, **Limits to Growth** which argues that *“important resources are limited but exploited at an increasing speed through the industrial processes of the market economies and the increase of world population. Mankind would destroy its own living basis if the economy would continue to grow exponentially. With the growing speed of globalization in the past two decades the processes have been accelerated, which the Club of Rome regarded to be most risky..... As a consequence, world trade is growing at much higher rates than GDP. Logistics has become one of the most important economic sectors, also growing above average. From the observation of the past development one could derive the conclusion that an exclamation mark has to be set after “globalization unlimited.”*⁴

We can come to the conclusion that economists and policy-makers alike can turn the global financial crisis into a beneficial process if they succeed to take the necessary lessons. Otherwise the warnings like that of the Club of Rome prove one of those proverbs: *“History repeats itself.”*

³ Philip McCann (2008)

⁴ Werner Rothengatter (2009)

ii. *Technological Developments and their interaction with the Economic Structure. Knowledge Society.*

Transportation is perhaps the most distinct sector of the economy in its technology content. Not only because of its very nature as an engineering-based industry, but almost all technological developments affecting the economy have repercussions with the transport sector in one way or the other.

Although we cannot say that these are all exclusively applicable to the developed part of the world, it is not wrong to say that technology is produced and developed in the advanced nations. The transformation of the economy and society is underway at a rate unprecedented before. However, this transformation process takes place mostly or at least at its full length in the realm of developed countries producing and developing technology. In the advanced industrial countries growth and employment are increasingly associated with technological evolutions. Here we have to mention the “emergence” of the so-called “knowledge society”. This comparatively recent phenomenon is being built “*on the pervasive influence of modern information and communication technologies, is bringing about a fundamental reshaping of the global economy. Its significance goes well beyond the hyping of the Internet or the dramatic declines in the dot.com sector.*”⁵

This is an important stage not only for what is known as the developed world, like EU and North America, but also for those who are lagging behind notwithstanding aiming to catch up with the globalisation movement properly. Here we have to point out the fact that knowledge is a much broader concept than information, which is generally the “*know-what*” and “*know-why*” components of knowledge.⁶ This brings us to the point which is the missing element in the developing world: scientific knowledge, research, R&D and the properly designed and run education policies.

b. Economic Policies vis-à-vis the Research. R & D and Education & Training Vector.

While the functional rationale of the knowledge society points to the content of educational reform, the phenomenological role of the knowledge society can be a key to understanding the current globalisation processes in education policy. In developed countries scientific research is carried out to provide information to policymakers. There the strong research infrastructure made of scientific researchers and experts as economists, geographers, civil engineers and others make the assessment of the costs and benefits of the impacts of the projected transport investments on the economy – on the land use, on the possible developments of the logistics networks, etc.

Nevertheless when the research process has been carried out only on pure academic grounds ignoring the constraints which the policy-makers face and have to tackle with, there appears a serious gap between what is known as the research and practice. Therefore, the scientific machine has to take these parameters into account when it is up to analyse any development in the transport and logistics networks on the side of political machine. Here the leading actors to be referred to are policymakers - public authorities, private enterprises and the households.

When all these accounts are to be considered, we come to the sphere of educational apparatus. Our main concern here of course has to focus on the transport and logistics education in particular. This is especially because the transportation system is such a complex one that the planning, design, construction, and operation of which requires a vast number of skilled professionals, to keep the potential misdeeds at a minimum. As these professionals are from the backgrounds of a variety of different disciplines (economists, financial analysts and engineers to mention the least) and the ground they have to embark on is not less complex than their background, the general approach to both the theoretical

⁵ ***Building the Knowledge Society.*** Report to Government by the Information Society Commission, December 2002.Ireland. p.5.

⁶ In order to facilitate economic analysis, distinctions can be made between different kinds of knowledge which are important in the knowledge-based economy: know-what, know-why, know-how and know-who.

and practical fields have to be interdisciplinary in character. In other words, both the policymaking side and the sectors these policies are to be applied are interdisciplinary. Then it appears a required conclusion to say that the philosophy of the educational and training apparatus is to be interdisciplinary. We cannot ignore the reality of multi-modality in the transport sector today as a prima facie evidence of the present day sector setup. The interdisciplinary character of the educational and training vector brings up the question of quality with it as an inevitable dimension with its side effects. This makes high standard as a *sine-qua-non* for the educational and training setup. Otherwise the ordinary qualifications in these make the whole apparatus open to potential additional costs.

As our paper is designed principally to embark on the conditions in the developing world where the widespread understanding of institutional background of transportation puts the educational issues at a higher level of priority than in the developed group, the bulk of our efforts here is to be directed towards issues concerning the “developing”. In the developing part of the present day world the professionals responsible for designing and implementing the transport policies, at either macro or micro level, are far from understanding each other on matters of transportation. To make things worse this lack of understanding is also valid between the planners and policy-makers of transport and the general public.

How, then, the parties concerned begin to understand each other and begin to communicate more effectively? *“Perhaps we need to begin this learning process before we become so immersed in our own subcultures. A natural place to start seems to be in college. It is during this time that transportation professionals begin to take on the vocabulary and approaches to problem solving that makes an engineer an engineer, a planner a planner, an environmentalist and environmentalist, and so on.”*⁷ Our initial intention before writing this paper was to design and implement to find quantifiable benefits (to put it in more specific terms, spillover effects) of developing an effective transport education system on the economy in general and on the transport and logistics networks in particular. Nevertheless, due to serious setbacks in methodological points on the one hand and in data availability (statistics of educational sector as well as transport and especially logistics activities) on the other, we had to revert our attention to the qualitative benefits of developing a proper educational system – yet at this stage. We strongly believe that serious effort is needed to be directed towards analysis of the inter-relationships between transport education and the transport sector and the rest of the economy and this connection deserves to be searched more thoroughly. What we can do here at this stage is just to make an invitation to launch studying in this area to fill the vacuum.

More is designed to be said in the concluding section in this regard.

4. TRANSPORT GROWTH AND ECONOMIC DEVELOPMENT IN AN INTERACTIVE FORMAT

The relationships and interactions between transport and the economy have been extensively analysed and discussed for a long time in the past in various platforms and time and again. As a result it has been widely accepted that an efficient transport system is required for a successful economic development process to take place and its sustainable continuation. This fact is a serious matter of concern among the group of developed nations. On the other hand, it has not been taken at the same rate in the context of developing country side as it deserves perhaps much more attention. The critical point here is the issue of precedence of either transport or the development process itself. In other words, it is a matter of debate whether the transport expansion or the development process itself has to take the lead: should the transport development / expansion be considered a prerequisite or concomitant of the economic development process? Our point here is that the precedence of either the transport expansion or the general economic development process is connected with the stage of the development process itself. At earlier stages the transport growth is

⁷ Waidley & Bittner (2007), p.4.

needed to be a prerequisite for the overall development process. This point can be proved by parallel growth statistics of either the transport or the overall growth rates.

Transport network expansions can generate positive spillovers, e.g. in the form of increased labour participation, as well as negative externalities, e.g. increased congestion, pollution. This is something valid for the developed as well as the developing world. However as these points of importance are being widely discussed and became a matter of scientific concern in developed section, it is left wide open in the developing camp: there is no trace of any study on this highly delicate issue.

The links between transport growth and the economy can be analysed within a format of several layers:

- Transport system, with its modal split, type and size of infrastructure and network, affects the economy through access to it.
- Through the access to the economy with its effects on land use and location of activities, spatial structure and the organisation of production, distribution and consumption happen to be determined.
- Additionally, through these stages, activity pattern (industry, business, households sector) is also shaped.

An important aspect of the analysis of the relationship of transport and economic growth is the role and impact of transport infrastructure investment on economic growth, or to put it that way, the potential contribution of increased capacity and operational efficiency of the transport system to economic growth. Contribution of the transport sector to the economy or to development process itself can take place either through the infrastructure investments or improvements to the already existing transport network. Both can be envisaged either in the developed or the developing country context. However, for the most part, transport infrastructure development should be given particular attention in the case of developing countries. *“Transport investments can be considered as a stimulus from the demand side to economic growth, and can contribute to the transformation of economic regions and urban areas.*

Infrastructure improvements could take the form of: i) investments with an improvement of the quality of the stock through for example new highways, airports, commuter rail lines, etc., repair and maintenance of existing infrastructure stock and/or ii) promoting efficient use using for example more capacity of existing infrastructure stock and optimisation of transport organisation using intelligent transportation systems, management of traffic flows, etc., changing user costs with fuel taxes, tolls, etc.”⁸

In some cases some regions could experience economic growth in the long run without transport investment growth only if transport services do not pose a bottleneck. Even if in the short-run, the development of transport investment can improve the competitiveness of one region in connection with the neighbouring region(s), this could last only during a short period because of capital and labour mobility as a fact. J. Berechman concludes that, within a reasonable degree of regional accessibility that is a sufficient transportation infrastructure, growth can be achieved by an assortment of policies, not necessarily transportation-related.⁹ Depending on this we try to assess this evaluation in Section 5 of this paper.

As transport growth and economic development are said to be strongly correlated, a comparatively recent question has been raised by researchers and policy makers, to be European for the most part. This is the issue or concept of **decoupling**. This is about the extent of the effect or contribution of one on the other – i.e. either the effect of transport development on the general economic growth or vice versa. As the American side are not interested with the issue, European researchers and policy makers are increasingly concerned to *decouple* transport from general economic activity. This is to make economic growth to continue with decreasing adverse effects to be caused by increasing transport

⁸ OECD. ENV/EPOC/WPNEP/T(2003), p.72

⁹ Berechman, J. (2001)

activity. *“This kind of decoupling involves a reduction in transport intensity, i.e., in the amount of transport activity associated with each unit of Gross Domestic product (GDP)”*.¹⁰

As transport demand has a particular place in the development / expansion of transport investments and facilities, the evolution of transport demand is to be looked upon with particular attention to observe economic development with reduced externalities. In this regard we can mention the general approach of EU’s official policy document, *White Paper*. This excerpt from the WP reflects the main philosophy of the European policy makers with strong tone of decisiveness: *“Transport is a key factor in modern economies. However, there is a permanent contradiction between society, which demands ever more mobility, and public opinion, which is becoming increasingly intolerant of chronic delays and the poor quality of some transport services. As demand for transport keeps increasing, the Community’s answer cannot be just to build new infrastructure and open up markets. The transport system needs to be optimised to meet the demands of enlargement and sustainable development, as set out in the conclusions of the Gothenburg European Council. A modern transport system must be sustainable from an economic and social as well as an environmental viewpoint.”*¹¹

During the third quarter of the 20th century the almost revolutionary transport systems developments (containerisation, the sharp fall in transport costs, the unforeseen developments in transport technology in almost all modes of transport and the consecutive improvements in the quality of services, etc.) have contributed to the enormous expansion of economic activities to a large geography. For different scales from local to the global levels, the influence of transport systems has transformed the spatial dynamics of industrial structure. Now, at this time of the developments of the economies world over, logistics is gaining greater importance than transport in the choice of industrial sites for the firm managers. Furthermore, it is not only the firms to take the logistics viewpoint into account but the designers and makers of macro-policies as well need to be equipped with tools of analysis to make transport and logistics networks more harmonious.

As a result of the highly sophisticated developments in ICT the functioning of the logistics mechanism appeared to have recorded immense improvement and as the coordination of the transactions began to operate at a faster rate and with less defection, routing and scheduling gradually improved and much more efficiently. Communication and transport networks can be regarded as the carriers, in both literal and symbolic sense, of new systems of industrial and spatial organisation.

Globalization has a fundamental link with transportation and logistics. Yet the principal conceptualizations of globalization either ignore completely any reference to transportation or make only implicit linkages. In actual fact the role of transportation is to be considered more than a mere support to the mobility of freight within global commodity chains, but an integral part of the value generation process. The implications of logistics for transport are much less researched, even though there has been a growing interest for external logistics of firms embedded in networks or supply chains. It is a fact of our time that the freight transport sector is influenced by logistics principles of production and distribution. However as it is very important to understand the interaction between logistics and transport, there is a need for finding ways to overcome the inherent methodological difficulties when studying this relationship. *“Simple relationships between logistics principles and transport growth are, however, difficult to verify both theoretically and empirically (Cooper, Black, & Peters 1998; McKinnon 1998).*

Therefore intermediate categories have been developed in an attempt to ‘translate’ logistics principles into transport related concepts (Jespersen et al., 2003):

- *distance – how far*
- *speed – for how long*
- *frequency – how often*
- *precision – when*

¹⁰ Gilbert, R. & Nadeau, K., ***Decoupling economic growth and transport demand: a requirement for sustainability.***

¹¹ European Commission (2001), p. 6

To the extent that logistics principles can be described by these categories, the consequences for transport can be proposed and empirically investigated. The four dimensions can be related to some essential characteristics related to modern principles of production and distribution and to characteristics related to tendencies in the postmodern society.”¹²

Furthermore, the methodological difficulties contain elements of an approach to look at current issues at an orthodox stand where the supply chain process is taken at a linear base. Dietzenbacher, on the other hand, suggests an input-output approach to look at the matters saying that *“in a national / regional economy there are many, many products and hence many, many product chains. Even the most detailed I-O table cannot hold enough detail for product chains, as every industry buys from and sells to any other industry identification of product chains seems impossible. Therefore there must be a focus on production processes and hence on production chains – in contrast to product chains.”¹³*

This may be interpreted another way of saying that *“the world is not flat”¹⁴*. Indeed if we assume the role of transport activities as a part of a chain in a linear dimension alone, then we find ourselves in a position to ignore the stimulus given to the developmental process by the transport sector. *“... logistics thinking tends to neglect transport. From a logistics point of view, transport is rarely considered more than a derived service or a necessary means for binding the logistic chain’s various actors and facilities together. There is a serious lack of knowledge as to what are the consequences of different logistics concepts in terms of transport. In continuation of this we lack methods for measuring and generating these data.”¹⁵* As global organisations operate as a hybrid between a market and a hierarchy the management seeks partnerships with independent suppliers, producers and distributors. In other words all these activities do not take place on a linear scale but in a matrix form.

Keeping this side of the subject matter in mind, it is possible to say that the interactive developments of transport and logistics networks offer new opportunities for the economies to connect to the global development process. A recent study by the WB presents the structural characteristics of the world economies in terms of their competitive logistics potential taking the elements of their logistics performance into account.¹⁶ With the globalization of production, supply and distribution in many branches of the industry, the logistics market has continued to grow together with the trend to outsource logistics and concentrate on the core business.

5. ATTEMPTS OF MEASURING THE IMPACT OF TRANSPORT DEVELOPMENT: SPILLOVER EFFECTS OF TRANSPORT GROWTH

This section attempts to examine the spatial spillover effects of transport infrastructure development on economic growth. It is well known that investments in transport infrastructure, leading to a reduction in transportation costs, have a positive contribution to economic growth of the province that the investments take place. The effects on the neighbouring regions, however, are ambiguous. On the one hand, public transport investments boost the economic activity in the region, leading to the growth of not only the local province but also the less-developed provinces nearby. On the other hand, negative spillover effects might be observed if more developed provinces in the region attract factors of production from the less developed ones (Alvarez et al., 2006; Xueliang, 2008). The observed spillover effect could be positive or negative depending on which effect outweighs the other.

¹² P. H. Jespersen & L. D. Nielsen (2004), pp. 6-7.

¹³ Erik Dietzenbacher (2007)

¹⁴ Cf. WB **World Development Report 2009**.

¹⁵ Jespersen & Nielsen, *ibid*

¹⁶ JF Arvis & M.A. Mušta & J. Panzer & L.Ojala & T.Naula (2007)

In order to test for the existence of spillover effects of transport infrastructure development on economic growth of provinces in Turkey, we use panel data belonging to 81 provinces for the years 1999 to 2001¹⁷. Following the neoclassical theory of economic growth, the analysis is based on the estimation of the following Cobb-Douglas type production function:

$$\ln(Y_{it}) = \beta_0 + \beta_1 \ln(L_{it}) + \beta_3 \ln(K_{it}^{prv}) + \beta_4 \ln(K_{it}^{trns}) + \beta_5 \ln(K_{it}^{opub}) + \beta_6 \ln(NK_{it}^{trns}) + \varepsilon_{it}$$

where Y_{it} is the output, L_{it} is the labour, K_{it}^{prv} is the private capital stock, K_{it}^{trns} is the public capital stock on transportation infrastructure, K_{it}^{opub} is the other public capital stock, and NK_{it}^{trns} is the public capital stock on transportation infrastructure in the neighbouring provinces. During the estimation, output is measured by the provincial Gross Domestic Product (GDP) and labour is proxied by the average number of workers in the manufacturing. Due to unavailability of data, private capital stock is proxied by the total cumulative amount of directed loans (credits). Public capital stock on transportation infrastructure in the neighbouring provinces is calculated by multiplying the public transport capital stock vector by an $N \times N$ weighting matrix:

$$NK_{it}^{trns} = \sum_{j=1}^N w_{ij} K_{jt}^{trns}$$

There are various weighting matrix specifications in the literature. Contingency matrix is one of the most widely used specification in which the matrix elements take a value of one if the two provinces share a border and zero if they don't:

$$w_{ij} = \begin{cases} 1 & \text{if } i \text{ and } j \text{ share a border} \\ 0 & \text{otherwise} \end{cases}$$

This study also makes use of the contingency matrix to measure for the spillover effects. The model is estimated by fixed and random effects modelling including dummy variables for the years. Table 1 presents the estimation results. A Hausman Test for random versus fixed effects is also applied, yielding a chi-square value of 7.61 with a probability value of 0.3683. Since random effects model is chosen against the fixed effects, conclusions of this study are drawn using the random effects model results.

The results in Table 1 confirm that public investments have an increasing impact on the GDP. A 10 % increase in investments on transport and communication, on average, have a 0.4 percent increasing impact on GDP. The effect is 2.9 percent for other public investments. Public investment on transportation in the neighbouring provinces is found to be statistically insignificant in both model specifications. Mentioned above, this variable might have a positive impact if increased economic activity in a province creates positive externalities for the less developed neighbouring provinces or might be negative if there is a shift of production factors from the less developed provinces to the developed ones. The statistically insignificant impact for this variable signals the existence of both effects, one eliminating the other. This surely needs further examination. Comparison of results with different weighting matrix specifications aiming to control each of these two effects will be beneficial.

Turning to the results in Table 1, average number of workers in the manufacturing has an increasing impact on GDP. A 10 % change in the number of manufacturing workers changing GDP by 4.6 percent, on average. Credits, which is included to capture the private capital stock is found to be statistically insignificant in random effects specification whereas it is positive for the fixed effects model.

¹⁷ The analysis is restricted to only 3 years due to data unavailability.

Table1. Fixed and Random Effects Estimations

	Fixed Effects	Random Effects
Credits	0.850* (0.503)	0.112 (0.094)
Public investment on transport and communication	-0.031 (0.069)	0.046** (0.02)
Other public investments	-1.251** (0.613)	0.290*** (0.072)
Labour	0.285 (0.506)	0.411*** (0.061)
Neighbouring provinces	0.062 (0.196)	0.099 (0.064)
1999 dummy	-0.388 (0.602)	0.461*** (0.157)
2000 dummy	0.306* (0.174)	0.133 (0.119)
Constant	23.848* (12.903)	0.895 (1.599)
No of observations	211	211
	F(7, 131)=1.28 Prob>F=0.2658	Wald Chi2(7)=315.02 Prob>Chi2=0.0000

* p<0.10, ** p<0.05, *** p<0.01

Notes: (i) Standard errors are reported in parenthesis.

(ii) All variables, except the year dummies, are in natural logarithms.

(iii) 2001 is the base for the year dummies

6. EULOGY FOR THE TRANSPORT EDUCATION AND TRAINING IN THE CONTEXT OF INCREASING OVERALL PRODUCTIVITY OF THE TRANSPORT SYSTEM.

The above reading makes it clear that a well-organised institutional research is needed to analyse the competitive position of a country within the framework of global trade and to help policy makers to design and implement sound transport policies in good harmony with the logistics networks. This is what the developed countries which are the most competitive in the world trade possess. If we look at the top performers in the WB Report mentioned above we see the clear proof of this contention.¹⁸ Out of 150 countries included by the Report the highest scoring countries in the so-titled LPI (Logistics Performance Index) are almost from the developed country group. We also know that the research basis in these countries is highly developed. As the Report reads *"The LPI suggests that policymakers should look beyond the traditional "trade facilitation" agenda that focuses on road infrastructure and information technology in customs to also reform logistics services markets and reduce coordination failures, especially those of public agencies active in border control. This demands a more integrated, comprehensive approach to reforms all along the supply chain. Indeed, there are strong synergies among reforms to customs, border management, infrastructure, and transport regulations because reforms usually reinforce each other. Countries performing well typically have a comprehensive approach that improves key factors in logistics performance in parallel, while countries with a piecemeal approach tend not to demonstrate lasting improvements"*¹⁹ and contends that by observing the structural weak points suggested by the analysis of the study of LPI the countries lagging behind to

¹⁸ op.cit., Table.1, p.2

¹⁹ op.cit., p.1

break out the vicious circle of logistics unfriendliness can manage to turn to effectively access global markets. In this study performance was evaluated using a 5-point scale (1 for the lowest score, 5 for the highest) and 7 areas of performance have been assessed:

- Efficiency of the clearance process by customs and other border agencies.
- Quality of transport and information technology infrastructure for logistics.
- Ease and affordability of arranging international shipments.
- Competence of the local logistics industry.
- Ability to track and trace international shipments.
- Domestic logistics costs.
- Timeliness of shipments in reaching destination.²⁰

It is not only the research capacity to analyse this kind of situations but the human-power to put this sort of suggested reforms into action is needed. There is a clear need for well-educated and experienced professionals to implement the policies prepared. As, for example, there has been contentions that the recent global financial crisis has been caused by the misdeeds of professionals this point is indeed valid for all areas including the carrying out transport and logistics policies.

There is one point we want to add to this observation: as the capacity to make a sound assessment of the situation and to organise and follow the reforms required, any country needs a complementary instrument to fulfil what is required. This instrument is the education and training in the fields of transport and logistics at contemporary standards.

This can be verified by looking at the countries ranking high in World Bank's LPI lists presented in the Report. When we look at the top 20 performers we see that all of these (with the exception of United Arab Emirates which is at the 20th grade at the overall score as 98th at domestic logistics costs) are the countries where the level of education (in transport & logistics) is at high levels to parallel the level of research. This is what the developing countries lag badly behind.

In a speech at Harvard University in 1943 Winston Churchill has observed that "*the empires of the future will be empires of the mind.*" He might have added that the battles of the future will be battles for talent. To be sure, the old battles for natural resources are still with us. But they are being supplemented by new ones for talent—not just among companies (which are competing for "human resources") but also among countries (which fret about the "balance of brains" as well as the "balance of power").²¹ As we have been dwelled upon the concept of knowledge society above, the importance of transport and logistics education & training cannot be singled out from the picture of this dimension. In the meantime, as foresight of W. Churchill proves to be admirable, though not necessarily for bringing up transport & logistics high-ranking minds exclusively, it would not be too wrong to interpret his words for this field as well. This sector, transport & logistics, can be assumed as the key one to lead the economy in connecting to global trade in a competitive standing.

The transportation system, especially taken in close interaction with the logistical networks of the country, is a very complex one and it requires a great number of well-educated and experienced professionals to design, plan, construct and operate the whole system effectively and safely. These professionals should have a multi-disciplinary / inter-disciplinary background to be able to work on the grounds of the conditions just described here. The making and operation of proper policies for the proper purposes must also cover the economic, political, and environmental dimensions.

If we take all these functional properties into account within the growing importance of the concept of a knowledge society we can come to the conclusion that an education policy must assume some roles to play. On the other hand, policy-makers of education face serious challenges in designing their plans. As one appears to be traditionally on the national front, the other comes from the international side, as major changes are being taken place in the domain of international organisations. Take, for instance, the Bologna Process of the

²⁰ op.cit., Box 1.2 **Building the Logistics Performance Index**, p.8

²¹ The Economist (2006)

European Union which demands common reforms in higher education.²² This is, clearly, something originating within the concept of globalisation movement which compels every actor on earth to follow the rules of global competition. Thus, while the functional rationale of the knowledge society points to the content of educational reform, the phenomenological role of the knowledge society can be a key to understanding the current globalisation processes in education policy, be it in the fields of transport & logistics or any other field – but much more so for the transport & logistics field as these are much more directly connected to the global competition process. The reference to the knowledge society can be observed in both British and German policy reports which mention the Knowledge Society dimension clearly with a strong extension to the education policies. So our emphasis on education is based on these vital grounds.

Nevertheless it is not only the sheer acceptance of the importance and essence of the transport and logistics education (and training) that matters, but its nature as well that we have to consider. As the field itself is characterised by multi-modality and multi-disciplinarity, its education must reflect these characteristics. And this is the dominant feature of an ordinary curriculum in the countries where transportation and logistics education is developed. But there is one point here we have to be clear: it is not only the education in transport & logistics that is the developed one. In these countries this sector is as developed as others and as research on an institutional basis.

Before proceeding further and touching the chief features of an interdisciplinary programme in transport & logistics, let us mention an important development about these programmes at a global scale. The knowledge and education became global issues within the conceptualisation efforts of leading international organisations. We have already mentioned the Bologna Process of EU above. Starting with UNESCO, we can put the names of several international bodies into a list of the institutions advocating the promotion of knowledge and education. Among them OECD and the World Bank are the most prominent ones. As a result of the efforts of these organisations it is not only the countries which deserve to be labelled as *knowledge societies*, but those which are far away from that stage yet also react positively to this new emphasis on international activities in education.

“In the long run, such exchanges led and are leading to ‘isomorphism’. Countries tend to orient themselves on common practices such as graduation or participation rates or on autonomous administration of schools or the like. This tendency to focus on similar policies was introduced by the establishment of an international organisational field around education policy in which the states are embedded today. To recall the four conditions which fix an organisational field: an increase in the extent of interaction among the states concerning their education policy should be observable, and sharply defined inter-organisational structures of domination and patterns of coalition should emerge. Countries set up departments that have contacts with other countries’ departments; scientific research on appropriate education policy is internationally coordinated. International organisations become dominant players in the field of education. Today, various publications deal with comparing one country with another and indicators are developed. Moreover, research turns to the phenomenon of international education policy. There is thus an increase in the information load. Finally, the mutual awareness of the countries’ common enterprise is documented in statements as the Bologna Declaration or OECD communiqués. The idea of the knowledge society was ground-breaking for the countries regarding themselves as involved in such an enterprise. It thus gave way to the international dynamics that can be assessed today.”²³

Looked from a global viewpoint, globalisation effects together with the influence of the policies of international organisations, force the countries to follow the suit of the successful. In other words, contemporary education issues spread globally and the countries agendas begin to be similar with each other. Transport and logistics education and training issues are

²² In other words, “the EU strives to become ‘the most competitive knowledge-based economy of the world’”; European Council (2000) Presidency Conclusions of the Council of the European Union. http://www.europarl.europa.eu/summits/lis1_en.htm

²³ A. P. Jakobi, (2007) p. 45.

not an exception to what we say here about the general guidelines of education policies. Then, we can conclude that what we say about international organisations to constitute an area of prospective education and training policies can also be considered valid for policies on transport and logistics education and training.

For the purposes of our approach in this paper, the interdisciplinary character of the contemporary transport & logistics educational programmes comes into the front as the most advantageous tool for either fostering the economy with better-equipped planners and / or practitioners in the transport and logistics sectors or bringing up prospective researchers. First of all, as we have mentioned above, it fits into the multi-modal and multidisciplinary structure of the national economies on the one hand and the global economy on the other. Benefits of an inter-disciplinary education are so clear-cut that the students / graduates of such programmes are better-equipped to understand, analyse and deal with problems of the real world which is built up on an interdisciplinary structure – and becoming much more so as time goes by.

These benefits can comfortably be claimed on the qualitative side. With these characteristics in mind we can contemplate about the benefits of transportation & logistics education. Unfortunately, as what we can do about the assessment of the benefits of transportation education can only be confined to the qualitative side, it is very difficult not only to measure the quantifiable benefits of transportation education but it is equally hard to propose a method for assessing the benefits of a multi-disciplinary education. Originally our aim was to develop and employ a method of measuring the spillover effects of the transportation education over the economic sectors – services as well as commodity-producing sectors - of the rest of the economy. But after failing to solve the methodological difficulties we were up to, we came to the conclusion that what we can do at this stage was to be content with working on the qualitative effects of developing a proper transportation education in conjunction with the inclusion of logistics knowledge.

As it was not possible to succeed quantifying the benefits (spillover effects) of reforming the educational system in transport over the economy, we tried to do it on the interaction between transport investment and the development of the economy on a regional basis. However, it is possible to contend that, from a pure theoretical point of view, the benefits obtained by transport improvement over the economy can / should hardly be said complete unless it is backed by an analysis on the consequences of a reformed educational system. First and foremost, any improvement in the economy cannot be thought to have reached its full limits of growth without the backing of a qualified manpower. This means that any productive achievement affected by the development of another sector should be deemed an under-achievement as compared with the one with an educated and talented manpower. Furthermore, as for the measurement side of the problem, it is again the educational system that provides the grounds of a research basis for a more reliable evaluation of any material development in the economy. To sum up what we have been trying to say is that a contemporary educational system is the *sine qua non* of the global economic prospects of any country and this is much more so for the transport and logistics sectors.

With our effort to measure / quantify the spillover effects of transport development on the economy in mind, we assert that if and when an educational system in transport and logistics was built on contemporary levels, it might eventually be possible (a) to make a more reliable assessment of these effects and (b) those effects could end up with a greater growth in the regions taken into consideration. In a World Bank Institute (WBI) study on the comparative positions of countries in terms of knowledge economy, the position of Turkey does not present a promising outlook regarding the trends in education.²⁴ In this report carried on a KAM (Knowledge Assessment Method) analysis basis Turkey appears in a relatively good position to experience a moderate economic growth. However it is advised that to maintain the current trend of economic growth there is need to invest more in knowledge, especially in terms of quantity and quality of education as Turkey's Knowledge Economy Index (KEI) currently ranks lower than the world average. In other words, Turkey appears to be the

²⁴ WBI (2006)

weakest on education among the pillars of the study takes into consideration – i.e., *Economic Incentive Regime, Education, Innovation and Information Infrastructure*. Another important aspect is the developments in these parameters: In this regard the situation of educational parameter has worsened across time – since 1995 on.

The situation in transport and logistics education is not an exception of this general picture. In Turkey we cannot observe any programme in Transportation to be scheduled at contemporary standards. There is no programme / curriculum in its interdisciplinary sense in Turkish universities in this special field. Although there are some units connected with transport education, they do not offer any programme or degree in a multidisciplinary context. Some classes are available, but all on pure engineering scale. There are universities with sections in transport education but without any class or teaching on topic and vice versa: in some Turkish universities some classes are available (all in engineering spectrum) without any support unit within the university organisation – lecturers coming from the non-academic fields, like business or industry, lecturing on irrelevant context – like, for instance, “Transportation Terminology” as a class.²⁵

As a result of these sorts of shortcomings, we could not succeed to carry out a study quantifying any effect of the transportation education system on the economy in one way or the other. We could not measure the effects of an entity which actually does not exist. On the other hand what we tried to make up a model of measuring the so-called spillover effects of transport sector development on the economy at the regional scale could not be completed at its full length as data unavailability. For us this is also closely connected with the absence of qualified human-power which might otherwise appreciate the significance of such statistics and the research work depending on the support of such data. These are issues which do not occupy the agenda of not only the public opinion in its popular sense but also of that of the academic circles. One should look at the shortage of data which confined our study on its quantification side only to the years 1999 – 2001 with this angle as well to make a thorough assessment.

Under these conditions our contention above (that any effort to evaluate any development in the transport and logistics sectors is doomed to fall short of a comprehensive analysis) gains ground. The solution is clear and simple: An earnest approach to design and implement proper and decent education policies is needed – as it is, indeed, the missing key element in most of the developing countries. Therefore what is to be done is to put the issue of proper transport and logistics education and training policies high on the agenda of the country without further delay.

BIBLIOGRAPHY

- Álvarez, A., C. Arias, L. Orea (2006). Econometric Testing of Spatial Productivity Spillovers From Public Capital. *Hacienda Pública Española / Revista de Economía Pública*, Vol. 178, Number 3, pp. 9-21.
- Arvis, J. F., M.A. Mustra, J. Panzer, L.Ojala and T.Naula (2007). *Connecting to Compete. Trade Logistics in the Global Economy*. The World Bank. Washington DC
- Berechman, J. (2001). *Transport Investment and Economic Development: Is there a Link?* ECMT. 119th Round Table on Transport and Economic Development
- Candemir, Y. (2005). *Ulaştırma Eğitim ve Öğretimi: Dünyada ve Türkiye’de (Transportation Education and Training: In the world and Turkey)*. In Turkish. Paper presented at the 6. Transport Congress. Papers. IMO Istanbul. 23 – 25 May Istanbul.
- Dietzenbacher, E. (2007). *Distance matters. Visualizing Production Chains using Average Propagation Lengths*. 16th International Input-Output Conference. 2-6 July. Istanbul
- The Economist (2006). *The battle for Brainpower*. Oct. 5
- EIA(Energy Information Administration) (2006). *International Energy Outlook 2006*
- European Commission (2001), *WHITE PAPER. European transport policy for 2010: time to*

²⁵ Candemir (2005)

decide

- Fontela, E. (2005). Toward a Sustainable Knowledge Society. EC-HLEG Key Technologies. Universidad Antonio de Nebrija
- Gilbert, R. and K. Nadeau. Decoupling economic growth and transport demand: a requirement for Sustainability - Paper prepared for presentation at the conference entitled *Transportation and Economic Development 2001* organized by the Transportation Research Board of the U.S. National Research Council, to be held in Portland, Oregon, originally from September 23-25, 2001, and now postponed until May 5-7, 2002.
- Jakobi, A. P. (2007). The Knowledge Society and Global Dynamics in Education Politics. European Educational Research Journal. Vol. 6, Number 1.
- Jespersen, P. H. and L. D. Nielsen (2004). Logistics and transport – a conceptual model. World Transport Policy & Practice. Vol. 10, Number 3,
- McCann, P. (2008). Globalization and economic geography: the world is curved, not flat. Cambridge Journal of Regions, Economy and Society. 1.
- OECD Handbook on Economic Globalisation Indicators (2005). Measuring Globalisation. OECD ENV/EPOC/WPNEP/T 4/FINAL (2003). Analysis of the Links between Transport And Economic Growth.
- Report to Government by the Information Society Commission. Ireland (2002). Building the Knowledge Society. December.
- Rothengatter, W. (2009) Globalization Unlimited? Keynote speech at Prospects for Research In Transport and Logistics on a Regional – Global Perspective. International Conference. 12-14 February, Istanbul.
- Waidley, G., J. Bittner (2007). An Interdisciplinary Approach to Transportation Education. Proceedings of the 2007 Mid-Continent Transportation Research Symposium. Center for Transportation Research and Education. Iowa State University.
- The World Bank (WB) (2008). Reshaping Economic Geography. World Development Report 2009.
- The World Bank Institute (WBI) (2006). Turkey and the Knowledge Economy: A KAM Analysis. May.
- Xueliang Z. (2008). Transport Infrastructure, Spatial Spillover and Economic Growth: Evidence From China. Front.Econ. China, Vol.3, Number 4, pp. 585-597.