
International Transport Forum 2010

Transport and Innovation: Unleashing the Potential

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Note: This document is the author's interpretation of the major themes discussed at the ITF Leipzig forum. Since several sessions were concomitant, the material being covered relates to the sessions that the author could attend. All opinions, errors or omissions are the author's own and do not reflect those of the ITF.

General Assessment: Is Innovation being Leashed?

The slightly modified title (Un/Leashing) reflects the prevailing paradigm underlined at several occasions during the Leipzig 2010 Forum. Transport innovations can have both the public and private sectors as promoters of innovative practices, but on occasions, more common on the public side, they can act as impediments to innovation, willingly (through regulations) or unwillingly (through unintended consequences). In light of many converging challenges such as urbanization, globalization, environmental constraints, the financial crisis, and energy, every segments of the transport system, from operators, regulators, owners to users are facing pressures to innovate; to unleash the potential of innovation. The rationale is straightforward. Economic history clearly underlines that innovations are linked with new opportunities, that they are a vector for productivity, but that they also come with risks and unintended consequences. Any perusing of periodical such as "Popular Mechanic", particularly the 1930-1960 era, indicates that in spite of the hype, technological and market failures abound. New ideas rarely become mainstream. While it is well known that more than 90% of all commercial products and services introduced on the market eventually fail, such a failure rate is unacceptable in the transport system, mostly because of its capital and infrastructure intensiveness. Mistakes would simply be too costly. This is one major reason why many segments of the transport system are reluctant to adopt innovation.

The global economy is rife with contradictions about the expected role of transport innovations as reconciling social benefits, growth, profitability and environmental efficiency appears to be unavoidable requirements. It also must be underlined that decades of investment in infrastructure, the setting of standards and managerial approaches have geared almost all transportation systems in a path dependency. This implies a heavy inertia in the transport

system and an array of challenges to implement revolutionary innovations and even those that are incremental. One of the most salient and somewhat paradoxical examples of path dependency in transportation is the container. While the container is considered a revolutionary technology with far reaching implications for global freight distribution, it is also a standard, mainly in terms of its dimensions, that impede any deviation from it; the system is locked-in. Therefore, discussing of another standard for containerization can be considered futile because of the tremendous level of capital accumulation that has already taken place (e.g. containerships and port terminals). Change would only occur if it can be clearly demonstrated that a new paradigm (a revised container standard) would be much more productive and that substantial incentives are present for its adoption and diffusion.

Yet, path dependency does not forbid innovations. A dominant trend in the transport sector is to improve the existing physicality with operational and managerial innovations. It is within this realm that information technologies are remarkable productivity multipliers, permitting the more effective use of existing assets, particularly those with a high level of capital intensiveness. This trend is well recognized by the industry and governments and personifies the IT revolution. Still, public policy has difficulties adapting to innovation since it involves change (momentum) and sometimes new paradigms, while policy and governmental institutions are based on fixity and status quo (inertia). Thus, public policy and the regulations they imply could be considered among the most important factors that are locking transport systems in a path dependency. Leashing or unleashing innovation is therefore much an issue related to the role of public policy over respective segments of the transport system.

Another important issue that arose during the forum was the difference between market-based innovations and those that can be geared by policy. This distinction is often not clear, but one of the key realms of engagement of public policy would be in the mitigation of risks related with innovation. The recurring strategy behind this mitigation concerns public-private partnerships (PPP) which are facing renewed interests in light of the financial crisis. While the public sector is facing financial constraints, the private sector is less impeded but the financial sector is reluctant to lend in an environment that is suddenly risk adverse. PPP are thus perceived as an emerging paradigm that could help foster and diffuse innovation in a transport sector that traditionally has a low tolerance to risk.

Managing the Supply Chains: Greenness as an Innovative Business Opportunity

The theme of integration along supply chains consistently appeared through the debate with the issue of green logistics and the importance of information technologies perceived to be the most prevalent vectors of innovation. There is a growing correlation between economic efficiency and green logistics, mostly because applying green supply chain management strategies implies more efficient freight distribution practices such as using more energy efficient modes, sourcing to closer suppliers, revising packaging and incorporating recycling (reverse distribution). The concept of sustainability seems to be receding from the agenda not because its implications are being discarded, but because it has been incorporated within business models. The matter is focusing on how to operationalize sustainability through green supply chain management.

The consumption side appears to have one of the most significant environmental impacts, particularly in terms of energy used and waste generation. Some mass consumption goods such as tea and shampoo require more energy for their consumption than the energy required for their production and distribution. For such a category of goods, the greenness of their

logistical chain could be considered to be a relatively trivial issue. This leads to the consideration of the concept of total life cycle of a product, which could be an effective tool to discern what is effectively within the realm of green logistics and what is the consumption segment, which is outside the control of those involved in freight distribution. This is an important issue as it enables to more clearly assess the real environmental and energy impacts of transportation.

A suggested strategy to capture and quantify the total life cycle of a product was the usage of “carbon labels”, where consumers could be informed about the amount of carbon (mostly in terms of a conversion of the energy input) that went into the production and distribution of a product. It is expected that this may influence consumer preferences. Considering the flexibility and adaptability of modern freight distribution, the usage of carbon labels is a risky and misleading strategy. The same product could be shipped and sourced differently depending on the final market and could thus involve significantly different carbon levels. The “decarbonisation” of supply chains is thus a complex and risky endeavor, but the industry is becoming sensitive to the issue and willing to improve it.

A recurring statement made was that transportation was too cheap, which leads to wasteful distribution practices. This is a very fallacious argument since transportation costs have substantially declined in relative terms, mainly because of technical improvements, economies of scale and massive capital accumulation in infrastructures. The benefits brought by globalization, namely cheaper goods are numerous. It would be like someone complaining that he is using more electricity because it is produced more efficiently and in greater quantities, with all the benefits this implies. Such an approach is misleading at best and wasteful at worst. Higher costs are an indication that innovation is lacking and policies aiming at changing this would be damaging. Additionally, transportation costs vary substantially according to the concerned supply chains. While in clothing and apparel, transport costs are negligible in relation to the retail value, they are substantial for furniture. Correspondingly, the apparel industry is very footloose in its locational behavior while furniture manufacturing tends to stick closer to final markets. The point is that the transport costs elasticity of different supply chains varies in a complex manner and intervention on this price mechanism could lead to unintended consequences.

Several diverse strategies have been discussed in which green logistics practices could be better embedded within supply chains. For instance, port community systems have demonstrated that information systems can help stakeholders within a well defined cluster interact more effectively and create new market opportunities. The development of inland ports is also pursued by several stakeholders in freight distribution, notably port authorities. Among the benefits of such inland distribution strategies are the massification of flows through modes that are more energy efficient (e.g. rail and barges), lower congestion levels around port terminals and a better utilization of scarce port assets. Last and not least, the whole realm of city logistics is recognized to be one of the most challenging, but prone to very high levels of return in improving the greenness of supply chains. Since cities are the realm of the “last mile”, freight distribution in urban areas tends to be costly, unreliable and inefficient. Urban consolidation platforms are being considered in a number of cities, which could help promote a more rational use of scarce urban transportation assets as well as to promote home deliveries where logistic management strategies can be more comprehensively implemented.

Intelligent Transport Systems: Too Much Innovation, Not Enough Implementation?

ITS have an increasingly diverse role on transport systems. They underline the far reaching impacts of information technologies on the utilization of conventional transportation assets, namely through better mode and routing choice. What used to be a focus on specific segments and modes of the transport system is moving towards attempts to manage whole networks, which multiplies complexity but also the level of return. Information technologies are particularly well suited to deal with complexity. Yet, the business models of enterprises using ITS appears to be a neglected dimension of the problem since it underlines the issue of who owns the large amount of data generated by ITS and how this data could be shared between users, providers and regulatory agencies. An important observation is that ITS can play an important role in the internalization of transport externalities since more accurate information is available about the transport system usage and thus who should assume costs.

While safety is a main priority of ITS, it can have unintended consequences such as potentially more driver distraction to keep track of real-time information. The users essentially do not care about the bells and whistles of technology as they are concerned with pragmatic issues such as seamlessness, safety and reliability. Participants at the forum identified the most prevalent and promising fields of application of ITS, including: 1) incident management systems; 2) the management of scheduled events such as construction or sporting events; 3) intelligent parking where the user is assigned a slot immediately upon entry; 4) integrated fare systems where one tag is valid for a variety of facilities and a wide geographical area, which is essential to congestion and road pricing schemes; 5) vehicular navigation systems that go beyond global positioning systems by including real time congestion constraints, and; 6) using social networks to gather real-time information about the condition of the transport system, notably congestion.

A recurring theme concerned the issue that technologies were readily available but that implementation was often lacking. This begs the question to what extent the public sector can play a role in the implementation of ITS.

The Public Sector: Leading, Following or getting out of the Way?

The system perspective about transportation has conventionally incited the public provision of infrastructure and the regulation of its operating conditions, more than any other sectors. Several shortcomings regarding the role of the public sector in innovation have been discussed. For instance innovation is a continuous process while public policy is often based on programs within a defined timeframe. This timeframe does not necessarily correspond to the innovation diffusion cycle, but to political expediency. Still, it is expected that the public sector will provide a framework helping to foster the transition between innovation and implementation. This role is generally assumed through public procurement initiatives since the public sector can assume the risk of testing and demonstrating an innovation. Through collaborative agreements between public agencies at various administrative levels, the public sector can also help foster the diffusion of innovation. It is however acknowledged that the transfer of ideas within the public sector is problematic, particularly since the public sector tends to have a strong inertia.

Innovation can fail to deliver expected results (mainly market adoption), so lessons must be learned from mistakes. In the private sector, this lesson often comes through bankruptcy or a significant monetary loss since the investment does not pay off. Yet, the experience gained is often valuable and can lead to better opportunities, namely by redesigning the innovation. The

public sector tends to have a rather irrational behavior over the issue of failure since it also comes at a political price. It is thus uncommon that the public sector will admit failure (saving face) and learn from unintended consequences. This can lead to a future reticence to get involved in a related innovative project.

Another set of tools available to the public sector concern tax policy, regulatory policy and standards. Regulatory policy can particularly be contentious. In a globalized world, a very common public obstacle concern border crossings, particularly for freight. Representatives from the shipping and freight forwarding industries stated that regulatory regimes concerning security and custom clearance were often a serious and undue hindrance on global trade. Border crossing requirements and delays add substantial transactional costs. The financial crisis also represents a paradigm shift for public policy since in many cases public actors are substantially more financially constrained than before. This will incite innovation related to the role of public and private interests within transport systems.

Pathways to Innovation: Dead End Ahead?

A common saying in the political arena is that no good crisis should be wasted. In this light, the financial crisis can be perceived as one of the most fundamental driver of change for transport policy in recent decades. Yet, the forces of inertia are prevalent with the common perception that innovation is simply a political discourse prone with generalities and unintended consequences. There are several contexts where the public sector could narrow the diversity of innovation and gear them towards a dead end. One is that regulation essentially kills innovation as it protects existing interests, often more concerned with rent seeking, and creates barriers of entry for new firms. On the long term this can be costly as historical evidence underlines that innovation is fostered by small private firms that act as pioneers by claiming the productivity and market rewards of their innovations. They consequently become large firms, many of them multinationals. Another risk relates to the fact that picking “winners” is inconstant with innovation. Governments have often the reflex to do so since they can gear their taxation and regulatory policies accordingly. In this regard, the European Union is perceived to have an “elitist” approach to innovation where various governments see their role of imposing innovation from a “top down” perspective and expect the industry to follow. This notably stems from the heavy involvement that European states had until recently over transport systems as owners, operators and regulators. Again, history demonstrates that innovation is much more a “bottom up” process.

While public policy tends to have a monolithic and exclusive perspective about innovation, innovation is commonly pluralistic and inclusive. The well known saying that “necessity is the mother of all invention” could thus be amended to “variety is the mother of all innovation”. It has been underlined that the promotion of national competitiveness is a bias since innovations are not a zero-sum game. An innovation in one country does not come at the expense of others. Quite the contrary, the diffusion of innovation promotes across the board improvement in productivity, but the inequality of this diffusion leads to national differences in productivity.

As a strategy to foster innovation, standards are a double-edged sword. First, they are inevitable and must be accommodated. They are an essential step in the innovation process by favoring a convergence of practices and the productivity this entails (ISO standards are salient examples). Second, they come at the risk of path dependency since a standard locks technology in a specific direction. This ambiguity is at the core of much of the uncertainties

related to innovation and its dissemination, particularly in the transport sector which is prone to standardisation.

Disseminating Innovation: Revising Expectations

Innovation is commonly more about politics than about technology, with means that expectation must constantly be revised. Innovation involves a learning curve and as an institution progresses along this curve the market potential of the innovation changes. Since public-private partnerships are being advocated as a realm of engagement, they involve a learning curve for both partners. One important aspect to insure that both partners succeed concerns the setting of clear goals and responsibilities, particularly if there is a significant asymmetry in terms of power relations. This can be problematic for developing countries as the private actor is commonly much more knowledgeable than the public actor. While the private actor may be able to negotiate an advantageous partnership, a weak public actor could create problems later on by being unable to accommodate effectively new challenges such as the expansion of infrastructures. This has notably been observed in the port terminal sector where in view of a weak public actor, expansion projects were curtailed because the private terminal operator was unable to secure additional land. It is therefore important to make innovation or the PPP acceptable to the public and try to anticipate changes in contract conditions. A consensus appears to be emerging that the clauses pertaining to PPP should be flexible and even permitting the renegotiation of contracts as the expectations of both partners is expected to change with economic, social, political and technological conditions.

Down to Business: Making Effective Public and Private Partnerships

In addition to have changed the geographical scale of production and consumption, globalization has also changed its temporal scale. The world has become a “24 hour” economy where markets, particularly for the transport and financial sectors, are continuously in operation. This post-fordist paradigm is in contradiction with the enduring fordist 9 to 5 workday. While there are physiological circadian limits to more flexible working hours, the potential remains to be expanded further with positive impacts on urban transport infrastructures by temporarily distributing the demand.

Evidence underlines that if innovation remains stranded by regulatory and taxation policies, the private sector eventually leaves zones of inertia to areas judged to be more supportive. This is a salient challenge for OECD countries where the public sector is increasingly been perceived as stringent, inflexible and prone to rent seeking behavior to cover stupendous social welfare and entitlement policies. The paradigm must be broken for a new partnership to be established and ensure that innovation continues to be the remarkable engine of growth and improvement in quality of life it has been since the industrial revolution.

The possible strategies to implement for such a new paradigm remained elusive in the discourse during the forum. Transportation remains a murky area between private and public interests, but intermodal integration was perceived to be a game changing event that would create multiplying effects. This ranges from a better maritime / land interface for the shipping industry to better interconnection nodes within public transit systems. It was positively noted that consumer behavior is changing, such as a higher prominence of public transit use among the younger generation (less than 39 years). If this factual observation becomes a trend, then

markets are going to be created to accommodate it and the relations between the public and private sectors will change accordingly. The business model – supplying the demand – is therefore an ever changing component of transport systems.

Concluding Observations: Reality Check

An impressive variety of issues related to transport innovation were discussed at the forum. Some were speculative and full of promises while others were already implemented and subject to improvements. Although the following points were not directly discussed, they are expected to be relevant to the context in which transport innovations will take place in the coming years:

- Horizontal and vertical diffusion of innovation. The forum has dominantly focused on the horizontal diffusion of innovation; between public and private actors (ex. PPP), between nations and between different levels of government. Little was said about the vertical diffusion of innovation, which concerns the means of its transmission between actors. New technologies have to be assimilated by their users and managerial practices incorporated in the business model. Knowledge and expertise have to be transmitted through institutions, particularly when there is a constant rotation of personnel (such as within the political realm). Innovation is also pedagogy.
- Innovation is an exercise in unintended consequences. All past transport innovations underline that at their introduction their societal and market potential could only be speculated and were most of the time underestimated. The same applies to future innovations, although their impacts can be more realistically assessed. There is a constant shift in the priority of transport policies that reflect changes in political preferences and concerns. The outcome is that the impacts of transportation in general and innovation in particular are either exaggerated or undermined. One such issue concerns climate change that has been subject to much debate and alarm; it may be an overstatement.
- Fiscal and welfare costs are going to be powerful inertial forces to innovation. The financial crisis that unfolded in 2008 underlined a significant lack of understanding of economic cycles and the accommodative policies of central banks and their impacts on the transport industry. With this in mind, the currently unfolding sovereign debt crisis and unsustainable welfare costs (e.g. pension and healthcare benefits) will seriously curtail state budgets and trigger some forms of sovereign defaults and even confiscation. Many governments will have limited options to invest in infrastructure and technology and will seek some “frugal” forms of innovations. Although scarce financial resources can be a vector for innovation, the public sector is very likely to respond with coercive policies such as capital control and trade restrictions.