

## RETHINKING URBAN MOBILITY IN DEVELOPING COUNTRIES

*Beti ANGELEVSKA*<sup>1</sup>  
*Vaska ATANASOVA*<sup>2</sup>

<sup>1)</sup> Department for transport and traffic, Faculty of  
Technical Sciences, Bitola, R.N. Macedonia

<sup>2)</sup> Department for transport and traffic, Faculty of  
Technical Sciences, Bitola, R.N. Macedonia

### Abstract

*Many countries, particularly in the developing world, are experiencing growth, development and urbanization at an unprecedented scale. These changes affect every aspect of their economy, society and environment.*

*Rises in the demand for the transportation of goods and people will increase the impacts of transport in terms of detrimental effects to people and the environment. Many of these effects like air and noise pollution, congestion and health effects are felt in urban areas in developing and emerging countries in particular. Thus, strategies and new approaches are needed to support sustainability in transport, and for developing countries, would be of much help for achieving the goals of sustainability. Hence, this paper elaborates such an approach in urban mobility: Avoid-Shift-Improve (A-S-I) approach. The concept of A-S-I is a fundamental guiding principle for the development and implementation of strategies and instruments to promote sustainable urban mobility, considering that urban mobility needs to provide mobility opportunities for all.*

**Key words:** sustainability, transport, A-S-I approach.

### 1 INTRODUCTION

Mobility is a key prerequisite for social and economic development. An efficient transport infrastructure is vital for economic production, trade and the movement of goods. Mobility facilitates access to markets, jobs, education and health care. In emerging economies and developing countries, it is crucial for poverty reduction [1].

However, today's culture of mobility – particularly the Western model to which many developing countries aspire – is unsustainable [1]. It is based on the notion that building more transport infrastructure – and creating more traffic – is the way to promote prosperity and development.

Unsustainable transport causes severe problems including pollution, energy consumption, accidents, rises inequity, declines quality of life and causes other threats associated with climate change. All these negative side effects harm people and the environment. It is expected that both the overall emissions and the demand for energy in transport will continue to rise in the next decades unless appropriate policy measures are introduced [2].

In order to achieve an equitable and sustainable model of mobility for the future, a step forward in transport policy is essential. Thus, urban mobility issues are of foremost importance to support the mobility requirements and require new approaches. The aim is to enhance the capacity of local decision makers and urban/transportation planners to formulate and implement appropriate policies that contribute to sustainability in urban transport in developing countries.

Strategies to make transport more sustainable should be designed to achieve a wide set of objectives using comprehensive combinations of available policy instruments. Any concept attempting to make mobility more sustainable works differently in developed and developing countries and even within these country-groups [2].

The concept of Avoid-Shift-Improve (A-S-I) is widely accepted as a guideline for policies to promote sustainable mobility [2]. This means that transport policy should (in this order) attempt to reduce the need to travel and shorten trip lengths, promote a shift to sustainable modes and to improve the sustainability of all modes.

The Avoid-Shift-Improve (A-S-I) approach allows an analysis of the important issues of sustainable transport including transport demand management, improved public and non-motorized transport, environmental protection, road safety, and gender in transport. In order to achieve sustainability, it also provides some means such as economic and financial instruments, institutional improvements, capacity building, regulation of markets and environmental standards.

The A-S-I approach will promote sustainable urban mobility, implemented as a policy intervention or as a long-term strategy in order to minimize negative effects caused by transport suggesting and recommending appropriate measures for developing countries.

### 2 EMERGING AND DEVELOPING COUNTRIES: THE CONTEXT OF URBAN MOBILITY

In the space of just a few decades, urban areas across the world, in both developed and developing countries have become increasingly automobile-dominated and less sustainable. In developing countries in particular, cities have experienced a rapid growth in transport-related challenges, including pollution, congestion, accidents, public transport decline, environmental degradation, climate change, energy depletion, visual intrusion, and lack of accessibility for the urban poor [3]. In more developed countries, particularly in Northern Europe, some cities have witnessed a trend of reclaiming urban space from the automobile and prohibiting cars from major parts of downtown areas and/or confining them in other ways [3].

In the coming decades, it is expected that approximately 90% of the planet's population growth will occur in the cities of developing countries [4]. These cities are struggling to meet the increasing demand for mobility and investment in transport.

Emerging economies and developing countries face a multitude of mobility challenges. In urban areas with a high population density and businesses concentrated in a relatively confined space, traffic congestion is generally the main problem. Combined with inefficient infrastructure, this causes time and productivity losses and is already having a severely detrimental effect on economic development [1].

Besides the lack of integrated strategies and solutions, there is generally also a shortage of reliable data and survey techniques as a basis for solving problems [1]. Planners also lack the evaluation skills needed to assess whether measures adopted have been successful and learn lessons, theoretical and practical, from mistakes and failures. As a consequence, many cities are trapped in a vicious circle. They steadily expand their infrastructure, sacrificing more and more valuable urban space and producing even higher levels of congestion, noise and emissions, which they then try to combat using the same methods as before [1].

The subject of sustainability in transport offers a wide array of pressing questions. Hence, there is a pressing need to improve the sustainability of transport in order to reduce all its impact on environment and economic growth. Also, it should be considered that emerging approaches are those that should be first choice during the planning of urban mobility (table 1).

**Table 1** The changing landscape of urban mobility

Conventional approaches	Emerging approaches
Supply and capacity	Demand management and resilience
Focus on mobility	Accessibility
Street as road for vehicles	Shared between all modes
Physical dimensions	Social dimensions
Vehicle-oriented	People-oriented and customer-focused
Motorised transport	Hierarchy of modes
Travel as a derived demand	Travel also a valued activity
Minimisation of travel times	Reliability of travel times
Petrol taxes/vehicle registration fees	User-pay models
Private car ownership	Car-sharing and ride-sharing

Source: [5]

In short [6]:

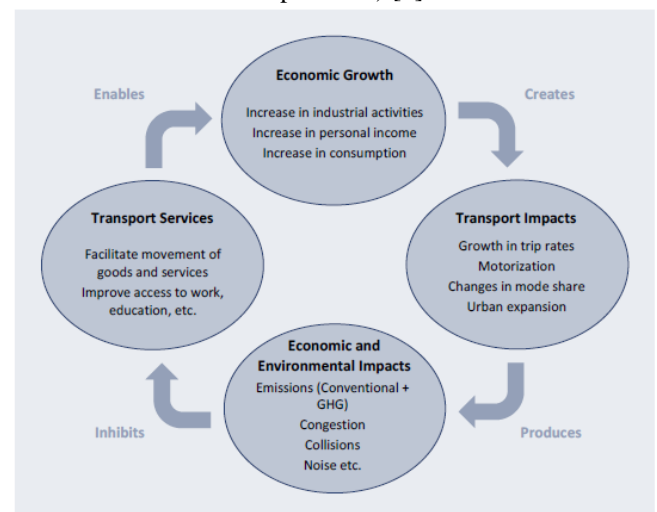
- Politicians, government institutions and planning processes need to emphasize accessibility over mobility.
- Cities need to be more compact, encourage mixed land use, and prioritize sustainable modes of mobility such as non-motorized transport, in order to develop sustainable mobility systems.
- Improved urban planning will be critical in designing and retrofitting cities to better accommodate sustainable modes.
- Policies to encourage sustainable urban mobility must take into account social, environmental, economic and institutional dimensions of sustainability. This calls for more inclusive framework for the planning, design and provision of urban mobility systems and services.

Today, the development of sustainable transport, including the delivery of accessible, cost effective and sustainable mobility, represents a major challenge for many countries [4]. This involves the requirements for safe, inclusive, resilient and sustainable transport, all of which go hand-in-hand with more stringent requirements in terms of safety and security, reducing the impact on the environment and climate change, and improving energy efficiency.

### 3 SUSTAINABLE TRANSPORT: SIGNIFICANCE AND BENEFITS

Sustainable transport is linked to many other sectors, complicating the analysis and resulting policies. Sustainable mobility in general takes account of economic, social and environmental aspects.

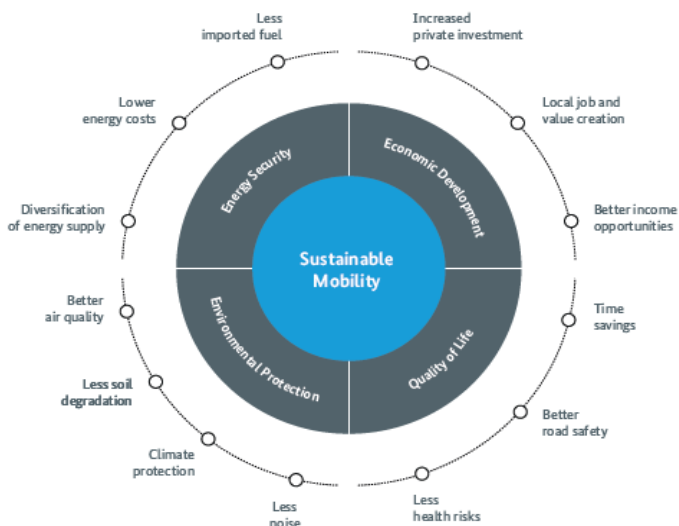
Figure 1 illustrates the challenges of making mobility sustainable. Transport has a number of direct benefits and plays a crucial role in the economic development of societies, thus enabling economic growth. However, this has repercussions, most notably on settlement structures and negative externalities in terms of CO<sub>2</sub> and air pollutant emissions, congestion and health impacts (caused by accidents or air and noise pollution) [2].



**Fig. 1** The challenges of making mobility sustainable

Source: [2]

A sustainable transport system provides goods and services to all inhabitants of an area, is affordable, safe and efficient and protects the environment and its services [2]. The benefits of sustainable mobility are given at next figure.



**Fig. 2** Benefits of sustainable mobility  
Source: [7]

The challenge to make transport sustainable stems from the observation that transport services enable economic growth, creating transport impacts, which in turn produce economic and environmental impacts, which thereby might inhibit transport services and quality of life [2].

#### 4 NEW APPROACH TO SUSTAINABLE MOBILITY: THE AVOID – SHIFT – IMPROVE (A-S-I) APPROACH

How can we avoid unnecessary traffic and shorten journeys? How can we ensure that bus and rail travel and cycling become competitive alternatives to the private car? And how can we reduce the overall volume of traffic, both passenger and freight? The answer is to create multi-functional compact cities with short distances, integrated transport systems in urban areas and optimized policies. This type of strategy will safeguard the supply of goods, facilitate equitable access to markets, jobs and cultural amenities, and boost political participation [1].

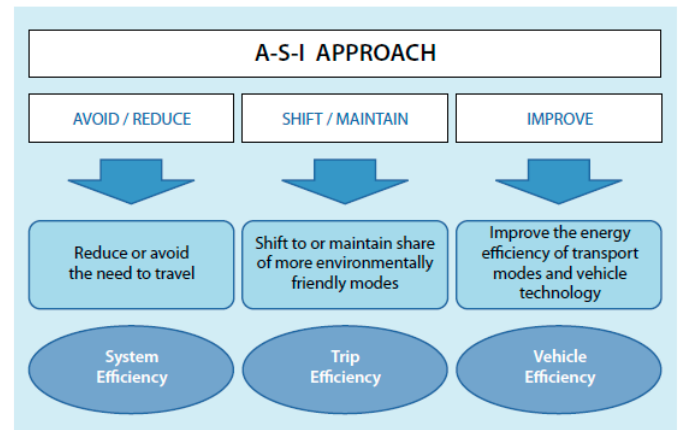
This should be combined with a visionary approach to urban design which puts people first and helps to reestablish urban spaces as meeting points for recreation, social interaction and exchange. This radical new approach not only involves the transport sector: it must encompass the related areas of urban and spatial planning, architecture, and economic policy.

The transport sector must support this transformation with appropriate policy strategies. A significant role, in this context, is played by the Avoid-Shift-Improve (A-S-I) approach [1].

The A-S-I approach entails three main pillars [8]:

1. Avoid/reduce
2. Shift/maintain
3. Improve.

Firstly, “avoid” refers to the need to improve efficiency of the transport system. Through integrated land use planning and transport demand management the need for travel and the trip length may be reduced.



**Fig. 3** The concept of A-S-I approach  
Source: [8]

Secondly, the “shift” instruments seek to improve trip efficiency. A modal shift from the most energy consuming urban transport mode (i.e. cars) towards more environmentally friendly modes is highly desirable. In particular, the shift towards the following alternative modes [8]:

- non-motorized transport (walking and cycling): they represent the most environmentally friendly options
- public transport (bus, rail, etc.); although public transport also generated emissions, lower specific energy consumption per km and higher occupancy levels imply that the associated CO<sub>2</sub> emissions per passenger km are lower compared to cars.

In many developing and emerging countries active and public transport are the main modes of transportation. Governments should seek to maintain and further improve this situation [7].



**Fig. 4** The A-S-I approach through pictures  
Source: [7]

Thirdly, the “improve” component focuses on vehicle and fuel efficiency as well as on the optimization of transport infrastructure. It pursues to improve the energy efficiency of transport modes and related vehicle technology [8]. Furthermore, the potential of alternative energy use is acknowledged.

The A-S-I approach follows a hierarchy: “avoid” measures should be implemented first, secondly “shift” and finally the “improve” measures.

Concepts that aim to make mobility more sustainable work differently in developed and developing countries (table 2).

**Table 2** Avoid, shift and improve and the state of economic development

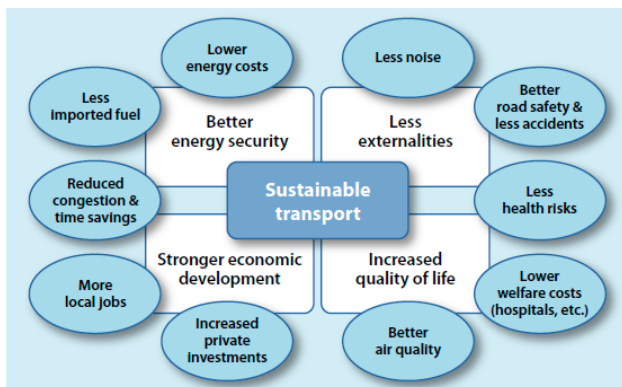
Principle	Developed countries	Developing Countries
Avoid	Reduction of vehicle kilometres travelled	Avoid generation of vehicle kilometres travelled
Shift	Shift from private vehicles to public transit and non-motorized transport	Prevent shift from public transit and non-motorized transport to private vehicles
Improve	Amend and downsize existing vehicles	Make future vehicles as clean as possible and discourage the up-sizing of vehicles

Source: [2]

The decisive distinction is that individual transport has to be reduced in developed countries whereas its growth has to be curbed in developing countries [2]. In both cases technological developments play a supporting role.

## 5 BENEFITS OF THE A-S-I APPROACH

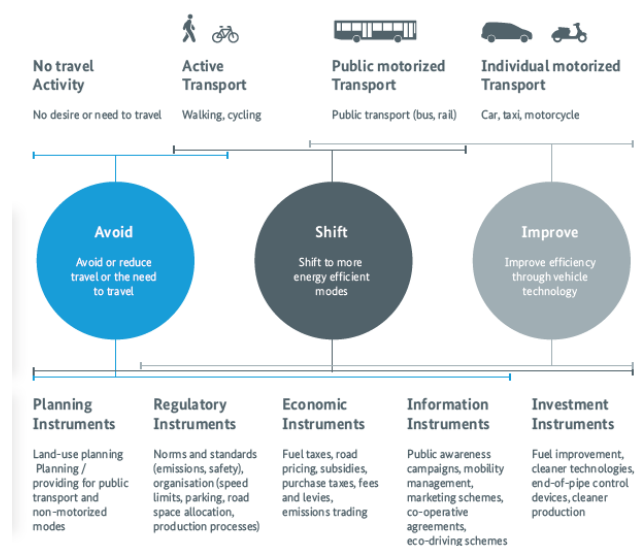
The benefits of improving the three aforementioned dimensions – transport demand, mode choice and technology – can be substantial. The A-S-I approach has the potential to contribute to emissions reduction beyond current expectations [8]. Vitalization of public spaces, better urban air quality and many other important co-benefits can be expected from the application of the A-S-I approach.



**Fig. 5** Benefits of the A-S-I approach

Source: [8]

The policy instruments in the Avoid-Shift-Improve (A-S-I) approach can be categorized into planning, regulation, technological measures, economic incentives and information (figure 6) and they differ in their ability to reduce the need to travel, induce modal shift or improve transport efficiency [2].



**Fig. 6** Instruments in the A-S-I approach

Source: [7]

The Avoid-Shift-Improve approach helps attract diverse stakeholders and build support for political and institutional reforms [4].

**Strategies to Avoid unnecessary travel and reduce trip distances [4]:**

- formally integrate land-use and transport planning
- achieve mixed-use development and medium-to-high densities along key corridors
- institute policies, programs and projects as a means to reduce unneeded travel.

**Strategies to Shift towards more sustainable mobility solutions [4]:**

- improve public transport services
- require non-motorized transport components in transport plans
- reduce the urban transport mode-share of private motorized vehicles
- achieve significant shifts to a more sustainable supply of mobility services.

**Strategies to Improve transport practices and technologies [4]:**

- diversify towards more sustainable transport fuels and technologies
- set progressive, appropriate and affordable standards for fuel quality, efficiency and emissions
- establish effective vehicle testing and compliance regimes
- adopt intelligent transport systems
- achieve improved freight transport efficiency.

The Avoid-Shift-Improve approach provides a framework for prioritizing solutions to maximize benefits of sustainable transport [4].

## 6 NEXT STEPS

Recommendations for sustainable mobility are given in three categories, for implementation by national and local governments and all related public and private stakeholders. By implementing these recommendations, international organizations, businesses and civil society organizations

will also have a role to play. The recommendations relate to [4]:

a) *Policy planning*: creating supportive institutional, legal and regulatory frameworks; making transport policy and investment decisions based on social, environmental and economic dimensions; developing sustainable transport systems and the technical capacity of transport planners and implementers, especially in developing countries; improving road safety through legislation and public policy; engaging people as partners for advancing sustainable transport solutions.

b) *Financing*: promoting the diversified funding sources and the coherent, constructive funding, charging and fiscal frameworks that sustainable transport systems and projects need; participation of private capital; increasing international development funding, including climate funding by international organizations and multilateral development banks.

c) *Technology*: promoting sustainable transport and energy innovation and technologies while staying as neutral as possible; this should include direct government investment and policies that enable and encourage private sector investments through various incentives and incentive-supporting structures.

## 7 CONCLUSION

The rapid and often unplanned and uncoordinated growth of urban areas has seriously compromised existing transportation systems and significantly increased the challenge of creating new transportation systems, especially in developing countries. The environmental and social impacts are significant and directly related to quality of life and urban productivity in these countries.

Relying solely on technical innovations, alternative fuels or specific modes of transport will not solve the problems described [1]. The only solution which offers a genuine prospect of success is an integrated package of measures aimed at avoiding unnecessary travel, reducing distances, providing the most sustainable forms of passenger and goods transport, and maximizing the efficiency of transport systems with technological innovations and alternative technologies [1]. Strategies to change public attitudes and encourage acceptance of sustainable forms of mobility have a key role to play.

There is no single dominant instrument nor is there a single solution for all national and regional contexts [2]. The complexity of urban transport policies calls for integrated and comprehensive programs that take regional and even city-specific circumstances into account.

Inspired by the principles of sustainability, one alternative approach focuses on the mobility needs of people instead of car infrastructure. The approach, known as A-S-I (from Avoid/ Reduce, Shift/Maintain, Improve), seeks to achieve significant greenhouse emission reductions, reduced energy consumption, less congestion, with the final objective to create more livable cities [7].

This means that transport policy should (in this order) aim to reduce the need for transport and shorten trip distances, promote a shift to more sustainable modes and improve vehicle and system-level efficiency through technological innovation and alternative fuels [2].

The Avoid–Shift–Improve approach provides a framework for prioritizing solutions to maximize the benefits of sustainable transport. The A–S–I approach is increasingly accepted as a useful framework within which to take action in support of sustainable transport [4].

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