

Improving Road Safety Transfer from Highly Motorised Countries to Less Motorised Countries

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ABSTRACT

The global road toll is estimated to be about 1 million fatalities each year, with the majority occurring in less motorised countries. As these countries motorise, sometimes quite rapidly, this figure is expected to rise. The transfer of road safety knowledge and expertise from highly motorised countries to less motorised countries is advocated by international agencies such as the World Health Organisation; however, the mixed successes of road safety transfer efforts are also acknowledged.

This paper presents a ‘road safety space’ model and method for improving road safety transfer, based on research conducted in two Southeast Asian countries. The model recognises that road safety problems and countermeasures are influenced by factors which lie outside the immediate context, both in the recipient country and in the country in which a particular countermeasure has proven to be effective. A method is outlined for the documentation and analysis of these factors, to enable a more considered approach to road safety transfer and a greater likelihood of success.

INTRODUCTION

Countries can be classified according to income level (low/middle/high, e.g. World Health Organisation 2004), level of motorisation (less/highly, e.g. Mohan and Tiwari 1998), or economic development (developed/developing/transitional/newly industrialised, e.g. Asian Development Bank 1998b, Jacobs et al 2000). These classification systems overlap to a large extent, such that highly motorised countries are usually those with high incomes and developed economies. Countries also differ in terms of road safety. The road safety picture is better in highly motorised countries (Jacobs et al 2000; Mackay 2000; World Health Organisation 2004), which account for a minority (10-16 per cent) of the estimated annual global road traffic toll of 0.75-1.2 million fatalities and 23-50 million injuries (Jacobs et al 2000; World Health Organisation 2004). Fatalities are predicted to rise to somewhere between 1 million and 2.34 million by 2020 overall (Murray and Lopez 1996; Jacobs et al 2000; Kopits and Cropper 2003, cited World Health Organisation 2004). Less motorised countries – on top of their majority share of fatalities – are expected to show the greatest proportional increase in road fatalities and injuries (Murray and Lopez 1996), especially those in Africa and the Asia/Pacific region (Jacobs et al 2000). In response to this large and increasing problem, the World Health Organisation has recommended that:

In developing countries...the priority should be given to the import and adaptation of proven and promising methods from developed nations, and a pooling of information as to their effectiveness among other low-income countries. (World Health Organisation 2004:12)

At the same time, others sound a cautionary note:

The numerous success stories of the developed nations cannot be simply implanted and implemented in these [developing] countries and, as a result, tackling the problem will require innovative research. (Davis et al 2003:vii)

This paper describes an approach to the transfer of road safety knowledge and expertise which has been applied in two case studies of road safety transfer in Southeast Asia. It is drawn from doctoral research conducted by the author (King 2005).

THE 'ROAD SAFETY SPACE' MODEL

The 'Road Safety Space' model is an ecological approach to road safety transfer which was developed in the course of research into the factors which contribute to the success of transfer of road safety measures shown to work in Western countries to less motorised countries in Asia (King 2005). While transfer of road safety knowledge and expertise from highly motorised countries to less motorised countries is recommended by agencies such as the World Health Organisation (2004) and the Asian Development Bank (1998a), little attention is devoted to the process whereby transfer efforts should take place. The literature was searched for best practice approaches to road safety transfer, focusing in particular on experiences in Asia. The lack of literature in this area meant that the net was spread wide, ultimately including more than 40 sources ranging from those which dealt with quite specific road safety measures and road user groups (e.g. the black spot treatments in Baguley and Mustafa 1996), up to very broad approaches (e.g. the broad injury approach in Peden et al 2001).

No evaluations of the transfer process were reported as having been conducted, and there were relatively few evaluations of the success of transferring particular road safety measures themselves. Instead, the references made recommendations as to the kinds of road safety measures which should be introduced, i.e. a list of best practice road safety measures, as opposed to identifying best practice for *transferring* road safety measures, i.e. ensuring that the transfer process provides the greatest opportunity for the road safety measure to succeed. At best, the indirect accounts of road safety transfer used in these sources constituted a 'recommended practice' approach, not 'best practice' (King 2005).

A common element across these sources was the recognition (partial in some cases) that the *context* is important, i.e. that there are factors in the recipient country which will influence the success of road safety transfer. A detailed analysis of these 'recommended practice' documents was undertaken in order to abstract the contextual factors which were explicitly or implicitly considered to have an influence on the success of transfer of road safety measures. The factors which emerged could be roughly classified as *economic*, *institutional*, and *social and cultural*. It is important to note that these factors are *not mutually exclusive*. The rationale for the categories chosen was ultimately arbitrary, although defensible:

- The *economic* arena can bring into consideration resource constraints on road safety transfer as well as global economic and aid relationships, which are relevant to road safety transfer through the role of the World Bank and the Asian Development Bank.
- *Institutional* issues deal with the organisation of road safety and its implementation, i.e. the way resources are managed and the structures involved.
- This has much to do with the formal relationships between structures involved in, or influencing, delivery of road safety, and with the practical issues stemming from how agencies work.
- *Social and cultural* factors are less formal, and apply more broadly to all road users. People in institutions also have social and cultural characteristics which influence the functioning of the institutions, just as institutional characteristics influence how funds are spent on road safety, and economic characteristics influence how road users react to road safety issues. Such an overlap cannot be avoided.

The factors were also classified in terms of how broadly they apply (according to the recommended practice literature): *globally* or in relations between a government and outside governments and organisations; *nationally* or mostly nationally, applying outside the transport sector as well as within it; to the *transport* sector outside of road safety; and to *road safety*. Table 1 (an edited version of a table in King 2005) provides examples drawn from the documents.

Table 1: Examples of contextual factors from recommended practice documents

	Economic	Institutional	Social and cultural
Global	Macroeconomic situation International business or aid constraints	International business or aid constraints	
National	Economic development/ national wealth/productivity Private sector capability	Policy and legal framework Institutional capacity/ capability and commitment	Social conditions Power relations
Transport	Motorisation	Road infrastructure/facilities Financial and technical resources, expertise and training needs	Proportion of nonmotorised road users Existing perceptions
Road safety	Road safety spending compared with other transport spending Organisational funding specifically available for road safety	Relative priority of road safety Road safety organisational infrastructure	Historical context and social acceptability of legislation and enforcement Cultural definitions

Developing a model to incorporate these contextual factors in a meaningful way presents two main challenges. The first is the need to account for macro-micro linkages, for example, how globalisation might affect the wearing of motorcycle helmets within a country. The second challenge is the need to bring such a diverse range of factors within a single framework. A number of theoretical perspectives were canvassed for their possible applicability to road safety transfer, either directly or through adaptation. They were drawn from the broad areas of development, anthropology, risk, globalisation, public health, injury control and community involvement. None were found to capture both the macro-micro linkages required by a model of road safety transfer, and all the types of factors which need to be incorporated. This pointed to the need for development of a hypothetical model of road safety transfer which could then be investigated.

The starting point was the definition of the *road safety space*, a theoretical concept:

Each road safety issue in a given country exists in a *space* defined by the economic, institutional, social and cultural factors which influence it. The factors include both broad and specific influences. The *road safety space* varies from one road safety issue to another, and from country to country, although some factors may be shared across road safety issues or across countries.

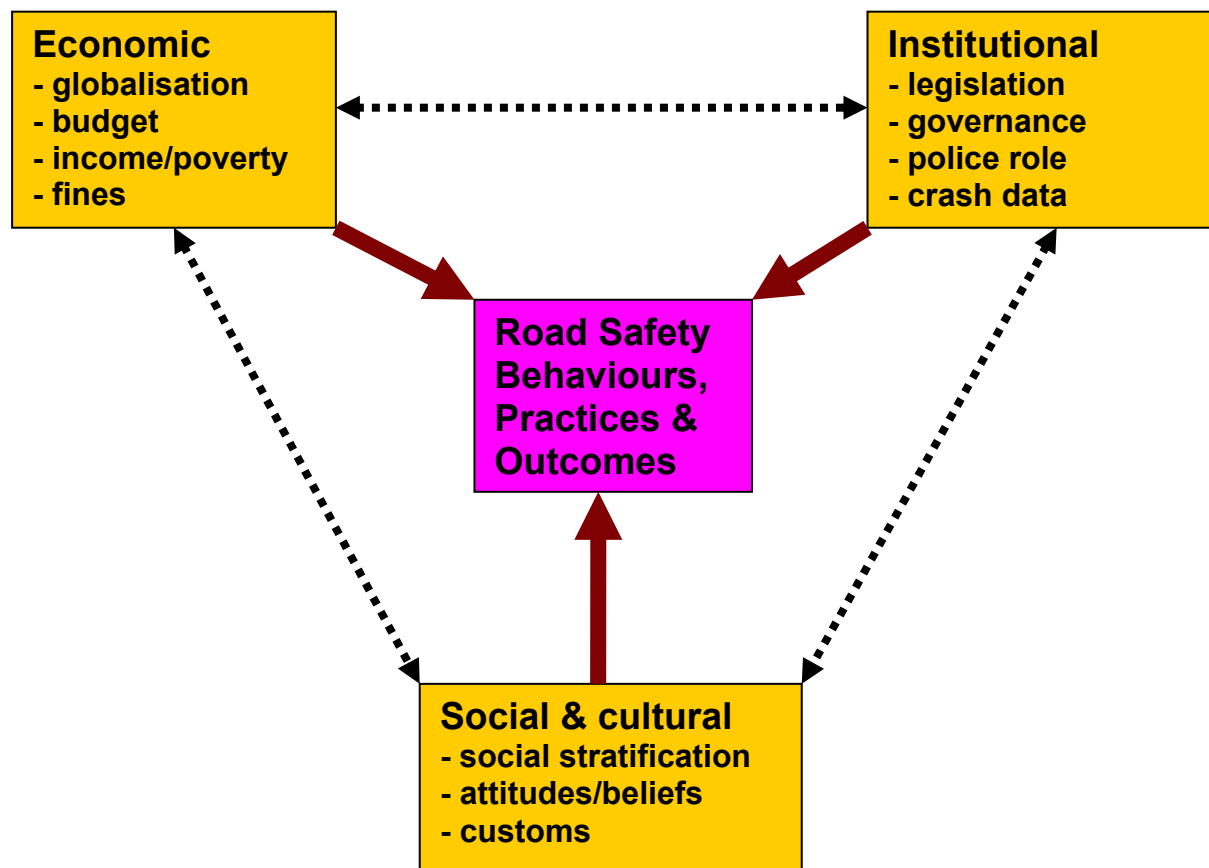
For example, intersection crashes in a country have their own road safety space, comprising the economic, institutional, social and cultural factors which influence the incidence and severity of intersection crashes.

This hypothetical model was influenced by a metaphor of biological adaptation, in which the road safety space in a particular country is conceived of as a kind of ecosystem. The transfer of a road safety measure to the country in the hope of making an impact on the road safety problem is analogous to introducing an outside species in the hope of changing some of the features of the ecosystem. The success of the transfer will depend on several factors. First, an understanding is needed of how the ecosystem functions in producing the outcomes evident in it. Second, an understanding is needed of how the introduced organism functions. Third, a notion is needed about how the introduction of the new species will change the pattern of relationships in the ecosystem.

In terms of this biological metaphor, successful transfer of a road safety measure requires an understanding of how a country's road safety space functions, how the measure itself functions in its originating country, and how its introduction will interact with pre-existing road safety systems and phenomena.

Figure 1 shows the model, with its three main categories of inputs. The arrows between these three sets of factors represent their interactions with each other. Each set of factors includes both macro and micro elements, and each interacts with the other. The net effect of this web of influences and interactions in the road safety space is a set of road safety behaviours, practices and outcomes.

Figure 1: Model of the 'road safety space' of contextual factors



The process which would be followed in road safety transfer, using the model, would be (for the road safety issue of interest):

1. Use the model to identify the contextual factors which influence the issue of interest.
2. Nominate candidate countermeasures which have been shown to be effective in the West.
3. Use the model to identify the contextual factors which influenced the success of these countermeasures.
4. Determine whether – given the context in the recipient country – these countermeasures are likely to be successful as they stand, or only after adaptation to local conditions, or only if the local context can also be changed, or not at all.

USING THE ‘ROAD SAFETY SPACE’ MODEL: CASE STUDIES

Ideally, the model would have been applied to a new project and used throughout. In practice, it was necessary to use the model in a semi-retrospective manner for projects which were already well under way. For this reason, the aims of the case study research were restricted to an assessment of the utility and feasibility of the model, i.e. would the model have been useful in helping achieve more successful transfer if it had been applied from the beginning of the project; and given the nature of the information required, would the use of the model have been feasible under the circumstances.

Two case studies were undertaken in two Southeast Asian countries. The first case involved the development and implementation of a road safety education course by foreign consultants (the “transfer agents”) with funding through the World Bank.

The second involved the implementation of a range of initiatives aimed at increasing helmet wearing, conducted by a non-government organisation (the transfer agents) with close government links, funded mainly by international philanthropic organisations, with staff being either local or with long experience in the country.

A case study approach was considered best suited to this kind of inquiry (Stake 2005). For each case there were three phases:

1. Background research: establish a general picture of the road safety space from existing sources.
2. Data collection:
 - in-depth interviews with key informants and others involved in the cases;
 - analysis of the content and themes in documents related to the cases; and
 - observations of the road use environment.
3. Data analysis:
 - transcribe interviews, enter transcripts, notes on secondary sources and observations into files for analysis;
 - extract themes relating to contextual factors from the data collection;
 - establish which contextual factors were known and/or taken into account; and
 - establish which contextual factors contributed to the success of transfer.

Identification of key informants took place by snowballing, starting with the transfer agents. A semi-structured questionnaire was developed, and was used mainly as an aide-memoire to ensure basic issues were covered. Some informants were interviewed more than once, and on separate visits more than a year apart. Tape recording was initially planned, but replaced by note-taking on advice from project staff. Publications, presentations and other material generated by the project teams, about the development of the transfer project and in particular the problem analysis phase, were solicited from informants. All material was examined for the acknowledgment of contextual factors and the actions taken to address identified factors, and cross-referenced with the interview material. Observations were recorded on the transfer cases and the broader road use environment in the country. Some observations were “passive” and others “active” (Spradley 1980). The data were analysed qualitatively with the assistance of NVivo (QSR International 2000). A form of thematic analysis was employed. The interview transcripts formed the primary data source, and the secondary sources and observations were analysed mainly for confirmatory or contradictory information, or to address questions which emerged from the interview data.

RESULTS

There is too much information to allow for a detailed exposition of the results, so examples will be cited. Table 2 presents the influencing factors identified in the school education case through analysis of the themes which emerged from the transcripts, secondary sources and observations.

They are classified in several ways: whether they are primarily economic, institutional, or social and cultural; how broad they are (which relates to the categories in Table 1); the degree to which they overlap with other areas (e.g. economic overlapping with institutional); whether the transfer agents knew about these influencing factors; and whether they used the factors they knew about, i.e. whether they took into account (in the transfer process) the factors that they knew had an influence on the road safety issue of interest (in this case, road use behaviour of school children). It is also noted that the transfer agents assumed the existence of several influencing factors which the author's research did not support.

The important points to note in Table 2 are that the use of the model led to the identification of influencing factors of which the transfer agents were not aware, or misperceived, and that the transfer agents were more successful in some areas than in others. Social and cultural factors stand out in this respect, possibly because the transfer agents were foreign, and local cultural constraints meant that they were unlikely to be made aware of any misconceptions.

Figure 2 presents a summary diagram of the road safety space in the motorcycle helmet case. It is a way of presenting the same information as in the tables in a spatial form, which provides a more convenient way of illustrating where the influencing factors lie with respect to breadth and the overlap between categories. Unlike the school education case, it can be seen that most of the factors in the road safety space were known to the transfer agents. However, in the school education case the transfer agents took account of almost all the factors known to them, while in the motorcycle helmet case the opposite happened.

The diagram indicates that the transfer agents had greater knowledge in some areas than others, but also makes it clear that there were a number of influencing factors which should have been taken into account. These tended to concern the passing and enforcing of legislation, and a later follow-up confirmed that failure to take account of these factors had interfered with successful implementation of the helmet program (King 2005).

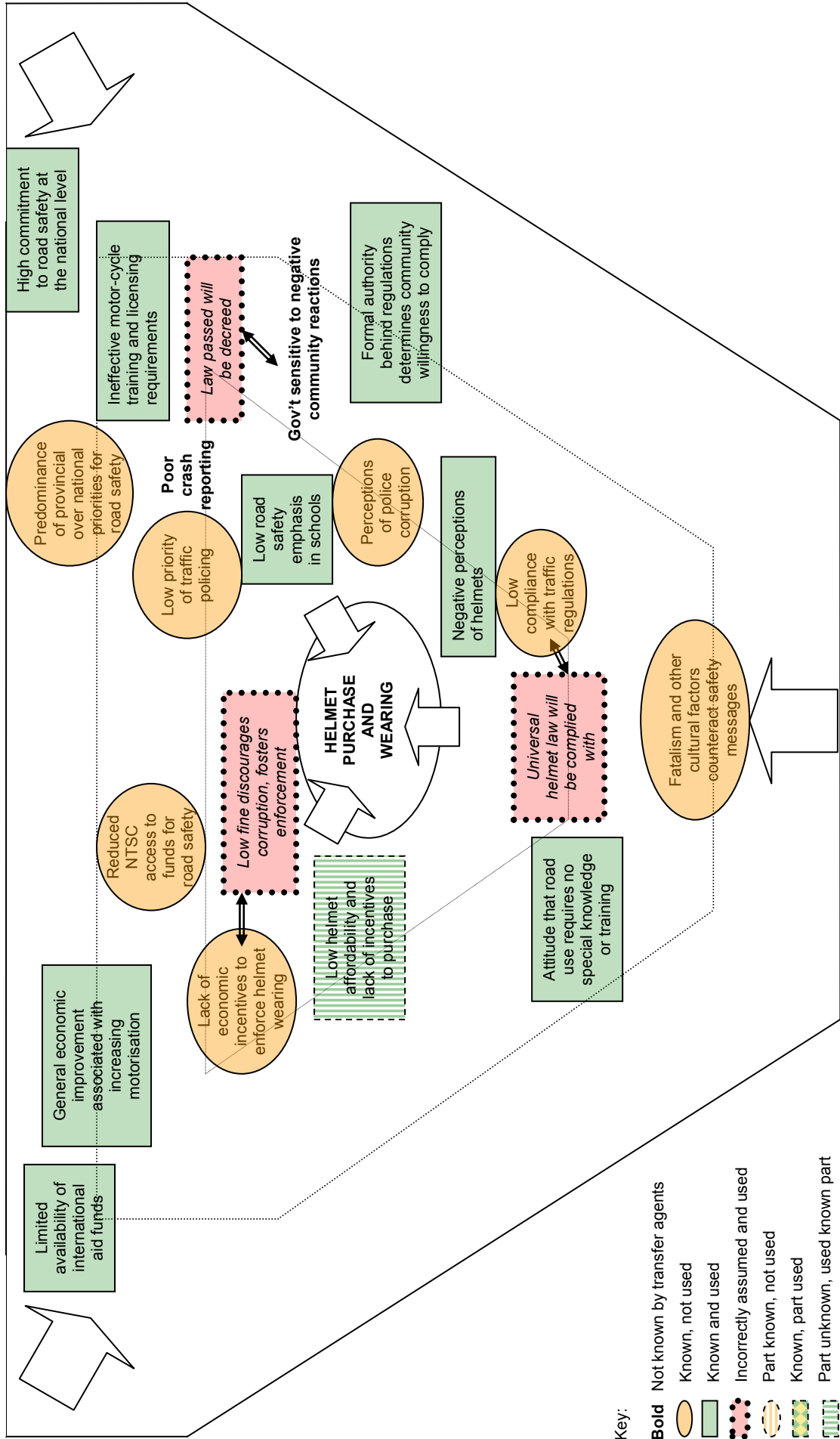
Table 2: Road safety space factors for school education case, breadth/specificity, overlap with other factors, known and/or used by transfer agents

	Factor	Level	Overlap	Knew	Used
Economic	Constraining influence of national and regional economic changes	Broad	I	✓	×
	Low government prioritisation of road safety/Master Plan funding	Mid-range	I	✓	✓
	Low affordability of safety equipment ↳ <i>Safety equipment affordable (misperception)</i>	Specific <i>Specific</i>		×	- ✓
	Unequal distribution of wealth/rural areas	Broad/Mid	S	✓	×/✓
	Emphasis on the monetary value of safety	Broad/Mid	S	×	-
Institutional	Mixed value of the school education system context ↳ <i>Good school education context (misperception)</i>	Specific <i>Specific</i>		×	- ✓
	Limited government commitment	Broad	E	✓	×/✓
	Lack of coordination across government agencies/bureaucratic behaviour	Broad/Mid	S	×	-
	Mixed value of rotation of senior positions	Broad/Mid		×	-
	Central bureaucracy vs. regional receptivity	Broad/Mid	S	✓	✓
	Perceptions of police corruption	Mid-range	S	✓	×
	Low priority of traffic policing	Mid/Specific	S	✓	×
Social and cultural	Buddhism, <i>karma</i> and fatalism as explanations of crashes and behaviour	Broad		×/✓	×
	Family values and style not oriented towards encouraging safe child behaviour ↳ <i>Family values and style conducive to protective behaviours approach (misperception)</i>	Mid-range <i>Mid-range</i>		×	- ✓
	Western safety culture does not reflect safe behaviours in Thailand ↳ <i>Concepts of Western safety culture and behaviour can inform the project (misperception)</i>	Mid/Specific <i>Mid/Specific</i>		×	- ✓
	Limited understanding of the influences on road safety behaviour in Thailand	Mid/Specific	I	×	-
	Need to shape the project for Thai culture	Mid-range		✓	×/✓
	Complex language issues	Broad		×/✓	✓

ECONOMIC

Figure 2: Composite view of road safety space in the motorcycle helmet case

INSTITUTIONAL



- Key:**
- Bold** Not known by transfer agents
 - Known, not used
 - Known and used
 - Incorrectly assumed and used
 - Part known, not used
 - Known, part used
 - Part unknown, used known part
 - ↔ (Links misperceived and "correct" factor)

DISCUSSION

The purpose of the research was not to evaluate the success or failure of the road safety measures being transferred, or even to evaluate the success or failure of the transfer process (which has subtly different implications), but to assess whether the 'road safety space' model was both feasible and useful.

With respect to the feasibility of the approach, it was clear that a lot of background information on the recipient country would be needed, until a sufficient information base had been developed. There would also be a need to commit time and resources to groundwork, which in theory would be justified by the potential benefits of more effective road safety transfer, although this still needs to be demonstrated. With respect to the utility of the model, the information available indicated that the use of the road safety space model would have been of benefit. In the education case, the road use situation and locally accepted practices could have been taken into account more. In the helmet case, the government's track record of reluctance to inconvenience people, plus the complicated legislative process, could have been anticipated.

However, some other issues emerged. Returning to the metaphor of biological adaptation, it is necessary that there is an understanding of how the road safety measure to be transferred functions in the country of origin, e.g. school education and motorcycle helmets in Australia. It emerged that while there was a general understanding of the context in the originating country, it was not focused, and a road safety space analysis for the originating country would be a necessary precursor to transfer. Issues of timing and geography were also raised: would it be better to look at compulsory motorcycle helmet wearing when it was introduced in an Australian State, or now?; and would it be better to look at school education in the Victorian context, or in some other State that might have more in common with the recipient country? These questions require further discussion and research.

CONCLUSION

Use of the road safety space model is an ecological approach to improving road safety transfer. The research described above is mainly exploratory in nature, although an attempt has been made to test the practicality of the road safety space model, in terms of its feasibility and usefulness. The case study results show that the road safety space model should be feasible and useful, and would become easier with the accumulation of better knowledge in some areas. For example, the explicit use of the road safety space model in a transfer effort would provide information on the country involved which would be relevant to further transfers.

The effectiveness of the model would be enhanced by the systematic development of information on road user behaviour in different countries as well, as this appears to be a significant gap in knowledge. Application of the road safety space model is therefore justified as part of an ongoing research and development process. An important limitation of this research is its retrospective nature. Future research should be prospective, to provide a better test of the value of the model. The findings of this research are relevant to road safety transfer in other less motorised regions of the world, and may also be relevant to issues of transfer for areas other than road safety, in particular public health and traffic engineering.

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