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# Modelling Smart Choices – Challenges and Opportunities

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# Overview

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- Background on smarter choices policy measures
- The nature of the challenge
- Potential approaches
- Conclusions

# Background (1)

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- ‘Smart Choices’ is a label for a range of novel policy measures including:
  - Workplace, school and personal travel planning
  - Travel awareness campaigns
  - Public transport information and marketing
  - Car clubs and car sharing
  - Teleworking and teleconferencing
  - Home shopping
- These measures have grown rapidly in popularity in recent years

# Background (2)

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- Modelling smart choices poses substantial challenges because:
  - It is difficult to represent SC measures in conventional models (principally not time and cost)
  - The means by which SC measures affect behaviour are, arguably, more complex
  - Moreover, empirical experience the impacts and affects of SC measures is still very limited
- Result:
  - A variety of ad hoc procedures are currently used
  - Widespread dissatisfaction with these methods

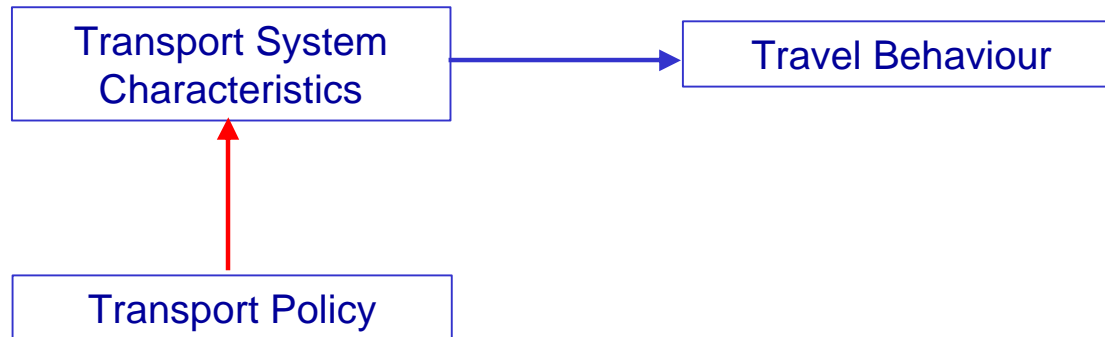
# Conventional policies

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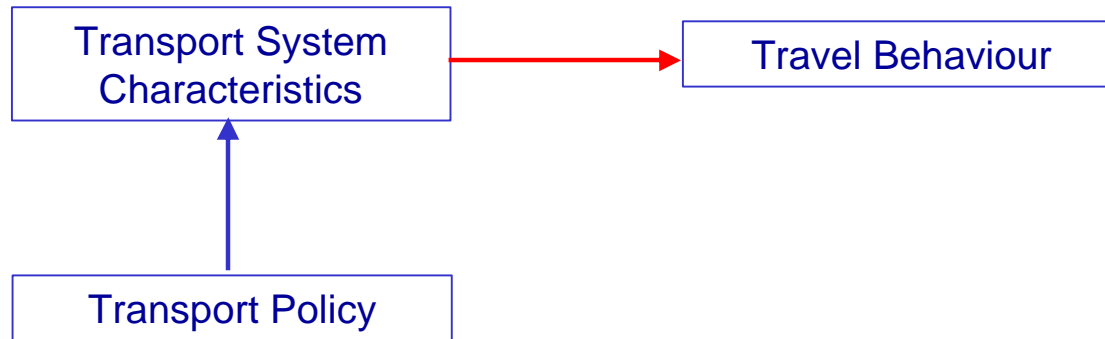
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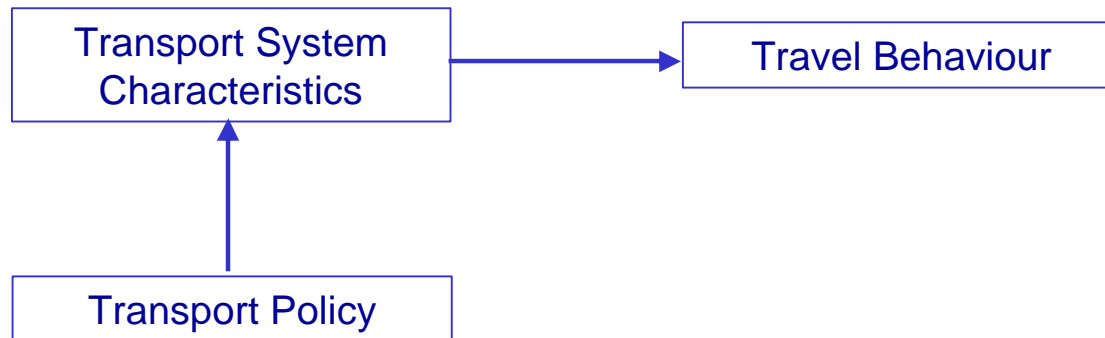
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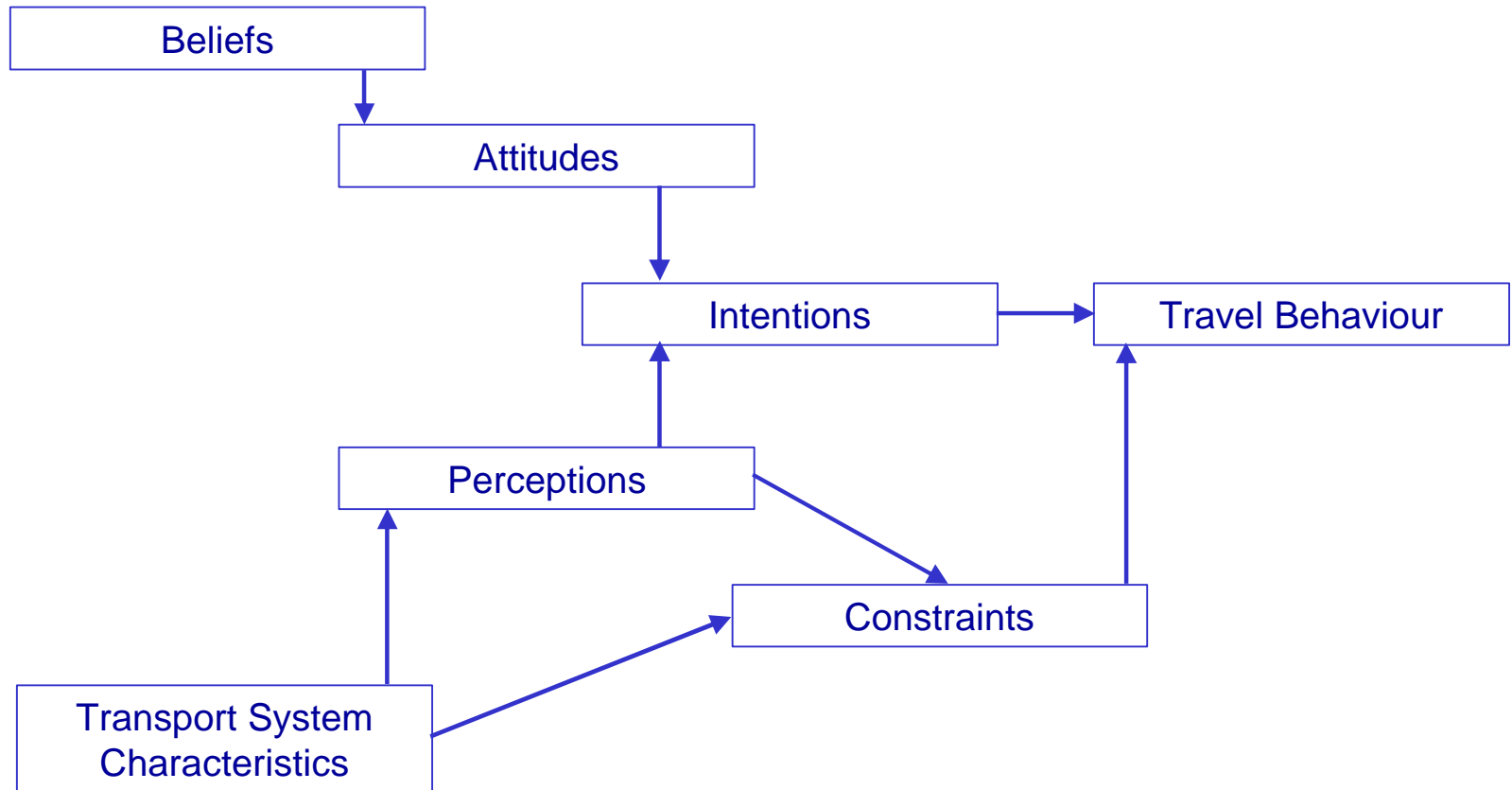
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$\Delta\text{Policy} \Rightarrow \Delta\text{System} \Rightarrow \Delta\text{Behaviour}$

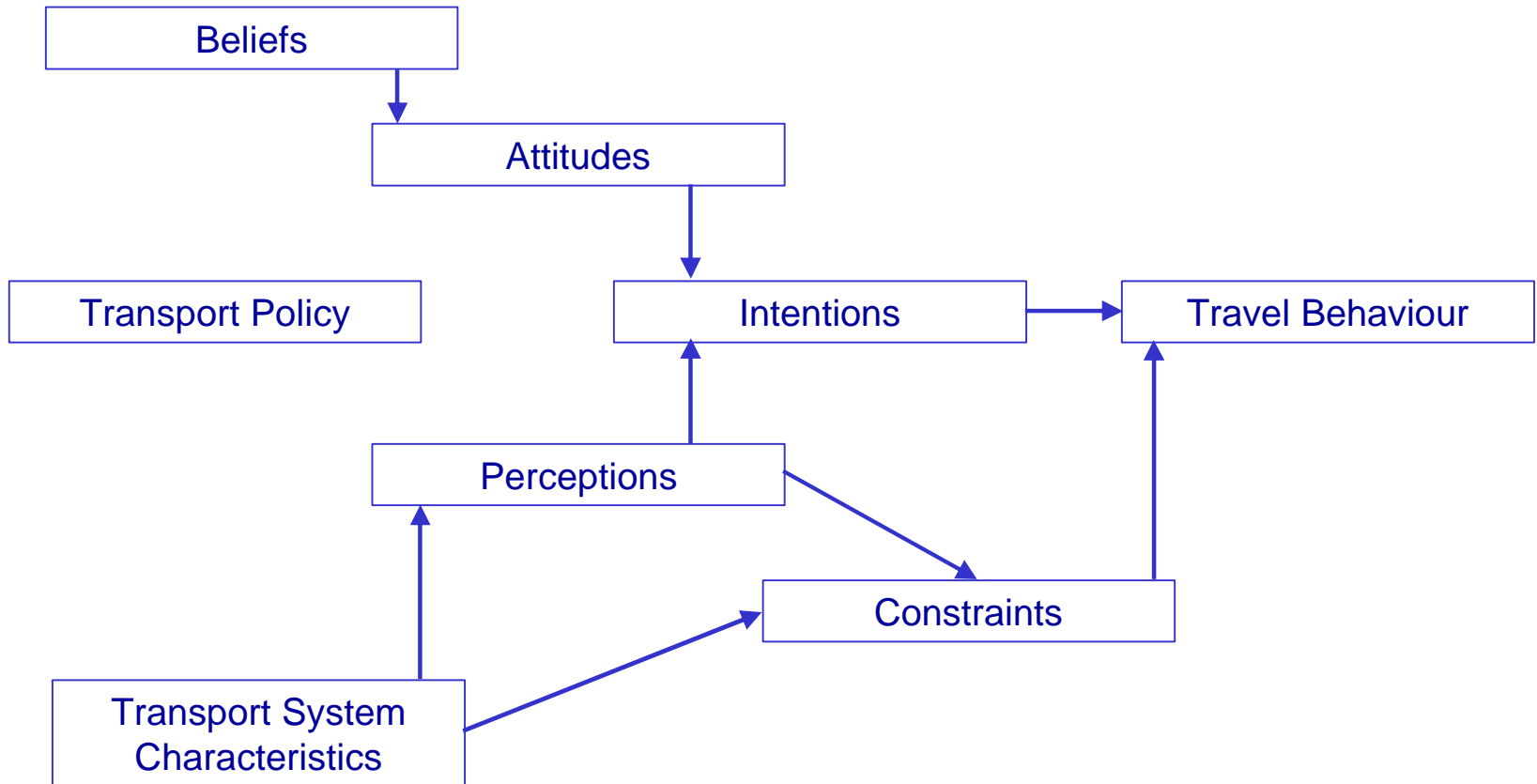
# Smart choices policies

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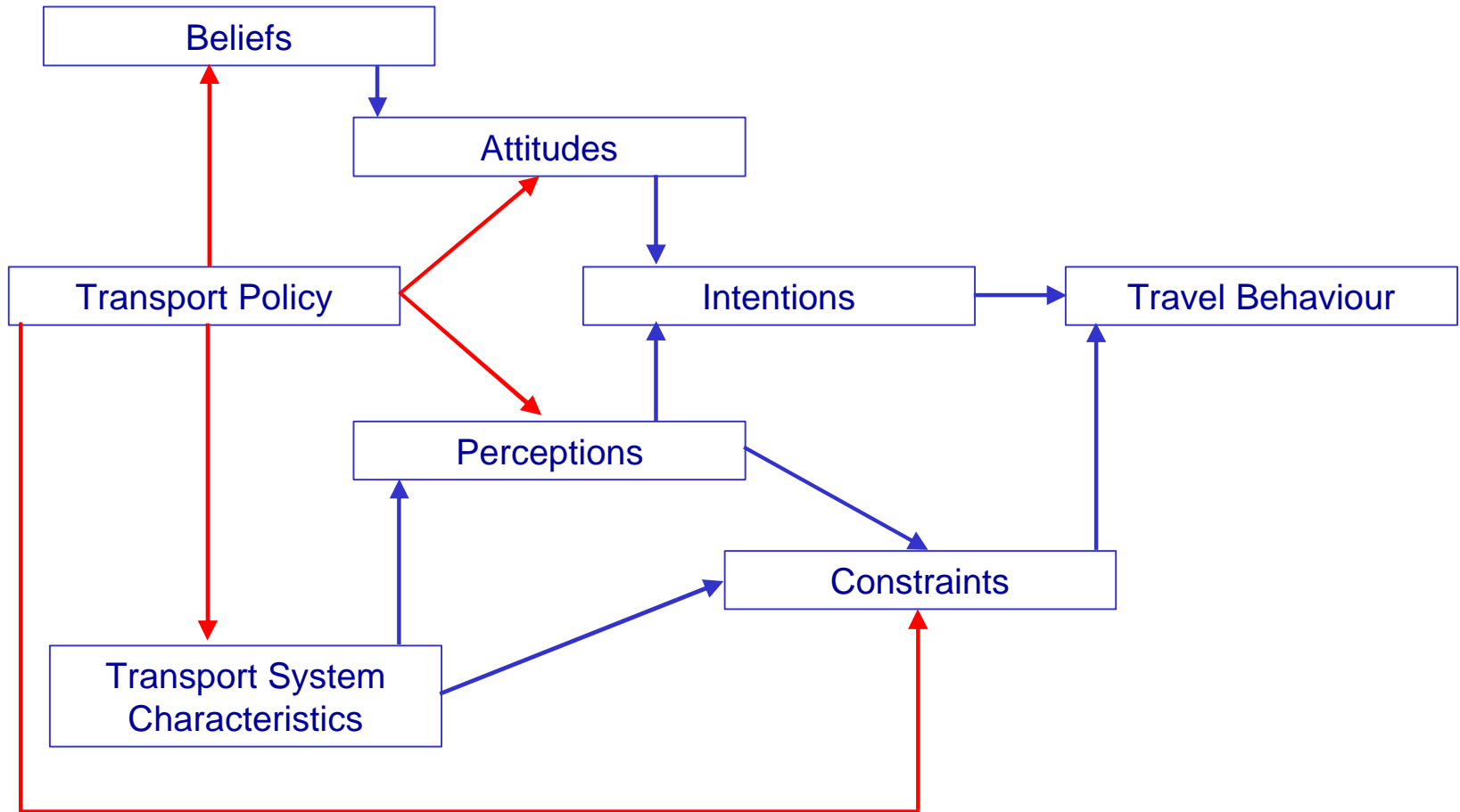


# Smart choices policies

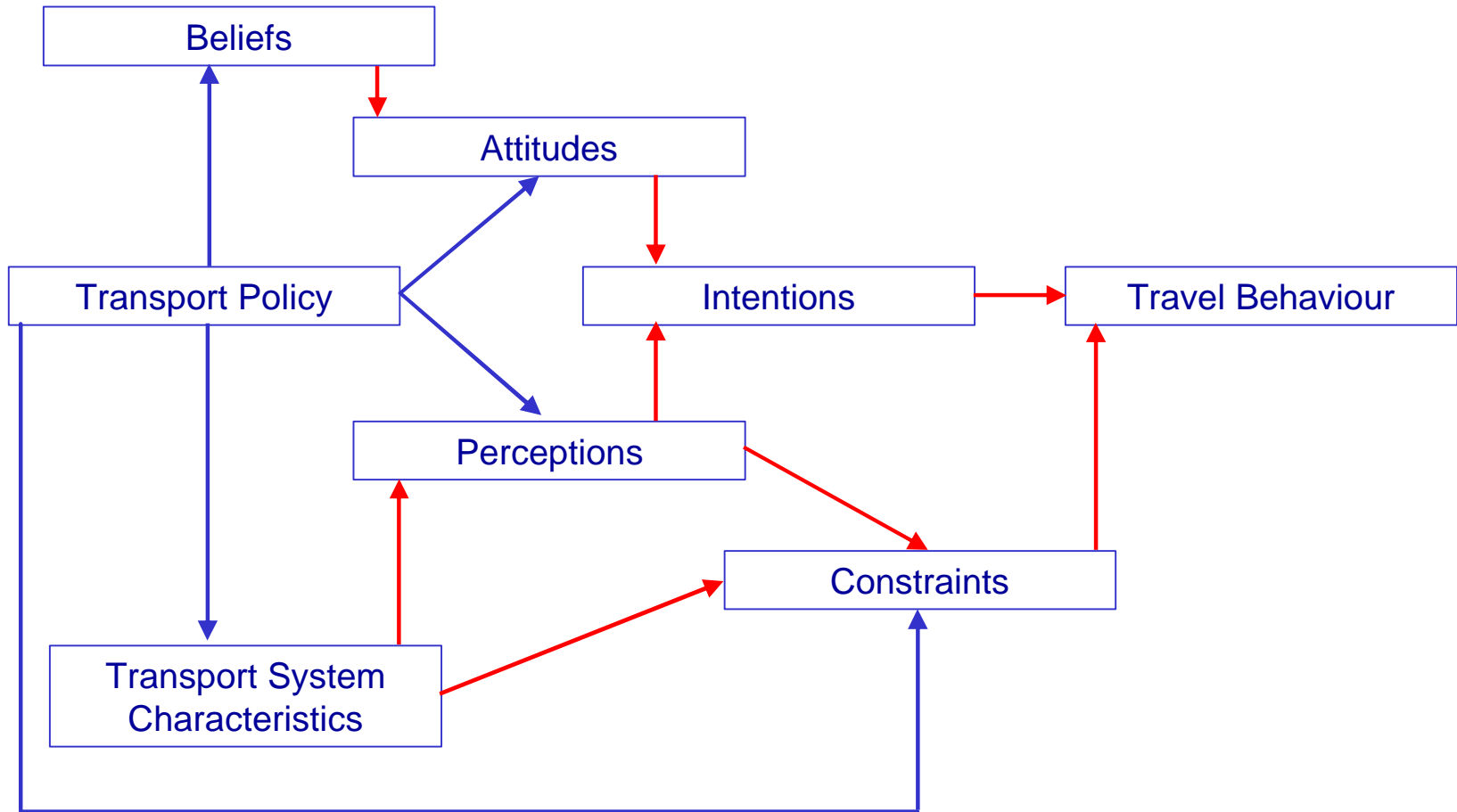
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# Smart choices policies

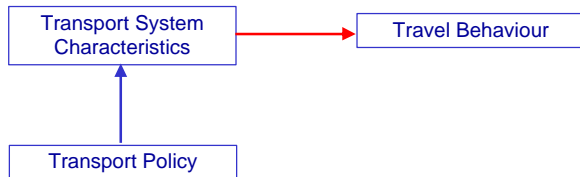


# Smart choices policies



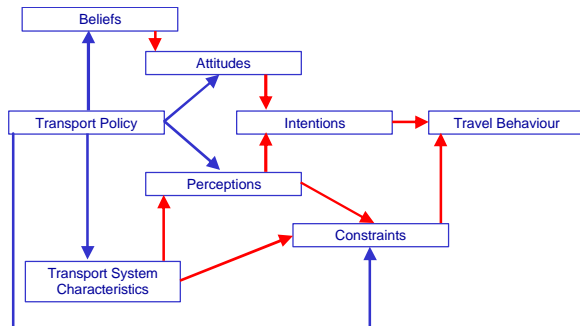
# The nature of the challenge

## ‘Conventional’ Policies



$\Delta\text{Policy} \Rightarrow \Delta\text{System} \Rightarrow \Delta\text{Behaviour}$

## ‘Smart Choices’ Policies



$\Delta\text{Policy} \Rightarrow \left\{ \begin{array}{l} \Delta\text{System} \\ \Delta\text{Beliefs} \\ \Delta\text{Attitudes} \\ \Delta\text{Perceptions} \\ \Delta\text{Constraints} \end{array} \right\} \Rightarrow \Delta\text{Behaviour}$

# Implications

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- This challenge looks daunting...
- BUT, existing modelling technologies are in fact much richer than is commonly appreciated, and can address several of these challenges:
  - The influence of beliefs, attitudes and perceptions can be systematically integrated into discrete choice models
  - Models of choice set formation can accommodate the effects of changes in perceptions and constraints
  - Models of learning and adaptation can accommodate effects of information, awareness campaigns and propaganda

# Implications

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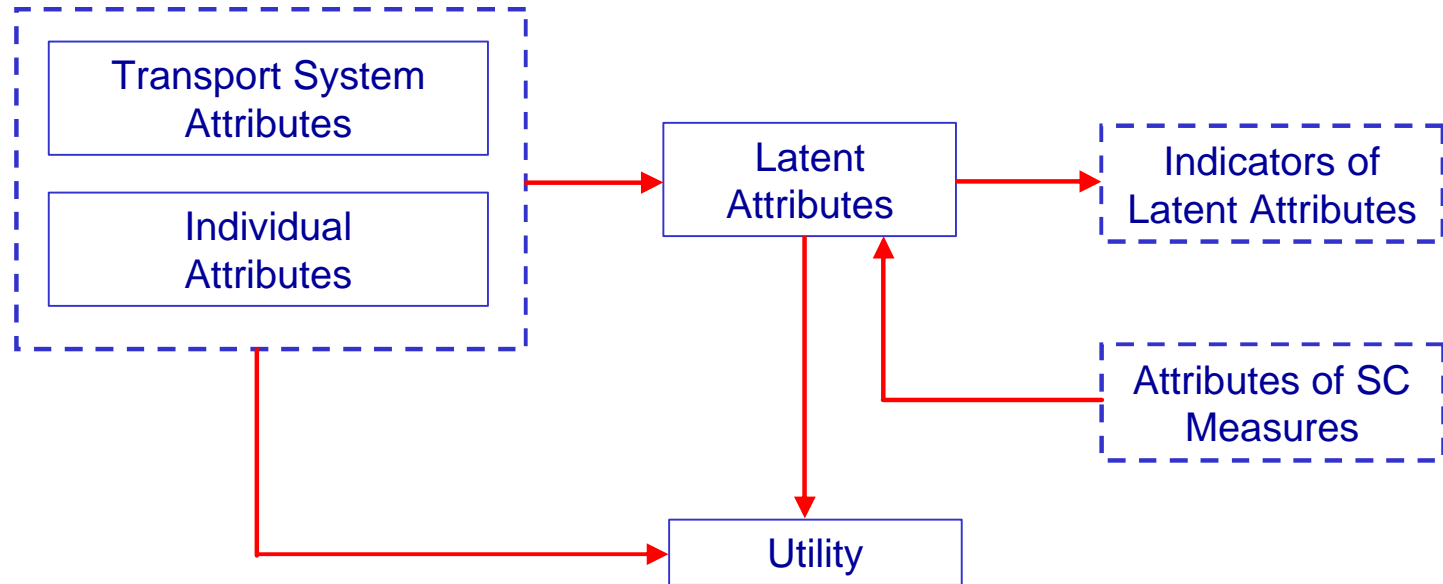
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# Integrating beliefs and attitudes (1)

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- The first papers dealing with this appeared almost 30 years ago
- A number of mature methodologies now exist
- The most elegant and flexible approach treats beliefs and attitudes as 'latent' attributes.
- These latent attributes affect the utility of alternatives (just like ordinary attributes) but cannot be directly measured
- We can however observe indicators of these latent attributes

# Integrating beliefs and attitudes (2)



- This approach is extremely flexible and can provide a basis for predicting change in latent attributes (e.g., beliefs and attitudes)
- Latent attributes may vary by alternative or individual (group)

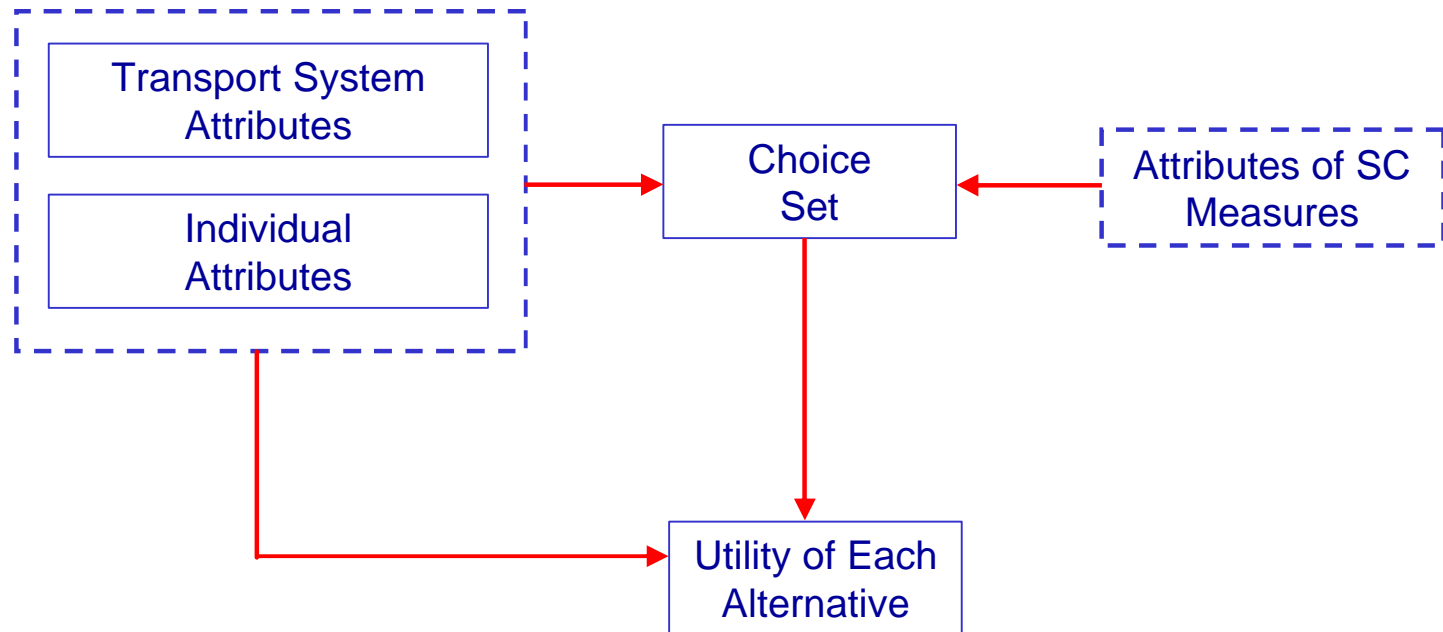
# Treatment of choice sets (1)

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- The first papers dealing with this (also) appeared almost 30 years ago
- And here too there are a number of mature methodologies for dealing with different aspects of alternative availability and choice set formation
- The simplest treats choice set formation as an explicit decision, forming a necessary pre-cursor to choice

# Treatment of choice sets (2)

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- In most cases, choice sets can be treated as latent quantities, so explicit enumeration of choice set elements at the individual level is not necessary

# Conclusions

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- The modelling of smart choices poses formidable challenges
- It is sometimes argued that the only option is resort to ad hoc fixes
- This view is fundamentally wrong
- Mature modelling approaches exist that can address several key SC modelling issues
- However, the profession is not necessarily well placed to exploit these opportunities – key skills gaps must be overcome