- Introduction

- Traffic Accident Causes

- Traffic Safety Projects

- Methodology

- VAC Method - 5 Steps

- Conclusion

- Traffic accidents in Vietnam have been a great economic and social matter.

- Although there have been many changes but the issue still remains complex and serious.

- Constructing method to evaluate performance of traffic safety projects is essential.

- **VAC** method (**V**alue **A**nalysis **C**onnecting) aims to assess the performance of traffic safety projects, focusing on road traffic safety projects based on comprehensive analysis.
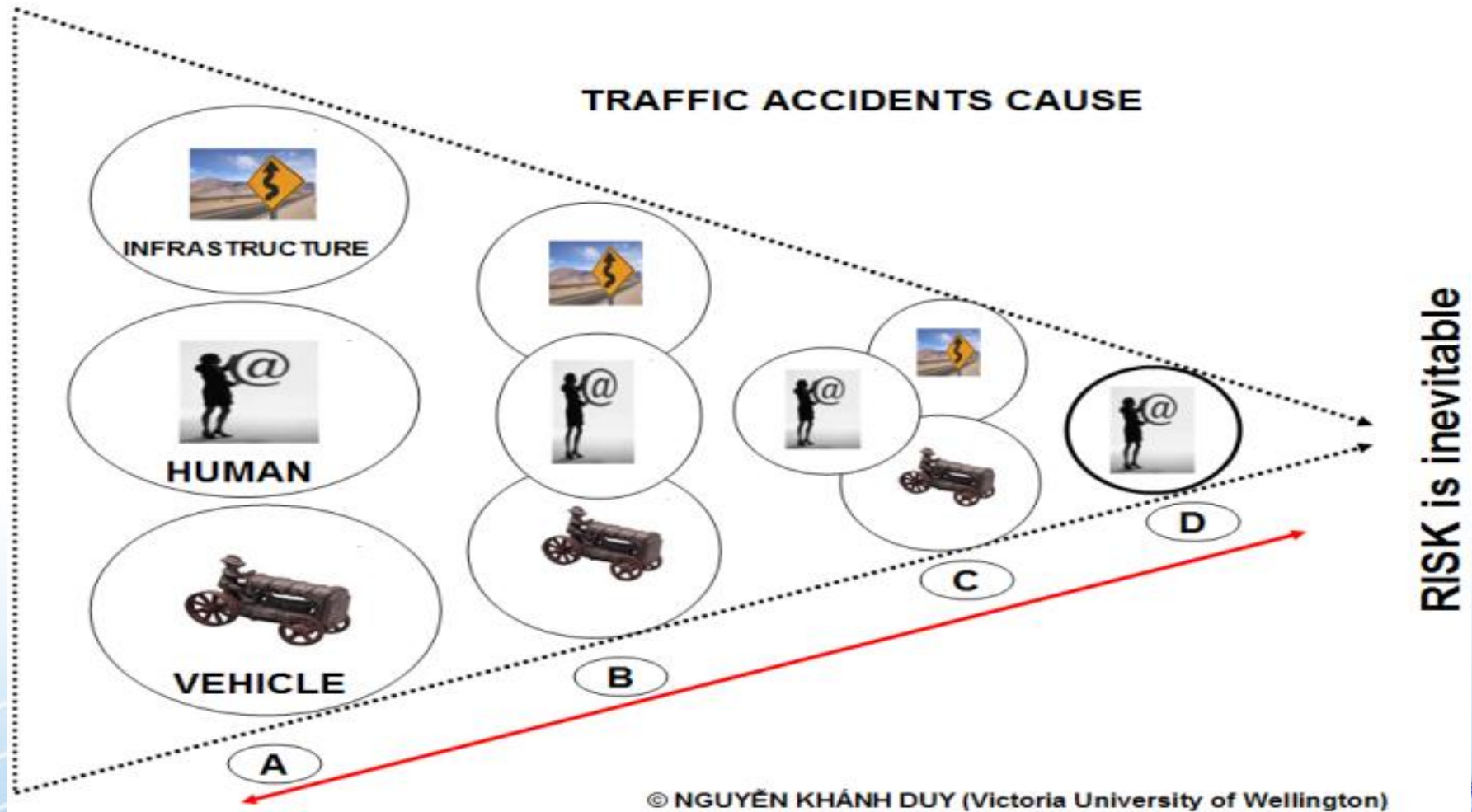
Fig. 1 Traffic Accident Causes

- *Traffic safety projects including one or some components* as:
  - **E**ngineering Component.
  - **E**ducation & Awareness Raising Component.
  - **E**mergency Component.
  - **E**nforcement Component.
- Classified into 2 types:
  - Single projects (including 1 component).
  - Combined projects (including 2 or more components).
- Almost traffic safety projects in the world are combined projects.

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- **Project Performance Evaluation**: comprehensive evaluation of the whole investment process from preparation to completion stage.

- **VAC establish 5 Steps:**

| Identify the overall goal | → | Understand and identify solution groups to achieve the goal | → | Recognize activities/ impacts/ interventions of above solution groups | → | Evaluate each related activity/ impact/ intervention | → | Benefit – Cost analysis |

STEP 1 - INDENTIFY THE OVERALL GOAL

- Construction of infrastructure (**E**ngineering).
- Traffic safety propaganda and education (**E**ducation & Awareness Raising).
- Traffic safety enforcement (**E**nforcement).
- Traffic accidents emergency (**E**mergency).

STEP 2 – IDENTIFY SOLUTION GROUPS

HARD *solution group:*

- "*Construction of infrastructure*" solution.

SOFT *solution groups:*

- Solution i=1 is: "*Traffic safety propaganda and education*" solution.

- Solution i=2 is: "*Traffic safety enforcement*" solution.

- Solution i=3 is: "*Traffic accidents emergency*" solution.

STEP 3 – RECOGNIZE ACTIVITIES/ IMPACTS/ INTERVENTIONS OF SOLUTION GROUPS

HARD solution group:

Check and evaluate performance:

- Roads/black spots improvement methods

- The installation of traffic safety facilities on the road (guide posts, traffic signs, traffic lights, rumble strips, reflective road markings, greenery, etc)

- Road corridor safety measures and traffic works.

STEP 3 – RECOGNIZE ACTIVITIES/ IMPACTS/ INTERVENTIONS OF SOLUTION GROUPS

SOFT solution group:

Activities/ impacts/ interventions of solution 1 "*Traffic safety propaganda and education*" with j=(1÷ 8):

- Activity j=1: Training for trainers and teachers.

- Activity j=2: Training for officers, engineers in charge of traffic safety appraisal…

   ……………………………………………………………

- Activity j=8: Training on first aid to traffic accidents.

STEP 4 – EVALUATE EACH RELATED ACTIVITY/ IMPACT/ INTERVENTION

HARD solution group: Apply calculations on Net Present Value (NPV) and Internal Rate of Return (IRR):

$$NPV = \sum_{t-0}^{n} \frac{B_t}{(1+r)^t} - \sum_{t-0}^{n} \frac{C_t}{(1+r)^t}$$

SOFT solution group:

- $C_{i,j}$ means the investment cost for solution i (i=1÷3) for a specific activity/impact/intervention j (j=1÷8) of this solution.

- E.g. When i=1 and j=1, $C_{1,1}$ is the investment cost of "*Traffic safety propaganda and education*" solution for "*Training for trainers and teachers*" activity.

STEP 4 – EVALUATE EACH RELATED ACTIVITY/ IMPACT/ INTERVENTION

KPI (Key Performance Indicator): evaluates performance of each related activity/impact/intervention. This performance evaluation bases on progress, quality and economic criteria.

- $KPI_{i,j}$ means the indicator of solution i ($i=1\div3$) for a specific activity/ impact/intervention j ($j=1\div8$) of this solution.

- E.g. When i=1 and j=1, $KPI_{1,1}$ means "*Traffic safety propaganda and education*" solution for "*Training for trainers and teachers*" activity.

STEP 4 – EVALUATE EACH RELATED ACTIVITY/ IMPACT/ INTERVENTION

KPI must satisfying the following conditions:

- **Necessary conditions**:
  - QUANTITY. E.g. Number of training courses for "_Training for trainers and teachers_".
  - QUALITY. E.g. checking/evaluation results of each training course.
  - Appropriate evaluation _methodology_.
- **Sufficient conditions:**
  - Database: economic data, relevant statistics.
  - Competent and experienced experts.
  - Cost for evaluation work.

STEP 4 – EVALUATE EACH RELATED ACTIVITY/ IMPACT/ INTERVENTION

Apply "*Expert Method*" to identify the value of $KPI_{i,j}$ with the limit (**$0\% \leq KPI_{i,j} \leq 100\%$**).

- If $B_{i,j}$ is the benefit of solution i (i=1÷3) for a specific activity/impact/intervention j (j=1÷8) of this solution.

- E.g. When i=1 and j=1, $B_{1,1}$ is the benefit of "*Traffic safety propaganda and education*" solution for "*Training for trainers and teachers*" activity.

- Formula: $$B_{i,j} = C_{i,j} \times KPI_{i,j.}$$

STEP 5 – Benefit – Cost analysis

HARD solution group: Benefit Cost Ratio (BCR):

$$BCR_{HARD}= \frac{\sum\limits_{t=0}^{n} \dfrac{B_t}{(1+r)^t}}{\sum\limits_{t=0}^{n} \dfrac{C_t}{(1+r)^t}}$$

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STEP 5 – Benefit – Cost analysis

SOFT solution group:

Cost is:

$$C_{SOFT} = \sum_{i=1}^{i=m} \sum_{j=1}^{j=S_i} C_{i,j}$$

Benefit is:

$$B_{SOFT} = \sum_{i=1}^{i=m} \sum_{j=1}^{j=S_i} B_{i,j} = \sum_{i=1}^{i=m} \sum_{j=1}^{j=S_i} C_{i,j} KPI_{i,j}$$

Benefit – cost ratio is:

$$BCR_{SOFT} = \frac{\sum_{i=1}^{i=m} \sum_{j=1}^{j=S_i} C_{i,j} KPI_{i,j}}{\sum_{i=1}^{i=m} \sum_{j=1}^{j=S_i} C_{i,j}}$$

STEP 5 – Benefit – Cost analysis

General Formula of Benefit – Cost Ratio (HARD and SOFT solutions):

$$BCR = \frac{\sum\limits_{t=0}^{n} \frac{B_t}{(1+r)^t} + \sum\limits_{i=1}^{i=m} \sum\limits_{j=1}^{j=S_i} B_{i,j}}{\sum\limits_{t=0}^{n} \frac{C_t}{(1+r)^t} + \sum\limits_{i=1}^{i=m} \sum\limits_{j=1}^{j=S_i} C_{i,j}}$$

Assessment: - B/C < 1: the project is lost.

- B/C = 1: Just enough for payback.

- B/C > 1: the project has profit.

VAC

- *VAC* method is applicable to evaluate the **performance** of traffic safety project.

- The purpose of VAC method is to *identify maximum output value* based on the analysis and connecting input resources.

- Important for the investors and policy makers to have thorough and comprehensive acknowledgement and to make timely adjustment in policy, investment instruction and financial control mechanism to achieve the target of investment./.

VAC

THANK YOU FOR YOUR ATTENTION