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A Multi-Criteria Performance Assessment Model for Cadastral Survey Systems

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- In this project, a cadastral survey system means:
 - A land boundary survey service under a cadastral system; or
 - A land boundary survey service under a land registration system.
- This project assesses individual cadastral survey system, and analyses its performance.

FIG7 has benchmarked cadastral systems

- This project aims at the assessment of a cadastral survey system by a structured framework.
- Multiple-criteria decision analysis (MCDA)
- A structured comparison

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Assessment Model

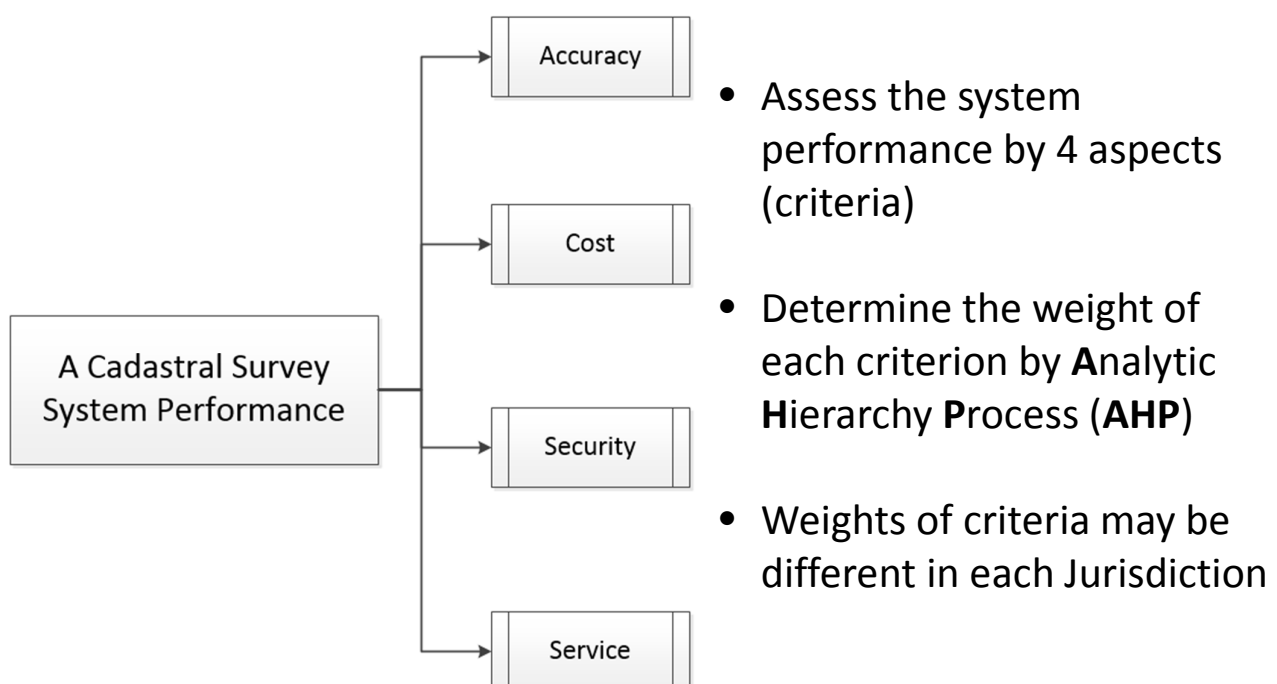
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Assessment Procedure

A Multi-Criteria **Performance Assessment** Model for Cadastral Survey Systems

- Measure the system **performance**, not its design
- Express the general successfulness or fitness
- Indicate in which particular area it needs improvement

A **Multi-Criteria** Performance Assessment Model for Cadastral Survey Systems



Criteria

Accuracy:

the performance on the positional accuracy of land boundary determination from both **technical** and **legal** aspects.

Cost:

the performance on the cost of **user** and the **system** maintenance

Security:

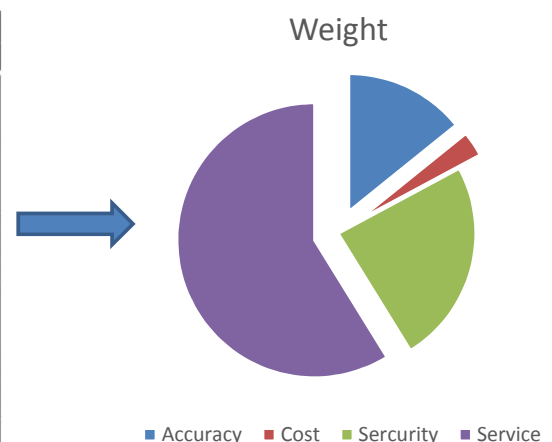
the performance on the reliability of the documentary **record** on the land boundaries & the boundary **dispute** rate

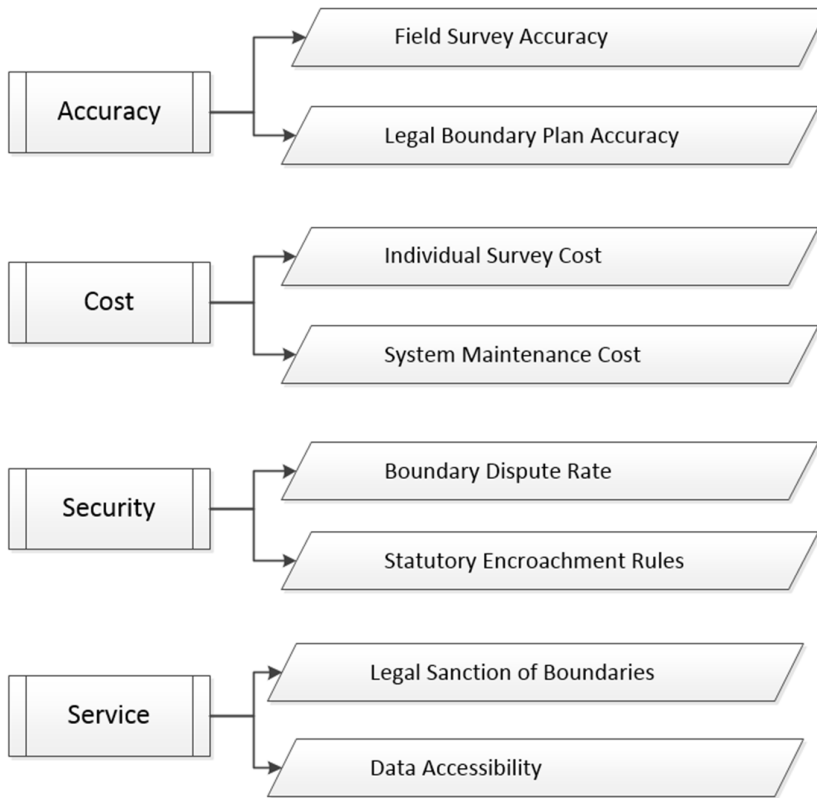
Service:

the performance on the **easiness** of using the system and **effectiveness** of the cadastral system service.

Example of AHP Weight Determination Method

	← Increasing Importance									Increasing Importance →									
Accuracy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Cost	
Accuracy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service	
Accuracy	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Security	
Cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Service	
Cost	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Security	
Service	9	8	7	6	5	4	3	2	1	2	3	4	5	6	7	8	9	Security	





Step 2
Determine the relative weights of sub-criteria

Step 3
Set questionnaire under the sub-criteria

- Questions on sub-criteria

Example

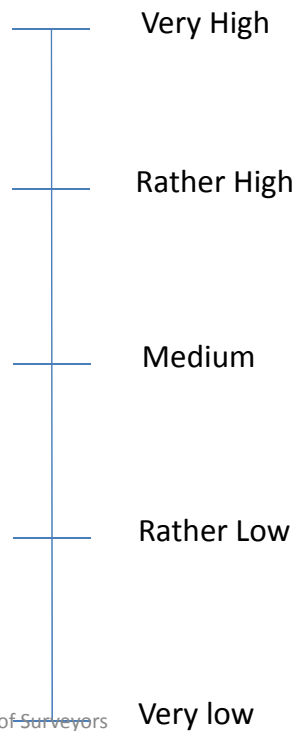
Field Survey Accuracy

- 1) Estimated field survey accuracy level in urban areas
- 2) Suggested required survey accuracy level in urban areas
- 3) Estimated field survey accuracy level in rural areas
- 4) Suggested required survey accuracy level in rural areas

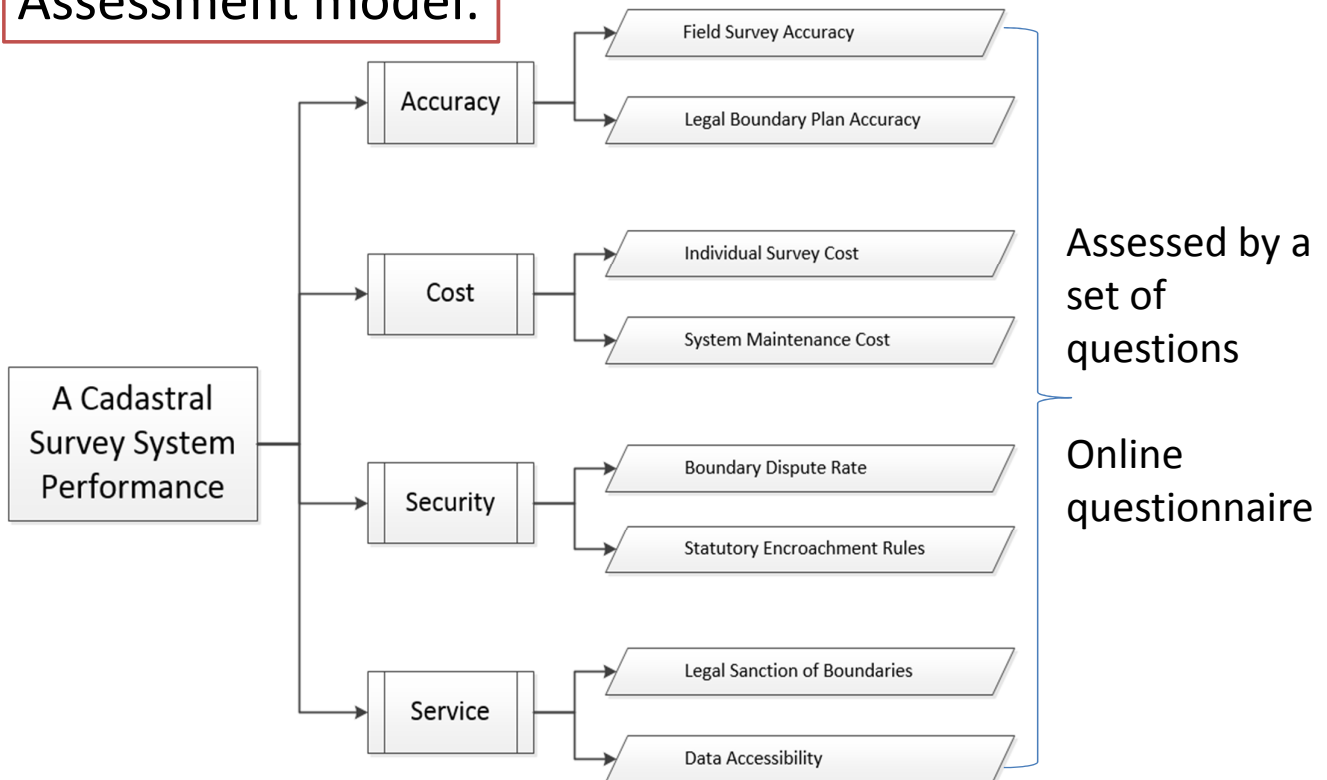
- Questions on sub-criteria

Example Data Accessibility

Qualitative scale



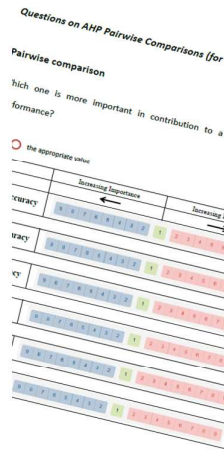
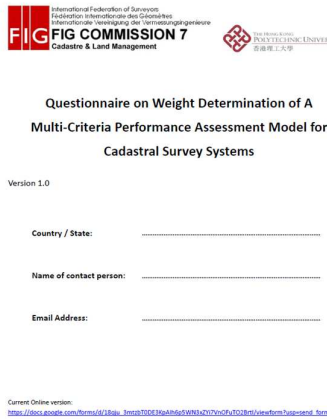
Assessment model:



Assessment Procedure:

Step1: determine the criteria set (finished)

Step2: collect the relative weight of the criteria set (interview & online questionnaire)



Questions on Pairwise Comparisons (for sub-criteria weight allocation)

Accuracy (total weight = 100%)

Accuracy

- Field Survey Accuracy
- Legal Boundary Map Accuracy

Cost (total weight = 100%)

Cost

- Individual Survey Cost
- System Maintenance Cost

Security (total weight = 100%)

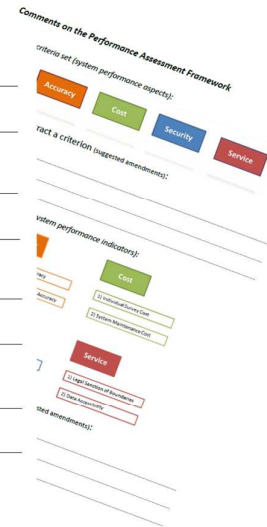
Security

- Boundary Dispute Rate
- Statutory Encroachment Rate

Service (total weight = 100%)

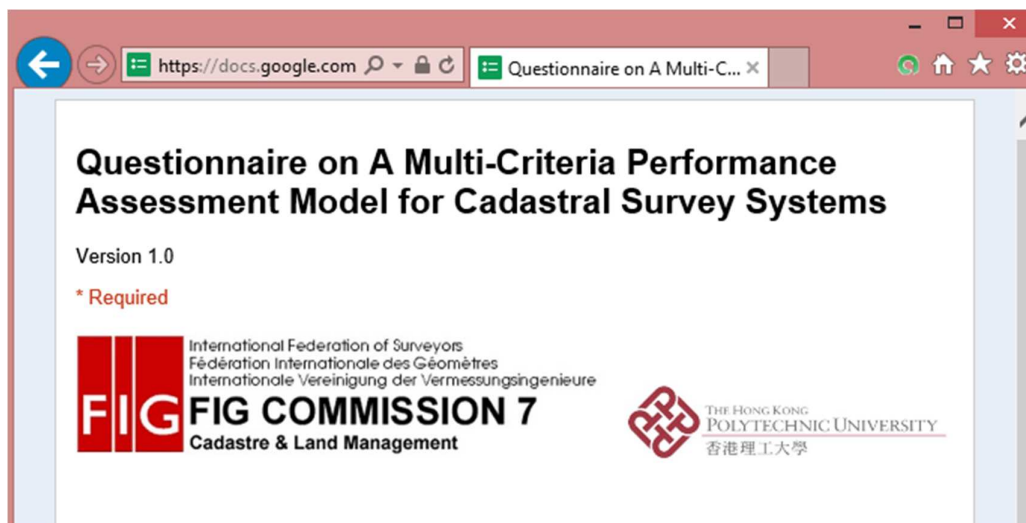
Service

- Legal Protection of Measurements
- Data Availability



Step 3

- Collect information and opinion from world-wide surveyors using online questionnaire



Collect information and opinion from

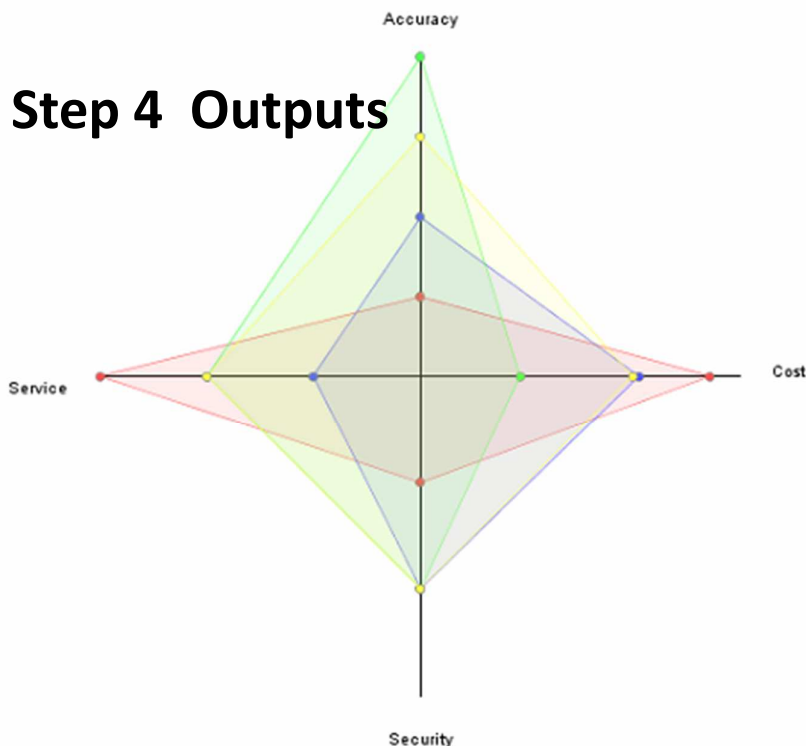
1) System Provider

- Expert surveyors set relative importance of the criteria
- Surveyors evaluate the system performance under the criteria

2) System User

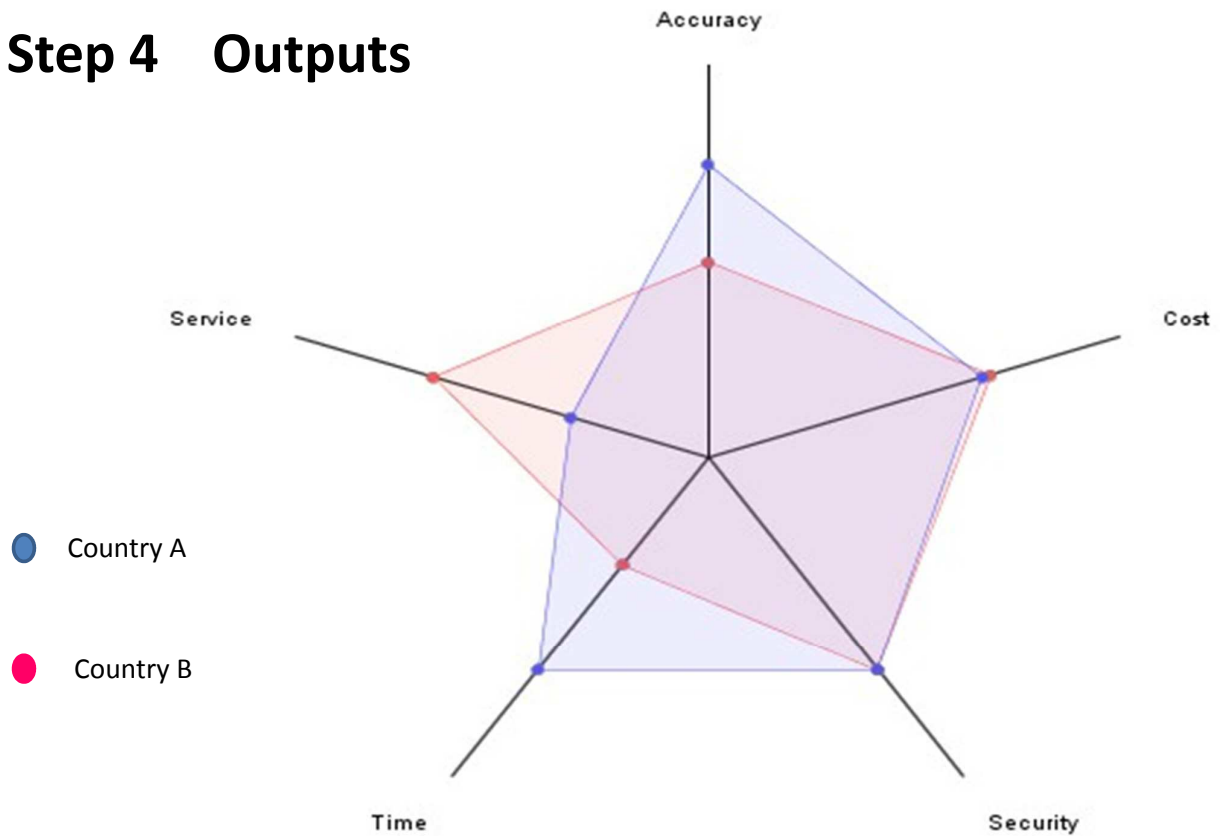
- User evaluation (Land administrators, solicitors, landowners etc.)

Step 4 Outputs



- Indicate strengths and weaknesses
- Comparison of different systems by Preference Ranking Organization Method for Enrichment of Evaluations (**PROMETHEE**)

Step 4 Outputs



The Hong Kong Polytechnic University
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THANK YOU

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