AIRPORT SMARTNESS INDEX – EVALUATION METHOD OF AIRPORT INFORMATION SERVICES

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SciNet Research Forum , Vienna, 17 June 2016

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Motivation

increasing air traffic and information technologies

appearance of smart airports

Main objective:

- *Definition and structure of smart airports*
- *How airport evaluation methods can be developed ?*
- *How information technology and services could be involved in evaluation?*

development of an airport evaluation method

Content

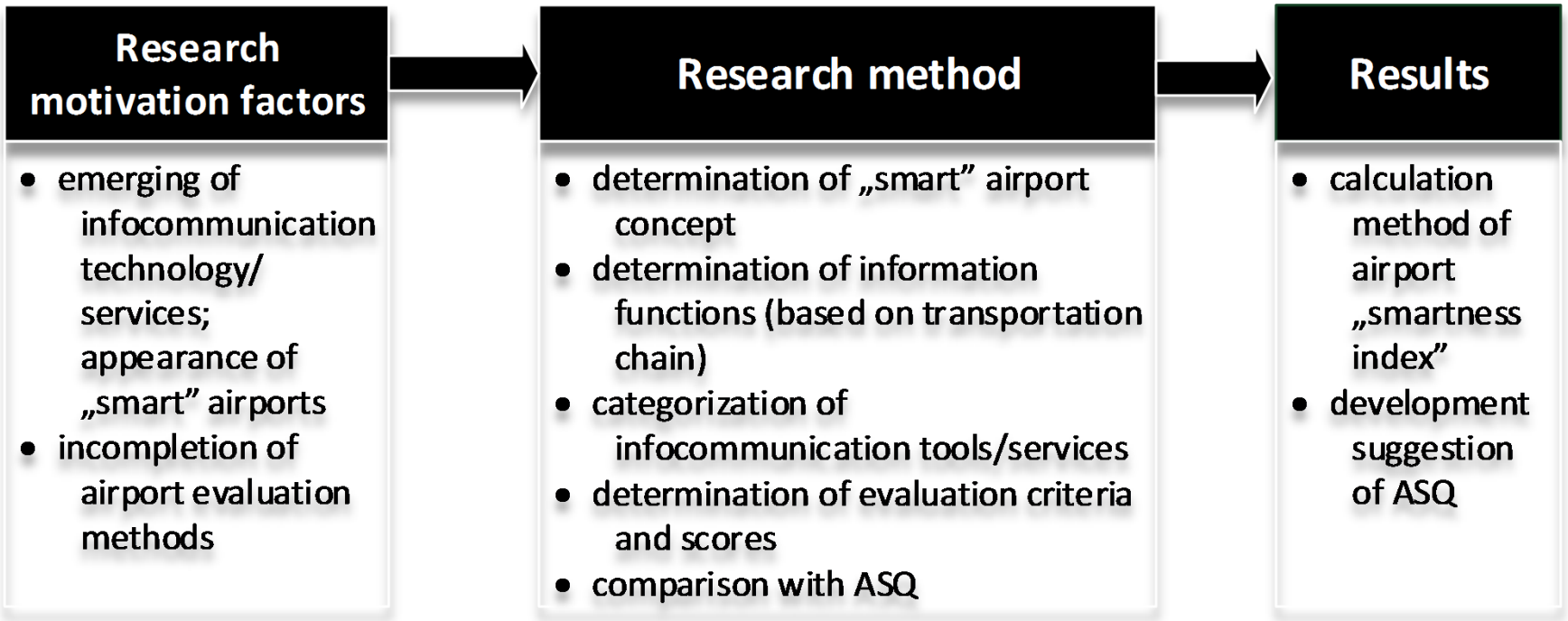
1. Introduction
2. Model of smart airports
3. Evaluation method
4. Comparison with ASQ
5. Conclusion

1. Introduction

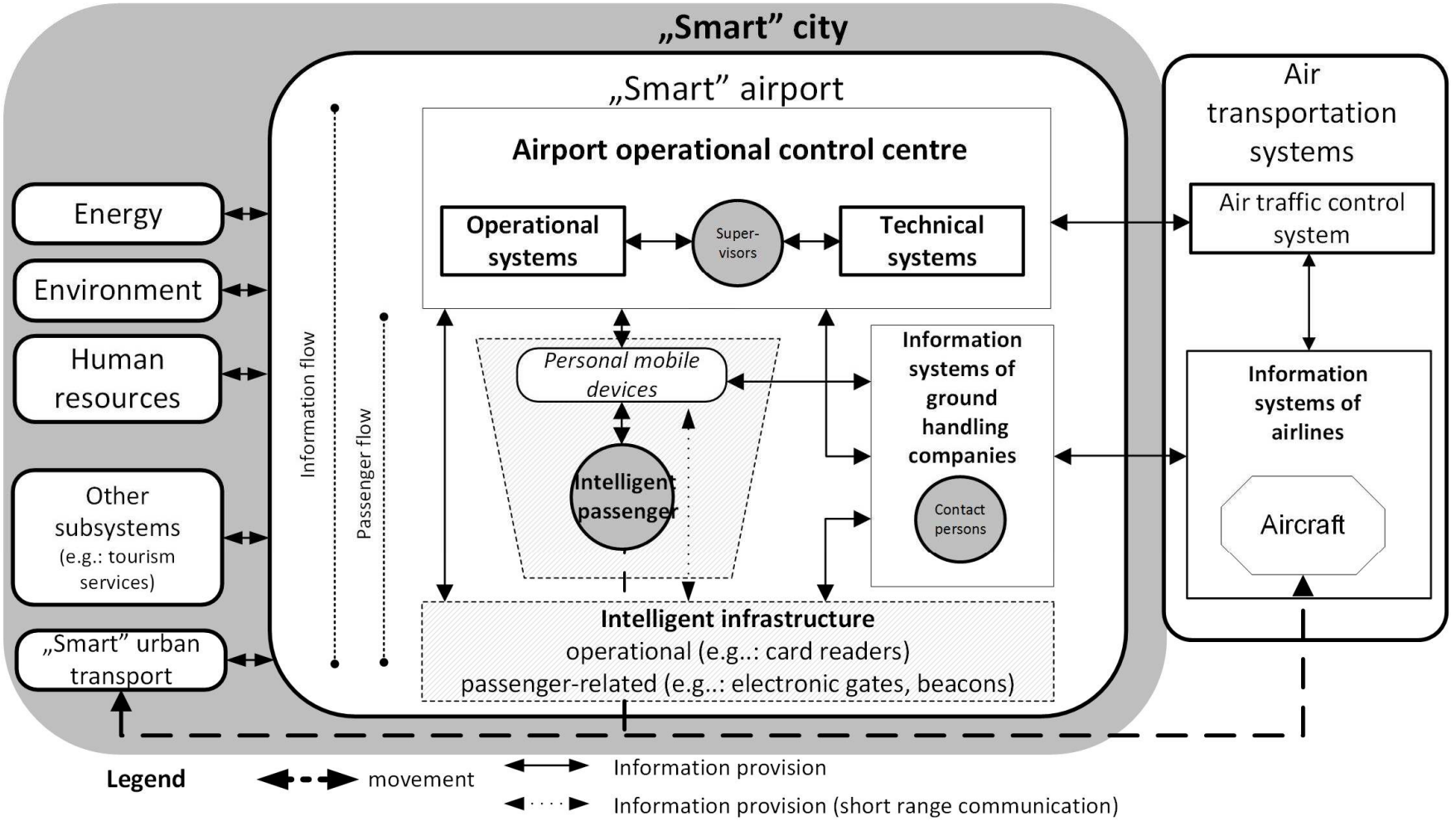
Airport development directions

- Expanding airport functionalities
- Transforming roles of operational companies of airports
- Diverse range of airport services
- Tigthening rules in passenger handling

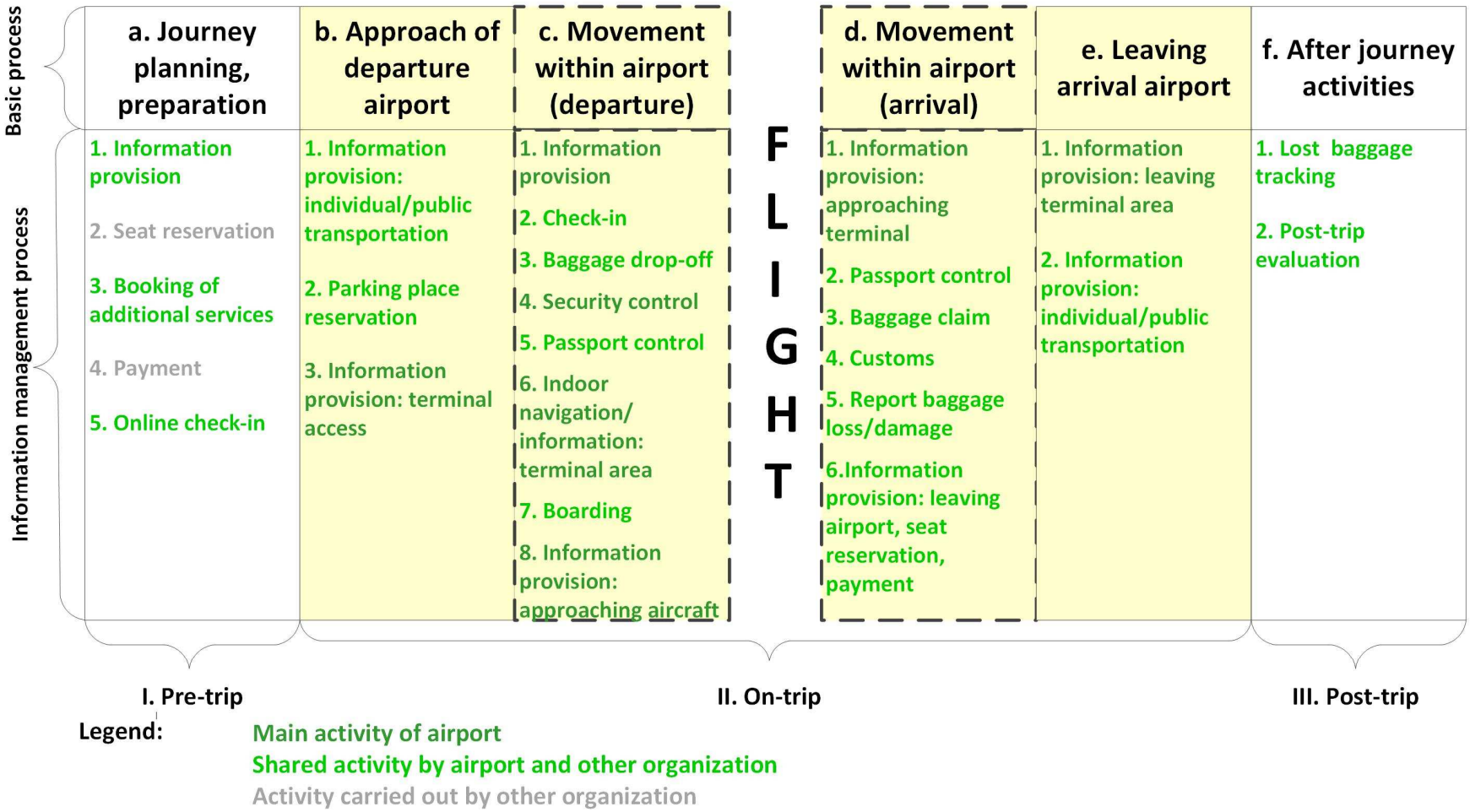
1. Introduction – research process



2. Model of smart airports



3. Evaluation method – structure of air transportation travel chain



3. Evaluation method – scores of functions

F_i	e_{Fi}	Technology (tools)	Service
b1	1	webpage	static information
	2	mobile application	dynamic information
	3	webpage/mobile application	ticketing/payment
b2	1	webpage/mobile application	static and dynamic information
	2	webpage/mobile application	parking place reservation/payment
	3	intelligent vehicle + intelligent infrastructure elements	intelligent parking-guidance (navigation, automatic license-plate recognition, parking assistance)
b3	1	webpage/guidance signs	static information
	2	mobile application/intelligent infrastructure elements (e.g.: interactive map)	dynamic, personalized information
	3	mobile application / virtual assistant/intelligent robot	personalized navigation, guidance

3. Evaluation method – calculation of smartness index

Table 2.: Negative correction values

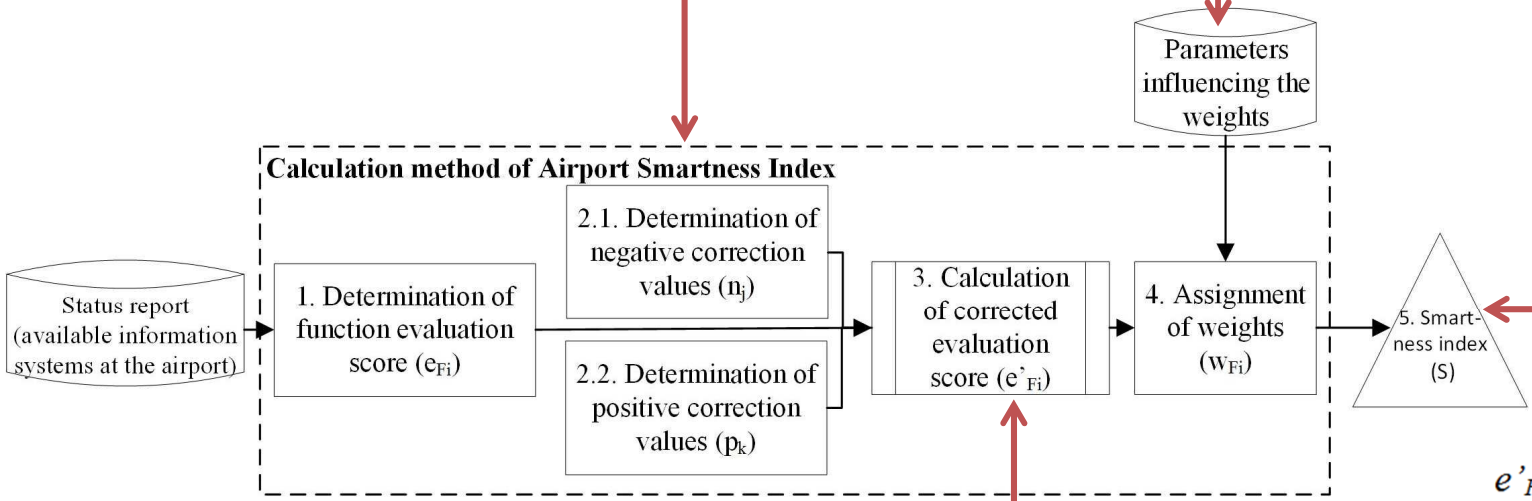
Negative correction values (n_j)		
n_1	Limited availability in space	-0.1
n_2	Limited availability in time	-0.1
n_3	Difficult usage	-0.1
n_4	Unreliability (poor data quality)	-0.2

Table 3.: Positive correction values

Positive correction values (p_k)		
p_1	Development intentions to the next level	+0.1
p_2	Development in planning phase	+0.2
p_3	Development in implementation phase	+0.3
p_4	Development in test phase	+0.4

$$w_{Fi} = \frac{1}{i_{max}} * \frac{x}{100} * \left(\frac{y}{100} + 1\right) * \left(\frac{z}{100} + 1\right)$$

F_i	x [passenger %]	y [passenger %]	z [passenger %]	w_{Fi}
b1	70	0	0	0.04
b2	36			0.02
b3	100			0.05
c1	100			0.05
c2	100			0.05
c3	81			0.04
c4	100		36	0.07
c5	100	60	0	0.08
c6	100	72		0.09
c7	100	60		0.08
c8	100	0		0.05
d1	100			0.05
d2	100			0.05



$$S = \sum_{Fi} e'_{Fi} * w_{Fi}$$

$$e'_{Fi} = e_{Fi} + N_{Fi} + P_{Fi}$$
$$N_{Fi} = \sum n_j$$
$$P_{Fi} = p_k$$

4. Comparison with ASQ

Comparison criteria	ASQ	ASI
Developer	ACI (Airport Council International)	own research result
Purpose	airport evaluation for the purpose of benchmarking	airport evaluation for the purpose of benchmarking
Evaluator	passenger	operator (through the weights: passenger)
Range of evaluated services	general services, facilities	detailed evaluation of information technology / services
Number of evaluation criteria	37 criteria in 9 groups*	19 (according to the functions)
Scoring system	scoring of services on 1-5 scale, where 5: best, 1: worst	scoring of services on 1-3 scale, where 3: best, 1: worst; correction of them, then weighting
Result	average scores by criteria groups (based on 37 criteria)	only one score: „smartness" index (but the values of the functions are available separately as well)
Taking into account the characteristics of the passenger groups	nationality, country, gender, age group, passenger profile	ratio of affected passengers (x), passenger needs (y,z)
Evaluation process	individually, 30-45 minutes prior to departure, 350 passenger questionnaire in every quarter of the year	by operators once a year
Frequency of evaluation	1 year	1 year

*ASQ evaluation criteria groups: overall satisfaction, accessibility, check-in, passport control, security, finding your way, airport facilities, environment, arrival services

5. Conclusion

Main contribution:

Evaluation method that focuses expressly on information management of airports is currently unavailable.

Key finding:

We developed ASI method for benchmarking and oprerational use that is a complementary of ASQ.

Lessons learnt:

The results mainly depend on the value of weights

Technology and services can be expandable

5. Conclusion

Further research directions:

Wider range of evaluation scale

More correction factors

Determination of weights through passenger questionnaires

Research area

1. Analysis method of air transportation systems

Analysis of information and communication system
Identification of organizations – functions – data groups

2. Model of integrated air transportation information system

Elements of operational and passenger side
Functional and operational model

3. Functional and operational model of air transport mobile application

Operational model of the mobile application
(part-model of integrated system)
Activity scheduling

4. Development of a part-function mobile application – passenger check-in

Grouping of airport activities
Analysis of time-elements of airport procedures
Development of method for forecasting check-in time

5. Evalution method of airport information technology - smartness index

Elements of smart airport
Method of evaluation method
Application of the developed method
Comparison with ASQ

THANK YOU FOR YOUR ATTENTION

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