Managing Strategic Mega Infrastructure Assets:

a review of European institutional and capacity-building challenges

OMEGA Series Seminar 2015
Agenda

1. Sharing worldview, position & perspective
2. Experiencing complexity
   Asset Management is not ‘rocket sciences’ …
   Beyond the ‘iron triangle’ …
   The innovation potential of London Heathrow …
3. Resolving conflict
   … but rocket sciences makes asset management more sustainable
   … is potential for dynamic capability in technology
   … can be facilitated by future infrastructure asset managers
4. Positioning and learn
Sharing worldview, position & perspective
Worldview

Institutional sustainability & collective action

advance state of the art in mega transportation project (MTP) management (Dimitriou et al., 2013)

MTP are part of infrastructure networks

overcome narratives that provide core rigidities

For institution building in MIA are no challenges that are exclusively ‚European‘

value chains are global

high-tech is global

soil disservices are local
Figure 1: Pilot phase executive education program CAS MIA in managing infrastructure assets at HSG
Position

Figure 2: Pilot phase executive education program CAS MIA in managing infrastructure assets at HSG

Doering and Parayre (2000)
Perspective as capacity institution builder in MIA

ISO 55 000/1/2 (2014)

Decoupling ‘means and ends’ (Wijen, 2014) in MIA

Lack of framing infrastructure assets as ‘high or appropriate technology’
Perspective as capacity institution builder in MIA

ISO 55 000/1/2

Figure 3: ISO 55001 elements of an asset management system (Woodhouse Ltd., 2013)
Perspective as capacity institution builder in MIA

ISO 55 000/1/2

Decentral, private institutions, co-exist with conventional policy measures (King et al., 2004)

MIA organizations are looking for specific roadmaps to ISO 55 00X compliance

Fundamental research – ’organizational perspective‘ - is missing to do so (Terlaak and King, 2006; Too, 2011; Jimenez and Pagano, 2012; Minnaar et al., 2013; El-Akruti et al., 2013)
Perspective as capacity institution builder

Decoupling ‘means and ends’ (Wijen, 2014) in MIA

MIA is a ‘highly opaque field’: complex causal relationships, multiplicity of behaviour, invisibility of practices

Compliance - oriented institution (‘best practice transfer’) deliver concrete, uniform rules to provide clarity and monitoring

‘Means’ (‘best practice transfer’) provide substantial compliance, but misse ‘ends’ (policy goal internalization within organizational context)

Niche institutions – between policy and best practice – can mitigate trade-offs

Institution according to (Fear and Azambuja, 2014)
Perspective as institution builder

Lack of framing infrastructure assets as ‘high technology’

MIA includes high-tech

Relationship between asset strategy, corporate strategy, technology strategy needs management attention

Figure 4: Smart grid product providers that need to collaborate in the future (OECD/IEA, 2011)
**Perspective as institution builder in MIA**

<table>
<thead>
<tr>
<th>Niche institution</th>
<th>integrated and innovative portfolio of capacities – combining new and existing ones (application knowledge) – will trade-off 'best practice' and complex policy.</th>
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<td>MIA profession</td>
<td>adding technology management and (urban) planning (NOT planning approach to corporate strategy) emergent strategies and organizational learning become institutions that provide clarity</td>
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Experiencing complexity
Asset management is not "rocket sciences"

Absence of "rocket sciences" is a quality indicator of asset management conferences and training courses

Strong narrative serving as core rigidity for integrated MIA
Beyond the ‘iron triangle’ (Dimitriou et al., 2013)

Managing MTPs exclusively as ‘projects’ is a result of emphasis on compliance seeking

Research in PM has limited potential to further improve large infrastructure situations (e.g. cost overruns, behavioural deviance) (Giezen, 2012; Eriksson, 2013; Mir and Pinnington, 2014; Liu et al., 2013; Pinto, 2014; Irimia-Dieguez et al., 2014)

Nevertheless, project management is the main approach to MIA, due to lack of alternatives
The innovation potential of London Heathrow (Gil et al., 2012)

Technology adoption in MTP rises when core rigidities (e.g. project culture framings) are balanced by alternative framings.

Figure 5: T5 stakeholder and embedded framing relevant to technological decisions (Gil et al., 2012)
Resolving conflict

How can a future MIA address the challenges
'Rocket sciences' can make MIA more sustainable

Impact assessment of new infrastructure (material sciences)

Guidelines for sustainable urban planning and underground space use

Disentangle soil services, disservices (costs), and grid assets (Total sciences of environment, ecosystem approach)
'Rocket sciences' can make MIA more sustainable

Figure 6: causal loop diagram of transition from decentral to central power supply in six municipalities in Germany 1880-1914. The orange-dotted arrows denote implicit processes, such as perceptions. Green variables belong to the environmental system and white ones to the social system. Dashed blue arrows indicate slow processes (Hasselmann, F. with R. Seidl, reproduced from Hasselmann, 2015).
'Rocket sciences' can make MIA more sustainable

Figure 7: conceptual model integrating underground space use by public and private construction with regional and sector economics (Mann, S. with F. Hasselmann, reproduced from Hasselmann, 2015).
Beyond the 'iron triangle' is dynamic capability in technology

Projects are innovation projects when they include innovation activities

Innovation activities can strengthen core competences (cc) and establish dynamic capability in technology by linking cc (Leonard, 1992, 1995)

Shared problem solving
Prototyping and testing
Implementing and integrating
Absorpting knowledge from 'outside'

Figure 8: activities that create and renew technological capability (Leonard, 1995).
Beyond the 'iron triangle' is dynamic capability in technology

Figure 9: classification of competences (Patel and Pavitt, 2000).

Figure 10: classification of competences for transmission system operator (Hasselmann, 2015a, adapted from Leonard, 1995).
Beyond the ‘iron triangle’ is dynamic capability in technology

Figure 11: linkages between projects and classification of competences for transmission system operator (Hasselmann, 2015a, adapted from Leonard, 1992).
Innovation potential can be facilitated by future HSG MIA managers

Figure 12: linkages between AM strategy and technology strategy formation (Hasselmann, 2015b).
Positioning and learn

HSG MIA strategy and modules are positioned
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continual improvement  communication  documentation

Figure 13: three core competences of MIA at CAS MIA HSG (www.casmiahsg.ch).
Figure 14: prototyping and testing at CAS MIA HSG (www.casmiahsg.ch).
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