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# A General Morphological Analysis to Support Strategic Management Decisions in Public Transport Companies

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#### Abstract

This paper presents a General Morphological Analysis (GMA) meta-model aiming to help decision-makers wishing to integrate sustainability concerns into the company strategy. This is made by joining Operational Research (OR) analysts, decision-makers and stakeholders as participants in the problem structuring and formulation process. This is particularly relevant in societal issues, where public transport companies are particularly important. Indeed, public transport companies play a quite visible role in the dimensions of corporate social responsibility, namely because of four reasons: (i) they provide daily services crucial to mass customers' mobility; (ii) their investments are usually of high value and rather sensitive to technological development; (iii) they play a crucial role in the energy sector and (iv) are strongly dependent upon macro-policies.

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Keywords: General Morphological Analysis; Environmental Management; Strategic-Decision Making.

#### 1. Introduction

GMA is a problem-structuring and problem-solving technique, designed for multi-dimensional, non-quantifiable problems where causal modeling and simulation do not function well (Ritchey, 2006). The authors consider that GMA offers an opportunity to explicitly materialize and propose a possible typology of decision-making modelling methods to approach different types of problems within the discussed context. With the help of this meta-model it is

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possible to provide the design of different ways to address problems, promoting and enhancing the transference of knowledge to and within the public transport companies. We see companies as living 'cells' in the economic and social structure where specific characteristics (such as learning, diversity and self-organization) must be present in order to assure resilience and sustainability when dealing with problems.

The motivation and scope of the research are presented in a diagrammatic form in Figures 1 and 2. The foundations and development of the GMA to support public transport company managers are then described and deserve a close-up detail in Table 1. Finally, two examples of application of the proposed GMA to public transport decisions are presented. These applications act as a "trigger" for further research and field tests.

### MOTIVATION Main social humanity concerns (such as economic growth and environmental protection) are at the core of the strategy and decision-making mechanisms of companies Demanding stakeholders' involvement Increasing companies' complexity Current and future Managers have to tackle a diversity of Problems "Imposes the adoption of new methods for structuring spaces and strategy alternatives, and organizational planning" Operational Research (OR) methodologies are increasingly Support from analysts/consultants/academics being relied upon a broader range of disciplines confronting which act as facilitators people without strong quantitative or model-building backgrounds Analyzing complex policy areas and developing future scenarios present additionally a number of difficult methodological problems "Traditional quantitative methods, Behavior elements become increasingly causal modeling and simulation alone important as we move from optimization to solving people related problems may be relatively usefulness" Other factors beyond quantitative elements Strong Social-Political Dimensions + Conscious Self-Reference among Actors Stakeholders with different perspectives and mental models, Need for maintaining credibility and "staying onside" with varied stakeholders requires distinctive interventions to the there is a need to create common language in environmental issues Models are being used to solve and to help understand complex environmental problems "Modeler with high ethical standards must be open to acknowledge the risks of behavioral effects" Responsible and ethical behavior in management actions concerning environmental issues Very few articles focus on Problem Structuring Methods as interventions, meaning systematic or purposeful actions by an action to create change and improvements, leading to "Complex connections between various actors (human and non-human), pursuing their personal interest, in a flux of changing circumstances and context" There is need for a balance between models and people skills

Fig. 1: Motivation of the Research

Non-experts in companies are increasingly seduced by

apparently easy-to-use technical software, making them

unconscious preys of pitfalls and risks

As "there are usually **multiple paths** that can be followed in a

decision analysis process" and "it is possible that these different

paths lead to different outcomes", unintentional biases in model

use may occur

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