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Evaluating new business operation models for small and medium size logistics operators within low emission zones

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Abstract

With the enforcement of LEZs, small and medium enterprises (SMEs) have to explore different business operation strategies to remain in market. Examples of these strategies are change in delivery operations, change in delivery vehicles, new strategies etc. In this paper, we propose a hybrid approach based on Gap Analysis and Importance Performance Analysis for selecting the most viable strategy for SMEs. In the first step, we identify the criteria for evaluating business strategies using literature review and discussion with logistics experts. In the second step, we conduct gap analysis to identify the gaps between the expected performance of the business operation strategies and the perceived performance. Lastly, we conduct Importance-Performance analysis to determine the areas in which business operation strategies perform best or worst and in which areas they need to improvise. A numerical application is provided.

Keywords: Low emission zones (LEZ); Gap Analysis; Importance Performance Analysis; Scenario selection; fuzzy theory

1. Introduction

Low emission zones (LEZ) have been implemented in several cities (about 200 in Europe so far) in order to reduce negative environmental impacts arising from old polluting vehicles (Dablanc, Montenon, 2015). All these LEZs target freight vehicles (exclusively or not). Recent studies show that these zones have been successful in minimizing emissions based on CO2, NOx and other particulates. There is however, only a very limited number of studies on the impact of low emission zones on business performance of small and medium logistics service operators. It is assumed

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that the implementation of LEZs will challenge the existing operational models of SMEs forcing them to look into new business models for operation (Dablanc, Montenon, 2015). In this paper, we explore different business operation strategies that SMEs can consider to remain in market with the enforcement of LEZs. We envisage four scenarios (or business operations strategy) which the logistics operators can undertake:

- Scenario 1: No change in existing fleet (Logistics operators take on the extra costs)
- Scenario 2: Change in delivery operations (Logistics operators change the delivery timings, routes, delivery zones, use of dedicated hubs/delivery zones)
- Scenario 3: Change in delivery vehicles (Retrofit existing vehicles, Buy – New or Used vehicles, Rent delivery vehicles, Vansharing)
- Scenario 4: Change in business strategy (Partnership with other logistics operators, Merger with other logistics operators, Outsourcing to 3PLs)

To evaluate these scenarios, we propose a hybrid approach based on Importance performance analysis and Gap Analysis. For evaluation of different strategies, we need data on evaluation criteria. However, it has been observed in general practice, that often there is almost none or very limited data available on strategies which are new or yet to be implemented, thereby making the evaluation process difficult. To address this situation, we will make use of linguistics ratings such as Good, Very Good, Poor, Very Poor etc. for assessing the alternatives (business operations strategy) and the criteria.

The rest of the paper is organized as follows. In section 2, we present the problem definition. The solution approach is provided in section 3. Section 4 presents the numerical application of the proposed approach. Finally, in section 5 we provide the conclusions and steps for future work.

2. Problem Definition

The research problems we are addressing in this paper are:
- Which criteria to choose for evaluating different business operation strategies?
- How to generate criteria and alternative (transportation projects) ratings under uncertainty?
- Which methods/techniques to choose for evaluating different business operation strategies? How to select the best strategy?

3. Solution Approach

Our solution approach comprises of three main steps.
1. Selection of evaluation criteria
2. Generating criteria and alternative (business operation strategies) ratings
3. Identifying the best alternative using Gap Analysis and Importance Performance Analysis

3.1. Selection of evaluation criteria

The first step involves selection of criteria for evaluating different business operation strategies that SMEs can consider to remain in market with the enforcement of LEZs. Four business strategies are considered in our study namely no change in existing fleet, change in delivery operations, change in delivery vehicles, and change in business strategy (Section 1). We identified ten criteria from literature review (Browne et al., 2004, Ellison et al., 2013, Tretvik et al., 2014), discussion with city logistics experts and our practical experience with city transportation projects (SUCCESS, La Rochelle, France). The final list of criteria is shown in Table 1.