

# Cooperation and Sustainability in Last-Mile Logistics Sector: Behavioural Aspects of Courier Express Parcel Service Providers

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The decisions of company managers are often not guided by the regulations governing the environment but by subjective factors that exert their effects in a hidden way in the decision-making manager's behavior. Market behavior is objectively controlled by regulators, but subjective factors lead to poor decision-making in some cases. On the one hand, the principal-agent problem is revealed behind the subjective factors, and on the other, cognitive biases affect the decision-making leader as a person. Cooperation with competitors from the same sector and sustainability issues are two similar areas where there is an opportunity to examine these concerns and where the nature of companies' decision-making shows similar or identical patterns on the basis of which decision-making behavior can be explored, characterized, and understood. This thesis examines the attitude of the managers of two existing Courier, Express, and Parcel market players regarding possible market cooperation. In-depth interviews and the completion of a unique questionnaire that revealed the presence of cognitive bias were the basis for the research. During the investigation, the cognitive bias influencing the decision of the two company managers was identified, and it was also examined whether the parent company or the owner's opinion affected their decision. The two case studies demonstrate how managers' decisions to develop collaborations are influenced by their prior experiences and prejudices.

## 1. Introduction

Increasing urbanization and the growth of e-commerce, which has started to expand dramatically since the COVID outbreak, is placing an increasing burden on the service providers of the Courier, Express, and Parcel (CEP) market (He, 2023). The logistics CEP is an industry focusing on the delivery of small parcels. The CEP service providers are responsible for delivering the products ordered by customers to the location specified by the customer. Halldórsson and Wehner (2020) state that the result of urbanization is a rise in the number of vehicles and trucks, which the CEP sector decisively contributes to. Additionally, the level of environmental pollution has increased as a result of the increased traffic, and the city governments have established or are introducing restrictive measures to combat this and promote sustainability (Jeong et al., 2022).

According to Teixeira et al. (2023), the most prevalent strategy taken by CEP market service providers to promote sustainability and decrease environmental pollution is the employment of alternative fuel-powered trucks in parcel delivery. Despite using alternative fuel vehicles reducing environmental pollution, it has no impact on reducing the amount of traffic in cities (Deng et al., 2022).

The cooperation of the service providers and the shared utilization of resources by the service providers could be a sustainable choice to fulfill the expectation of operating the service in a more sustainable way (Justiani and Wibowo, 2022). Bhasker and Sarmah (2019) state that in their simulation model, in the scenario of cooperation where fewer vehicles were used for the service, the model produced a 19.02 % fuel saving. Furthermore, Hasan and Niyogi's (2020) collaborative experiment resulted in a 45 % cost reduction. Even though the usage of shared resources is not uncommon in the transportation industry, and in addition, it would be beneficial for both the city and the service providers, CEP market participants rarely work together (Bartucz et al., 2023). Based on the aforementioned, the goal of this thesis is to ascertain whether there is a lack of service providers who cooperate

despite the fact that doing so is advantageous for CEP service providers. Since the economic advantage has been established, there must be another, often invisible, factor influencing the service providers' decisions in addition to the advantages. These explanations can be found in the field of cognitive bias. Behavioral science already has a discipline dedicated to studying cognitive biases in decision-making (Korteling and Toet, 2021). The novelty of this paper is that cognitive biases influencing the growth of collaboration in the logistics CEP market have not yet been studied. The development of collaborations is still ahead of the CEP market. Considering the foregoing, it is vital to examine and comprehend the cognitive variables that affect the judgments made by CEP market service managers. With this knowledge, behavioral and decision-making processes may be established to assist in the development of rational decisions.

With the aid of a simulation model, the following subsections illustrate the economic and sustainability advantages of cooperation and provide a summary of the presence and impact of cognitive biases on managerial decision-making. Though there are good reasons for cooperation, service providers rarely work together. Accordingly, this article regards the objective decision made in the context of the knowledge, facts, and simulation outcomes as being a rational choice. Why are there so few CEP market collaborations if the collaboration benefits the service providers economically? Decision-making regarding cooperation can be influenced by factors inside and outside the CEP company. Our article examines decision-making within the company influenced by factors affecting the individual decision-maker. The primary source of the internal firm problems is the well-known principal-agent problem, which arises when the manager's and owner's objectives diverge (Shah 2014). In the case of CEP market companies, this system of relations is also interpreted in such a way that the interests of the international parent company differ from the interests of the manager of the local subsidiary. As a result, the decision to collaborate may be impacted by the owners' and managers' competing interests. In the case of 21st-century companies, however, decision-making is not delegated to one person, but decisions are made in groups or using the multi-eye principle. Nevertheless, the protagonist in the decision process is always the individual. After being presented with a data-supported opportunity, the corporate manager uses his own biased judgment and informs his superior of his decision. The person is influenced by irrationalities at the time when he must make a decision. In order to determine when and why managers make irrational decisions, the authors investigated the aspects impacting the decision-making process, which are given through two case studies.

### 1.1 The outcome of the cooperation simulation

The authors created a simulation model in Aptean Paragon Software to verify the positive effect of shared resource use. The model analyzed three situations: 1) service providers do not cooperate; 2) service providers partially cooperate; 3) the service providers jointly operate a distribution center. For simplicity, the model used 1-day delivery information, assigned cost elements, and limited resource data. Furthermore, Paragon has defined the number of resources required for delivery. Figure 1 a) and b) demonstrates the reduction of the number of vehicles used and the km traveled data.

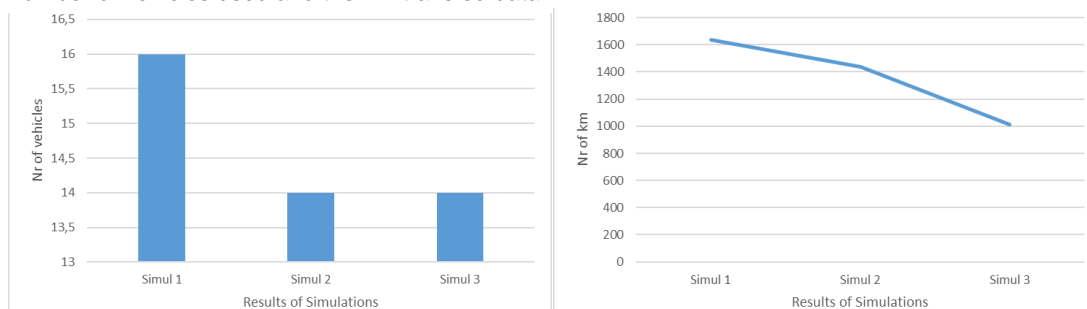


Figure 1: a) Number of used vehicles; b) Number of km traveled by simulation model (own elaboration)

In addition, Figure 2 shows the reduction of variable costs when using a common resource pool. The simulation clearly showed that the shared resources model reduces the number of vehicles present on the roads, thereby favoring the sustainability expectations of the city administration. The joint use of resources is also beneficial for the actors who entered into cooperation since, in the simulation, the cost of the vehicles was reduced by 12 %, the cost of the traveled kilometers by 38 %, and the cost of time by 17 %. As fewer vehicles employ the city's roads and, as a result, have a lower environmental impact, the utilization of shared resources benefits the CEP market service providers economically as well as the city.

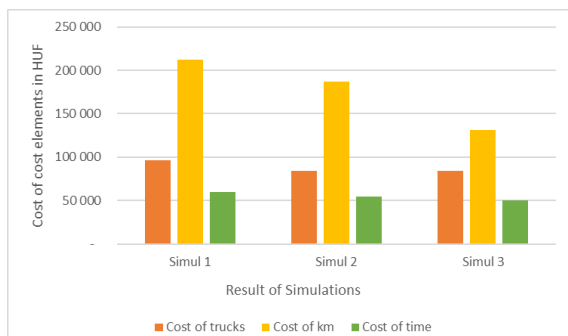


Figure 2: Evolution of variable cost elements (own elaboration)

## 1.2 The cognitive bias effects

Whilst some authors have also demonstrated the financial advantage of cooperation among CEP market service providers, it must be assumed that other considerations, such as cognitive biases, influence the decision to the extent that they exceed the financial advantages. A cognitive bias is a type of systemic inaccuracy in thinking that happens when people process and interpret data from their environment, which has an impact on their judgments and decisions (Palmucci and Ferraris, 2023). The phenomenon has been researched by cognitive sciences and social psychology for decades. Although company managers assume that they make their decisions based on known and understood circumstances, data, and rationalities, the low number of CEP market collaborations justifies the assumption that at the moment of decision, the manager is affected by irrational factors that influence his decision (Sós et al., 2023). Human decision-making is not guided by normative frameworks but is instead exceedingly context-sensitive and susceptible to systematic, predictable errors that are frequently regarded as illogical (Manusco et al., 2014).

The authors in this article present the cognitive biases existing when the potential of cooperation occurs, which cause the decision-maker to either develop cooperation or reject it. The present case study is based on 2 companies operating in the CEP market in a Central and Eastern European country. Company "A" has an international background and occupies a prominent position in the examined market. Company "B" has a local background, founded a few years ago, but has since achieved a significant market share. Both companies have a local decision-making manager. Company "A" has its own and subcontractor network resources. In contrast, company "B" established a strategic cooperation with another CEP service provider to manage the deliveries from its warehouse.

The purpose of this article is twofold: 1) to investigate whether cognitive biases can be experienced when a CEP company manager makes a decision about cooperation; 2) to identify the point where cognitive bias affects the decision-making process. Of the two investigated companies, one cooperates, the other does not. If the condition is given that the joint use of resources, i.e., cooperation, is economically beneficial for the parties and it strengthens sustainability for both the companies and the service providers, then why does one leader choose cooperation, and why does the other reject it? The authors conducted an investigation with the decision-making managers of the two companies in order to reveal which irrational factors influenced their decisions during the decision-making process. The examination of the behavior of the managers is novel due to the technique used, and the authors draw attention to the novelty that rationality supported by data is always influenced by irrational factors.

## 2. Methodology

The results of psychological experiments prove that most decisions contain biases. Cognitive bias is a factor arising from personal and human nature that cannot be examined directly or only with difficulties. In order to examine the presence of cognitive biases, a technique was selected within empirical research that can be used to indirectly examine the decision-maker's perception of reality and the resulting decision. From a methodological point of view, the investigation has two levels: 1) first level - semi-structured interviews; 2) second level - application of combined techniques. The second level combined techniques included projective technics to reveal the attitude rooted deeper in the decision maker's mindset: free associations, attitude questions, and true-false answers. The central element of both levels was the topic of cooperation. The combined techniques made it possible to examine the innermost feelings, unconscious approaches, and thoughts of the decision-maker. The advantage of the combined techniques is that by executing the exercises,

the respondent conveys information that reflects his hidden feelings, beliefs, and unconscious ideas about a particular topic (Steinman, 2008).

### 3. The biased decision-making – results of the case studies

In 1974, Kahneman and Tversky proved that even the most rational business decision-makers are influenced by their intuition in making their decisions (Tversky and Kahneman, 1974). "Bounded Rationality" is thought to be adaptive and typically leads to precise, speedy, and occasionally even better decisions and judgments (Ceschi et al., 2019). Nevertheless, it is sometimes incomprehensible to an outsider why a particular decision was made by the leader. In order to understand it, the leader's personality needs to be known, such as his past in business life, what principles he acts on, what motivates him, what hinders him, and how dependent he is on his superior. He can make decisions alone. Tversky and Kahneman (1974) distinguished 12 biases, then more emerged. Sibony (2020) examined 27 biases and grouped them into 5 bias families. This article recognizes some of the bias categories identified by Sibony during the two case studies.

Making decisions includes deciding on a course of action, acquiring data, and weighing the pros and cons of potential courses of action (Omarli, 2017). The literature has a wide variety of decision-making models. The simple stages that participants must take while making a decision are included in simple decision-making models. The research states that complex decision-making procedures often involve three to seven steps. decision-making.

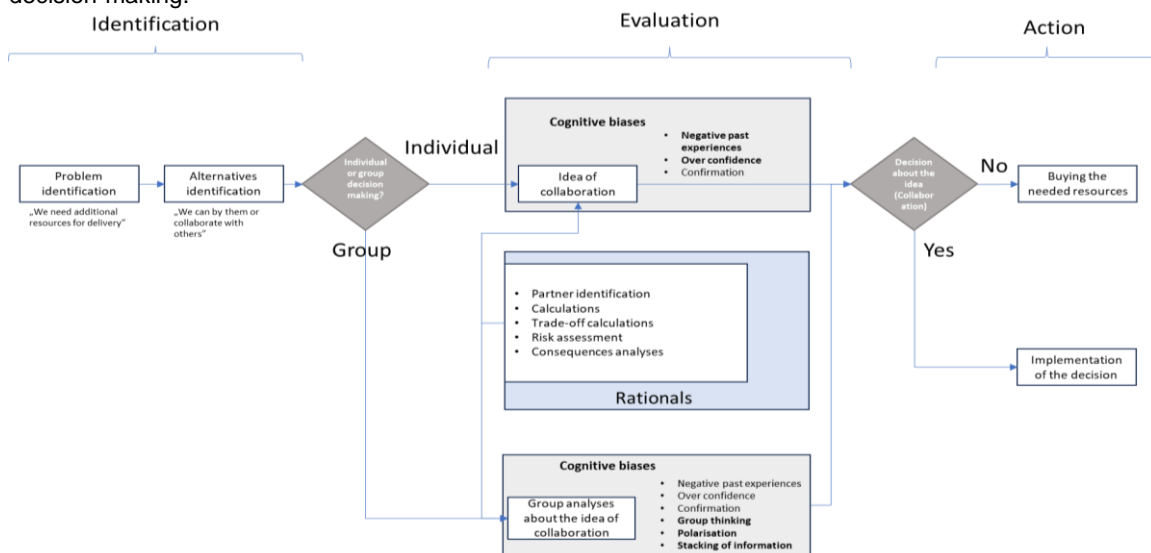


Figure 3: Decision-making influenced by cognitive biases (own elaboration)

Figure 3 shows the point where cognitive bias has an influence on the decision-maker. Once the problem has been identified, possible alternatives are also created, which must be decided upon. This article examines the individual decisions of managers of CEP market companies. It is also necessary to examine the individual in the case of non-individual decisions since the individual makes his proposal through his own distorted view of reality, which may further influence the decision of the owner, the parent company, or even the other members of the group. In order to avoid this situation, the majority of companies require group (at least two actors) decisions from the company's managers since one of them could mitigate the negative effects of biases (Paulus et al., 2022). At the same time, even in the case of decisions to be made in groups, there are biases, but in the case of group decision-making, the experiences that only affect the individual can be mitigated.

#### 3.1 Case of Company "A"

During the semi-structured interview with the senior manager of company "A", the manager's summarised opinion about the cooperation was negative. He used words and phrases such as "we are big enough and capital strong" and "we were badly scammed a few years ago". Based on the completed combined technique questions, a completely different picture emerged. In several cases, the leader indicated that cooperation is useful. However, competition law restrictions deserve special attention. He characterized the cooperation as "positive", "cost-sharing between client and service provider," and "win-win" by free association. Nevertheless, "dangerous", "loss of business" and the "small fish-big fish" effect were expressed in his answers. In addition, the negative experience he suffered in the past no longer influenced him in the direction of "never again",

although this past experience resulted in the need for a strong contract in case of cooperation. Moreover, he would cooperate if it carries benefits and serves sustainability interests. In addition, it was noticeable that trust is needed for cooperation to develop; he would consider cooperation if it would help the company's situation, but at the same time, he considered cooperation too risky. In the decision-making process at the company, the 4-eye principle is applied: the manager prepares the decision, and the decision is made together with his international superior. Based on what the interviewees said, they are generally of the same opinion as the international superior, and the principal-agent problem is not apparent. The used decision-making method helps mitigate the biases that influence decisions.

Summarizing what was said during the interviews with the manager of company "A": the manager demonstrated anti-cooperative behavior during the first interview, though his opinion showed a much better attitude during the combined technique task. The most frequently cited problem in relation to collaborations is the possible existence of legal barriers to competition, as well as joint work based on strict contracts. Cognitive biases can be discovered based on the answers given by the manager, which influence the manager's decision regarding the development of cooperation. The two most significant biases within this case study are the confirmation and the experience biases. According to Korteling and Toet (2021), the propensity to choose, interpret, concentrate on, and remember facts that support one's beliefs and expectations is the definition of confirmation bias. The manager of Company "A" could not hide even when he had already made a positive statement about the usefulness of the collaborations. In addition, Sibony (2020) emphasizes that experience bias is present when the test respondent compares situations to those that he can recollect based on his own experiences. In the case of Company "A" manager, based on his past experience, only a strong contract could protect him from possible negative moves by a cooperating competitor.

### 3.2 Case of Company "B"

In contrast to company "A", the manager of company "B" clearly showed a pro-cooperation attitude even during the semi-structured interview. The company arrived on the local CEP market a few years ago with strong capital. Shortly after their arrival, they started to expand their portfolio by delivering parcels. They needed vehicles and labor resources to enter the parcel delivery market. Instead of investment, the company chooses cooperation. The manager's decision regarding the cooperation was strongly influenced by the fact that the manager of the future partner company was a former acquaintance of the manager of company "B" (*confirmation bias*). A strategic cooperation agreement was established between the two companies, which was followed by a further simple cooperation agreement with other companies. In terms of the nature of the established cooperation, it is of a complementary type since company "B" did not have the desired capability, so it "bought" it with a cooperation agreement. Company "B" entered into a classic cooperation with the other cooperating partners, the primary purpose of which is to share resources.

The most significant biases are also the experience and the confirmation biases. Past positive experience encourages the decision-maker to cooperate with a company that has a long, established, and positive relationship with its manager. Based on this, future cooperation can only have a positive outcome based on the manager's intuition. In the case of both company managers, confirmation and experience bias could be identified in the decision-making process. At the same time, the two biases should be interpreted with opposite signs since the past experience in the case of company "A" would definitely support the cooperation with a strong contractual background, while in the case of company "B", a positive experience with another person definitely steered the manager in the direction of cooperation.

## 4. Conclusions

CEP market service providers can initiate cooperation with each other in accordance with the measures taken by city governments to reduce environmental pollution and strengthen sustainability. As a result of the cooperation, the use of the common resource pool in the simulation performed by the authors reduced the number of vehicles involved in the delivery by 12 % and the number of kilometers traveled by 38 %, which also reduced the level of pollutant emissions proportionally. For CEP market service providers, the use of shared resources results in a 12 % cost reduction in the use of vehicles and a 17 % reduction in the time cost factor.

Despite statistics showing the economic advantages of cooperation, the number of CEP market collaborations is minimal. The decision regarding cooperation may even be negatively influenced by the personal experience expectations of the company managers of the CEP market participants. Company manager "A" of the two case studies examined is not specifically against cooperation, although the company has not entered into cooperation with any other CEP market competitor so far. The negative experience suffered by the company manager in the past does not encourage him to enter into cooperation. At the same time, the CEO of company "B" had no negative experience related to cooperation, and on the basis of a positive experience, he became strongly in favor of cooperation, which bias also appeared in the decision he made.

During the decision-making process, the decision-making leader's opinion is driven by irrational factors, even if the decision to be made is supported by rational data during the decision-making process. Managers must be aware of the fact that they cannot make a rational decision because this process is influenced by irrational factors. The novelty of this article, based on the study of the behavior of CEP market participants, is that the proven economic and sustainability benefits of cooperation do not necessarily lead to the development of cooperation since the decision of the decision-making leader is influenced by past experience, beliefs, or other cognitive biases.

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