The idea of project implementation results from the authors' scientific and business experience. We focus on the so-called return logistics of plastic waste that is thrown away by residents of different cities and towns. Our experience shows that residents are complaining about the rising costs of waste disposal, the increasing number of waste containers that they have to set up in their homes, and the problems of waste selection. Consequently, some of the waste that should be selected goes to mixed waste containers. This forces export (waste transportation) service providers to re-sort waste and, as a result, generates higher service costs.

In addition, the waste collection system is becoming more and more expensive due to the use of multi-container solutions, which makes it necessary to drive specialist garbage trucks on the same routes many times. Such solutions are socially and ecologically harmful, and irrational in terms of efficiency. Because the experience of other countries that use more advanced systems in practice is widely known, we decided to review the available solutions and focus on optimizing the solutions used in Poland.

Our idea is to extend the methods known in theory to optimize waste return logistics processes with new factors that can potentially improve the general efficiency and especially – economic efficiency of waste return logistics processes. In the project, we focus on plastic waste, because it is the dominant fraction in the so-called municipal waste morphology (i.e. structure of waste). Using more and more common access to data repositories and improved methods of collecting and analyzing data from distributed data soures (big data), we intend to construct and check in practice a new method of parametric assessment of waste return logistics systems, which will be based on a verified set of quantitative data describing technical factors , demographic, economic, organizational etc.

The expected effect of the practical application of the method developed by us will be to obtain higher efficiency of the analyzed reverse logistics processes, which should translate into the reorganization of these processes and reduce their arduousness for customers. First of all, we are talking about economic nuisance and limiting the cost of waste disposal, which in some Polish cities reached in 2019 the level of PLN 120-170 from a family of 4 people a month.

In our project we will use the most modern research tools and methods. We use advanced statistical and econometric methods, mathematical modeling, machine learning, robotic process automation, big data analysis, etc. Our team includes IT specialists, logistics specialists, business practitioners who have many years of experience in the organization and practical implementation of waste return logistics services in major Polish cities. We work with nationwide chambers and associations of logistics companies in the waste industry (transport and processing), we are able to independently build solutions based on the concept of the Internet of Things (IoT). We are convinced that our experience and skills will allow us to achieve the full objectives of the project.