OPTIMIZING LOGISTICS PROCESSES IN CASH SUPPLY CHAINS

The logistics of banknotes and coins has gained great attention in the past few years. Cost-efficient and secure cash deliveries to automated teller machines (ATMs), bank branches, and retailers have become necessary as a result of the financial crisis, the decline in cash usage, and the increase of the intensity and violence of raids on ATMs and cash-in-transit. This dissertation presents five distinct yet interrelated research studies that provide solutions for managing ATM inventories and cash deliveries in order to improve the cost-efficiency of cash supply chains, user satisfaction, and the security of cash logistics. Extensive field research is conducted to gain an understanding of how users and managers perceive ATM service quality. Quantitative research techniques are used to develop tools and statistical models based on field research findings. Intuitive heuristics and exact algorithms are developed to forecast cash demands, control cash inventories, and manage ATM deliveries in cash supply chains of several maturities. Substantial contributions to the theory and logistics of cash distribution are made by solving new problems in novel ways. In addition, by using real world data, a potential cost saving of 32.0 to 37.7 million euro per annum is identified through benchmarking the performances of newly developed models with the cash operations of the three largest commercial banks in the Netherlands.

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