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Vehicle Trade Time Application Service Design for Fintech using Action Design Research

Completed Research Paper

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ABSTRACT

We study the critical aspects of vehicle trade-in time and its benefits to consumers and financial institutions. While previous research has explored the exchange or trade-in of the existing or used vehicle toward a reduction in the price of a new good, it has not contributed to suggesting the best time to trade-in a vehicle. This study fills this gap by examining the requirements and usefulness of forecasting vehicle trade-in time (VTT). Furthermore, the study evaluated how VTT service benefits consumers for informed decision-making and Fintech to gain more customers using behavioral science. For this research, by applying Design Science Research, we designed a machine learning(ML) based VTT information systems(IS) research framework and developed an application service prototype for instantiation using non-linear trend time series and hierarchical forecasting models and integrated it with an existing Fintech loan service by applying collaborative system design. We engaged the financial institution Digital Federal Credit Union to develop and evaluate the prototype. It serves as a preliminary model or mock-up that allows designers, stakeholders, and users to interact with and evaluate the concept more concretely. For prototype evaluation, we proposed the Hybrid IS Success (HISS) model that combines the refined Technology Acceptance Model (TAM) with the DeLone and McLean (D&M) updated IS success (ISS) model. Our study makes three contributions. First, it contributes to descriptive knowledge concerning the problem space by identifying the critical aspects of vehicle trade-in time. Second, it contributes to prescriptive knowledge concerning the solution space by offering a VTT IS research framework based on machine learning forecasting models for Fintech and consumers. Finally, our prototype and the proposed HISS evaluation model contributed to the instantiated artifact with DSR. In a nutshell, our research contributes to the knowledge base in the form of an expanded understanding of the kernel theories and the development of new behavioral theories for designing ML artifacts in the Fintech context. The paper provides a comprehensive VTT IS research framework from which select components were used for the DCU bank pilot study. Our long-term goal is to utilize the full framework for a full study.

Keywords

Vehicle Trade-in Time, Machine Learning, Design Science Research, Non-linear Trend Time Series Forecasting, Hierarchical Forecasting.