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Optimizing cooperation strategies for new energy vehicle manufacturers and technology suppliers: A game theory approach

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ABSTRACT

New energy vehicle manufacturers usually choose to cooperate with technology suppliers to improve their products' market competitiveness. For this purpose, this paper constructs a single and dual sales-channel supply chain system comprising a technology supplier and a new energy vehicle manufacturer. Within this framework, the technology supplier acts as the leader in a Stackelberg game, while the new energy vehicle manufacturer acts as the follower. Based on intelligent driving cooperation cases between Huawei and Chang'an, BYD, and Seres, three cooperation modes—"technology introduction + own sales channel (Model A)", "cooperative R&D + own sales channel (Model B)", and "technology introduction + channel support (Model C)"—are examined to analyze cooperation mode selection strategies for the new energy vehicle manufacturer and the technology supplier. The study found that when the profit ratio of the technology supplier to the new energy vehicle manufacturer (referred to as the revenue sharing coefficient) meets certain conditions, the optimal cooperation mode of the new energy vehicle manufacturer and technology supplier is Model C. Additionally, the profit obtained by the technology supplier under Model A is always the smallest, while the profit size between the other two models depends on the revenue sharing coefficient. Moreover, five situations describe the profit outcomes of the new energy vehicle manufacturer across the three cooperation modes, which are affected by the revenue sharing coefficient and the proportion of the technology supplier's R&D investment cost. This study addresses a gap in research on cooperation modes within the new energy vehicle sector, and the conclusions obtained can provide valuable theoretical insights for new energy vehicle manufacturers and technology suppliers when selecting cooperation strategies.

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Optimizacija strategij sodelovanja med proizvajalci elektrificiranih vozil in dobavitelji tehnologij: pristop teorije iger

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POVZETEK

Proizvajalci elektrificiranih vozil za povečanje tržne konkurenčnosti svojih izdelkov pogosto sodelujejo z dobavitelji tehnologij. Prispevek vzpostavi dobavno verigo z enim in dvema prodajnima kanaloma, ki ga sestavljata dobavitelj tehnologije in proizvajalec elektrificiranih vozil. V tem sistemu je dobavitelj tehnologije vodilni akter v Stackelbergovi igri, proizvajalec elektrificiranih vozil pa sledilec. Na podlagi primerov sodelovanja na področju inteligentne vožnje med podjetjem Huawei ter proizvajalci Chang'an, BYD in Seres so analizirani trije modeli sodelovanja: »uvajanje tehnologije + lasten prodajni kanal (model A)«, »skupne raziskave in razvoj + lasten prodajni kanal (model B)« ter »uvajanje tehnologije + podpora prodajnim kanalom (model C)«. Cilj analize je določiti strategije izbire ustreznega modela sodelovanja za proizvajalca elektrificiranih vozil in dobavitelja tehnologije. Rezultati kažejo, da je ob določenih pogojih glede razmerja delitve dobička med dobaviteljem tehnologije in proizvajalcem elektrificiranih vozil (koeficient delitve prihodkov) optimalna oblika sodelovanja model C. Dobiček dobavitelja tehnologije je v modelu A vedno najmanjši, primerjava dobičkov v modelih B in C pa je odvisna od vrednosti koeficienta delitve prihodkov. Opredeljenih je pet možnih scenarijev razporeditve dobička proizvajalca elektrificiranih vozil v treh modelih sodelovanja, na katere vplivata koeficient delitve prihodkov in delež stroškov vlaganj v raziskave in razvoj, ki jih nosi dobavitelj tehnologije. Prispevek zapolnjuje raziskovalno vrzel na področju modelov sodelovanja v sektorju elektrificiranih vozil, ugotovitve pa ponujajo dragocene teoretične usmeritve proizvajalcem elektrificiranih vozil in dobaviteljem tehnologij pri izbiri ustreznih strategij sodelovanja.

PODATKI O ČLANKU

Ključne besede:
Proizvajalci elektrificiranih vozil;
Dobavitelji tehnologij;
Modeli sodelovanja;
Stackelbergova igra;
Vlaganja v raziskave in razvoj;
Upravljanje oskrbovalnih verig;
Teorija iger;
Industrija električnih vozil

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