学校编码：**10384**

学号：**17720120153400**

分类号_____密级_____

UDC_____

厦门大学

博士学位论文

基于战略顾客支付意愿的双渠道供应链模型的扩展

The Extension of Dual-channel Supply Chain Model Based on Strategic Customer WTP

赵 洋

指导教师姓名：计国君　教授
专　业　名　称：管理科学与工程
论文提交日期：2016 年 03 月
论文答辩时间：2016 年 05 月
学位授予日期：2016 年　　月

答辩委员会主席：_____

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2016 年 03 月

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摘 要

电子商务和物流业的快速发展增加了顾客购物的便利性，很多制造商会在传统零售渠道的基础上，增加电子渠道来迎合顾客购物足不出户的愿望，节约了顾客的时间，大大提高了交易的效率，比如苹果、三星、海尔、联想等都采用传统渠道与电子渠道相结合的销售方式。电子渠道不仅吸引了制造商，也吸引了传统零售商，从而形成产品多渠道销售的模式。同时顾客也在多渠道中权衡利弊，做出最有利于自身的购买选择。本论文以双渠道供应链的战略顾客选择模型为基础，分别在顾客类型、销售时期、产品类型、销售渠道四个方面进行扩展，综合应用顾客剩余效用分析法、博弈论和计算实验等方法，得到了一系列理论结论和数值计算结果。本论文主要的研究内容如下：

首先将顾客类型异质化，分为传统顾客、电子顾客和战略顾客三种类型，讨论每种顾客类型的比例如何影响战略顾客的选择，分别得出在分散决策和集中决策时，制造商和零售商的最优策略，分析当顾客组成比例变化时对制造商和零售商的最优定价有何影响，研究发现：分散决策下，如果战略顾客无差别对待渠道产品，制造商会建立自营的专卖店和自营的网络平台销售产品；无论是采用分散决策还是集中决策，战略顾客的比例越少时，产品定价会越高，而且对零售商越有利。

其次将销售期分为正常销售期和打折销售期，分析了战略顾客在正常销售期的选择，选择等待的战略顾客进入打折销售期，讨论这部分顾客的选择。探讨了在复杂情形下，当分别采用分散决策和集中决策时，制造商和零售商的最优策略，研究发现：依据参数的不同，战略顾客的选择有 20 种不同的情形；在最复杂的情形下，制造商和零售商如果能预测出战略顾客的选择，则分散决策和集中决策下的最优定价是一致的；利用数值实验分别讨论了战略顾客对电子渠道产品的接受程度和对电子渠道的偏爱程度增加时，战略顾客选择的变化。

再次研究了高低性能差别的两种产品对战略顾客和最优策略的影响，设定了三种情形：单一传统渠道销售两种产品、传统渠道销售高性能产品和电子渠道销

售低性能产品、传统渠道销售低性能产品和电子渠道销售高性能产品，分别讨论在这三种情形下采用分散决策和集中决策时，制造商和零售商的最优策略。同时利用数值分析参数对每个最优策略的影响，并将不同决策下的最优利润作比较，得出相应结论，研究发现：在单一传统渠道和双渠道模型一中，制造商如果要扩大产品的需求量，可以提高低性能产品的满意度；对于零售商而言，不愿意制造商开设电子渠道，假如制造商必须开设电子渠道的话，双渠道模型一比双渠道模型二更有利于零售商。

最后将双渠道扩展到多渠道，研究了在传统直销渠道有销售功能和无销售功能两种情形下，战略顾客的选择以及制造商和两个零售商的最优策略，进一步讨论直销渠道打折因子和产品性能差别打折因子对渠道价格和多渠道供应链的影响，研究发现：制造商可以通过缩小高低性能两种产品的差别程度来提高低性能产品的销量和产品总销售量；传统直销渠道没有销售功能只是体验店时，如果产品性能差别不明显，传统零售商和电子零售商都将受益。

本论文旨在揭示战略顾客选择购买渠道的内在机理，进一步补充和丰富了在不同扩展情形下，战略顾客选择行为和供应链最优决策的相关研究成果，所得到的相关结论对实际有指导意义。

关键词：战略顾客；支付意愿；多销售期；多产品；多渠道

Abstract

The rapid development of electronic commerce and logistics industry brings customers more convenience. Keeping the traditional retail channel, many manufacturers open the electronic channel to meet customers' wish of shopping without leaving home, which can save time and improve trade efficiency greatly. Companies such as Apple, Samsung, Haier and Lenovo all adopt the combination of traditional retail channel and electronic channel. The electronic channel not only attracts manufacturers, also attracts traditional retailers. It forms multi-channel sales mode. Therefore, customers weigh the pros and cons in multi-channel, and choose the most favorable channel to their own. Based on strategic customer choice model in dual-channel supply chain, this paper extends customer type, sales period, product type and sales channel respectively, applies methods of customer surplus utility analysis, game theory and numerical analysis. The main research contents are as follows:

Firstly, customers are divided into traditional customers, electronic customers and strategic customers. The results show that the manufacturer will establish self-support stores and network platform to sell products in decentralized supply chain, if the strategic customers hold the products between retail channel and electronic channel are no difference. Whether decentralized decision or centralized decision, the less the ratio of strategic customers, the higher the product pricing, and more favorable for retailer.

Second, sales period can be divided into the normal sales period and discount sales period. The study shows that the choices of the strategic customers have 20 different types according to the parameters. In the most complicated type, if the manufacturer and retailer can exactly estimate the strategic customer choice, the optimal pricings in both centralized and decentralized dual-channel supply chains are

consistent. We also find that the choices of the strategic customers are affected by the product acceptance of electronic channel and preference for the electronic channel.

Thirdly, the manufacturer sells two differentiated products in the single retail channel，the dual-channel Ⅰ and the dual-channel Ⅱ respectively. The results show that if the manufacturer wants to expand product demand in the single retail channel or dual-channel model Ⅰ, it needs to improve satisfaction with lower performance products. We also find that the retailer does not want the manufacturer to open the electronic channel when the manufacturer is dominant, but if the manufacturer has to open electronic channel, for the retailer, the dual-channel model Ⅰ is superior to dual-channel model Ⅱ.

Finally, the manufacturer sells two differentiated products in multi-channel supply chain, which includes a traditional retail channel, a traditional direct channel and an electronic retail channel. Traditional direct channel is divided into two categories, with sales function and without sales function. The results show that manufacturers can narrow the performance difference between the two products to improve the sales of the low performance products and all products, and when traditional direct channel is an experience store without sales function, the performance difference between the two products is less obvious, which is better for traditional retailer and electronic retailer.

The paper aims to reveal the inner mechanism of strategic customer choosing channel, further supplement and enrich related research results about strategic customer choice behavior and optimal decision.

Key Words: Strategic customer; Willingness to pay (WTP); Sales periods; Multi-product; Multi-channel supply chain

目 录

Contents

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