The University of Hong Kong

Department of Industrial and Manufacturing Systems Engineering

M.Sc.(Eng.) in Industrial Engineering and Logistics Management

IMSE7099 Dissertation

Proposal

Performance improvement of a distribution centre in xyz in China

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Prof. X.Y. ZEE

Date of submission: May 2024

Abstract

This abstract should be about 350 to 499 words long. It should be an abbreviated, accurate representation of the contents of the report. Major results, conclusions and/or recommendations should be given, followed by supporting details of method, scope or purpose, as necessary.

Declaration

I, CHAN xxx, hereby declare that the M.Sc.(Eng.) Dissertation final report, entitled "An investigation into xxxxxxx yyyyyy aaaaaa bbbbbb zzzzzz", which I am submitting, represents my own work and has not been previously submitted to this or any other institutions in the application for admission to a degree, a diploma or any other qualifications.

Signed: _____
CHAN, xxx

Date: _____5 May 2024_____

Acknowledgements

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Chapter 1 Introduction

1.1 Research background

Demand uncertainty, as the key source of transaction risks, affects most decisionmaking processes in supply chains. It arises when the quantity demanded for a given product or service in the market cannot be effectively predicted. Failure of a supply chain to contain demand uncertainty may result in unmet demand, loss of market share, excess inventory holding cost, excess capacity in production, among others. The greater the demand uncertainty, the more difficult a supply chain can achieve a good match between supply and demand, manifested by the difficulty in optimising its members' supply, pricing, ordering and other operational decisions, and in generating sufficient income to cover their operating and other expenses. Traditionally within the scope of supply chain management, these problems are now considered by the research community as belonging to supply chain finance, an emerging area that addresses the interrelated issues in operations management and finance. Given that many firms are facing liquidity problems and need to maintain their financial viability, this study addresses the crucial issue that demand uncertainty can affect the financial problems that exist in a company. It is desired that appropriate financial approaches could be designed to deal with these problems. A corollary is that these financial problems are inseparable from their operational counterparts, and thus they should be tackled in a simultaneous or holistic manner.

Reducing demand uncertainty is always desired; and innovative information technologies are expected to provide a solution to the problem. In the past two decision-making of each supply chain member for investigating the decisional dynamics within supply chains.

With reference to Bourland et al. (1996), this study defines the practice of collecting and processing raw market data to acquire information about market demand as information acquisition (IA) and the practice of disclosing privately acquired information to other members as and information disclosure1 (ID). Both IA and ID are well-studied topics in supply chain management highlighted by the benefits derived from reducing demand uncertainty, information asymmetry among supply chain members and strategic effects of information sharing. However, as mentioned above, this study will Boyabatlı and Toktay (2011); Hadwiger (2013) emphasise not only on the informational and operational, but also on the financial aspects of supply chain management, with the latter known as supply chain finance. Therefore, the decisional dynamics considered in this study will jointly involve the informational approaches manifested by the formulation of information strategy that coordinates IA and ID approaches, as well as the operational (such as product pricing and ordering) and financial problems (such as credit pricing and financing method) within supply chains. To illustrate the research ideas, the following discussion will be made through a simple example of a two-tier supply chain, which consists of a supplier (she) and a newsvendor-liked retailer (he). Both channel members are selfinterested, and the retailer is capable of IA and ID. The retailer's IA and ID Boyabatlı and Toktay (2011); Cachon and Lariviere (2001); Hadwiger (2013).

This model is developed to investigate how the supplier and the retailer will behave and respond when the latter is capable of IA and ID in this multi-stage noncooperative

game. This model of the supply chain system is the most basic one, which is illustrated in Figure 1.1. The market uncertainty is captured by a binary distributed market demand. Both the retailer and the supplier are assumed to have sufficient capital and aim to make optimal decisions to maximise their own benefits. In particular, added to this investigation are two important factors, (i) the feasibility of ID and (ii) the observability of IA Cao et al. (2020).
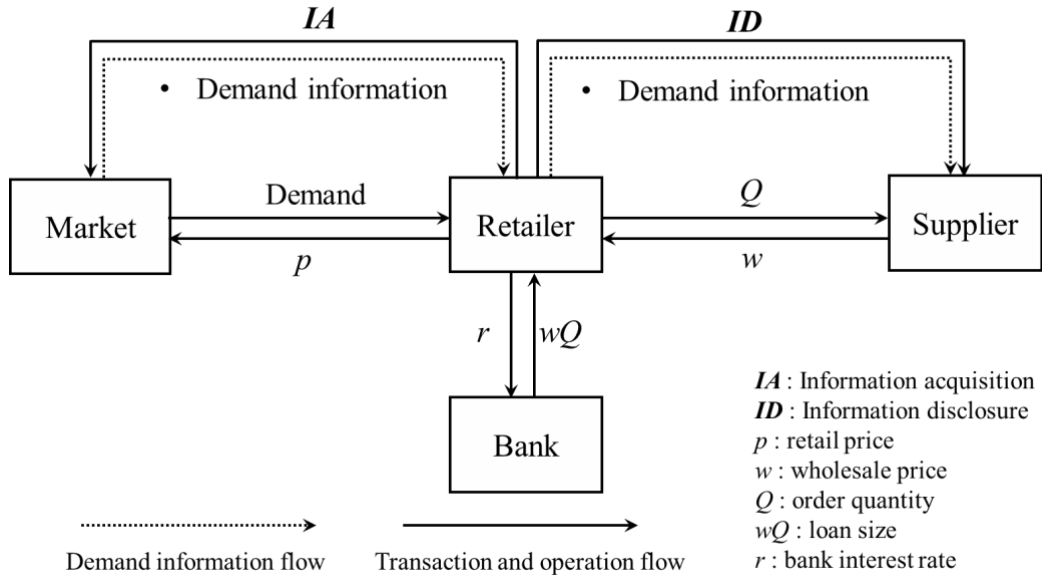

Figure 1.1 Model structure of the supply chain system for the first study

Chapter 2 Literature overview

2.1 Introduction

The purpose of this study is to investigate the retailer's optimal information strategy for acquiring and disclosing the demand uncertainty-related information as well as its effects on the decisional dynamics within supply chains, especially in the supply chain with financial constraint. Three research streams are identified, and the related literature is categorised accordingly. These include the effects of demand uncertainty, the information strategies related to IA and/or ID, and the decisional dynamics in the supply chain with financial constraint. For the first stream, the literature to be reviewed is mainly about the effects of demand uncertainty on the decision making in both well-funded and financially constrained supply chains. For the second stream, numerous studies have investigated the information-related strategies under various scenarios. These are divided into three categories, i.e., the optimal degree of IA, the effect of ID on firms' decision-making, and the interplay of firms' approaches to IA and ID. The third part of the review, which belongs to the operations-finance interface, is focused on two areas. The first is on the interdependence of the operational and financial decisions in financially constrained supply chains. The second is on the selection of financing approaches for supply chains where multiple financing approaches are available. The literature on these three research streams is reviewed in Section 2.2, 2.3 and 2.4, respectively. Finally, based on the literature review, serval research issues which are worthy of further investigation are identified and summarised in Section 2.5.

$$Q_D(H) = \frac{a}{4}(1 + d) \tag{2.1}$$

2.2 Demand uncertainty in operations management

2.2.1 SubsubSection

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Table 2.1 Summary of notations

Notations	Explanation
i	Market state, which can be High or Low, i.e., $i(=H, L)$
A_i	Potential market size when $i = H\,or\,L$
A_H	Market size in "High" state ($A_H = a(1 + d)$)
A_L	Market size in "Low" state ($A_L = a(1 - d)$)
a	Expectation of market size ($a > 1$)
d	Uncertainty level of market size ($d \in (0, 1)$)
d	Probability of the market state is High, i.e., $i = H(a \in (0, 1))$
Q	Order quantity
P	Market clearing price ($P = A_i - Q$)
w	Wholesale price
π^R	Expected profit of the retailer
π^S	Expected profit of the supplier

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Appendix

This is an appendix. You can have extra code, published papers (if not protected by copyright), or any other supplementary information.

Appendinx 2.1: The derivation of the optimal wholesale price in the N-ID scenario

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