Asia Pacific Management Review xxx (2017) 1–6

HOSTED BY

Contents lists available at ScienceDirect

Asia Pacific Management Review

journal homepage: www.elsevier.com/locate/apmrv

Optimal ordering decision by increasing the intermediary of supply chain

Hui-Ming Teng [a], Ping-Hui Hsu [b, *]

[a] Department of Business Administration, Chihlee University of Technology, New Taipei, Taiwan
[b] Department of Business Administration, De Lin Institute of Technology, New Taipei, Taiwan

ARTICLE INFO

Article history:
Received 17 February 2015
Accepted 28 November 2016
Available online xxx

Keywords:
Intermediary
Information sharing

ABSTRACT

Gatherings such as weddings, birthday parties, corporate dinners, and many others are taken place everywhere at any time all around the world. A banquet host not only has the responsibility of arranging the event date, location and setting up the layout, but also plans on how to invite the guests. How many guests will show up is very important because the number of guests will directly affect the amount of food ordered. If the ordered quantity falls short of the amount needed for the guests present, then the host shows a lack of courtesy and may lose his reputation. If the order quantity exceeds the amount needed, the host will not only encounter a loss of profit but the excess food would be wasteful. This study aims to derive an optimal order quantity by decreasing the uncertainty in demand by adding an intermediary to the supply chain. Numerical examples and sensitivity analysis are provided to describe the model.

1. Introduction

Participated in many large banquets (over 25 tables) there was always a lot of thoughts: firstly, the guests were always late, attendance was always fell short of expectations, the banquet was always delayed (usually delayed one hour). Secondly, too many remaining dishes (the last few dishes often used rarely, if the guest is not packaged to bring back is usually to kitchen, wasted). Year after year, the situation has not improved. Being late for banquets has become the habit, improvement is not easy. Food wastage feels deep regret to raise the motivation of study.

If this is a corporate issue, you can use the organization intelligence to improve it. However, this problem had usually occurred in everywhere, everybody. It will not be easy to form a consensus. It is even more urgent issues in the world today with a large number of hungry people, especially in environmental awareness.

Why did the banquets always not start on time? The reason seemed to be less participants as expected, the host were still waiting for. Invited guests for host usually can be divided into: Bowing acquaintance, Friend in general, Friendly friends, Ordinary family relatives, Super friends, and brothers and sisters The present rate of invited guests is not consistent at all levels, resulting in estimated monetary gifts is not easy, the estimated attendance more difficult to grasp. Because it is difficult to estimate attendance, the ordering quantity is a puzzle problem. If the ordering quantity is less than the number of guests will be making host discourtesy, affecting the reputation. If the ordering quantity is more than the number of guests would result in losses and food waste. Many restaurants provide a contingency policy to trade at high prices is needed for provisional orders. But those fall canceled some orders are needed to pay compensate. So not only can reduce the host loss, can reduce waste, but uncertain rates of attendance will eventually cause the loss. (Friends of the Earth International, FOEI[#]) Friends of the Earth International (FOEI) investigated that in a Chinese banquet of 1000 people, food waste raises up to 400 kg enough to feed 200 people; later serving dish of leftovers is more serious; rice, noodle and dessert on the last meal waste over 30% (Mingpao, 2010). FOEI proposed that reduces the number of main dishes to reduce food waste. Restaurant representatives said that the number of main dishes had changed “eight→six” in 20%–30% banquets, and encouraged the use of “Chinese-style Western food” to reduce waste. At present, the monetary gift quotation of wedding banquet and ordering quotation are as follows (Table 1 and Table 2).

Banquet is not for profit, is come from the host's good faith. As far as social consensus, the host ready for a sumptuous meal, guests give the host gifts; the party reached a successful conclusion. To

* Corresponding author.
E-mail addresses: tenghuim@mail.chihlee.edu.tw (H.-M. Teng), pinghuihsu@gmail.com (P.-H. Hsu).

Peer review under responsibility of College of Management, National Cheng Kung University.

http://dx.doi.org/10.1016/j.apmrv.2016.11.001

Please cite this article in press as: Teng, H.-M., & Hsu, P.-H., Optimal ordering decision by increasing the intermediary of supply chain, Asia Pacific Management Review (2017), http://dx.doi.org/10.1016/j.apmrv.2016.11.001

master does not lose money, guests without losing the goodwill to achieve the best meal and not wasteful.

Supply chain integration means to be combined to form a more complete organization, where each member organization, business processes, information systems, which are link and sync them carefully, as if it were a single supply chain jobs and well coordinated system, members are committed to the pursuit of creating maximum value for members of the supply chain. Its job dimensions include: business flow – solution: consignment, logistics – solution: JIT, information flow – solution: integration of inventory management system, payment – solution: shorten payment cycles, human resource– solution: dealer presence at customer locations. The explosion of information availability has given decision makers of supply chains a lot of possibilities and opportunities for improvements in their supply chain efficiency (Choi, 2010). Information plays a key role in the management of supply chain. (Nahmias, 2001). Generally the more echelons of supply chain, the more bullwhip effect. This is because of less sharing information between two echelons. In the theory of supply chain management, it is known that decreasing the echelon of the supply chain always improves the uncertainty of demand and increases profitability. However, this theory is based on the fact that the echelons are not closely related, which leads to less information connection between echelons of the supply chain. Therefore, if the additional intermediary of the supply chain builds a strong connection between the corresponding echelons, then the total performance of the supply chain can be improved. By adding an intermediary to the supply chain the costs will likely increase. This study explores the appropriate size of intermediation to balance the costs, and to determine the trade-off point between profit and cost. There were many researches on how to reduce the bullwhip effect. The past researches usually focused on pulling system or reducing echelons of supply chain. This study considers the information sharing between two echelons by adding an intermediary echelon.

This study considers that all guests can be divided into several groups (such as relatives, classmates, colleagues, and so on), each group may invite a convener (prestigious). The convener is both the host's close friend and the leader of the group. The convener may invite the other quests of the group to banquet instead of the host, and learn about at will, because this relationship can reduce the uncertainty in the group to attend the banquet. The media group is composed of the convener come from each group, of course, the media cost is needed to be paid by the host.

As a result, the uncertainty of attendance will drop significantly, while the host only have to pay the media cost. However, uncertainties decrease should be proportional to the number of medium member. By contrast, the medium cost should be related to the number of medium member. How to trade-off is the focus of this study. With a supply chain perspective, the host could be considered as retailer, guests could be considered to be consumers, and media group is inserted into the supply chain. Increase the medium of the supply chain will increase costs; this study will examine the medium size to trade off the related cost between increasing medium cost and reducing the uncertainties of attendance.

Many papers have been published in the last decade on the topic of supply chain management especially in sustainable and green supply chain (Seuring, 2013). Supply chains are generally complex; the members must work towards a unified system and coordinate with each other (Arshinder & Deshmukh, 2008). Hsu and Wee (2005) proposed that sharing information between two (or more) supply chains on their production, inventory and delivery status will increase total system profit. Zhang and Chen (2013) studied information sharing in a supply chain consisting of one supplier and one retailer, in which both the supplier and the retailer possessed partial information on the demand. This study is primarily based on inventory theory and related theories of probability and statistics to establish mathematical models and profit optimization. Numerical examples and sensitivity analysis are provided to describe the model.

Table 1
The monetary gift quotation (2012, unit: NTD).

	General restaurant		Wedding restaurant		Luxurious restaurant	
Monetary gift	Absent	present	Absent	present	Absent	present
Bowing acquaintance	600	1200	600	1600	600	2000
Friend in general	1200	1600	1200	2000	1200	2200
Friendly friends	2000	2200	2000	2200	2000	2600
Ordinary relatives	2200	2600	2200	2600	2200	3200
Close friends	3200	3600	3200	6000	3200	6000
Brothers and sisters	3600↑	6000↑	3600↑	6000↑	3600↑	6000↑

Resource: The monetary gift quotation, 2010, http://im88.tw/?p=1243

Table 2
Ordering quotation (2012, unit: NTD).

Restaurant	Price (per table)
Gloria prince hotel Taipei	1 8,0 0 0–20,000 + 1 0% (12 quests per table)
Westin Taipei	19,600 + 10%
Sheration Taipei Hotel	At least 18,800 + 10% (12 quests per table)
Taipei Garden Hotel	At least 1 6, 8 0 0 + 1 0% (10 quests per table)
Fu JI wedding plaza	1 0, 8 0 0–15,800
Shintongwan	1 0, 8 0 0–13,800

Resource: please see references (Gloria prince hotel Taipei, 2010; Westin Taipei, 2010; Sheration Taipei hotel, 2010; Taipei Garden Hotel, 2010; Fu JI wedding plaza, 2010; Shintongwan, 2010)

2. Notation

The following notations are used:

M	Number of invited quests
n	number of member of media group
k	ordering quantity, variable
p	Unit selling price(unit monetary gift, p when quest is present) $p/2$: defaulting price (unit monetary gift $p/2$ when quest is absent)
c_1	Unit wholesale price; $p > c_1$
c_2	Unit returned price, $c_1 > c_2$
c_3	unit urgent ordering price; $c_3 > c_1$
c_4	Unit media costs
X	customer's demand, random variable
$f(x)$	probability density function of x
$f(x,n)$	Given the number of media member, n, the probability density function of x
$E\pi$	Expected profit (Expected balance)

Please cite this article in press as: Teng, H.-M., & Hsu, P.-H., Optimal ordering decision by increasing the intermediary of supply chain, Asia Pacific Management Review (2017), http://dx.doi.org/10.1016/j.apmrv.2016.11.001