A SUPPLY CHAIN MODEL FOR ENABLING COLLABORATIVE FREIGHT DISTRIBUTION IN THAILAND'S NEWSPAPER INDUSTRY
โมเดลห่วงโซ่อุปทานที่นำไปสู่การร่วมมือกันในการกระจายสินค้าในอุตสาหกรรมหนังสือพิมพ์ไทย

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Abstract

Thailand newspaper supply chain is facing ineffective freight distribution practices due to half-loaded vehicles and substantial fuel consumption. Logisticians in the field of freight distribution and movement have argued for co-opetition and collaborative freight distribution approach. This study, therefore, aims to explore whether co-opetition has positive impact on collaborative freight distribution. A survey-based research methodology was employed to collect data from newspaper companies, news agents and transporters in Thailand. The survey resulted in a final sample of 225 firms, representing a 45% response rate. The measurement items were subjected to preliminary data analysis before exploratory and confirmatory analyses were carried out. Structural equation modeling (SEM) analysis was employed to establish the structural model and test hypothesised relationships among the variables. The results yielded by the SEM/path analysis indicated that a co-opetition is a critical enabler of collaborative freight distribution. Moreover, management commitment, relationship management, and communication management are antecedent factors of co-opetition for enabling collaborative freight distribution.

Keywords: Supply chain management, Collaborative freight distribution, Co-opetition, Newspaper industry

บทคัดย่อ

อุตสาหกรรมหนังสือพิมพ์ไทยกำลังประสบปัญหาการกระจายสินค้าอันเนื่องมาจากการขนส่งไม่เต็มคันรถและการใช้เชื้อเพลิงที่เกินความจำเป็น นักห่วงโซ่อุปทานจึงได้เสนอแนวคิดในการสร้างความร่วมมือระหว่างบริษัทคู่แข่งและการร่วมมือกันในการกระจายสินค้าดังนั้นงานวิจัยชิ้นนี้มีวัตถุประสงค์เพื่อศึกษาผลกระทบของการสร้างความร่วมมือระหว่างบริษัทคู่แข่งต่อการร่วมมือในการกระจายสินค้า ดำเนินการโดยการเก็บแบบสอบถามจากกลุ่มตัวอย่างซึ่งเป็นบริษัทหนังสือพิมพ์ ร้านขายหนังสือ และบริษัทขนส่ง ในประเทศไทย และได้การตอบรับจำนวน 225 บริษัท หรือ 45%   เครื่องมือที่ใช้ในการวิเคราะห์

ข้อมูลประกอบด้วย การวิเคราะห์องค์ประกอบเชิงสำรวจ การวิเคราะห์องค์ประกอบเชิงยืนยัน และการสร้างโมเดลสมการ
โครงสร้าง

ผลวิจัย พบว่าการสร้างความร่วมมือระหว่างบริษัทคู่แข่งส่งผลเชิงบวกต่อการร่วมมือในการกระจายสินค้า อย่างมี
นัยสำคัญทางสถิติที่ระดับ .01 อีกทั้งยังพบว่า ความมุ่งมั่นในการบริหาร การสร้างความสัมพันธ์ และการบริหารการสื่อสาร
เป็นปัจจัยสำคัญในการสร้างความร่วมมือระหว่างบริษัทคู่แข่ง ที่มีผลเชิงบวกต่อการร่วมมือในการกระจายสินค้า อย่างมี
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คำสำคัญ : การจัดการห่วงโซ่อุปทาน, ความร่วมมือด้านการขนส่ง, ความร่วมมือระหว่างคู่แข่ง, อุตสาหกรรมหนังสือพิมพ์

Introduction

Firms are facing new business era when internet and electronic devices become part of daily life.
Newspaper industry is undertaken because of its urgent need for a new strategy that would ensure its
survival in an era of electronically-driven communications. Unfortunately, the newspaper industry is
collapsing, due to a significant decline in demand of its hard copies, on one hand, and the emergence of
advanced telecommunication technologies, such as the internet, cable news, and personal communication
devices on the other (Parr 2010). Thus the newspaper industry needs to identify and adopt new business
strategies for improving its business performance and profitability through its supply chain strategies. On the
other hand, as transportation accounts for approximately 30% of the total supply chain cost, consumes
approximately 6% of the gross domestic product (or GDP) , firms need to implement new freight
transportation approaches to mitigate transport inefficiencies, such as high transportation costs and poor
time performance in order to survive in electronic-driven and globalized business era (McKinnon 2000;
Sutherland 2006).

In Thailand's newspaper industry context, the industry is facing many challenges. First, as internet
usage is growing in popularity, where news and information is accessible much faster, and hardcopy
newspapers are becoming less attractive (Thomas 2011). Secondly, inefficient newspaper distribution
generates substantial costs of fright distribution (Enroth 2009). Therefore, newspaper distribution operations
must be reengineered in Thailand's newspaper industry for improving freight distribution efficiency, reducing
transportation costs and travel distance, improving on-time delivery, and improving sale.

To effectively improving freight distribution operation, the potential solution is the concept of co-
opetition. Co-opetition as a business strategy implies that the firm should horizontally collaborate and
compete simultaneously with its competitors to achieve common goals and objectives through joint
business activities (Brandenburger & Nalebuff 1998). Thus if the co-opetition was successfully agreed and
implemented throughout the horizontal supply chain, firms in the relationship would be able to jointly
distribute freight (McKinnon 2000). Moreover, the antecedent factors of co-opetition for activating
collaborative freight distribution are also critical and must be examined. Potential antecedent factors are
management commitments, relationship management and communication management (Chin, Chan & Lam
2008). However, the commencement of collaborative freight distribution through co-opetition in Thailand's

newspaper industry is less researched and scarcely documented. Therefore, the exploration of the relationship between co-opetition and collaborative freight distribution as well as antecedent factors are the main objective of the research.

Research questions and aims

Regarding to the contextual overview of research above, the research is aiming to answer the following research questions: Can co-opetition enable collaborative freight distribution in Thailand's newspaper industry? and What are antecedent factors for co-opetition to activate collaborative freight distribution in Thailand's newspaper industry? Therefore, the aim of this research is to examine the co-opetition and the extent to which it can enable collaborative freight distribution.

Research Instrument and Data Analysis

Quantitative research method is employed for this study. Self-completed questionnaire is used to collect data. The data set obtained from the questionnaire survey is used in subsequent analyses, performing in two stages using the statistical program. In the first stage, the data set is checked for data consistency via preliminary data analysis consisting of missing value assessment, comparing respondents' characteristics, non-response bias assessment, multivariate normality assessment, multicollinearity test, uni-dimensionality test and common method variance assessment, for the purpose of data management and data cleaning. Moreover, EFA is employed for the purpose of data exploration. In the second stage, the data set from the first stage is analysed via path analysis program, applying Confirmatory Factor Analysis (CFA) and Structural Equation Modeling (SEM). The aim of this analysis is to find the most appropriate observed variables (measurement items) pertaining to each latent variable (i.e. measurement dimensions), as well as testing the relationship between exogenous variables (independent variables) and endogenous variables (dependent variables).

Literature review

Following the call from Flint et al. (2005) for the development of theory in the field of supply chain management (SCM), this research is founded on two main ground theories: game theory and resources-based view. First, game theory is a fundamental theory of co-petition strategy. It implies that the cooperation between organizations/ firms can lead to the improvements in value-added services and result in a non-zero sum game or produce the co-opetitive game theory (Brandenburger & Nalebuff 2002). Second, resource-based view theory is a fundamental theory of collaborative freight distribution. It asserts that the firm can improve its competitive advantage through the acquisition of valuable, rare, imperfectly imitable, and non-substitutable resources (Barney, Ketchen & Wright 2011). Thus, the firm can acquire complementary resources through participation in inter-firm networks and, in doing so, generate competitive advantage (Jenkins, Ambrosini & Collier 2007).

Co-opetition

Co-opetition is a recent concept in the business world since it helps firms to accelerate innovation, R&D, and performance. It derives from the combination of competition and cooperation (Bengtsson & Kock 2000; Cruijssen, Cools & Dullaert 2007). Co-opetition occurs when a firm cooperates and competes simultaneously with other firms to achieve its strategic goals (Luo 2004). As Ross and Robertson (2007) stated, co-opetition refers to the circumstance in which two or more rivals cooperate for enhance a piece of 'pie' in the marketplace and then compete for the greatest share of that 'pie'. Co-opetitive relationship allows firms to establish mutually beneficial relationships with other competitors. They might jointly work in one business function (i.e., R&D) and compete in another (i.e., sales and marketing) (Beckeman, Bourlakis & Olsson 2013). Firms could cooperate in activities that far from customers while compete in activities that closer to customers (Bengtsson & Kock 2000).

Chin, Chan, and Lam (2008) proposed three main driving forces of co-opetition including management commitment, relationship management, and communication management. Firstly, management commitment represents the degree of management support and attitude of top management towards the implementation of co-opetition approach. (Chin, Chan & Lam 2008). The authors asserted that co-opetition approach will never be successful if full management commitment is not present. Literature sources offer strong evidence indicating that management commitment is an antecedent factor for establishing co-opetitive business operations (Min et al. 2005). Secondly, relationship management is defined as the development of relationship among competitive organizations for creating, enhancing and sustaining long term co-opetitive business operation (Chin, Chan & Lam 2008). It is often employed as a component for achieving and sustaining long term co-opetitive business operations, as well as preventing future conflicts, because business activities are linked and resources are tied together when several competitive firms have to jointly implement various business activities (Min et al. 2005; Zineldin 2004). Many scholars agreed that relationship management is a critical consideration for achieving co-opetition approach (Klein, Rai & Straub 2007; Zineldin 2004). Thirdly, communication management refers to "the systematic planning, implementing, monitoring, and revision of all channels of communication within an organization and between coopetitors" (Chin, Chan & Lam 2008, pp.444). It is often employed as the communication among competitive firms to sustaining their long-term success and prevents potential uncertainties. When information is correctly communicated and transferred, information systems allow effective and real time information sharing, which facilitates effective communication among parties, as well as minimizes potential for conflict (Chin, Chan & Lam 2008).

Collaborative freight distribution

Collaboration in the supply chain would allow participating firms to share and acquire complementary resources and capabilities for sustaining organizational performance and improving environmental and social sustainability (Gold, Seuring & Beske 2010). Specifically, strategic alliance in freight distribution could improve freight movement performance (Zhou, Hui & Liang 2011). Moreover, horizontal collaboration in logistics could improve productivity of core activities, reduce costs of non-core activities, reduce purchasing costs, broaden service level at a lower cost, and protect market share (Cruijssen, Cools & Dullaert 2007). Min et al. (2005) and Kilger and Reuter (2005) proposed six antecedent elements for establishing collaborative relationships: strategic intent (i.e., aims and objectives), internal alignment (i.e., adapting the current operation towards the collaborative arrangement), relationship management (i.e., establishment of collaborative relationship), information sharing (i.e., sharing latest and specific information), resource sharing (i.e., sharing facilities and human resources), and formulization (i.e., implementation of collaborative plans, standardization of communication technology, sharing of specific information, and agreement on common objectives and goals).

The most recent practice that emerged in transport collaboration is collaborative transportation management (CTM), defined as "a holistic process that brings together supply chain partners and services providers to drive inefficiencies out of the transport planning and execution process. CTM start with the shipment forecast includes order generation and load tender and finally delivery execution and carrier payment" (Sutherland 2003pp. 1). According to Sutherland (2006), the objective of CTM is to eliminate inefficiencies in transportation processes related to, for example, inventory, time, distance, and space, by vertically and horizontally collaborating with other supply chain members. The author further stated that firms need to work with other firms by forming strategic alliances or partnerships, as a single firm cannot overcome the inefficiencies in transportation and freight distribution in isolation. Once two or more firms agree to participate in transport collaboration, they are able to share resources, facilities, explicit and tacit knowledge, as well as risks to improve their freight distribution performance. CTM can be regarded as value-added because it can reduce dwell time waiting to load and unload, as well as optimize weight and volume of transportation assets. Moreover, it can reduce deadhead miles due to improved routing. Participating firms can combine their delivery routes and identify optimal routes that can serve all destinations of all participating firms while eliminating billing errors. The author noted that, by participating in the CTM, firms could reap greater benefits than can be achieved if operating in isolation. Sutherland (2003) stated that CTM can increase sales, reduce costs, improve transportation asset utilization, reduce inventory, and improve outstanding sales. The author asserted that CTM requires effective freight consolidation, effective real-time information sharing, common objectives, leadership management, trust, and sharing benefits and risks amongst all collaborative partners. Moreover, in order to facilitate effective CTM, collaborative partners must consider formal contract terms, creating daily transportation plan,

establishing continuous improvement programs and performing regular financial analysis pertaining to transportation.

Brouthers, Brouthers, and Wilkinson (1995) asserted that firms need to firstly find partners that possess complementary skills and human resources, as this would allow them to accelerate their performance and enhance competitive advantage. With complementary skills and resources, partners can share tacit and explicit knowledge through joint business activities. Firms can create new strategies or launch new products by employing skills and resources of their partners. As complementary financial resources are also important, partners must be able to financially support the firms when launching a new project.

Secondly, fair benefits and risks sharing among partners also play an important role in collaborative freight distribution. As evidenced above, advantage and unique resources are being shared between alliance partners. Thus, they must be fairly distributed in order to sustain long-term relationship, ensure long-term commitment, optimize mutual benefits, abate conflict (Sutherland 2006).

Lastly, effective CTM is cost-effective, real-time, automated, and extendible. Thus, advanced information technology plays an important role in CTM (Esper & Williams 2003). According to Mason and Lalwani (2006, pp.59), "developments in information communication technology (ICT) are creating a new operational landscape for collaborative logistics system." Hence, ICT is critical for improving speed of information flow within the supply chain. Esper and Williams (2003) added that the Internet allows parties to communicate via email and other IT tools to automatically receive load tenders, load tender acceptance, inbound shipment, manage cross-dock labour and capacity, monitor status of shipment orders, diary capacity, and available shipment during the day.

Hence, critical factor affecting collaborative freight consolidation are partner selection, benefits and risks sharing, and advanced information technology.

Collaborative freight distribution can be enabled by the association of co-opetition (Chen, Yeh & Chen 2010). A successful strategic alliance and collaboration could enable collaborative freight distribution, as a strong relationship between competitors can abate conflicts, generate more trust, improve performance, and achieve effective information sharing (Zhou, Hui & Liang 2011).

Therefore, the following hypotheses will be tested in this study:

H1: Co-opetition has a positive effect on collaborative freight distribution.

Conceptual framework

The section above identified relationship among concepts that arise from literatures. Thus, this study will reuse previous major concepts to model a more consistent framework. Next, the development of conceptual framework is provided (Figure 1), in order to clarify the reasons behind the inclusion of these major concepts and dimensions in the proposed conceptual framework. Thus, the conceptual framework to be adopted in this study comprises of two main concepts, with six sub-components (or measurement items).

1) Co-opetition consists of three measurement dimensions—management commitment (MC), relationship management (RM), and communication management (CM)

2) Collaborative freight distribution consists of partner selection (PS), fair benefits and risks sharing (BR) and advanced information technology (IT).
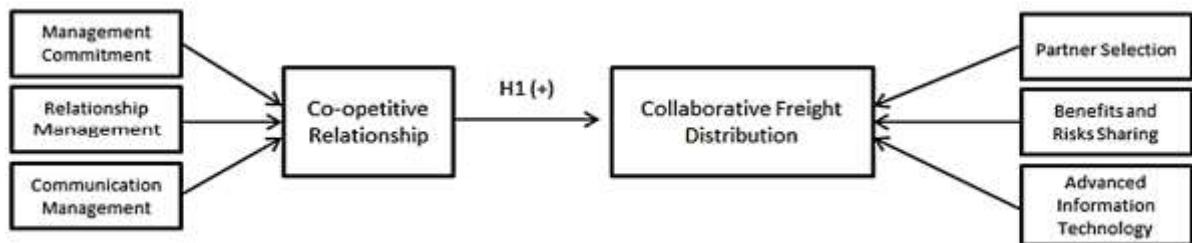

Figure 1: Conceptual framework

Methodology

Survey-based research

An empirical research method and survey-based research are common approaches in the field of marketing and management (Flynn et al. 1990). Boyer and Swink (2008) stated that researchers in the field of supply chain management often use empirical data to develop and validate business models. Survey-based research allows the researcher to elicit attitudes or perceptions of participants, which is known as perceptual measure. Therefore, survey technique was employed in this study to collect respondents' views pertaining to the study objectives. The data collection procedure is separated into two phases, the pilot study phase and the full sample study.

Questions or measurement items employed in this study were adapted from the measures established in literature. In order to make responses uniform and facilitate subsequent analyses, questionnaire items were presented in a 5-point Likert-type scale, with 1 being "strongly disagree", 2 being "disagree", 3 as "neither agree nor disagree", 4 as "agree", and 5 being "strongly agree." Thus, by adopting this approach, data and results could be interpreted and presented more clearly and easier than other methods (Blumberg, Cooper & Schindler 2008).

Pilot and the full survey

Prior to the actual data collection and data analysis, the researcher has undertaken a pilot study to test content validity of the questionnaire. The pilot study started off by distributing 150 questionnaires conveniently to the companies who took interest for this study. As the result, the response rate is 22.67%. In the full survey stage, since the population of newspaper companies and newsagents appear to be small, thus the survey included all companies for participation in the survey. This led to an unbiased sampling (Veal & Ticehurst 2005). On the other hand, the transport companies were in larger proportion (approximately 4,000 companies) thereby the population was conveniently selected (Veal & Ticehurst 2005).

Therefore, the study sample included 500 companies consisting of 121 newsagents, 224 newspaper companies and 155 transport companies nationwide. As the result, a total 225 questionnaires were received through two data collection phases, including 73 from newsagents, 86 from newspaper companies, and 66 from transporters. This yielded the response rate of 45%.

Data analysis

The data set obtained from the survey is used in subsequent analyses, performed in two stages using the statistical program and path analysis program. In the first stage, the data set was checked for data consistency via preliminary data analysis, consisting of missing value assessment, multivariate outliers, comparing respondents' characteristics, non-response bias assessment, multivariate normality assessment, multicollinearity test, uni-dimensionality test and common method variance assessment, for the purpose of data management and data cleaning. As the result, the data set is clean and consistence for structural equation modeling. Further, EFA was also employed for the purpose of data exploration. For the second stage, the data set from the first stage was analysed, applying CFA and SEM. The aim of this analysis was finding the most appropriate observed variables (measurement items) pertaining to each latent variable (i.e. measurement dimensions), as well as testing the relationship between exogenous variables (independent variables) and endogenous variables (dependent variables).

Results

Exploratory factors analysis (EFA) was employed to purify the measurement items individually for each constructs. These items were then subjected to confirmatory factor (CFA) analysis that provided a good fit to the data. The factor standardised loading, Cronbach alpha, construct reliability (CR) and average variances extracted (AVE) are employed to validate the set of data as present in Table 2. Cronbach alpha and construct reliability (CR) are used to assess the reliability, whereas factor standardised loading and average variance extracted (AVE) assess convergent validity. A lower limit of acceptability is considered to be around 0.6 (Nunnally 1978). The result for all coefficient alphas for constructs and sub-constructs in this study range from .63 to .81. The CR values range from .66 to .87. Standardised loadings vary from .54 to .87 indicates a good convergent validity of constructs and sub-constructs. All loading is above the recommended value of .5 (Hair et al. 2010). AVE values range from .42 to .57 indicating an adequate convergent validity. All loading are above the recommended value of .5 (Fornell & Larcker 1981). Hence all measurement constructs and measurement items are valid.

Hypothesis Testing

Figure 2 and Table 1 present the structural model of the hypothesized model, standardized loading and p value of the hypothesized model. All measurements had standardized loading significant less than 0.01 level. The data fitted the model very well, with Chi-square = 7.95, degrees of freedom = 8, p value = .44, CMIN/DF = 0.99, GFI = 0.99, AGFI = 0.97, NFI = 0.98, TLI = 1, CFI = 1, PCLOSE = .77, and RMSEA =

0.00. Based on the goodness-of-fit indices, it can be concluded that the hypothesized model had an adequate level of fit.
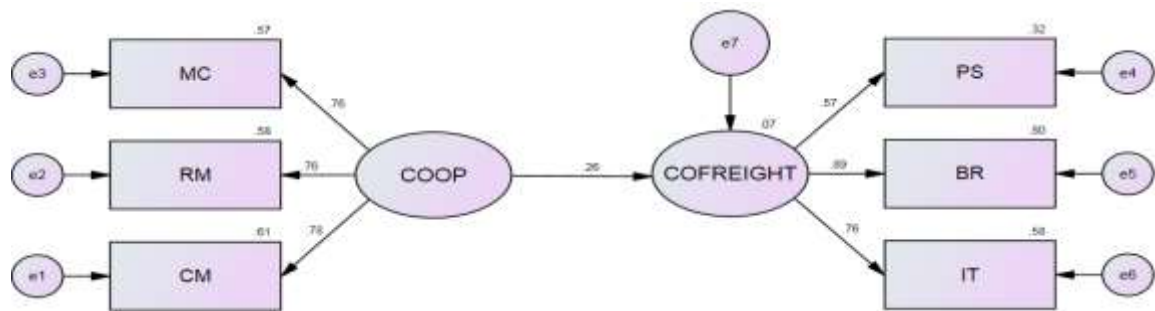
Chi-square = 7.945, df = 8, p = .439, CMIN/DF(<3) = .993, GFI(>.9) = .988, AGFI = .970, NFI = .982, PCLOSE = .769
RMSEA(<.08) = .000, TLI(>.95) = 1.000, CFI(>.9) = 1.000

Figure 2: Hypothesized model

Table 1: Standardized loading and p value of the hypothesized model

			Standardized loading	P value
COFREIGHT	<---	COOP	0.26	0.002**
CM	<---	COOP	0.78	0.001**
RM	<---	COOP	0.76	0.001**
MC	<---	COOP	0.76	0.001**
PS	<---	COFREIGHT	0.57	0.001**
BR	<---	COFREIGHT	0.89	0.001**
IT	<---	COFREIGHT	0.76	0.001**

** Statistically significant at p < 0.01

Table 2: Result of measurement model (CFA) with standardised coefficient, Cronbach Alpha, Construct reliability (CR) and Average variance extracted (AVE) of co-opetition and collaborative freight distribution construct

Scale and items	Standardised Loading*	Alpha	CR	AVE
Coopetition (alpha =.80)		.80	.75	.55
1) Management Commitment (MC) (alpha =.67)		.67	.66	.51
You are intending to arrange a long-term contract (either formal or informal) with your competitor.	.65			
You have the ability to apply new knowledge to accomplish goal of the relationship.	.66			
You are willing to share physical resources, such as delivery vehicle etc., with your competitor.	.58			
2) Relationship Management (RM) (alpha =.63)		.63	.68	.52

Scale and items	Standardised Loading*	Alpha	CR	AVE
You are enthusiastic about accepting your competitor's organizational culture or working environment.	.87			
You are willing to accept risk, i.e. unforseen events, cost and uncertainties, which are being shared by your competitors.	.54			
3) Communication Management (CM) (alpha =.65)		.65	.66	.50
In the relationship with your competitor, you are intending to arrange the written documents (e.g. handbooks) that spell out detailed tasks, activities and schedule for the cooperation.	.74			
In a relationship, you establish with your competitor, participants must be willing to share internal and external information.	.66			
Collaborative freight distribution (alpha =.81)		.81	.87	.52
4) Partner selection (PS) (alpha =.72)		.72	.74	.52
You are willing to assess and evaluate your partner's goals/objectives before choosing the partner.	.67			
You consider complementary skills of your partner, e.g., partner's experience, capabilities, and potential for making real contribution, when choosing an alliance partner.	.63			
You are willing to learn a new working environment.	.70			
Commensurate levels of risk must be involved among you and your potential partner	.59			
5) Benefits and risks sharing (alpha =.68)		.68	.80	.50
You will implement collaborative freight distribution, if it is going to improve sales of you and your partner's firm.	.69			
You will implement collaborative freight distribution, if it is going to improve on-time delivery of you and your partner's firm.	.75			
You will implement collaborative freight distribution, if it is going to improve fleet utilization of you and your partner's firm.	.74			
You will implement collaborative freight distribution, if it	.66			

Scale and items	Standardised Loading*	Alpha	CR	AVE
is going to reduce driver turn-over of you and your partner's firm.				
6) Advance information technology (IT) (alpha =.81)		.81	.84	.57
You will implement information technology, if it is going to increase vehicle utilization of you and your partner's firm.	.68			
You will implement information technology, if it is going to fairly increase visibility, e.g. identifying location of freight in the supply chain, of you and your partner's firm.	.79			
You will implement information technology, if it is going to improve end-customer satisfaction, e.g. increase number of perfect order, of you and your partner's firm.	.83			
You will implement information technology, if it is going to increase revenues, e.g. improve fully load miles, better on shelf performance, and increase order quantity, of you and your partner's firm.	.72			

Results of hypotheses testing

The hypothesized relationships among constructs were tested by structural equation modeling (Cunningham, Holmes-Smith & Coote 2006). The final structural model can be used to answer the research hypothesis and research questions.

Hypothesis 1 is verified since the result exhibit the relationship of co-opetition on collaborative freight distribution. The results indicate that co-opetition is significantly and positively effect on collaborative freight distribution (β = 0.26; $p < 0.01$). Therefore, hypothesis 1 is supported (table 1).

The result further exhibit that co-opetition is significantly explained by management commitment (β = 0.76; $p < 0.01$), relationship management (β = 0.76; $p < 0.05$), and communication management (β = 0.78; $p < 0.01$). Respondents perceived these dimensions as significant factors for achieving co-opetition that directly influenced collaborative freight distribution (table 1).

The result also found that collaborative freight distribution is significantly explained by partner selection (β = 0.57; $p < 0.01$), fair benefits and risks sharing (β = 0.89; $p < 0.01$) and advanced information technologies (β = 0.76; $p < 0.01$). Respondents perceived these dimensions as critical element of collaborative freight distribution (table 1).

Discussion

Co-opetition

Co-opetition is significantly explained by management commitment (β = 0.76; p < 0.01), relationship management (β = 0.76; p < 0.01), and communication management (β = 0.78; p < 0.01). Respondents perceived these dimensions as significant factors for achieving co-opetition that directly influenced collaborative freight distribution.

For management commitment, respondents are more likely to arrange a long-term contract (either formal or informal), apply new knowledge to accomplish goal of the relationship, and share physical resources with their competitors. That is, firms are likely exhibit commitment with their partner firms and share resources, reconfigure, as well as, apply new freight distribution strategies to align with the overall strategy of their partner firms. This confirms the findings of Chin, Chan, and Lam (2008), who claimed that the management team needs to create long term contract to assure joint management activities and joint business operation among competing firms. At the same time, the firm must evaluate its practices and identify capabilities, resources, and skills they possess. This would assist in identifying complementary resources required from the alliance partners for creating new strategies in order to maximize partnership benefits. Chin, Chan, and Lam (2008) concluded that a co-opetition approach would never be successful if full management commitment was not demonstrated.

The results also indicated that respondents perceived relationship management as an antecedent for achieving a co-opetition. Respondents agreed that enthusiastic about accepting competitors' organizational culture or working environment and willing to accept risk which are being shared by competitors are critical for establishing the co-opetition. Regarding to accepting new organizational culture, these findings showed that sample newspaper companies and other firms involved in the relationship must ensure that they are open-mind and ready to learn new working environment to facilitate joint working environment. Zineldin (2004) further asserted that all parties in the relationship need to adapt their current business process, vision, mission, and strategy in line with the mutual goal, in order to achieve a better coincident business operation, information sharing, and uncertainty minimization. Further, the findings also showed that firms must be willing to accept risks which are being shared by partner firms. The results of this study are consistent with Chin, Chan, and Lam (2008) who asserted that risk sharing is the basis of long term trust-building in co-opetition.

The third factor that enforces co-opetition is communication management. The respondents perceived that the written documents that spell out detailed tasks, activities and schedule for the cooperation must be arranged. This is because the written documents would prevent miscommunication in the joint working activities (Zhao, Zhao, and Hou 2010). Furthermore, the results also found that respondents are likely to cooperate with firms who are willing to share internal and external information. Chin, Chan, and Lam (2008) asserted that external information sharing would allow firms to share important documents and secret recipe to generate new business strategies and joint management. Moreover, firm

could generate solid internal business process when internal information is effectively shared. Hence, respondents from sample firms perceived that successful co-opetition can be established with the consideration of management commitment, relationship management, and communication management.

Collaborative freight distribution

The result found that collaborative freight distribution is significantly explained by partner selection (β = 0.57; p < 0.01), fair benefits and risks sharing (β = 0.89; p < 0.01) and advanced information technologies (β = 0.76; p < 0.01). Respondents perceived these dimensions as critical element of collaborative freight distribution.

As the research findings show, sample respondents perceived that partner selection routinely plays an important role in the collaborative business activity. Firms need to continually seek new resources for improving business operation (Bierly III & Gallagher 2007). These new resources could derive from acquired assets, internal development, or the development of relationships with other firms. Since alliance partners can improve resource acquisition potential, careful selection of appropriate partners is essential. The study found that, prior to selecting potential partners, respondents are more likely assess and evaluate partners' goals and objectives, complementary skills, the willingness of the firm to learn a new working environment, and commensurate levels of risk must be involved among firms in the relationship. First, sample firms believe that goals and objectives of potential partners should be aligned with their goals and objectives, in order to improve the strategic fit of the firm. This is consistent with Lambe, Spekman& Hunt (2002). Moreover, the coherent goals and objectives would lead to the coherent business operations. Newspaper companies would be able to support each other to achieve the same goals, since they would have similar business philosophy and strategies. Consequently, the firm and its partners could achieve their respective goals faster, at a lower cost, since resources are being shared. Second, respondents from sample firms perceived that the consideration of complementary skills of potential partners is important. Appropriate evaluation of partners' goals and objectives would allow the firm to assess the availability of complementary resources that are not available within the firm. Resources can take various forms, such as capital, firms-specific assets, technology, knowledge and skills, and capabilities (Claycomb& Frankwick, 2004). Newspaper companies may be able to gain new geographic markets from capitalizing on its partners' routine delivery routes. As a result, the firm could improve its sales by selling newspapers to new customers. Third, respondents from sample firms are likely to select partners that have willingness to learn new working environment. When this is presented, the collaborative business operations could commence faster, as the alignment between top executives would lead to a more rapid reconfiguration of internal business cultures and environments of their respective companies. Thus, employees as well as management teams could rapidly adjust their prevalent behaviours and attitudes to align with the new business environment. According to Hoffmann (2007), all firms would improve their competences when they adapt their internal business operations according to the new business environment. Last, respondents from sample firms are likely to select partners that emphasize on commensurate level of risk. Cruijssen et

al. (2007) asserted that all partner firms must be prepared to involve in potential risk to sustain long term relationship and prevent unforeseen event. Thus, partner selection must be performed before commencing collaborative freight distribution.

On the other hand, respondents from sample firms believed that fair benefits and risks sharing must be considered when the working environment changes toward collaborative business operation. The study findings indicated that firms are likely to join in collaborative freight distribution if sales, on-time delivery, fleet improvement, and driver turn-over reduction were fairly allocated to all firms in the relationship. This is in line with Luo's (2002) findings, which revealed that the sharing of benefits, resources, costs and risks would help firms to sustain and improve joint business operations. Moreover, sharing of benefits and risks would help all firms to stabilize the market demand and operating costs fluctuations. Nonetheless, Cruijssen et al. (2007) asserted that fair benefits and risks sharing can prevent future conflict that may lead to the collapsing of a horizontal relationship. Thus, benefits and risks sharing must be concerned for initiating collaborative freight distribution.

Advanced information technology is given precedence by respondents as a critical factor for initiating collaborative freight distribution. The study findings demonstrated that respondents from sample firms are willing to implement advance information technology if it could improve vehicle utilization, increase visibility, improve end-customer satisfaction, and improve level of revenue when working in collaborative freight distribution (Esper and Williams 2003; Mason, Potter &Lalwani 2002). As, for example, real-time demands could be shared among firms through information technology, the delivery vehicle schedule could be arranged accordingly to improve space utilization. Thus, advanced information technology must be considered to implementing collaborative freight distribution.

The relationship between co-opetition and collaborative freight distribution

The results exhibited that Hypothesis H1 is supported which stated that co-opetition is positively influence on collaborative freight distribution (β = 0.26, p < .01). Sutherland (2006) and Zhou, Hui & Liang (2011) asserted that collaborative business activity among competitors would require co-opetition. Thus, co-opetition between competing firms are critical considerations for selecting potential partners, managing fair benefits and risks sharing, and implementing appropriate advanced information technology for enabling collaborative freight distribution.

As the research results of the present study shown, respondents perceived that co-opetition approach is critical for considering criteria for selecting alliance partners, including goals and objectives, complementary skills, risk involvement, and capability to learn a new working environment. The research findings contributes to the work of Lambe, Spekman, and Hunt (2002) that the firm has to consider its goals and objectives and evaluate them against those of the potential partners in order to establish relationships, as well as assess the complementary business strategies and objectives of the potential partners. However, if the goals and objectives of the parties planning to enter into an alliance are similar, but their business strategies are different, all parties must reconfigure their strategy and internal business processes according

to the mutual goals and objectives. The study revealed that relationship management is another critical consideration. Moreover, information should be shared between parties, in order to exchange information, opinions, and report on business progress, which is supported by the work of Morris, Koçak & Özer (2007). Firms must also consider communication management by implementing information technologies to communicate and exchange real time information with their potential partners in order to reduce potential for future conflict, as Chin, Chan & Lam (2008) supported. In conclusion, the results of this study indicated that co-opetition is critical for partner selection.

The research results also showed that an establishment of co-opetition can influence fair benefits and risks sharing, regarding to sale and on-time delivery, fleet utilization, and driver turn-over improvement. The study contributed to the work of Cruijssen, Cools, and Dullaert (2007), who asserted that benefits and risks sharing must be managed fairly in order to sustain long-term relationships and avoid potential conflicts from emerging. Based on the results obtained in this study, respondents perceived that one of the important considerations is obtaining an agreement on the mutual goals and objectives. If the firm and its partnershave different goals and objectives, this disparity may lead to unequal expectations with respect to the benefits that would be derived from the co-opetition. Thus, the firm and its partners must have aligned or similar goals and objectives in order to agree on fair benefits and risks sharing. For example, alignment in the objectives aimed at improving on-time delivery of all partners (i.e., benefits sharing) in the co-opetition would require a solid agreement on strategies, tactics and operations of freight movement management. All partners must create new strategy or reconfigure both current strategy and internal processes according to the mutual goals and objectives. Once this is achieved, all partners would have an equal expectation of the benefits that could be derived from the alliance. Thus, respondents perceived that aco-opetition is critical for fair benefits and risks sharing.

Moreover, as shown by the study results, respondents perceived that advanced information technology must be implemented by all firms in the co-opetition for improving service levels (i.e. better on-time performance) and increasing visibility (i.e. identifying location of freight in the supply chain). Effective real time information sharing is one of the most critical considerations for collaborative freight distribution (Esper& Williams, 2003). Thus, respondents believed that advanced information technologies must be implemented. Information technologies would allow firms to frequently exchange information on the new developments and potential issues. For example, the firm could share real time de-tour route during the delivery with its partners. Thus, all partners could change their delivery routes accordingly, in order to avoid late delivery. Therefore, co-opetition would influence involving firms to implement advanced information technologies. All in all, the study indicated that co-opetition could influence collaborative freight distribution.

Conclusion and implication

The results reported here extend the discussion of previous authors in various aspects. For example, this work is an extension of that performed by Cheng, Yeh, and Tu (2008) in a sense that inter-

organizational business operations in resources-based view framework have the potential to enhance competitive advantages of all parties in the supply chain and improve their freight distribution performance. Firms could acquire complementary resources through an engagement in inter-firm relationships The results of this research suggest that establishment of strategic alliance or inter-organizational relationship among competitors within an industry can lead to an agreement on freight collaboration. Strategic alliances in freight distribution result in financial (i.e., maximized profitability), economic (i.e., economies of scale), strategic (i.e., wider delivery geographical area), marketing (i.e., improved customer satisfaction) and operational objectives (i.e., increased delivery frequency) (). Once two or more firms agree to participate in transport collaboration, they are able to share valuable resources—including rare, imperfectly imitable and non-substitutable resources—as well as facilities, explicit and tacit knowledge. They can also minimize the risks and ultimately improve their freight distribution performance

This research also proposes a model of sustainable freight distribution that could be used to redesign logistics and freight movement by newspaper companies, transporters and newsagents in newspaper supply chain in Thailand context. The model suggests that the consideration of co-opetition and collaborative freight distribution could be adopted to improve logistics performance and reduce costs of operation.

This study provides evidence of the positive relationship among co-opetition and collaborative freight distribution. As previously noted, independent firms are unable to optimise route planning, logistics capacity, vehicle capacity utilization, full truck load and transport process without the consideration of co-opetition among competing firms. This advantage arises because firms in co-opetitive relationships could share and gain supplementary and complementary resources. For example, they may have a mutual goal to improve distribution efficiency and agree on joint-distribution centre, whereby small loads of newspapers from various firms are combined to enable dispatching larger loads. They could also share trucks and delivery routes when newspapers are being distributed to the same or nearby destination. This research revealed that collaborative freight distribution among competing newspaper companies would improve sales, increase the on-time delivery rates, and increase visibility.

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