

ทรัพยากรที่เอื้อให้เกิดการแบ่งปันข้อมูลในโซ่อุปทาน  
ข้าวโพดหวาน จังหวัดเชียงใหม่  
Resources Facilitating Information Sharing in  
Sweet Corn Supply Chain, Chiang Mai

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(Received: August 27, 2021; Revised: February 2, 2022; Accepted: March 10, 2022)

## บทคัดย่อ

เนื่องจากการแข่งขันของตลาดสมาชิกในโซ่อุปทานข้าวโพดหวานเริ่มตระหนักถึงการจัดการห่วงโซ่อุปทานมากขึ้น การแบ่งปันข้อมูลในโซ่อุปทานเป็นหนึ่งในแนวทางที่นักวิชาการและผู้ปฏิบัติงานต่างให้การยอมรับในการปรับปรุงประสิทธิภาพการจัดการโซ่อุปทาน อย่างไรก็ตามการเลือกที่จะเข้าไปมีส่วนร่วมในโซ่อุปทานที่เอื้อให้เกิดการแบ่งปันข้อมูลยังเป็นเรื่องที่ท้าทาย บทความวิจัยชิ้นนี้มีวัตถุประสงค์เพื่อศึกษาความสัมพันธ์ระหว่างทรัพยากรที่เกี่ยวข้องกับการแบ่งปันข้อมูลและประเมินโอกาสที่จะเกิดการแบ่งปันข้อมูลในโซ่อุปทานข้าวโพดหวาน โดยใช้ทฤษฎีความได้เปรียบด้านทรัพยากรและสร้างแบบจำลองการวิเคราะห์การถดถอยโลจิสติกแบบไบนารี ประกอบด้วยทรัพยากรมนุษย์ สัมพันธ์ และกายภาพ โดยใช้แบบสัมภาษณ์กึ่งโครงสร้างในการรวบรวมข้อมูลจากผู้ปลูก ผู้ประสานงาน ผู้รวบรวม และผู้จัดการโรงงาน ผลการศึกษาพบว่าทรัพยากรมนุษย์ (ระดับการศึกษา ประสบการณ์การทำงาน) ความสัมพันธ์ (การเป็นสมาชิก ช่องทางการซื้อขาย) และกายภาพ (สายพันธุ์ข้าวโพดหวาน) มีความสัมพันธ์อย่างมีนัยสำคัญทางสถิติกับการแบ่งปันข้อมูลและสามารถเป็นแหล่งที่มาของโอกาสในการแบ่งปันข้อมูล จากผลการศึกษาครั้งนี้สมาชิกโซ่อุปทานสามารถใช้เป็นแนวทางในการเลือกโซ่อุปทานที่มีโอกาสการแบ่งปันข้อมูลและปรับปรุงประสิทธิภาพในการแบ่งปันข้อมูล

**คำสำคัญ:** การแบ่งปันข้อมูล การจัดการโซ่อุปทาน ข้าวโพดหวาน ทฤษฎีความได้เปรียบด้านทรัพยากร

## Abstract

Due to the competition in the market, sweet corn supply chain members are more aware of supply chain management. Information sharing in the supply chain is an approach that scholars and practitioners accept in terms of improving supply chain management efficiency. However, participating in a supply chain that promotes information sharing is still a challenge. This paper aims to investigate the association between related resources and information sharing and to evaluate the possibility of information sharing in sweet corn supply chain. This paper used the resource-advantage theory as the theoretical foundation and modeling binary logistic regression analysis, consisting of human, relational, and physical resources. Data was collected through semi-structured interviews with growers, coordinators, integrators, and factory managers. The results revealed that human resources (e.g., education level, work experience), relational resources (e.g., membership, trading channel), and physical resources (e.g., sweet corn variety) have statistical significance with information sharing. This confirms the resource as a potential source of opportunities to share information. The study helps supply chain members select a supply chain with better information sharing and provides guidelines to improve the efficiency of information sharing.

**Keywords:** Information Sharing, Supply Chain Management, Sweet Corn, Resource-Advantage Theory

## Introduction

Sweet corn is an economic crop that generates income for Thailand. Sweet corn was transformed into canned corn products and was mainly exported to Japan, South Korea, Taiwan, the Philippines, and America. The corn product has worth up to 6,721 million baht and has an annual growth rate of 12.13%. Sweet corn cultivation has generated income for 56,933 households [1]. Sweet corn is a short-lived crop, and it can be grown all year round. The corn product can be sold in the fresh market to customers and transported to an industrial factory.

In latest years, it was discovered that domestic sweet corn factories were competing for raw materials, resulting in a raw material shortage in production [2]. The shortage affected the service level because it could not respond thoroughly to the needs of customers. However, sweet corn production is beyond the production capacity of the factory in some periods. A surplus of fresh sweet corn cannot enter the production process in time, contributing to deterioration. The damage caused a waste of resources. However, these problems also reflect inefficient supply chain management.

Supply chain management is the systematic strategic coordination in business operations within an organization and between organizations to improve long-term supply chain efficiency [3]. Efficient management contributes to the flow of services, information, production, financial resources, demand, and forecast. Also, it delivers the highest value and increases satisfaction to customers. Information sharing is one of the ways that scholars and practitioners recognize its benefits since its high potential for improving work procedures. Moreover, generating the supply chain integration is crucial [4]. It acquires to raise service level to appropriate with the requirements and promote the collaboration of supply chain members [5]. In addition, it decreases the bullwhip effect, which is the main problem of long-term supply chain management [6].

Today, even though information and communication technology can support information sharing and facilitate accessing information sources more efficiently than in the past. Nevertheless, the existing supply chain cannot be observed or identified how much information can be shared. If those supply chain members share information inappropriately or do not contribute information or attempt to hide information, this results in problems in supply chain management and impacts inappropriate production volume.

## Objectives

This paper aims to investigate the association between related resources and information sharing and to evaluate the odds of information sharing.

## Literature Review

### Sweet corn supply chain

Sweet corn is a short-lived crop and a specific type of perishable product, fresh produce. The difficulty for fresh produce management is that product value degrades dramatically over time in the supply chain at temperature and humidity-dependent rates [7]. Most of them are sold to industrial factories for transforming into different products. The sweet corn supply chain is related to members at various levels. It connects to the agricultural and industrial sectors, which increase the value of raw materials. The supply chain is defined as a network of agencies, which are organizations or groups of more than three people who directly relate to upstream and downstream of the business, with the flow of raw materials, products, services, finance, and information from the source to end-customers. Also, the supply chain is from upstream to downstream to generate the value as products or services; then, delivery them to consumers [3; 8]. The sweet corn supply chain is an agri-food supply chain concept used to describe the actions from production to distribution that deliver agricultural or horticultural products from the farm to the table. Sweet corn supply chain actors consist of seed producers, growers, agriculture institutes, integrators, processors, wholesalers, retailers, and consumers. One of the main actors in the chain is growers who encounter limits in business skills, aspirations, and thinking systems, especially those with low social and financial conditions [9]. The sweet corn business system is divided into three sections: 1) Upstream refers to both input and output activities; 2) Midstream refers to marketing or product procurement activities, as well as processing activity; 3) Downstream refers to sales, product distribution, and export activity [10].

### Information sharing in supply chain

Members of the supply chain are frequently dispersed, resulting in information that is highly fragmented. Thus, there is necessary to improve management and information sharing facilitation among the members with a complex supply chain and high coordination cost [11]. The improvements are considered a challenge in terms of cooperation among supply chain members. According to Lotfi et al. (2013), information sharing was both a guideline for an organization's survival and a driver of supply chain integration. Information sharing in the supply chain is data sharing, information, and knowledge among supply chain members. The types of information that are often shared among supply chain members, for example, forecasts, demand, production planning, production capacity, and inventory level. Coordination of information sharing is essential in order to support crucial business decisions that may influence pricing, quality, cost, availability, lead time, and profit-sharing. Information flow is in both directions, from the upstream chain members to the downstream chain consumers

or vice versa [12]. Therefore, information sharing is an integral part of supply chain management. It is the potential to decrease information asymmetry among supply chain members. Furthermore, essential information concealment is a challenge for detecting opportunistic behavior of those behaved members. Therefore, information sharing allows reducing potential opportunistic behaviors [13]. It can also allow members to work together to reduce supply chain inefficiencies because it directly affects the relationships between supply chain members [14]. This enhances the supply chain's overall benefits in terms of constructing competitive advantages and establishing good relationships among members [15].

### Theory and hypotheses

Competition theories which focus mostly on company-level analysis explain and forecast performance inside the company. In contrast, R-A theory intrinsically considers factors beyond the firm. In supply chain management, the supply chain is seen as a unified entity rather than relegating fragmented responsibility for distinct portions of supply chain [16]. The idea of a resource advantage requires comparing the entity's resources to those of other entities, which necessitates finding comparative advantages outside of the organization. Hunt and Davis [17] clearly showed how several R-A theory premises make it more suited as a theoretical lens for supply chain management research than the resource-based view. It assumes that consumers' and organizations' information is imperfect and expensive, and characteristics of the resources are diverse and imperfectly transferable. In addition, Griffith and Yalcinkaya [18] refer to the resource-advantage theory's focus on resources and their utilization can provide insights at the firm/inter-firm level and the individual level. Therefore, the creation of a competitive advantage is applied to resources and capabilities beyond a firm. The rationale is that resources are available across firms [19]. R-A theory is a general competition theory describing the competitive process. Each organization in the marketplace should have at least some unique resource that can provide a comparative advantage in resources, leading to a competitive advantage position. These resources should have the potential to be a source of competitive advantage in the long term. According to R-A theory, resources are the tangible and intangible things that are available to the organization that efficiently and/or effectively produce a market offering. These resources can be categorized as finance, human, organization, physical, relational, informational, and legal resources (Hunt & Davis, 2008). Information sharing can be identified as a relational resource; according to Priem and Swink [20] stated that creating effective communication, shared understandings, and shared collaborative values across the supply chain are the enhancement of relational and collaborative competencies. Strong relationships and better information sharing are hard to replicate. Inimitability results from the arrangement of relationships promoting the ideation

and exploitation of resources from supply chain collaboration [21]. The resource supports the organization's ability to generate a market offer efficiently and effectively. This ability, in particular, is seen as a higher order of socially complicated fundamental resource combinations. [22].

This study employs the R-A theory lens in terms of resources required for information sharing. The resources configurations which create a significant and unique contribution to competitive advantage are based on three lower-order resources; human, relational, and physical resources. Human resources: gender, age, education level, and work experience are the fundamental variables that reflect not just skills, knowledge, and comprehension of the tasks being performed but also the probability of a behavior occurring. Relational resources: memberships, contracts, and trading channels are collaborative operations involving two or more individuals/firms. Physical resource: sweet corn varieties, they are referred to sweet corn seeds, which are a key material in production.

#### **Human resources**

Initiatives to better understand information sharing behavior begin with supply chain participants, who are the drivers of supply chain management activities. Therefore, it is necessary to identify the resources that drive behavior or decision-making. Several studies have shown that gender, age, education level, and work experience are linked to information sharing [23-29]. They also indicate the effectiveness of interpersonal communication in working together. [30]

**H1, H2, H3, and H4** are gender, age, education level, and work experience, respectively. They influence opportunities to share information.

#### **Relational resources**

According to the findings of Galappaththi et al. [31] on information sharing networks, membership is a mechanism for members to network, access, and exchange information with one another. Furthermore, effective information sharing is critical to the socioeconomic well-being and social-ecological sustainability of the community. Jraisat et al. [32], on the other hand, found that member networks triggered information exchange in supply chains. As a result, network participants are expected to be more likely to share information within the network and exchange information with the rest of the supply chain.

**H5:** Membership influences opportunities to share information.

In a competitive situation among supply chains, supply chain partners need to have appropriate incentives and information to collaborate in response to competition generated by competing for supply chains. According to the findings of Ha and Tong [33], they showed that contracts of generating information sharing is essential as a value driver of information

sharing and the ability to share information in order to gain a competitive advantage under competition between supply chains. Furthermore, contracts are also used to promote coordination and encourage information sharing in case of information asymmetry [34].

**H6:** Contract influences opportunities to share information.

Sweet corn is traded between growers and processors via two main channels: direct processors and integrators. According to transaction cost theory, opportunistic behavior is referred to self-benefit behavior [35]. For instance, if there is an information imbalance, integrators inhibit information sharing in order to speculate on their exploits. When other supply chain members detect opportunistic behavior, it significantly impacts the relationship. The empirical evidence from a study by Ju et al. [36] found that the aggregator's opportunistic behavior hinders information sharing in a competitive environment. As a result, integration capacity and supply chain agility have suffered. This has an impact on the supply chain's overall performance.

**H7:** Trading channels influence opportunities to share information.

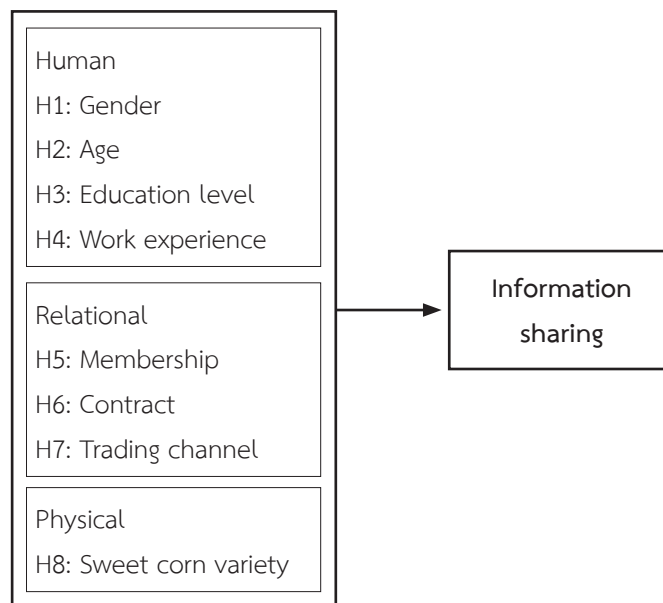
#### **Physical resource**

Supply chain members are well aware of the selection of sweet corn varieties. However, before trading or producing sweet corn, it is crucial to exchange the knowledge related to the variety in order to choose the one that best fits their needs, not only in terms of cultivation but also of sweet corn characteristics. A study by Shikuku [27] found empirical evidence of a link between the adoption of maize varieties and information sharing since supply chain members lack the knowledge to deal with the drought and rapidly changing climates. As a consequence, yields are reduced, or diseases and pests cause harm. Also, the physical and quality properties of sweet corn did not meet the processor's standards.

**H8:** Sweet corn varieties influence opportunities to share information.

#### **Conceptual model**

This research can separate independent variables into three resources. The first resources are human resources relating to gender, age, education level, and work experience. The second resources are the relational resources included membership, contract, and trading channel. The third resource is a physical resource which is sweet corn variety. The dependent variable was information sharing. This conceptual research model is illustrated in Figure 1.



**Figure 1** Conceptual model

## Methodology

### Population and sample

Chiang Mai Province was chosen as the location for this investigation because the province contains the country's largest cultivated area and highest number of growers, with 33,724 rai and 5,812 households, respectively [1]. The population consisted of sweet corn supply chain members, including growers, coordinators, integrators, and processors, located in Chiang Mai. These are some parts of sweet corn supply chains for determining sample size in binary logistic regression analysis. According to the recommendation of Long and Freese [37], the sample size should not be less than 100 samples or less than 10 times of variables' numbers. Stoltzfus [38] suggested that the smallest sample size was in a range of 10-20 times of the variables. The issue has not been definitively settled. However, there were 9 variables in this study, leading to sample size determination in the total number of 300 samples. In the process of multi-stage sampling, step 1 was purposive sampling from 7 districts. The individual district had grown more than 1,000 rai, including Mae Chaem, Chiang Dao, Mae Taeng, Fang, San Sai, Hod, and Mae Wang. Step 2: Snowball sampling was used to choose sweet corn growers, coordinators, integrators, and factory managers.

### Instruments

It applied a semi-structured interview that included both open-ended questions and close-ended questions. They were divided into 2 parts. The first part was general information:



gender, age, education level, and work experience. The second part was related to resources: membership, contract, trading channel, sweet corn variety, and information sharing. The independent variables were defined as dichotomous variables: gender, age, education level, work experience, membership, contract, trading channel, and sweet corn variety. The dependent variable was information sharing, indicating 0 = no information sharing and 1 = information sharing. The data were collected from growers, coordinators, and factory managers who completed an interview.

### Data analysis

It applied descriptive statistics (i.e., frequency, percentage) to describe data characteristics. Then, the association between dependent variables and information sharing was tested with Chi-square ( $\chi^2$ ). The results of analyzing each association, if any of the variables were statistically relevant to information sharing ( $p \leq 0.05$ ), were included in the binary logistic regression model, which analyzed a nonlinear relationship between independent and dependent variables with 2 values to predict how do events or opportunities share information. The reason for opting in to the logistic model since it is more popular than probit models is that coefficients can be interpreted more easily in terms of odds ratios. The odd ratio or OR is used to describe the opportunity that will happen. The criteria for analysis were illustrated in the following: 1) Independent variables should not have multicollinearity, the correlation coefficient was not more than 0.70 [39]; 2) The suitability of the coefficients in the equation, the omnibus test had statistically significant ( $p \leq 0.05$ ) [40]; 3) The goodness of fit of the model, the Hosmer-Lemeshow test should not have statistical significance ( $p > 0.05$ ) [41].

### Results

Data characteristics of questionnaire respondents were mainly male participants (82.7%), their age was 55 years old or younger (66.3%), primary education or lower (73.3%), 10 years of work experience or lower (63.0%), membership (60.0%), and using contracts (69.7%), trading through integrators (77.3%), and selecting sweet corn variety of Hybrid 59 to produce (56.0%). The test results of the association between the independent variables and information sharing were statistically significant ( $p \leq 0.05$ ). The test results were age ( $p = 0.033$ ), education level ( $p = 0.033$ ), work experience ( $p < 0.001$ ), membership ( $p = 0.036$ ), trading channel ( $p = 0.008$ ) and sweet corn variety ( $p < 0.001$ ), while gender ( $p = 0.986$ ) and contract ( $p = 0.181$ ) were not significant ( $p > 0.05$ ). The detail is described in Table 1.

**Table 1** Descriptive statistics and the test results of association

Variables	Information sharing						$\chi^2$	p
	No		Yes		Total			
	n	%	n	%	n	%		
Gender							<0.001	0.986
Female	16	30.8	36	69.2	52	17.3		
Male	76	30.6	172	69.4	248	82.7		
Age							4.523	0.033
≤55 yr	53	26.6	146	73.4	199	66.3		
≥56 yr	39	38.6	62	61.4	101	33.7		
Education level							4.550	0.033
≤Primary	75	34.1	145	65.9	220	73.3		
≥Secondary	17	21.3	63	78.8	80	26.7		
Work experience							19.345	<0.001
≤10 yr	41	21.7	148	78.3	189	63.0		
≥11 yr	51	45.9	60	54.1	111	37.0		
Membership							4.392	0.036
No	45	37.5	75	62.5	120	40.0		
Yes	47	26.1	133	73.9	180	60.0		
Contract							1.786	0.181
No	23	25.3	68	74.7	91	30.3		
Yes	69	33.0	140	67.0	209	69.7		
Trading channel							7.010	0.008
Other	12	17.6	56	82.4	68	22.7		
Integrator	80	34.5	152	65.5	232	77.3		
Sweet corn variety							32.368	<0.001
Other	63	47.7	69	52.3	132	44.0		
Hybrid 59	29	17.3	139	82.7	168	56.0		

According to the results of the analysis previously mentioned in criteria, there are three results which are: 1) the correlation coefficient between the independent variables were in the range of 0.015-0.335 (<0.70), as illustrated in Table 2; 2) the coefficients' suitability in the equation from the omnibus test was  $p < 0.001$  ( $p \leq 0.05$ ); 3) the goodness of fit of the model from the Hosmer-Lemeshow test was  $p = 0.059$  ( $p > 0.05$ ). Therefore, it summarized that this model was suitable for binary logistic regression analysis. Furthermore, the overall correct prediction rate was 77.3%.

**Table 2.** The result of analyzing correlations between independent variables

Variables	1	2	3	4	5
1 Age					
2 Education level	-0.190				
3 Work experience	-0.170	0.197			
4 Membership	0.063	-0.062	-0.076		
5 Trading channel	-0.170	0.128	0.096	-0.263	
6 Sweet corn variety	-0.335	0.003	0.155	0.016	-0.015

**Note:** This table reports Spearman’s correlation coefficients.

As shown in Table 3, the results of binary logistic regression analysis revealed that only age was not significant (OR=1.001, 95% CI=0.538-1.862, p=0.997). The remaining variables can be divided into two groups. Firstly, resources contributed to the higher odds of information sharing; therefore, the sweet corn variety of Hybrid 59 had the highest value of OR. Hybrid 59 was selected for comparison with other varieties. It likely had 4.412 times greater odds of information sharing (OR=4.412, 95% CI=2.412-8.070, p<0.001). Those with 10 years of work experience or less were 4.608 times more likely to share information than those with more than 10 years of work experience (OR=3.006, 95% CI=1.688-5.352, p <0.001). Those with a secondary school or higher level of education were 1.193 times more likely to share information than those with a primary school or lower level of education (OR=1.193, 95% CI=0.975-3.840, p=0.059). Members were 1.460 times more likely than non-members to share information (OR=1.640, 95% CI=0.929-2.893, p=0.088). Secondly, resources contributed to a reduction in the odds of information sharing. Trading through the integrator channel had the lowest OR value. Trading through integrator channel against other channels. The odds of information sharing were reduced by 69.5% (OR=0.305, 95% CI=0.139-0.670, p=0.003).

**Table 3** Result of analyzing binary logistic regression

Variables	B	OR	95%CI		p
			Lower	Upper	
Age					
≤55 yr	(ref.)				
≥56 yr	0.001	1.001	0.538	1.862	0.997
Education level					
≤Primary	(ref.)				
≥Secondary	0.660	1.935	0.975	3.840	0.059

**Table 3** Result of analyzing binary logistic regression (continued)

Variables	B	OR	95%CI		p
			Lower	Upper	
Work experience					
≤10 yr	1.101	3.006	1.668	5.352	<0.001
≥11 yr	(ref.)				
Membership					
No	(ref.)				
Yes	0.495	1.640	1.640	0.929	0.088
Trading channel					
Other	(ref.)				
Integrator	-1.186	0.305	0.139	0.670	0.003
Sweet corn variety					
Other	(ref.)				
Hybrid 59	1.484	4.412	2.412	8.070	<0.001

**Discussion**

The study of the relationship between the independent variables and information sharing in the sweet corn supply chain revealed that education level is a reasonably predictable human resource. Except for age, overall supply chain members, who are younger (≤55 years), are somewhat more likely to share information, but not significantly. This is consistent with the study of Xu et al. [29]. This might be because of the capacity to acquire information of supply chain members at various ages. There is no distinction.

According to studies, better-educated supply chain members are more likely to share information. This is in line with the findings of Mao et al. [42], and it also suggests that they are more willing to share information. Supply chain members with a higher level of education may better understand information sharing and they are more likely to be proficient in acquiring information and knowledge [43]. However, the study of Maguire-Rajpaul et al. [44] demonstrated that more educated members could understand information and apply knowledge to solve problems solving. As competent individuals, they are frequently questioned and they advise other members [29].

Supply chain members with less experience have more opportunities to share information. Their work experience reflects in their knowledge and ability to deal with problems. Knowledge sharing activities have primarily been conducted in work-related contexts, while information sharing has also been implemented in non-work contexts [45].

Therefore, they constantly attempt to seek new knowledge and exchange useful information to work and fill a need to connect with other supply chain members [46]. On the contrary, Nonogaki et al. [25] stated that those who have more experience might know how to solve problems and share information in order to give advice or assistance to others, particularly in the practice of sharing information [23].

Membership had more opportunities to share information because belonging to either group involved in a supply chain facilitates the information exchange within the group. Additionally, their information exchange relied on the expected social motivations characterized by obligatory reciprocity [24]. Social exchange theory refers to the individual voluntary actions that are motivated by returns. They expected to receive rewards, and they usually come from other people in the relationship between groups or individuals [47]. According to the study of Galappaththi et al. [31], membership provided supply chain members with a mechanism for networking and accessing information. Following Van de Brake et al. [48] found that if there were a member of more than one group at the same time, it would increase information sharing. It was an expanding social network for learning and distributing useful information [49].

Trading through integrators is less likely to share information. It can say that in a competitive environment, integrators attempt to maintain the advantages. However, they are aware risks of losing a competitive advantage and bargaining power through sharing information [50]. Besides, integrators may hedge their risks by avoiding sharing information to control and maintain a competitive position, rather than measuring implementation to collaborate with other supply chain members [51]. According to Rachapila and Jansirisak [2], farmers who cultivated sweet corn using the integrator system had an insufficient relationship in information sharing, collaboration planning, trust, and commitment.

Supply chain members who choose to produce or grow from the sweet corn variety of Hybrid 59 have more opportunities to share information. It is a popular type for growing and trading in a large volume. According to its outstanding reputation, sweet corn growers prefer it because of its high yield, disease resistance, and simplicity of nutrition. In addition, it is also preferable for buyers to provide the appropriate size-by-weight, attractive color, and pleasant flavor. These characteristics are regarded as indicators of general trust in the sweet corn variety; therefore, reputation boosts trust [52]. According to the study of Mirkovski et al. [53] and Wang et al. [13] showed that trust has a positive impact on information sharing. Moreover, it also represents the dissemination of information.

## Conclusion

The study applied the R-A theory lens to information sharing in the sweet corn supply chain to examine the association between the resources (e.g., human, relational, and physical) and information sharing. Furthermore, they were also evaluated for the odds of information sharing decisions by emphasizing the types of information shared across supply chain members, namely forecasts, demand, production planning, and production capacity. The findings confirm that the resources as lower-order resources promote information sharing opportunities as higher-order resources, which implies that information sharing competence of a supply chain can be derived from lower-order resources. In particular, from human resources: work experience and education level are vital drivers of information sharing behaviors among supply chain members, as expressed by a positive effect on information sharing. From the perspective of relational resources, trading through integrators is interesting because it negatively affects information sharing. This is not surprising since integrators are very competitive with one another and gain an advantage by concealing information. Contrary to membership which promotes sharing of information because membership is motivated by mutual benefit expectations and the expansion of social networks. Physical resource: sweet corn variety with trust is derived from appropriate characteristics of sweet corn and meets growers' and buyers' needs, leading to the dissemination of information through word-of-mouth communication. The study suggests that selecting a supply chain facilitates information sharing. Supply chain members can use certain supply chain resources as a criterion for deciding to become a member of the supply chain, namely, the sweet corn variety being used for growing or production should be favored. There is a grouping of each player (e.g., cooperatives, alliances). Trading channels should be in direct trading form between processors and growers. In addition, information sharing on human resources could be made more effective and improved by promoting learning and facilitating communication through information technology in order to improve it to be more effective.

## Limitations and future research

The limitations of the study are threefold areas. Firstly, questionnaire respondents were limited to only Chiang Mai, Thailand, which may affect analysis and comparison. Therefore, the study at the regional or national level was more suitable. Secondly, the sweet corn supply chain consists of diverse upstream and downstream members. This study only focused on some members of the supply chain; however, studying the whole supply chain can provide better information across the entire supply chain. Finally, supply chain information sharing consists of vertical and horizontal information separation. For this reason, horizontal information sharing should be undertaken in the further study because it will increase a better understanding of information sharing in the supply chain.

## Acknowledgment

This research is supported by the Graduate Development Scholarship 2020, National Research Council of Thailand.

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