KEY PERFORMANCE INDICATORS IN EMERGING SUPPLY CHAIN OF MANGOSTEEN IN BOGOR DISTRICT, WEST JAVA PROVINCE, INDONESIA

INTRODUCTION

- Mangosteen (*Garcinia mangostana L.*) is the highly demanded fruit for export commodity from Indonesia → contributing 37.4% of exported fruit from Indonesia in 2006

- The biggest mangosteen production center in Indonesia is West Java Province → Purwakarta, Subang, Bogor, and Tasikmalaya Districts (Directorate General of Horticulture, 2007)

- The activities of mangosteen production in West Java Province have not been efficient yet to compete internationally

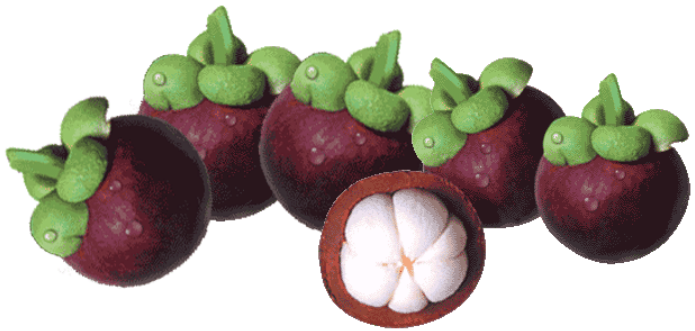
- Supply chain management in mangosteen business was initiated in Bogor district in 2007 → integrating processes from receiving raw material to selling finished products in order to have competitive advantages in facing the market demand and consumer's preference of the fruit

Supply chain management of mangosteen is characterized by some special properties

- Perishable products
- Climate and season dependent in the planting, growing, and harvesting process
- Bulky
- Informal to very formal arrangements of various partnership

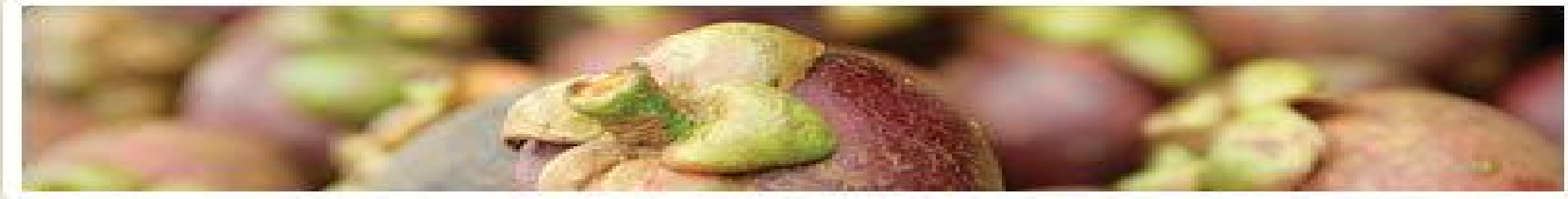
- The development of more integrated mangosteen supply chain should be followed by simultaneous development of supply chain performance

- Indicators of supply chain performance have an important role to play in setting objectives, evaluating performance, and determining future courses of actions



OBJECTIVE

- Identify key performance indicators of emerging mangosteen supply chain in Bogor District
  - Mapping of the supply chain characteristics
  - Decomposing performance indicators of the supply chain in a hierarchical fashion into sub-problem
  - Determining key performance indicators using Fuzzy Analytical Hierarchy Process (Fuzzy AHP)



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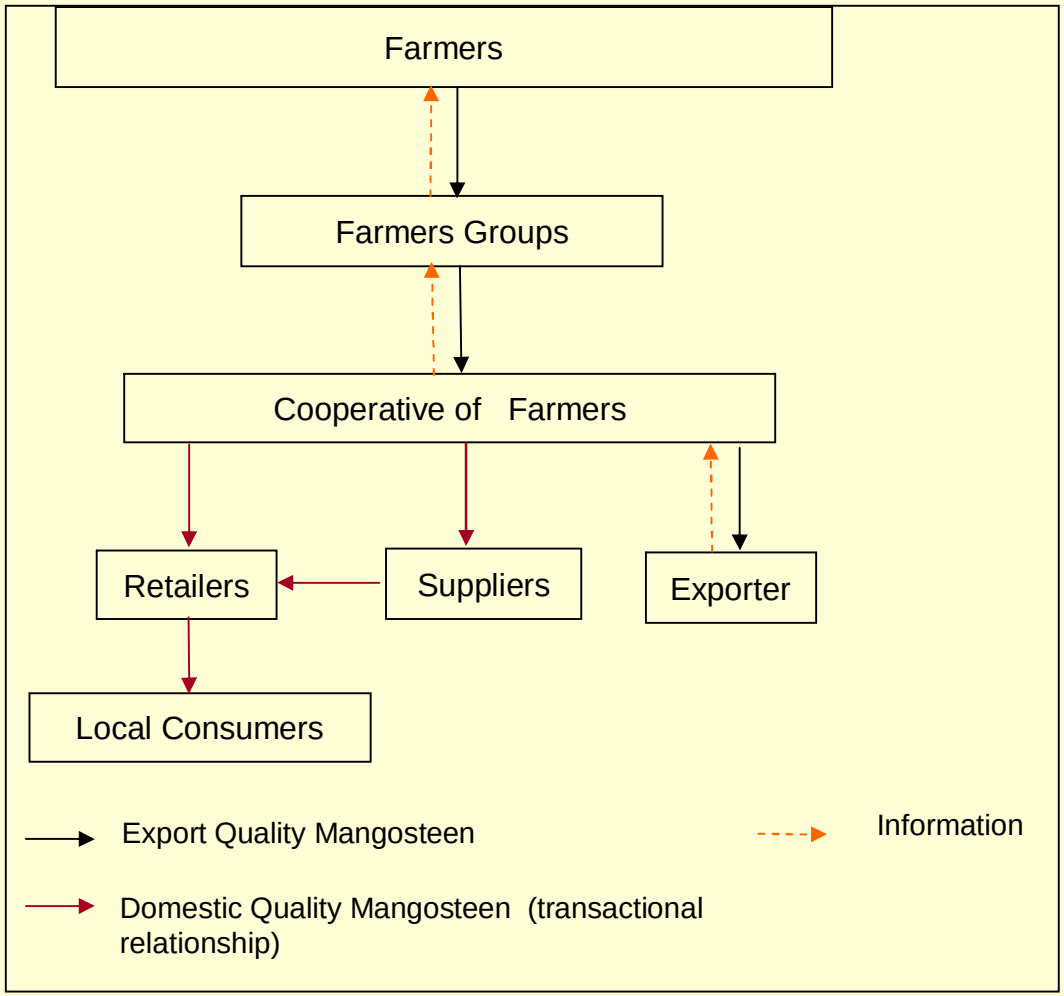


PERFORMANCE INDICATORS OF SUPPLY CHAIN

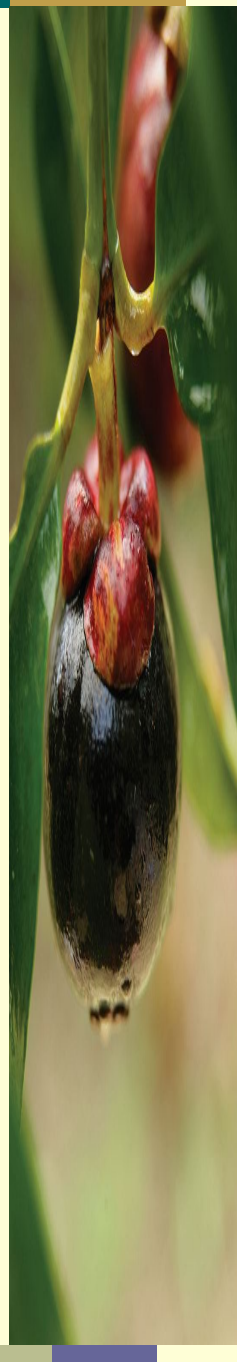
- Supply chain performance: the degree at which supply chain fulfills end user requirements concerning the relevant performance indicators at any point in time and at what total supply chain cost (Vorst, 2000)

- Performance indicators: criteria with which the performance of product, service, and production processes can be evaluated (Vorst, 2000)

- Key performance indicators: a relatively small number of critical dimensions which contribute more than proportionally to success or failure in the market (Christopher, 1998)

- The Supply-Chain Council's Supply-Chain Operations Reference (SCOR) model → a standard supply-chain process reference model designed to fit all industries (Aramyan *et al*, 2006)

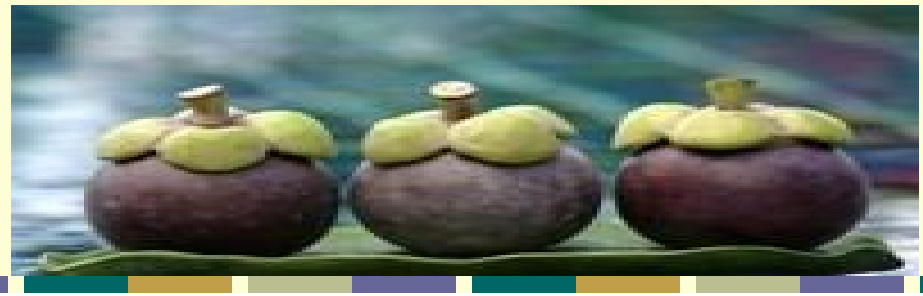
- A set of supply-chain performance indicators advocated by SCOR:
  - Reliability measures
  - Responsiveness measures
  - Agility measures
  - Total supply chain management cost measures
  - Asset management measures



KEY PERFORMANCE INDICATORS IDENTIFICATION

- Emerging supply chain → introduction of new system to the members of chain usually requires special effort

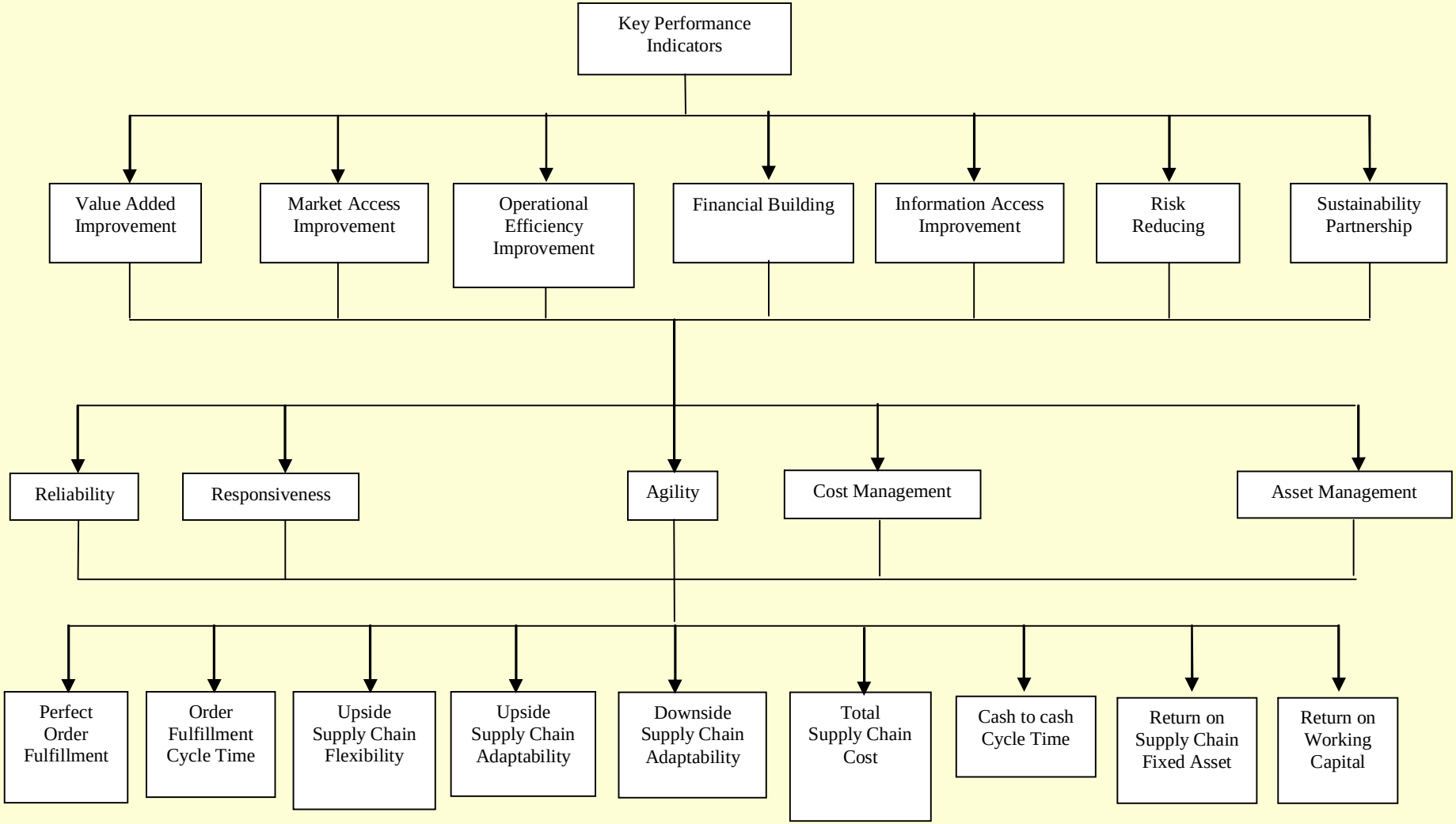
- The conflicting goals of individual members in the supply chain → complexity commonly faced by supply chain members



- Key performance indicators of the supply chain should be identified to determine critical dimension which contribute to success of chain as a whole by considering the integration of the goals of the supply chain → multi-criteria decision making

- Fuzzy Analytical Hierarchy Process (fuzzy AHP) method was used to identify key performance indicators of the supply chain → proposed to makeup the vagueness and existing uncertainty in deciding the importance of performance indicators by the decision-maker
  - Hierarchy of key performance indicators identification was established
  - Experts were asked to compare the elements at a given level on a pairwise basis to estimate their relative importance in relation to the element at the immediate proceeding level → using a nine point ratio scale

RESULT AND DISCUSSION



AHP structure of key performance indicators identification

Degree of Importance of Mangosteen Supply Chain Performance Indicators

Level	Detail	Degree of Importance
Goals of supply chain	Value Added Improvement	0.215
	Market Access Improvement	0.144
	Operational Efficiency Improvement	0.074
	Financial Building	0.063
	Information Access Improvement	0.192
	Risk Reducing	0.255
	Sustainability Partnership	0.057
Atribut of perfomance	Reliability	0.227
	Responsiveness	0.160
	Agility	0.220
	Cost Management	0.229
	Asset Management	0.163
Performance Indicators	Perfect Order Fulfillment	0.147
	Order Fulfillment Cycle Time	0.102
	Upside Supply Chain Flexibility	0.101
	Upside Supply Chain Adaptability	0.101
	Downside Supply Chain Adaptability	0.101
	Total Supply Chain Cost	0.163
	Cash to cash Cycle Time	0.100
	Return on Supply Chain Fixed Asset	0.082
	Return on Working Capital	0.100

- The main goal of mangosteen supply chain in Bogor District, West Java Province, Indonesia is reducing risk

- The most important performance indicators:
  - Total supply chain cost → initiating business process coordination and integration across members of mangosteen supply chain
  - Perfect order fulfillment → lack of quantity
  - Order fulfillment cycle time → lack of quantity

CONCLUSION AND FUTURE OUTLOOK

- The result of key performance indicators identification helps to guide mangosteen supply chain members in Bogor District in making trade-off between performance components to improve the performance of the entire supply chain

- The key performance indicators can be used for future improvement of supply chain performance by designing the supply chain structure and business process → performance of the supply chain can be optimized

- Performance measurement system should also be developed for measuring degree of mangosteen supply chain performance