



Knowledge Management, Value Chain Modelling and Simulation as Primary Tools for Mass Customization

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ICE 09

Outline

1. Mass Customization
2. MC and Knowledge management
3. MC and Simulation
4. Case study: DOROTHY
5. Conclusion and Outlook

Drivers of MC

1. the product should be customizable.
2. the customers should demand customization.
3. The company's value chain and supply chain should be ready for MC.

Steps for implementing MC

1. Determine the desired level of customization, and the best customization strategy to be adapted
2. Study what change should be done in the whole company and its supply chain to enable such a strategy. (also determine the cost of such a change)
3. Evaluate and implement this strategy

MC is an attractive strategy



MC is not feasible in all environments

it presents many challenges to be dealt with

time

cost

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Enablers of MC

Modularity and standardization

Adaptation of change throughout the entire supply chain

Automating technology

Worker flexibility

Effective and integrated IT system

Process and manufacturing flexibility

Controlling variety induced complexity

High level of manufacturing capability

Collaboration and coordination between all the members of the supply chain

Customer decision support system

Strong customer relations

[Da Silveira et al. , 2001]

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Two main ways to deal with the challenges of MC :

1 Assuring collaboration and coordination between different players of the supply chain



2 Finding a suitable trade-off between external variety versus internal complexity

KM is a business process that identifies, collects, creates, organizes, stores, and distributes valuable knowledge in order to apply it to problems and use it to attain certain goals [Raman 2006].

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Failures in transmitting and translating customer requirements to the design and production team

Insufficient collaboration between the main agents involved in the customization process

- Delays
- Increased cost
- Increased internal complexity
- Reduced customer satisfaction



1. Mass Customization

MC is a knowledge-driven enterprise meaning that knowledge and information are the main differentiators of successful business. [Helms et al. , 2008]

2. MC and Knowledge management

The information system needs should store customers' desires and needs transforming them into important knowledge to be used in the creation of products and services → **Update flow**

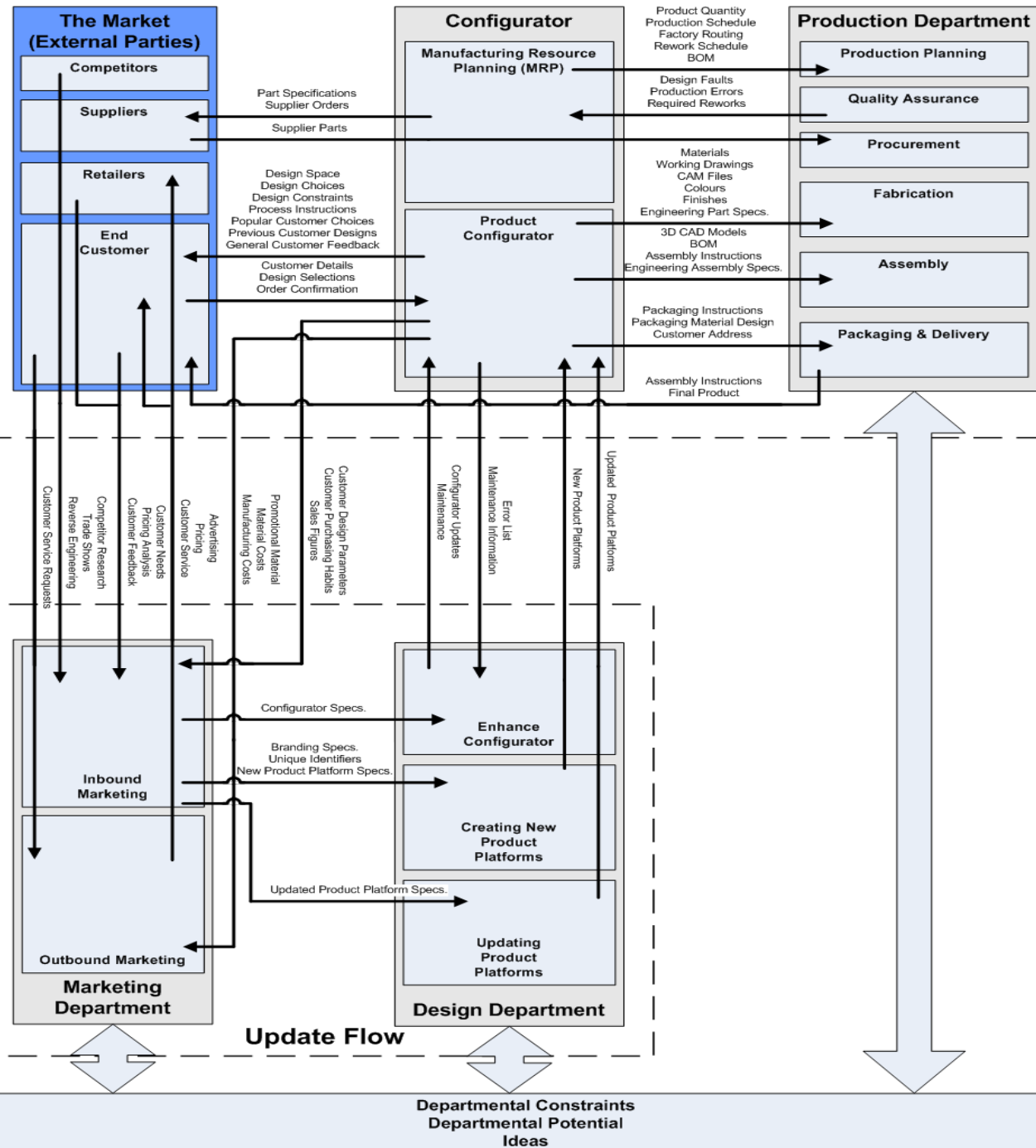
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KM leads to the improvement of customer relationship management, supply chain management, and product development [Fahey, et al. 2001].

Product Creation Flow



[Cross, Seidel, R., Seidel, M. and Shahbazpour 2009]

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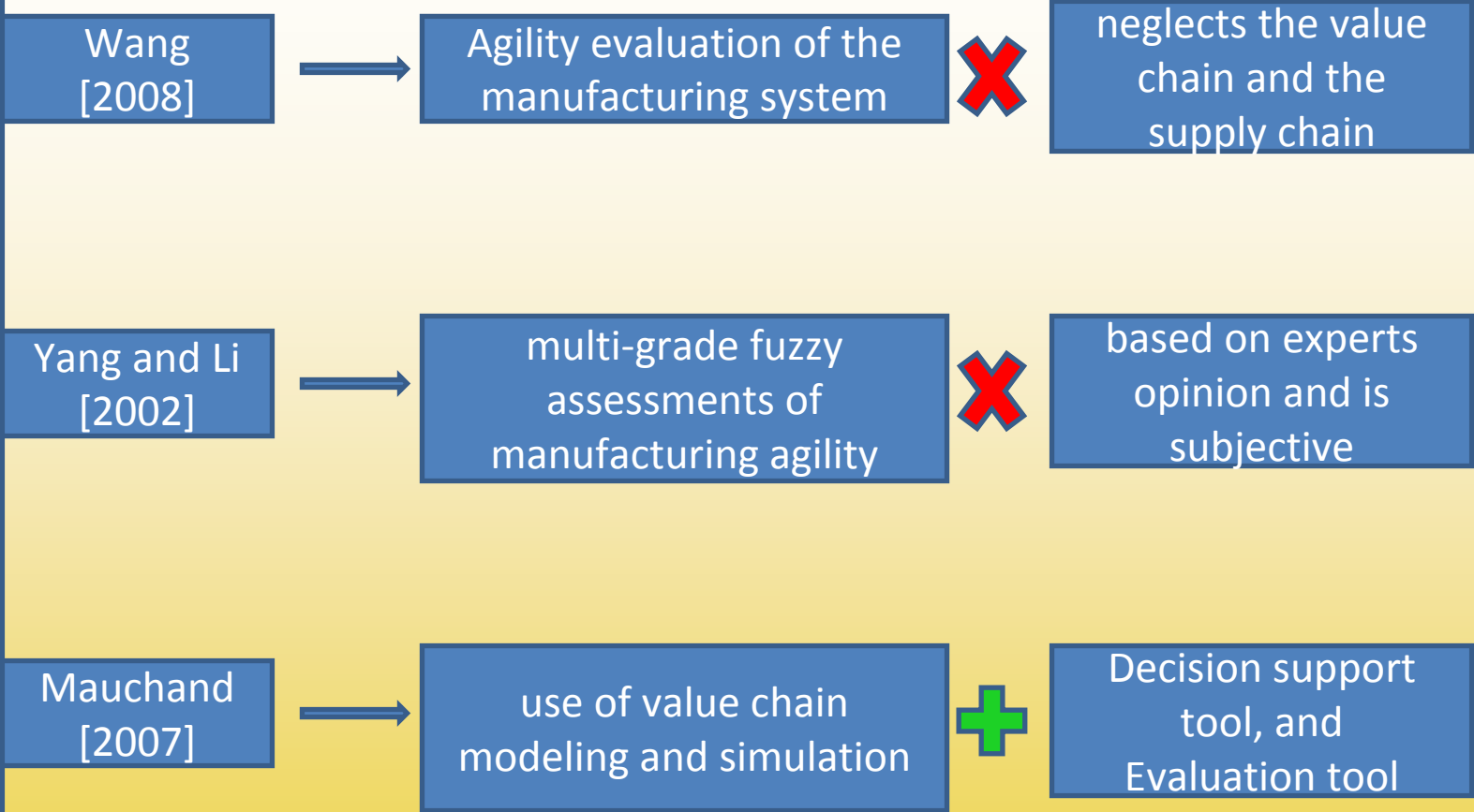
1. Need management decision support system

2. Evaluation is usually based on determining the cost needed to implement MC vs. expected increase in profit

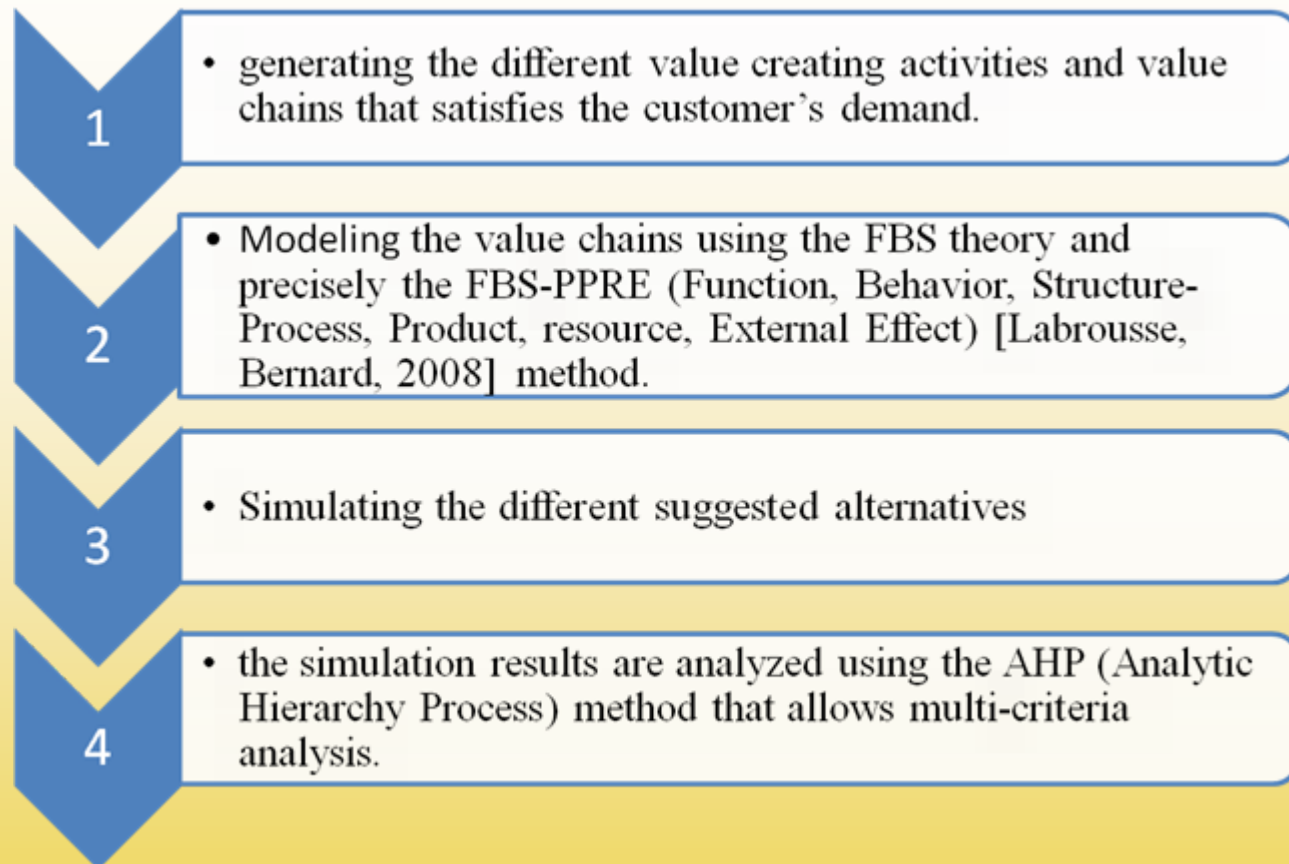


Considering cost as the only performance and evaluation indicator is not enough

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[Mauchand 2007] used simulation as a decision support tool aiming on evaluating the performance of the enterprise.



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The concepts related to performance are cost, quality, time and value.

A multi-level model

She used ABC (Activity Based Cost) as a cost estimation method

DOROTHY

1) Determining the level of customization → company's decision makers

2) Study what change should be done in the whole company and its supply chain to enable such a strategy.

Knowledge management → We need to identify the data flow, the critical data, what information is transferred to machines and computers, what data is to be sent to which partner or member of the value chain and where we can gain time, efficiency, and value.

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3) Evaluation

3.a. Determining performance indicators:

The combination of the three performance indicators cost, quality and time results in the value assessment [Chen, Huang, 2006].

Many other criteria can be added to this combination.

3.b. Value chain modeling:

Two major models the product model and the process model.

Methods → IDEF0, GRAI, FBS, MOKA, etc... they Do not tend to be universal, and are restricted to the product view. Hence, Labrousse and Bernard proposed a generic model: the **FBS-PPRE**

3.c. Simulation

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➤ Mass Customization requires unique operational capabilities combined with knowledge management

➤ Managers should seek opportunities to add value through increased variety but before committing their companies to a mass-customization strategy, they should carefully analyze the technology available, demand, costs, and benefits

“As with any new innovation, essential is not the innovation itself but how it is being implemented and practiced in every day life.” Ruhonen et al. (2006)

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