E-Business Value in Dynamic Business Environment

Hsin-Lu Chang
Associate Professor
National ChengChi University
hlchang@nccu.edu.tw

Challenges Facing Today

• **Cost Reduction**
  – Eliminate duplicate systems
  – Re-use, don't re-build
• **Reduce cycle time and costs for external business processes**
  – Move from manual transactions with suppliers towards automated transactions
  – Facilitate flexible dealings with partners with minimal process or IT impact
• **Support an agile business model**
  – Many existing IT systems are inhibitors to change: complex and inflexible
  – Existing integrations can be inhibitors to change: multiple technologies, point-to-point integration, inflexible models
• **Integrate across the enterprise**
  – Integrate historically separate systems
  – Completion of mergers and acquisitions
  – Across physical and technology barriers
Taiwan’s Tech Clout

#1 Provider of chip foundry services, with 70% of the market worth $8.9 billion

#1 Provider of notebook PCs, with 72% of the market worth $22 billion

#1 Provider of LCD monitors, with 68% of the market worth $14 billion

#2 Provider of servers, with 33% of the market worth $1.8 billion

#2 Provider of digital still cameras, with 34% of the market worth $2 billion

#1 Provider of PDAs, with 79% of the market worth $1.8 billion

Example: Taiwan PC Industry

- **Why it matters?**
  - Global No. 1 IT supplier
    - LCD screens, routers, notebook, cable modems, to name a few
  - The revenues of Taiwan’s 25 key tech companies should hit $122 Billion this year
  - 40% to 80% of China’s exports in ICT industry are made in Taiwanese-owned factories

- **Challenges ahead**
  - Most of production has shifted to China
    - Coordination becomes more complex and dynamic
  - Global logistics issues
  - Fierce competition, squeezed margin, and scale economics
  - Real-time responsiveness is more important than efficiency
The Best Supply Chain Aren’t Just Fast and Cost-Effective

R&D Activity: from internal R&D process integration to the sharing of design data and product information among customers and suppliers

Procurement: from operational-oriented e-procurement, to strategic-oriented e-sourcing

Production: from internal capacity planning optimization to advanced production planning, which integrate the entire supplier group

Logistics: from the management of regular activity such as in-transit status updates to exception management such as event-driven technology

Trends in E-Business Technology Development

- How to Enhance Supply Chain Visibility and Sharability?
- How to Effectively Collaborate?
- How to Be a Real-time Enterprise?

More internally focused integration  More externally focused integration
Observations

- **Observation 1**: IT by itself cannot meet the challenge, as its real power is an enabling human judgment and decision making, not replacing it.
- **Observation 2**: It is likely to find that even when firms have implemented the same IT, the outcome of their e-business development differs.

“Fitness” between IT and Business Environment

A “right” IT should be able to handle alternative uncertainties arising from business environment.
Studies of IT and Uncertainty

• **External** environment
  – From the views of *transaction cost economics* (*TCE)*:
    • Environment
    • Partnership

• **Internal** environment
  – From the views of *resource-based perspective* (*RBP*) and *dynamic capabilities approach* (*DCA*):
    • Process
    • Knowledge

The Fit Concept in Previous Studies

• **Task-technology fit (TTF) theory**

<table>
<thead>
<tr>
<th>Level</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>The process level</td>
<td>Gribbins et al. (2004)</td>
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<td>The group level</td>
<td>Zigurs and Buckland (1998), Dennis et al. (2001).</td>
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</table>

• **Information processing theory**
  Bensaou and Venkatraman (1995), Premkumar et al. (2005)
Business-IT Fit Model

External
- Environment Uncertainty
- Partner Uncertainty

Internal
- Process Uncertainty
- Know-how / Knowledge

Business Environment

IT Environment

FIT

Performance of EP

A Case Study: E-Procurement Systems in Greater China

Dell
HP
OSHIBA
OEM
### Sample Companies

<table>
<thead>
<tr>
<th>Firm</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<tr>
<td>Industry</td>
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<td>Manufacturing</td>
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<td>• Aluminum Die Casting</td>
<td>• Labels</td>
<td>• Cable</td>
<td>• Multilary Chip Capacitors</td>
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<tr>
<td>• Magnesium Die Casting</td>
<td>• Nameplates, Overlays, and Tear-drop Doming</td>
<td>• Connector</td>
<td>• Electrolytic Capacitor</td>
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<td>• In Mold Labeling</td>
<td>• Flexible PCB</td>
<td>• Fixed Resistors</td>
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<td></td>
<td>• Inductor</td>
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<td>• HF Products</td>
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<td>Material category in the central firm’s typology</td>
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<td>Electrical engineering</td>
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<td>Direct Shipping</td>
<td>Direct Shipping</td>
<td>VMI HUB</td>
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</table>

### System Background in the Cases

**OEM**

- Sourcing and Assessing Suppliers
- Recognizing Parts
- Generating Orders
- Receiving Materials
- Accounts payable
- Quality Assurance

**Suppliers**

- Parts Recognition and Spec. / ECO
- Processing Orders
- Preparing Shipments
- Managing Inventory
- Accounts Receivable
- Quality Improvement

**Current EP Scope**

- Module Forecast; PO/PO Change
- Order Reply
- ASN
- VMI Information

**Entire EP Scope**

- Generating Orders
Use of Electronic Procurement Systems

The degree of integration between buyer and supplier

Low-integrated

High-integrated

Web based procurement systems:
Web access

EC Turnkey:
Data exchange

AP-to-AP connection:
Process interaction

Loose

Tight

High

Low

The wherewithal of supplier

Low

High

Web based procurement systems:
Web access

Firms Realize System Benefits Differently

Firm 1
(Mechanics)

Firm 2
(Labels)

Firm 3
(Cables)

Firm 4
(Passive)

Error Reduction

Data Consistency

Timeliness

strategic necessity

strategic necessity

strategic necessity

strategic necessity

benefits
Cases result in Environment Uncertainty

Product customization

- Firm 1: 10 PNs
- Firm 2: 20-30 PNs
- Firm 3: 100 PNs
- Firm 4: 1000+ PNs

Number of parts available for customization

- Frequency of urgent orders
- Frequency of order change

Dynamics of demand

- Firm 1: Rare changes
- Firm 2: Many Emergent orders
- Firm 3: Many changes
- Firm 4: Many changes (over 30%)

Dynamics of supply

- Firm 1: Goods return problems
- Firm 2: Emergent PO
- Firm 3: Need Coordination of extra support person
- Firm 4: Hub delivery

Levels of Coordination required for shipment

The respondents in Firm 3 and Firm 4 commented a lack of fit between the current weakly integrated EP and business environment:

“...The current EP system only allows 10 items at most to be processed in a Web page, but for us there are usually more than a hundred items in a purchase order.”

“The system does not support re-do function, which creates a lot of frustration. Usually I need to check hundreds of boxes to fulfill a purchase order. Once I check a wrong box, I start again from the beginning.”

“When the OEM updates its forecasts, which occurred very frequently, the changed parts were not highlighted in the system, so we had to find out what was being changed by ourselves.”
Cases result in Partnership Uncertainty

- **Lack of Reciprocal Investment**
  - Firm 1: Iterative Co-design
  - Firm 2: Co-design
  - Firm 3: Standard products, No R&D interaction
  - Firm 4: Standard products, No R&D interaction

- **Lack of Trust**
  - Firm 1: Mutual trust
  - Firm 2: Loses track of shipments
  - Firm 3: Suspicion of allocation changes
  - Firm 4: Suspicion of allocation changes & Hub problem

Intensity of co-design activity
- Long-lasting relationship
- The perception of partner’s opportunistic behavior

Cases result in Process Uncertainty

- **Dynamics of process**
  - Firm 1: Fulfill order, return process
  - Firm 2: Fulfill order
  - Firm 3: Fulfill order, contact extra support person
  - Firm 4: Fulfill order, coordinate Hub delivery

- **Dynamics of product**
  - Firm 1: Change by every module in the form, function and structure etc.
  - Firm 2: Change by every module in graph
  - Firm 3: Standard material
  - Firm 4: Standard material

- **Complexity of product**
  - Firm 1: Special and dedicated material
  - Firm 2: Special but simple material
  - Firm 3: Standard material
  - Firm 4: Standard material

Task complexity
- The extent of changes in product specifications for each module
- Lead time for production
- Duration of a batch production (days)
The current weakly integrated EP cannot fulfill the needs of dynamic processes in Firm 3 and Firm 4.

“When customers return defective items the OEM requires us to carry them back. However, the current system does not provide real-time quality information. The OEM always informs us in an urgent manner which increases the difficulty to efficiently arrange the return.”

“The OEM requires us to coordinate with the hub to fulfill the orders. However, the order information shown in our system is often inconsistent with the information at the hub.”

Cases result in Knowledge Uncertainty

Past IT implementation experience

Coordination capability

Technical knowledge

Managerial knowledge

Firm 1  Firm 2  Firm 3  Firm 4
Low managerial skill  Show coordination skill  Extra assistant  "Willing" to do further
(Mechanics)  (Labels)  (Cables)  (Passive)
External Uncertainties and EP Performance

Simple Web solutions do not fit Firm 3 and Firm 4 for the following reasons:

1. No support for customized IT component suppliers
2. No control for OEM opportunistic behavior

Internal Uncertainties and EP Performance

Simple Web solutions do not fit Firm 3 and Firm 4 for the following reasons:

1. No support for key competencies
2. Too ready to use
Use of Electronic Procurement Systems

Managerial Implications

- Though a simple basic EP system can not live up to expected benefits in complex and dynamic environment, a powerful highly integrated EP system can not fit all suppliers neither.

- We argue that companies should align their EP with different suppliers just like they provide several versions of their products for different customers to get maximum profits.

- Improper alignment makes suppliers fail to cooperate and harms the focal firms eventually. Therefore, fit between business environment and technology can produce win-win situation and best profits to both buyer and sellers.
Q&A