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Open Innovation in Global Manufacturing Supply Chains

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The Network: Overview

- One of 29 Nationally
- All key FE/HE partners
- Employer driven
- 7 Industrial sectors
- Vocational learner focus
- Level 3 to 4 onwards
  College into University

Meeting Today's Challenges

- Market Liberalisation and Globalisation
- Customer Expectations
- Shareholder Value
- Hungry Competition
- Product and Process Innovation
- Technological Rate of Change
- Social, Stakeholder & Environmental Pressures

Acceptance of Change

- Heart of 1800’s Industrial Revolution
- Combination of Textiles, Mining and Steel Making which allowed UK to export all over the World
- Recent demise of ‘Traditional’ industry has been replaced by thriving Innovative Creative & Digital Sectors

Enterprise Doom and Gloom

Global trade flows are set to shrink by 9% during 2009, according to a forecast by the World Trade Organization (WTO, 2009)

Japan is currently experiencing its worst recession in over 60 years. Its record-breaking largest ever trade deficit, exports have slumped, unemployment is high, and now as global demand slows, official figures show Japan’s industrial output has fallen by a major 10 per cent.

Japan's exports saw a record plunge in February, Exports fell 45.4% year-on-year to 3.526tn yen ($36bn; £24.6bn); [BBC, 2009]
Relative UK Decline 4th to 6th

<table>
<thead>
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<th>Year</th>
<th>GDP (G)</th>
<th>Growth (Gr)</th>
<th>US (Trn)</th>
<th>Japan (Trn)</th>
<th>Germany (Trn)</th>
<th>China (Trn)</th>
<th>UK (Trn)</th>
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<td>2008</td>
<td>$14.84Tm</td>
<td>-0.2% Gr</td>
<td>$5.89Tm</td>
<td>0% Gr</td>
<td>$3.48Tm</td>
<td>0.5% Gr</td>
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<td>$4.96Tm</td>
<td>1.4% Gr</td>
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<td>3.2% Gr</td>
<td>$5.29Tm</td>
<td>2.1% Gr</td>
<td>$3.81Tm</td>
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<td>2005</td>
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<td>3.3% Gr</td>
<td>$5.00Tm</td>
<td>2.1% Gr</td>
<td>$3.10Tm</td>
<td>1.4% Gr</td>
<td>$3.10Tm</td>
</tr>
</tbody>
</table>

GDP, Growth, Population and GDP Per Head Figures

Changing Economic Fortunes

Growth, Stimulus and Rescue Plans

Modern Enterprise Environment

Business Imperatives

For any Enterprise to be successful it needs to maximise the derived value and synergies from its:

- Products and Processes
- Technology and Data
- People and Stakeholders

Achieved Through:

Continuous Improvements to Quality, Speed and Price

Inevitable Change

If ...Collective... action is not taken, the decline of our prosperity will continue at further pace

- Reduced Productivity Per Enterprise
- Declining Customer Focus and Profit
- Increased Overseas Activity
Process and Organisation Streams

- Each case has unique set of market demands and operating challenges but the issues essentially remain the same:
  - Production: Which product? How many? When?
  - Inventory: What is P/M? Stocking points? Levels?
  - Location: Type of Facilities? Where?
  - Transportation: How to move? When? Routes?
  - Information: Collected? Shared? Decision Making?

Achieving Business Excellence

- How to achieve ‘World Class Manufacturing’
- Strategic Planning Processes
- People and Team
- Total Quality and Continuous Improvement
- Planning and Control Processes
- New Product Development Processes

Enterprise Advancement

- Mergers, Acquisitions & Divestitures:
  - Recently, 30% of the World’s 2000 leading enterprises were considering acquisition
  - 40% Saw themselves as acquisition targets
  - In 1999, the value of these transactions was estimated to be more than $2 Trillion
  - Reductions are born from:
    - Lack of differentiation and a high rate of generalist focus
    - Poor return on investment measurements
    - Lack of required skills and ineffective alliances
Market Development

Established Markets:
- Europe
- North America
- South America
- Middle East
- Japan

Maturing Markets:
- Russia
- South Africa
- China
- India

Growth Markets:
- Vietnam
- Russia
- South Africa
- China

Emerging Markets:
- Vietnam
- Russia
- South Africa
- China

Platforms:
- North America
- South America
- South Africa
- China
- India
- Taiwan
- Korea
- Russia
- Malaysia
- Iran
- Iraq
- Israel
- Vietnam
- Burma
- Former Soviet States
- Saudi Arabia
- Pakistan
- Singapore
- Hong Kong

Entry Development

Consolidation

TIME

Establish a base to learn, collect information and set up contacts

Set up representative office to coordinate efforts

Regional office for administration of synergies

Agents, Representative offices

Establish initial investment through joint venture or local subsidiary

Joint venture Acquisition

Joint venture Local operation

Joint ventures Local subsidiary

Initiate several business activities, multiple presence

Rationalisation

Joint venture

Acquisition

Local operation

Expand

Expand

Integrate into Global / Regional operations

Global Supply Chain

Definition:
Supply chain spanning global and several companies, functioned and controlled centrally, irrespective of functional or corporate structures

Key differences:
- Traditional transaction systems structured by function and company
- Overlapping flow of actual supply chain, inventories and flows
- Able to take both strategic and tactical view of total supply chain

Benefits:
- Improved customer service
- Increased throughput/flexibility
- Reduced inventories
- Reduced cost

Global Supply Chain

Supply chain impacts:

Virtual Enterprise Broker

Virtual Enterprise

Preparation & Formation

Operation

Dissolution

Processes in a Networked Organisation

Supply Chain Approach

G. Kruse: Supply Chain Analytics, 2004

Need Vs Available Technology

Partnership enterprises

Increased global competition

Design for product customisation

Increased quality

Cost reduction

Data interchange

PES control effects

Technology-driven product customisation

Early 2000

Efficient, High Velocity Material Flow

Effective Information Flow

Synchronization of Demand and Supply

Virtual Enterprise

Preparation & Formation

Operation

Dissolution

Is Your Enterprise Like This?

Creating a ‘Joined-Up’ Supply Chain

We need to examine the information flow in its entirety...

Does info. normally flow this smoothly?
Creating a ‘Joined-Up’ Supply Chain

We need to examine the information flow in its entirety...

Or is it more like this?

Barriers to Success

Out and Inflexible systems
Disruption to business
Performance
Ownership of initiatives
Personal management
Timescales
Performance measurement
Confusion and loyalty
Low levels of Staff involvement

The Case for Open Innovation

Alastair McKinna QC
At the Bar afterwards!

The Knowledge Landscape is Changing

No man (or woman) is an island

Knowledge-sharing

Enterprises must look beyond their own boundaries

Shifting Sand

In the US the number of patents held by individuals and small businesses in 1970 was 5%...thirty years later it is over 25%

US businesses employing less than 1000 people had 4.4% of US industrial R&D in 1981...20 years later it was 24.7%!

Similarly those employing more than 25,000 had 70.6% in 1981...in 2001 this figure is 39.4%

In short...another cycle!
The Next Move?

Innovation

- Disruptive Innovation seeks to gain market share through disruptive techniques which, through new technology, take advantage of competitors' weaknesses, for example offering cheaper versions of a homogenous product.

- Open Innovation meanwhile has a more symbiotic approach. By looking to outside sources for inspiration and accepting knowledge and information from external partners, organisations can grow together and exploit new technology.

It is the latter approach of open innovation that is felt to provide a more stable foundation for long term business growth and technological advancement.

One Viewpoint?

A Different Approach or Another Fad?

Ideas Without Edges?

- An entrepreneurial and global mindset
- Thinking inside-out?
- These are some of the things to consider this evening
- To boldly go where no one has gone before…. 

Self Reflection

Perceptions

Leading

How?
What?
Where?
Why?
Some Open Innovation Fans!

Paradigm Shift...
- Enterprises are increasingly rethinking the fundamental ways in which they generate ideas and bring them to market, harnessing external ideas while leveraging their in-house R&D outside their current operations.
- A recession, the likes of which we have never seen before, innovate or die, is even more relevant.
- There needs to be paradigm shift... if we try to solve tomorrow's problems with today's solutions what will we get?

This is What the Fuss is About...

Some Open Innovation Thoughts
- Firms must look beyond their own boundaries for success.
- A new definition of risk... a paradigm shift?
- "Inside-out" thinking

'Sharing Knowledge'
- Open Innovation still makes a lot of people nervous. Large corporations fear being accused of "stealing ideas".
- British Design Innovation
- Oakland Innovation
- Kraft/P&G/Netflix/BMW/Airbus are examples of company Open Innovation initiatives

Application in SMEs
- There has been little focus on SMEs re. OI yet they are often important drivers of innovation.
- Advantages in flexibility but disadvantaged in scale.
- Difficulties in transforming invention to innovation.
Two Sides of the Coin

Explorative
- Own R&D
- Accident
- Serendipity
- Time短
- Finance短
- Outsourcing R&D
- venturing
- Participation with other firms
- Customer involvement
- Employee involvement

Exploitative
- Employee involvement
- Customer involvement
- Participation with other firms
- Time short
- Serendipity
- Own R&D
- Examples of Alcoa’s Open Innovation

Examples of Alcoa’s Open Innovation
- Eco-Friendly Bus Customer Yutong Bus Co. Challenge Critical weight reduction in the world’s largest bus market Summary Alcoa and Yutong Bus Co., China’s largest bus manufacturer, are developing an environmentally-friendly bus design to significantly reduce greenhouse...

Barriers to Open Innovation
- Extra administration
- Finance
- Lack of technological knowledge
- Legal/administrative knowledge
- Marketing insufficient market intelligence, market affinity, marketing problems with new products
- Organisation/culture/shared values
- Intellectual Property issues
- Attitudes to Risk
- Employees lack knowledge/competence, not enough labour flexibility
- Lack of employee commitment, resistance to change
- Idea management
- Different time frames

An Opportunity or Just Too Much Trouble?
- At the Convergence 2008 conference on automotive electronics, BMW announced that it is looking for partners with which to collaborate on an open-source car computing platform. No other auto companies have officially signed on to collaborate, though Chrysler, Ford, GM, and Honda have reportedly expressed interest.

The “Logic” of Open Innovation
- Good ideas are widely distributed and no-one has a monopoly
- Not all the smart guys and gals work for us
- Companies must have poker players as well as chess players
- The need to manage IP in order to manage research

Involving Customers in Innovation is not new...
- Proctor & Gamble has been using a programme called Connect + Develop – a form of Open Innovation
- Described as accessing externally developed IP developed in others businesses and using the developed assets and know how to be used by others.
- In other words let’s get together and become business partners and jointly benefit!
Potential Benefits

- P&G’s Connect + Develop Strategy already has resulted in over 1000 active agreements
- 50% of P&G’s products have benefited from some kind of external collaboration
- In reality though, is this not an impossible task with small businesses?

New and Improved Ways….

- Of organising…of leading…of innovating
- Embracing different cultures…different mindsets
- Customers within our organisations are as important as without

What is Happening Already?

World at Your Finger-Tips

- Tips
- Internal IT Structures
- Suppliers
- Customers
- Inbound logistics
- Operations
- Outbound logistics
- Marketing & sales
- Customer service & support

Internal IT Structures

- Firm Infrastructure: Financing, Planning, Investor Relations
- Human Resources: Management, Recruiting, Training, Comp.
- Procurement: Components, Machinery, Advertising, Services

Extranet
- Tightly coordinated virtual corporation
- Create new efficiencies in dealing with suppliers
- Faster, cheaper cycles
- Leverage knowledge into more effective product development and marketing
- Customer intimacy
- Excel at customer service, one-to-one marketing, and online selling

Internal Focus of Systems

- Primary IT System
- Enterprise Resource Planning (ERP)
- APS
- Complementary IT Systems
- BI
- CRM
- EDI
- SFDCC
- WMS
- Intranets
- Supply chain data (distributed databases)

External Focus is Required

- Supplier A
- Supplier B
- Partner C
- Partner D
- Customer X
- Customer Y

Intranet
- Extranet
- Internet
Reducing NPD Lead-times

Traditional
- Concept
- Design
- Detailed Design
- Prototype
- Pre-series

Concurrent
- Concept
- Detailed Design
- Prototype
- Pre-series

Hybrid
- Concept
- Product/Concept
- Product/Design
- Detailed Design
- Prototype
- Pre-series

B2B Landscape

Winning: E-Collaborative Bidding
Collaborating with other businesses electronically across the internet to jointly bid for contracts
You and your competitors!

These Have
Aer Lingus
American Airlines
Qantas
FINNAIR
CATHAY PACIFIC
LAN
BRITISH AIRWAYS
IBERIA
...to provide their customers with services no airline can deliver on its own

Why SME Focus
Procurement is skewed against smaller firms:

A more level playing field for (SMEs) can be achieved to replace....

Win Lose With
Win Win

based on sharing competencies

E-Trading Portal
Component Operations

Elbow Component
Requirements Capture
Manufacture Operations X5

Competency Based Approach

Virtual Enterprise

SCM Collaborative Demonstrator

End-to-End SCM Enactment
SCM and SMEs

- SCM is not a high priority amongst SMEs (Quayle, 2000)
- SMEs lack time & resources to adopt SCM technology (Wagner et al, 2003)
- SMEs do not recognise the benefits of effective SCM (Stockdale & Standing, 2004)
- SMEs supplier relationships do not encourage innovation (Stockdale & Standing, 2004)
- SMEs have ‘arms length’ relationships with their suppliers (Morrisey & Pittaway, 2004)
- UK’s performers 97% on-time, North top performers 92% (Winning Moves, 2004)

Recent Research Programme

Recapping UK Development

- Manufacturing Supply Chain Dominated by Large Hierarchical Corporations
- 99% of UK Businesses are SMEs
- SMEs are Excluded or Low Tier Suppliers

Risks and Opportunities

- Need to Safeguard Knowledge in Declining Sectors
- Promote ‘New’ Clusters (Creative and Digital)
- Focus upon Innovation
- Improve Synergies Between the Two
- Concerns About Service Sector?

Strategic Problems

- Too Much Emphasis?

Productivity Push

‘v’ Innovation

- What to do When Internal Systems Have Become Very Efficient – Offshore?

Points of Development

- Government Policy on Creativity and Innovation (Cox Review)
- Strong Collaborative Approaches
- Critical Mass of Innovative, Globally Competitive Companies
- World-class, Internationally Renowned Knowledge Communities
- Multi-disciplinary Exploitation
Innovation Challenges

Inspiration + Creativity
SMEs
Design + Exploitation

Generation of New Ideas
Open Innovation
Extract Value from New Ideas

Problem Areas

- Large Company R&D Department or Project Focus
- Innovation Ownership
- Company-wide Approaches

- SME Resource Constraints
- Exploitation Methodology
- Intellectual Property Protection

Top-Down Networks

Current Developments

- Much Research Ongoing on Open Innovation
- Whilst Technological Need Remains Little Effective Support Exists
- Government Bodies are Currently Providing 1st Phase:
  – Infrastructure and Environments
  – Assisting Start-up Funding and Tax Breaks

Japanese Approach

- 75% Manufacturing and Export
- Highly Hierarchical
- Driven by established Networks
- Rising Labour and Raw Material Costs
- Scared of Outreach and Foreign Investment
- Extraordinary Attention to Detail
- Few Natural Resources
- Lower Creative ‘Sparks’

Nissan Production Emphasis

Much Less to Say...
How to Get the Best of All Worlds

Extra-Disciplinary – Open Innovation

WOIS - Contradictions

QFD - Voice of The Customer

TRIZ - Systematic Innovation

Strategic and Realistic

Conclusions

- Innovation Exists in All Companies
- Knowledge Capital is Not Always Valued

How do you Get People to Think Innovatively Outside Enterprise Boundaries and Create Value?

The Trybos Model

To drive successful change and innovation

The level of dissatisfaction with the current situation

A clear and positive vision of the future

Knowledge of the first few steps

The economic and psychological cost

Supply Chain Opportunity

Organisational Futures

Delivering Success:
- What Will Our Future Look Like?
- New Skills Requirements
- ‘Do Nothing’ Option
- Wait Until it is too Late
- Uncertain and Mixed Global Economy
- Rising Labour Costs
- China Overtaken UK as 4th Richest Country
  Now – 6th Behind France

Focus Together Upon the Business Case
(Quality, Speed and Price)