Inside the IT Innovation Wave Machine

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Agenda

- Motivation
  - Managers face waves of IT innovation and struggle to make sense of them
  - How should these waves be understood and what managerial insights follow?
- Waves as natural consequence or as orchestrated by a “machine?”
- The simple contagion model
- The wave machine
- The wave complex discerned
- Managerial insights
- Research challenges
Buzzwords!

- Why so many in the world of IT?
- Is there substance here or just so much noise?

- ERP!
- Big Data!
- Knowledge management!
- CRM!
- Business intelligence!
“… and I keep waiting for a silver bullet, a magic formula, an answer to all my prayers, and it never happens!”
-IS manager

“…they jumped into it, because it was the latest and the greatest craze at the time and they figured they had to sign up for it, too …and, ‘We’ve got to go in and we’ve got to do what everybody else is doing,’” -Consultant

“In today’s business world you really have to grab right at the money. Profit before taxes, cash, cost reduction. We’re gonna take a building and close it, because of this technology. We’re gonna reduce our administrative staff. I mean, hard core numbers.” -IS manager

“I think [data warehouse] is a well-worn concept, and I think a whole lot a people thought it was a good idea 30 years ago. So, yeah …it’s a 30-year-old concept with a different name. It’s sort of a rose by any other name.” -IS manager

“… you see if it has meaning, you know, as you understand it. Would it help your organization, would it help certain areas of your organization, where might it help, what are the benefits of it? …you really need to drill down, in terms of what these concepts are, and what it means from an implementer’s point of view, and what it can mean to your business.” -IS manager
Innovation

- **Innovation** - an idea, practice, or object new to the organization adopting it
  - Often identified by a buzzword and facilitated by an organizing vision (for new IT)
  - Examples: ERP, CRM, Data warehouse

- **Innovation diffusion** - the process by which an innovation “spreads” over time among organizations
  - Involves communication leading to adoption and implementation
  - Typically involves more imitation than it does invention
  - A firm innovates relatively early or late compared to others
  - Consultancies are heavily involved, with different types playing different roles
The innovative process

- **Comprehension** - understanding the innovation in terms of the community’s organizing vision for it
- **Adoption** - deciding whether and when to undertake the innovation, making a resource commitment
- **Implementation** - undertaking the project, making the change, bringing the innovation to life for its users
- **Assimilation** - learning while doing, incorporating the innovation into everyday practice, achieving new capabilities
Waves of innovation

- A popular metaphor
- Evokes the S-shaped diffusion curve
- Suggests a natural phenomenon
The IT innovation wave phenomenon

What accounts for it?

- Is it a “natural phenomenon” that somehow unfolds of its own accord? (as with the annual spread of the flu)
- Or, is a kind of “machine” at work, such that the phenomenon should be understood as orchestrated?
“Natural” explanation

- Diffusion by contagion
  - Widely studied across fields

- Simple models and their extensions
  - More or less accurate in modeling the S-shaped diffusion curve
  - Provide some limited predictive capabilities
  - Mask the agency that drives the process
  - Mask the complexity of the wave phenomenon
The IT innovation wave machine

- An alternative explanation
- Orchestrates the IT innovation’s diffusion by means of its *organizing vision*
- Carries the IT innovation through several stages
  - Ground breaking
  - Vision launching
  - Attention gathering
  - Bandwagon building
  - Momentum riding
- Generates the IT innovation wave phenomenon
Ground breaking

- Introducing new IT artifacts, e.g. a new software app, onto the business playing field
- Usefulness demonstrated when artifact is put into practice, typically as part of a business process
- But are there wider and compelling business implications? Is this the “killer app” everyone is looking for?
IT research and analysis
Ref: Firth and Swanson, 2005

Consultancies specialized in assessing new IT and its market

- Gartner Group, Forrester Research, Meta Group, Giga Group, International Data Corp. (IDC)
  - Gartner’s 2000 revenues approximated $1b, about $100K per client
- Offer research reports, events, analyst contact, and specific consulting to clients, primarily potential buyers of the new IT
- Play leading roles in the discourse associated with organizing visions (as illustrated by Gartner in articulating the vision for ERP)
- Services viewed by clients as most useful for monitoring IT trends and comprehending new IT, less useful in support of own IT adoption and implementation decisions
Organizing vision
Ref: Swanson and Ramiller, 1997

A focal community idea for applying new IT in firms
- Typically identified by a buzzword
- Defines the innovation in broad strokes and is the basis for its comprehension
- Produced by and sustained through the community’s talk about it (e.g. at trade shows and in trade press)
- Provides for interpretation (what is it?), legitimation (why do it?), and mobilization of entrepreneurial and market forces (in providing requisite products and services)
- Drives and is driven by the innovation’s adoption and diffusion
- Has a characteristic “career” (in terms of its visibility, prominence, and influence over time)
- Illustration: Enterprise Resource Planning (ERP) in the 1990s, as first articulated by the Gartner Group
ERP’s career
Ref: Swanson, 2003

“Recent events in hardware, operating systems and applications are crystalizing (sic) our definition of Enterprise Resource Planning systems-- the Next-Generation MRP II.” (Wylie, 1990)

“Here comes SAP!” (Fortune, 1995)  “What’s all the buzz about? Simply put, R/3 seems to be a case of the right product at the right time.”
(Xenakis, CFO, 1996)

“The growing number of horror stories about failed or out-of-control projects should certainly give managers pause.”
(Davenport, HBR, 1998)

“(I)t becomes clear the enterprise resource planning strategies were really designed to get the corporate house in order.” (Connolly, Computerworld, 1999)

“As 1999 winds down, it seems ironic that enterprise resource planning (ERP) has again attained almost the same dubious status it had when the acronym entered the lexicon in 1990- that of an idea that would never work.”
(Keller, Manufacturing Systems, 1999)
CRM at the height of inflated expectations, with disillusionment soon to set in.
Innovation launch
Ref: Wang and Swanson, 2007

- How does an IT innovation achieve early momentum toward wide adoption?
- Research suggests that institutional entrepreneurship may play a crucial role
  - Self-interested actors leverage resources to create new institutions or to transform existing ones
  - Mobilization and legitimation activities are undertaken
- Case study of Professional Services Automation (PSA)
  - Enterprise software purported to help service-oriented organizations manage their projects and employees, 1998-
  - Actors included IT research firms, software vendors, consultancies, conference firms, trade publications, and universities

The study suggests that to successfully launch an IT innovation institutional entrepreneurs should:

- Develop and recognize leadership in the innovation’s organizational community.
- Facilitate or persuade community members to focus their attention on the innovation.
- Develop a coherent organizing vision for the innovation.
- Incorporate definitive success stories from users and vendors into the organizing vision for the innovation.

Alas, this was not accomplished in the case of PSA
Innovation comprehension
Ref: Ramiller and Swanson, 2003

- Study (1994-96) combining field interviews with survey
  - 143 respondents
- Exploring managerial reception of organizing visions
  - Sample item: “The company that waits to do X is going to fall dangerously behind.” (agree-disagree)
  - 45 items
- Examining reception of three visions in different stages of their careers:
  - E-commerce (early ascent)
  - Client server (late ascent)
  - CASE (descent)
- Identifying the dimensions of reception
  - Factor analysis

Dimensions of reception
- Interpretability
- Plausibility
- Importance
  - Business benefits
  - Practical acceptance
  - Community interest
- Discontinuity

Finding
- To the extent an organizing vision is ascendant (in discourse), it is received as important
Adoption dynamics

- Rate of adoption rises, then falls
- Extent of adoption among potential adopters is uncertain
  - Important for network effects
- Rapidity of adoption is also uncertain
  - Important for drawing attention to the innovation
- Bandwagon can be created where innovation becomes a management fashion
The adopter’s dilemma
Opportunity and risk

<table>
<thead>
<tr>
<th>Adopt early</th>
<th>Competitive advantage</th>
<th>Know-why specific to firm</th>
<th>Know-how emergent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adopt with the majority</td>
<td>Competitive parity</td>
<td>Know-why likely muddled</td>
<td>Know-how likely scarce</td>
</tr>
<tr>
<td>Adopt late (if at all)</td>
<td>Competitive survival</td>
<td>Know-why likely clear</td>
<td>Know-how likely plentiful</td>
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Where do we find the consultancies?
Management fashion
Ref: Abrahamson and Fairchild, 1999

- **Definition:** “relatively transitory collective beliefs, disseminated by the discourse of management-knowledge entrepreneurs, that a management technique is at the forefront of rational management practice” (p. 709)

- **Theory:** normative expectations are that management techniques will progress over time, creating a market for discourse disseminating rational, progressive management knowledge. “The discourses contain labels that denote particular management techniques and specify important organizational goals and the means of attaining them...” (p. 709) Example: quality circles

- **Research questions:**
  - What are the shapes of the popularity curves of management fashions and what explains these shapes?
  - Does the lifecycle of discourse promoting a fashionable management technique (e.g. via an organizing vision) co-evolve with the lifecycle of its diffusion across organizations?
  - Does the downswing in one management fashion in a management fashion niche coincide with the upswing of the next fashion in that niche?
Momentum riding

- Momentum in adoption allows bandwagon participants to ride and exploit it
- Consultancies are drawn in, in particular to help with implementation
- Illustrative case study (Wang and Swanson, 2008)
  - Business Week’s special advertising sections on CRM (nine published, 2000-2004)
  - Participants acted to both exploit and extend CRM’s momentum
    - Serialized content
    - Accentuated evolution and progress of CRM
    - Identified promising new developments to keep CRM vision fresh and responsive
- Extracting lessons from implementation and assimilation
Implementation gaps
Ref: Fichman and Kemerer, 1999

Adoption often outstrips implementation!
Assimilation

- Research suggests that upon implementation of new IT, firm performance may initially suffer (see, e.g., Ross, 1998)
- Firms must learn how to use new IT
  - Training is important, but does not suffice
  - Situated learning by doing is required (see, e.g., Yamauchi and Swanson, 2010)
  - Workers must learn how to use new IT not only individually, but also collectively
- With experience, firms are able to assimilate new IT into reconstructed work practices and organizational routines such that new capabilities are achieved
Learning model
Ref: Swanson, 2004

How is an IT innovation assimilated?

<table>
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<tr>
<th>Work-situated Attention to Innovation</th>
<th>Focal Attention</th>
<th>Subsidiary Attention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovative Concept (in coordinative communication)</td>
<td>Interpretation</td>
<td>Sublimation</td>
</tr>
<tr>
<td>Innovative Practice (in task performance)</td>
<td>Experimentation</td>
<td>Routinization</td>
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New capabilities are achieved with routinization
Mindfulness
Ref: Swanson and Ramiller, 2004

<table>
<thead>
<tr>
<th>Innovation Processes</th>
<th>Mindful Innovation</th>
<th>Mindless Innovation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Innovation with attention given toward organizational learning)</td>
<td>(Innovation without attention given toward organizational learning)</td>
</tr>
<tr>
<td><strong>Comprehension</strong></td>
<td>“We’ve been tracking this one for some time.”</td>
<td>“Our CEO read about this in an airline magazine.”</td>
</tr>
<tr>
<td><strong>Adoption</strong></td>
<td>“It’s right for us and we’re ready for it.”</td>
<td>“Everyone else is doing it.”</td>
</tr>
<tr>
<td><strong>Implementation</strong></td>
<td>“We’re reinventing this with everyone’s involvement.”</td>
<td>“Consultants are putting this in for us as we lack the expertise.”</td>
</tr>
<tr>
<td><strong>Assimilation</strong></td>
<td>“We’re still learning as we go along.”</td>
<td>“We’re letting our problems take care of themselves.”</td>
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</table>

If mindlessness is a bad idea, why do we see so much of it?
The IT innovation wave complex

Beyond the simple adoption curve!
Managerial insights

- The IT innovation wave machine as an institutional apparatus.
  - Driven by various participants, including IT research and analysis firms, vendors, consultancies, conference organizers, publishers and writers, gurus and academics, who make their livings from it.
  - Has a limited attention capacity on the part of its participants, which it tends to devote to a few among many candidate innovations.

- Distinguishing among the components of a wave complex is vital to managers faced with innovation decisions.

- Managerial mindfulness in discerning a particular wave complex and acting on it as appropriate is a challenge.
  - Seeing the mindlessness of others for what it is can be important.
Making managerial sense of an IT innovation wave complex

<table>
<thead>
<tr>
<th>Focal Questions</th>
<th>Mindful Extensions</th>
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</thead>
<tbody>
<tr>
<td>What is the current Web attention given the innovation, and is it growing or</td>
<td>What is your own organization’s attention to Web content on the innovation, and</td>
</tr>
<tr>
<td>declining, and at what rate?</td>
<td>what have you learned of importance?</td>
</tr>
<tr>
<td>What is the current conference attention devoted to the innovation and is</td>
<td>What is your own organization’s participation in conferences devoted to the</td>
</tr>
<tr>
<td>attendance growing or declining, and at what rate?</td>
<td>innovation, and what have you learned of importance?</td>
</tr>
<tr>
<td>What is the current business and trade press coverage devoted to the innovation</td>
<td>What is your own organization’s consumption of this business and trade press</td>
</tr>
<tr>
<td>and is it growing or declining, and at what rate?</td>
<td>coverage, and what have you learned of importance?</td>
</tr>
<tr>
<td>What is the current level of adoption of the innovation among firms, and what</td>
<td>What are the various reasons given for current adoptions and do these reasons have</td>
</tr>
<tr>
<td>is the growth rate, and is it increasing or declining?</td>
<td>validity in your own organization? Which of the current adopters are in your</td>
</tr>
<tr>
<td>What vendors have branded their offerings under the innovation’s buzzword, and</td>
<td>organization? Which of the current adopters are in your industry?</td>
</tr>
<tr>
<td>how rich and compelling are these offerings?</td>
<td></td>
</tr>
<tr>
<td>What are the platform and network effects, if any, associated with widespread</td>
<td>What are the ramifications of these platform and network effects for your own</td>
</tr>
<tr>
<td>adoption of the innovation?</td>
<td>organization?</td>
</tr>
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<td></td>
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Making managerial sense of an IT innovation wave complex (cont.)

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<th>Focal Questions</th>
<th>Mindful Extensions</th>
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<tbody>
<tr>
<td>Is there a discernable fashion bubble associated with current adoption of the innovation, and how large is it?</td>
<td>To what extent is your own organization attracted to this innovation because others have adopted it?</td>
</tr>
<tr>
<td>What is the current implementation gap among adopters of the innovation?</td>
<td>Is your own organization a contributor to this gap? What does the gap suggest for your organization, as an actual or potential adopter of the innovation?</td>
</tr>
<tr>
<td>Which consultancies provide implementation services for the innovation, and what are their capacities, and at what rate are they growing?</td>
<td>What is your own organization’s need for consultancy implementation services, and can these services be obtained at reasonable cost?</td>
</tr>
<tr>
<td>What implementation “horror stories” associated with the innovation are being reported, and what lessons are being drawn from these?</td>
<td>Is your own organization a contributor to these stories? What do the stories suggest for your organization, as an actual or potential implementer of the innovation?</td>
</tr>
<tr>
<td>What is the current gap among organizations that have implemented the innovation, in achieving promised business value?</td>
<td>Is your own organization a contributor to this gap? What does the gap suggest for your organization, as an actual or potential implementer of the innovation?</td>
</tr>
<tr>
<td>What are the compelling success stories among organizations that have adopted and implemented the innovation and gained value from it?</td>
<td>Does your own organization have (or be likely to have) such a story? What would this story be if you could write it?</td>
</tr>
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Research challenges

- Gaining a better understanding of the IT innovation wave complex, and its behavior
- Gaining a better understanding of the institutional apparatus constituting the IT innovation wave machine, and its workings
- Developing and reconciling the encapsulating theory across the findings of multiple studies
References


