NUCLEAR ELECTRICITY: A SUCCESSFUL FAILURE

THE AGE OF COMMERCIAL NUCLEAR ELECTRICITY generation began on 17 October 1956, when Queen Elizabeth II switched on Calder Hall, on the Cumberland coast of England. Sixty years is long enough to judge the technology, and I still cannot improve on my evaluation from about 10 years ago: a “successful failure.” The success part is well documented. After a slow start, reactor construction began to accelerate during the late 1960s, and by 1977 more than 10 percent of U.S. electricity came from fission, rising to 20 percent by 1991. That was a faster penetration of the market than photovoltaics and wind turbines have managed since the 1990s. Today the world has 448 reactors, many with capacity factors of better than 90 percent. That’s the share of the reactors’ potential output that they averaged year-round, producing more than twice as much electricity as PV cells and wind turbines combined. Nuclear power provided the highest share of electricity in France (77 percent), but Swiss reactors contributed 38 percent and South Korea got 30 percent, as did Japan before Fukushima. The U.S. share remains at almost 20 percent. The failure part has to do with unmet expectations. The claim that nuclear electricity would be “too cheap to meter” is not apocryphal: That’s what Lewis L. Strauss, chairman of the U.S. Atomic Energy Commission in 1954, told the National Association of Science Writers in New York in September of that year. And equally audacious claims were still to come. In 1971, Glenn Seaborg, a Nobelist and chairman of the Atomic Energy Commission then, predicted that nuclear reactors would generate nearly all the world’s electricity by 2000. Seaborg envisioned giant coastal “nuclear desalinating sea water, geostationary satellites powered by compact nuclear reactors for broadcasting TV programs, nuclear-powered tankers, and nuclear explosives that would alter the flow of rivers and excavate underground cit

ies. Meanwhile, nuclear propulsion would carry men to Mars.

The project to generate electricity from fission stalled during the 1980s, as demand for electricity in affluent economies fell and problems with nuclear power plants multiplied. And three failures were ominous: Accidents at Three Mile Island in Pennsylvania, in 1979; at Chernobyl in Ukraine, in 1986; and at Fukushima in Japan, in 2011, provided further evidence for those opposed to fission under any circumstances.

Meanwhile, there have been cost overruns in the construction of nuclear plants and a frustrating inability to come up with an acceptable way to store spent nuclear fuel. Nor has there been much success in switching to reactors that might be safer and less expensive than the dominant design of pressurized water reactors, which are essentially beached versions of U.S. Navy submarine designs of the 1950s.

As a result, the Western public remains unconvinced, utilities are wary, Germany and Sweden are on the course of shutting down their entire industries, and even France plans to cut back. In August 2016, 61 reactors were under construction worldwide, too few to make up for the capacity that will be lost as aging reactors are shut down in coming years.

The only leading economies with major expansion plans are in Asia, led by China, South Korea, and India, but even they can’t do much to reverse the decline in the share of nuclear power in worldwide electricity generation. That share peaked at nearly 18 percent in 1996, fell to 11 percent in 2015, and is expected to bump up to just 12 percent by 2040, according to the International Energy Agency.

There are many things we could do—above all, use better reactor designs and act resolutely on waste storage—to generate a significant share of electricity from nuclear fission and so limit carbon emissions. But that would require an unbiased examination of the facts and a truly long-range approach to global energy policy. I see no real signs of that.
“IT complements any good work you’re doing. The IT won’t help unless you’ve got a good process in place” (Richard Venn, Western Sussex Hospitals NHS Foundation Trust—Mathieson [2015]).
Table 1. A PAIR examination of KM Process and Outcome

<table>
<thead>
<tr>
<th>KM Process</th>
<th>Productivity</th>
<th>Agility</th>
<th>Innovation</th>
<th>Reputation</th>
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<tr>
<td></td>
<td>Productivity of a process that makes sense, predictions, evaluation, or decisions about a situation</td>
<td>Agility of a process that makes sense, predictions, evaluations, or decisions about a situation</td>
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<tr>
<td>KM Outcome</td>
<td>Knowledge that aids organization’s productivity</td>
<td>Knowledge that aids organization’s agility</td>
<td>Knowledge that aids organization’s innovativeness</td>
<td>Knowledge that aids organization’s reputation</td>
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Holsapple (2015)
“The Research Core of the KM Literature”
(Wallace et al., Int. Journal of Info. Mgt., Vol. 31, 2011)

• Bibliometric analysis and a content analysis on KM literature based on 21,596 references from 2,771 source publications
• 27.8% used no identifiable research methods
• Of the remaining refereed articles:
  - 60% employed mainstream social sciences research
  - 40% used provisional methods as a substitute for more formally defined or scientifically-based research methodologies
Knowledge Management Google Searches Trend Since 2004
(Google, 2015)
Number of academic publications with “Knowledge Management” keyword (Ribiere, 2015)
Key Categories Why KM May Have Difficulties
(34 experts, 111 reasons; Ribiere, 2015)

• Culture
• Measurement/Benefits
• Strategy
• Organizational structure
• Governance and Leadership
• IT related Issues
• Lack of KM understanding / Standards
NASA Knowledge Services Strategic Framework
(Hoffman, 2015)

- **PEOPLE**
  - Networks, alliances, and communities of practice
  - Culture of openness and sharing

- **SYSTEMS**
  - Accessible information, user-friendly services
  - Infusion of lessons learned, mishaps, and best practices

**Effectiveness**
NASA 2020 VISIONING

- Make a Metaphor
- Bring back some retirees
- Disney rotation from different areas
- Sabotage, dislocate people
- Reverse thinking
- IT in charge of change, password everyday
- Win - the novice, the expert, the mid-level folks
- Rewards and recognition have been shown to work, not a target card
- Budget devoted to capturing and sharing knowledge
- If I were King...
- Don't ask for permission, ask for forgiveness
- Play your cards right!

Danger:
- This is how it's always been done
- Better:
  - 30-second story
  - Last minute capturing is bad
- Prioritizing which knowledge to go after
- What method or share?
- Last minute capturing is bad
- 10 tips for a killer presentation
- Make info accessible to everyone in the org
- Short YouTube videos
- More related to younger generation
- Use new technologies
- Social network maps
- Everyone in the org

HARRISBURG UNIVERSITY
OF SCIENCE AND TECHNOLOGY
Effective knowledge sharing depends on:

- An open leadership climate
- A capacity to learn from failure
- Good information quality
- Satisfaction with change processes
- Performance orientation
- A vision for change

“Organizational Readiness for Successful Knowledge Sharing: Challenges for Public Sector Managers,” (W. Taylor, G. Wright), (IRM Journal)
Learn from KM Implementations (APQC)

• CoPs are a central part of a KM strategy (sponsorship, membership, roles & responsibilities, accountability and measurement, and supporting tools)
IBM’s Global Business Solutions’ Knowledge Sharing Measures

**Professional Development**
- Increase visibility, recognition and reputation in organization
- Foster personal connections and grow their personal networks
- Promote continuous learning / knowledge sharing culture

**Productivity**
- Accelerate time to locate & access expertise
- More rapid identification of people who can positively influence business outcome
- Increase opportunities for innovation
- More expedient knowledge creation & sharing
- Reduce time to perform activities

**Knowledge Sharing**
- Increase awareness and leverage of expertise in the business as it evolves
- Increase x-department / x-geo collaboration
- Accelerate pervasive dissemination of knowledge (codified and tacit)
- Optimize the use of content through social networks

**Collaboration**
- Increase amount of informal and formal cross department & cross geo collaboration
- Visibility of formal and informal communities – information flow / collaboration & health of network
- Visibility of expertise & faster reciprocal contact due to social network introductions
- Increase efficiency and effectiveness of collaboration
Key CoP Success Factors
(Probst and Borzillo, 2008)

• 57 CoPs from major European and US companies
• Stick to strategic objectives
• Divide objectives into sub-topics
• Form governance committees with sponsors and CoP leaders
• Have a sponsor and a CoP leader who are “best practice control agents”
• Regularly feed the CoP with external expertise
Main Reasons for CoP Failure
(Probst and Borzillo, 2008)

• Lack of a core group
• Low level of one-to-one interaction between members
• Reluctance to learn from others
• Lack of identification with the CoP
• Practice intangibility
Community Facilitation Time

Online Facilitators on Knowledge Hub

- Content (27.0%)
- Growth (17.0%)
- Events & Activities (11.0%)
- Relationships (10.0%)
- Technology (6.0%)
- Business Integration (3.0%)
- Strategy (10.0%)
- Moderation (16.0%)

6.3 hours per week on average

https://knowledgehub.local.gov.uk/group/facilitatorscommunity
Have a Senior Champion & Align Your KM Strategy With Your Organizational Strategies, Goals, and Objectives
Develop a Well-Designed KM Implementation Plan (People, Process, and Technology)
Develop a Formal Knowledge Retention Strategy—Start from Day One of the Employee’s Life with the Organization
Incorporate KM as Part of Human Capital Strategy, Succession Planning, Workforce Development, Strategic Planning, and/or Quality Management
Be Thoughtful in Your Approach (Knowledge Audit, Social Network Analysis, etc.)
Align Your KM Approaches to Fit Your Organizational Culture
Celebrate the Successes, Then Bring in the Bittersweet Stories
Develop KM Metrics (Especially Outcome Measures)

"Not everything that counts can be counted, and not everything that can be counted counts."
Don’t Force-Fit Technology
(People/Culture/Process Are Where The Rubber Hits the Road)
KM is Just One Part of Your “Strategic Intelligence”

Beyond Knowledge Management
What Every Leader Should Know

Edited by Jay Liebowitz

Knowledge Management Handbook
Collaboration and Social Networking

Edited by Jay Liebowitz
Knowledge Sharing Tenets for Success

- Enhance reward and recognition system to include learning and knowledge sharing competencies
- Acquaint people with knowledge sharing and its benefits
- Share the message that with creativity comes failure and we all benefit from talking about our successes and our failures
- Integrate knowledge sharing into everyone’s job
- Educate people about what types of knowledge are valuable and how they can be used
- Make sure the technology works for people, not vice versa
NCHRP
REPORT 813

A Guide to Agency-Wide Knowledge Management for State Departments of Transportation
Successes and Failures of Knowledge Management

Case studies and leading research demonstrating how to leverage knowledge within organizations to improve decision making and facilitate innovation.

Contributions include:
- Clyde W. Holsapple (University of Kentucky, USA) discusses parameters of knowledge management success.
- Ed Huffman (MASH Headquarters, USA) explores success and failure co-eating in NASA through BEA Knowledge and the James Webb Space Telescope (JWST).
- Yolanda Chan (Queen's University, Canada) and Kristine Lumsdell (Ohio University, US) examine knowledge loss and retention - the paradoxical role of IT.
- Eric Tsui (The Hong Kong Polytechnic University) shares lessons learned from nearly two hundred cases of KM journeys by Hong Kong and Asian Enterprizes.
- Vincent Richeron and Francesca Caltabiano (Bangkok University, Thailand) discuss why companies are still struggling to implement Knowledge Management, with answers from 15 experts in the field.
- Seth Earley (Earley Information Science, USA) explains how organizations can build their knowledge processes for long-term sustainability.
- John S. Edwards (Aston Business School, UK) offers views on processes - perhaps still considered the poor relation in the knowledge management forum.
- Anshu Sengupta (University of Tennessee-Martin, USA) offers some personal reflections on major challenges through KM successes and failures.

...and much more!