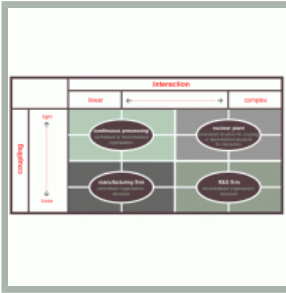


technology typology



characteristics

author:	Perrow, Charles B.
country:	United States
period:	1970
type:	model
role:	consultant and manager
activity:	analyse and design
topic:	org. design & development and technology & operations
abstr. level:	environment
perspective:	learning
status:	final
module:	classics I
comments:	3

description:

The American sociologist, Charles Perrow, developed a classification scheme based on the knowledge required to operate technology. Technology is an important factor in contingency theory. It assumed that the type of technology determines an organisation's most effective structure and success in the market. Perrow used two dimensions to create his typology. Task variability referred to the number of exceptions that a worker encounters in his workday. Task analyzability referred to the degree search activity is required to solve a problem. Users of the technology require less search effort to manage exceptions when able to use existing analytical methods rather than having to rely on their intuition and guesswork. The four technology categories are:

1. ROUTINE

characterised by the lack of exceptions and its depth of comprehension. Traditional manufacturing technologies such as assembly lines belong to this category.

2. CRAFT

characterised by its lack of exceptions and unpredictable outcomes that are difficult to analyse. Construction work that demands the drafting of new designs to resolve building problems is an example of applied craft technology.

3. ENGINEERING

characterised by many exceptions and its depth of comprehension. Standard and accepted methods are available to provide solutions to problems. Accountants, most engineers and laboratory technicians use engineering technologies.

4. NON-ROUTINE

characterised by many exceptions and poor comprehension. Problems appear frequently with no existing solutions. Commercial space engineering is an example of a non-routine technology.

Perrow stressed the importance of addressing the diversity of technologies at organisations. More than Thompson, he argued for analysing technologies at the level of the organisational unit. Most organisations have multiple technologies that operate interdependently. He saw technology as a determinant of uncertainty in organisations. A high level of uncertainty creates difficulty in predicting required activities and structuring them. Firms using 'uncertain' technologies favour an organic over a mechanic organisation structure.

In the early 1980's, Perrow investigated the roots of the near nuclear meltdown at Three Mile Island. Building on his previous typology, he developed a framework for characterising the most appropriate form of organisation to control technology. He based his framework on the complexity of interactions in a system and the way units in a system are coupled. The components of a tightly coupled system aggressively impact one another. A system in which two or more events can interact in unexpected ways is regarded as interactively complex.

Systems that are complex and tightly coupled are the most difficult to control and thus the most likely to lead to disaster. Perrow noted the following paradox: a complex system requires thorough diagnosis to identify the root cause, but a tightly coupled system requires quick action to prevent the problem from disseminating through the system.

It is impossible to anticipate problems a priori with non-routine technologies and effective solutions have yet to be developed. Time is required to develop an understanding of the technology. Perrow concluded that large nuclear power reactors are examples of non-routine technologies and that future "catastrophic accidents" are to be expected. He pleaded in "Normal Accidents", that tightly coupled complex systems such as nuclear plants should be abandoned because of their high potential for catastrophe and the low cost of alternatives.

assets:

 interaction coupling chart
ProvenModels • editor PM • version 0.1 • 80 KB

 perrow technology typology
ProvenModels • editor PM • version 0.1 • 50 KB

pros:

- Charles Perrow built on the studies of both Thompson and Woodward that challenged classical management's belief in the existence of universal principles to structure effective organisations.
- Perrow focused his research more on the non routine aspects of technology than Woodward and Thompson by investigating those problems that cannot be analysed a priori.

cons:

- Although the contingency theory provided useful insights, the analysis lacked refinement. Most organisations now operate in what contingency theorists call a dynamic environment requiring an organic organisation.

- Contingency theory adopted technological determinism as a key assumption that negated the possibility of using one technology in multiple ways.
- Contingency theory assumed that one factor could change while the other variables remained constant. In practise, this objective proved impossible.

references:

- Normal Accidents: Living with High-Risk Technologies
<http://www.amazon.com/gp/product/0691004129?ie=UTF8&tag=provenmodels-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=0691004129>
Charles B. Perrow • 1984 • Basic Books • United States • ISBN 0691004129
- Organization Theory: Modern, Symbolic, and Postmodern Perspectives
<http://www.amazon.com/gp/product/0198774907?ie=UTF8&tag=provenmodels-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=0198774907>
Mary Jo Hatch • 1997 • Oxford University Press • United States • ISBN 0198774907
- Organizational Analysis: A Sociological View
<http://www.amazon.com/gp/product/0422734802?ie=UTF8&tag=provenmodels-20&linkCode=as2&camp=1789&creative=9325&creativeASIN=0422734802>
Charles B. Perrow • 1970 • Tavistock Publications • United Kingdom • ISBN 0422734802