Strategy and Structure Follow Technology: A Spinout Proposition of J. D. Thompson’s Organizations in Action

Nobuo TAKAHASHI

Abstract: This study reconfigures part one of Thompson (1967) as a theoretical restatement of Chandler’s (1962) historical evidence. When organizations grow, their growth orientations and strategies emerge from their technical rationality, according to Thompson’s first criteria of technology instrumentality. Regarding instrumentally reasonable/rational organizations, according to his second criteria of economy, organizational structures such as horizontal departmentalization, vertical hierarchies, and multidivisional forms become necessary to minimize coordination costs. In other words, when discussing growth strategies and multidivisional forms, Chandler claimed that “structure follows strategy,” but Thompson rightfully claimed that “strategy and structure follow technology.”

Keywords: technical core, technical rationality, multidivisional forms, assessment, structure follows strategy, Japan Quality Award

©2016 Global Business Research Center. This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited.
Introduction

Thompson (1967) has taken much interest in his unique concepts, such as the technical core (Shimizu, 2010). However, his book’s overall assertions are difficult to understand, and not much focus has been placed on them. The book comprises two parts, “part one” and “part two,” without any titles. This study reconfigures “part one” in its entirety as a theoretical study of *Strategy and Structure* (Chandler, 1962). ¹ Chandler advocated the proposition that “structure follows strategy” when discussing growth strategy and multidivisional forms, but Thompson rightfully proposed that “strategy and structure follow technology” in essence.

Technical Core

People find *organizations in* non-random, planned, and reasonable/rational *actions*. *Organizations in Action* is the appropriate title. This pioneering idea by Thompson is also linked with Weick’s (1979) notion of organizing (Takahashi, 2009). In other words, Thompson’s unique notion of the organization is “an open system subject to the criteria of rationality” (Thompson, 1967, p. 11).

The non-random and planned actions are based on technologies. Technical rationality is evaluated according to (a) instrumental criteria and (b) economic criteria, where (b) economic

---

¹ Almost entirely independent of this, “part two” develops an administrative theory based on technology as the key concept. Its motif is a redevelopment of administrative theory as attempted by Simon (1947) and Cyert and March (1963) in the Simon–March–Cyert stream of study (Thompson, 1967, p. 9), which considered technology as its foundation (Takahashi, 2013). From a different angle, what is attempted in part one (especially Thompson, 1967, pp. 28–35) can also be considered a summary of the problems involved in administrative theory (Takahashi, 2008, 2015b) as critiqued by Simon (1947, chap. 2), particularly “organization by purpose, process, clientele, place.”
Strategy and structure follow technology

criteria are considered after (a) instrumental criteria have been met. Since (a) instrumental criteria are primarily important (Thompson, 1967, pp. 14–15), we first consider (a) instrumental rationality.

A purposive organization must have core technologies for achieving goals at its core. The existence of these core technologies generates a type of homeostasis or self-stabilization. Complex organizations are formed to operate technologies that would be impossible for each individual to operate (Thompson, 1967, p. 15).

Open systems that follow these rational criteria have three levels, as noted by Parsons (1960, chap. 2): technical, managerial, and institutional. At the institutional level, open systems exist as a part of broader social systems; however, at the technical level—which is the lowest—technical rationality is pursued as a closed system by eliminating uncertain variables from the technical core as much as possible (Thompson, 1967, p. 11).

Direction of Expansion of Organizations

An organization usually has only some core technologies within its domain and never possess all core technologies. Thus, organizations are not self-sufficient (Thompson, 1967, p. 26). Simultaneously with these deficiencies, an organization also has excess unused resources. As an organization grows, the direction of growth is not random. Excesses and deficiencies orientate organization’s growth or growth strategy.

Three dimensions of domain

The following three dimensions determine organizational domain (Thompson, 1967, p. 40).²

² Thompson wrote that these three dimensions appear “in examining the
1. Technology included
2. Population served
3. Services rendered

Each of these three dimensions of organizational domain correspond to the following examples of instrumental criteria for technology (Thompson, 1967, pp. 15–18).³

1. Serial interdependence, as conceived by scientific management⁴
2. Standardization, as conceived in a bureaucracy
3. Specialization, as conceived in administrative theory

An organization grows to set organizational boundaries around activities that would be crucial contingencies (Proposition 4.1).⁵ This provides the following subpropositions.

1. When continuous reciprocal interdependence is high, a domain

³ Thompson suggests three types of technologies: (1) long-linked technology, (2) mediating technology, and (3) intensive technology and provides an example of each (Thompson, 1967, pp. 15–18). In fact, however, one case can fit any of these types, so it fails as a typology. For example, a general hospital is given as an example of (3) intensive technology (Thompson, 1967, p. 17). However, each individual professional uses a broad range of standardized technologies (2). Moreover, no hospital will administer injections without checking the patient, examining the patient, and making a diagnosis; thus, the actions taken there have serial dependence (1). In fact, Thompson gives Bell’s Telephone System as an example of a combination of (1), (2), and (3) (Thompson, 1967, p. 44), and in that sense, the three types are not typology at all, but rather they should be described as three factors of technology or instrumental criteria.

⁴ A relation in which action B is executed only after action A is successfully completed, action C is executed only after action B is successfully completed, and so forth.

⁵ A contingency is one source of uncertainty outside an organization. An accurate definition is given in Chapter 12 (last chapter) of the book by Thompson (1967).
Strategy and structure follow technology

expands such that the technology in it expands through vertical integration (Proposition 4.1a).

2. When standardization occurs, a domain expands by increasing the population that is receiving a service (Proposition 4.1b).

3. When specialization occurs, a domain expands by taking on clients (Proposition 4.1c).

In other words, an organization grows along the three dimensions of organizational domain corresponding with the instrumental criteria of technology, thereby leading to a clear orientation in organizational growth and emergence of growth strategy.

Balancing components

Resources are not necessarily continuously divisible and can only be obtained in definite units (Thompson, 1967, p. 45). Consequently, unused portions will always remain in some components of the organization, and the organization will try to grow (Proposition 4.2) until they almost completely use the unused portion that is most difficult to reduce. Thompson refers to this as the balancing of components. The result of this balancing is that the organization expands its organizational domain to match its capacity whenever they have excess capacity (Proposition 4.3).

Power

An orientation in organizational growth will result from the aforementioned excesses or deficiencies, but when the firm has

---

6 Proposition 4.1c uses the phrase “the object worked on,” but the example given (Thompson, 1967, pp. 43–44) is related to clients.

7 Although Thompson does not mention it, Penrose (1959, pp. 68–72) makes the same assertion (Takahashi, 2002, 2015c).

8 Thompson’s original wording was “organization,” although it should be more correctly “firm” in this subsection, since legally distinct firms in a power relation will function as one organization and should therefore be viewed as a “transfirm organization” (Takahashi, 2014).
power over the others who control the required activities, there is no need to formally incorporate those activities by growing (Thompson, 1967, p. 48). If a firm has the ability to take action without considering the actions of its competitors, that firm will have power over its competitors (Thompson, 1967, p. 31). Dependency and power are two sides of the same coin (Emerson, 1962); thus, firms will maintain alternative means to minimize the power of others (Thompson, 1967, Proposition 3.1), or they will try to obtain prestige (Thompson, 1967, Proposition 3.2), enter into contracts (Thompson, 1967, Proposition 3.3a), co-opt executives (Thompson, 1967, Proposition 3.3b), or coalesce through combinations or joint ventures (Thompson, 1967, Proposition 3.3c). These arguments are becoming conventional wisdom, being almost the same as those of “resource dependence perspective” made later by Pfeffer and Salancik (1978).

Decentralized Division

Next, if an instrumentally rational/reasonable organization attempts to improve its efficiency based on economic criteria, a horizontal departmentalization and vertical hierarchy as well as a multidivisional form of organizational structure are required to minimize coordination costs.

Departmentalization and hierarchy

An organization that is attempting to increase efficiency will group its positions to minimize coordination costs through horizontal

---

However, although Pfeffer and Salancik (1978) are often cited, they are mentioned as metaphors. Research that expands and validates the resource dependence perspective is limited, and the idea of resource dependence perspective has been broadly accepted without rigorous testing (Pfeffer, 2003).
departmentalization and vertical hierarchies (Thompson, 1967, Proposition 5.1).

First, three types of internal interdependence exist (Thompson, 1967, pp. 54–55).10

(A) Pooled interdependence, where no direct relation or contact exists, but the failure of one component puts the entire organization at risk and threatens other components
(B) Sequential interdependence, where a one-way, direct relation exists
(C) Reciprocal interdependence, where a bi-directional, direct relation exists

In managing internal interdependence, coordination costs are minimized by grouping and localizing reciprocally interdependent positions to be tangential to each other in the case of (C) (Thompson, 1967, Proposition 5.1a), or grouping and localizing sequentially interdependent positions autonomous under the condition that they adhere to plans and standards in the case of (B) (Thompson, 1967, Proposition 5.1b). In the case of (A), the organization groups positions will be homogeneous within each group (Thompson, 1967, Proposition 5.1c). This is departmentalization.

However, a hierarchical structure is created when interdependence cannot be confined within a group. In other words, a group with reciprocal interdependence will seek to form a second-order group or cluster (Thompson, 1967, Proposition 5.2) and will rely on a task force or project organization for coordination (Thompson, 1967, Proposition 5.4d). A group with sequential interdependence will form tangential clusters (Thompson, 1967, Proposition 5.3) and rely on a committee for coordination (Thompson, 1967, Proposition 5.4c). For

10 Thompson asserts a containment relation, where A ⊃ B ⊃ C, although actually one can select either B or C, where they do not overlap each other.
homogeneous positions or groups, organization will blanket them under rules that cross divisional lines (Thompson, 1967, Proposition 5.4a), and liaisons will be assigned to manage rule-making agencies for standardization. (Thompson, 1967, Proposition 5.4b).

**Decentralized division**

The technical core always should be appropriately geared to both input and output activities (Thompson, 1967, p. 19). Therefore, an organization will create the following type of self-control situation for the technical core to minimize coordination costs.

1. An organization will attempt to seal off core technologies from environmental influences (Thompson, 1967, Proposition 2.1).
2. Thus, the organization will surround the technical core with input and output components to buffer it from environmental influences\(^{11}\) (Thompson, 1967, Proposition 2.2).
3. Furthermore, the organization influences the environment to smoothen and level input and output transactions (Thompson, 1967, Proposition 2.3).
4. The organization will also attempt to anticipate and adapt to environmental changes that cannot be buffered or smoothed (Thompson, 1967, Proposition 2.4).
5. If that also fails, the organization will resort to rationing\(^{12}\)

---

\(^{11}\) Buffers are created in response to quantitative changes, although standardization in response to qualitative changes, as discussed by March and Simon (1958), should inherently be established. Preventative maintenance is also classified as a buffer (Thompson, 1967, p. 20). When preventative maintenance is neglected, however, machinery will stop working for long periods of time due to sudden malfunctions, resulting in great losses. Therefore, categorizing it as a buffer is a mistake since it does not take much time to smooth and level the downtime of machinery with, for instance, weekly inspections.

\(^{12}\) Rationing is the securing of high-priority activities and functions in emergencies at the expense of other activities and functions (Thompson, 1967, p. 23). An example of this is the “safe mode” of a personal computer;
Strategy and structure follow technology

(Thompson, 1967, Proposition 2.5).

An organizational structure does not become complicated only because it increases in scale (Thompson, 1967, p. 74). If the technical core can be isolated from boundary-spanning activities except for scheduling, then it is reasonable to have a centralized organization comprising functional divisions (Thompson, 1967, Proposition 6.3). In contrast, when reciprocal interdependencies exist between major components of an organization, segmentation will occur; to minimize coordination costs, the components will form self-sufficient clusters, such as “decentralized divisions,” and each cluster will have its own domain (Thompson, 1967, Proposition 6.4). Thus, Thompson uses technology to explain the multidivisional form proposed by Chandler (1962).14

Implications of the Japan Quality Award

Thompson’s idea of technical rationality is based on rational criteria and enables the following types of assessments:

(A) When standards of desirability are crystallized, if belief15 in a cause/effect relation is complete, an efficiency test is conducted to determine the level of attainment toward a state of 100% desirability (Thompson, 1967, p. 86).

13 The first half of Chapter 6 of the book by Thompson (1967) also discusses the “task environment” and its two dimensions of degree of homogeneity and degree of stability, which were proposed by Dill (1958).

14 However, the case of GM in the study by Chandler (1962) is rather one of centralization from a holding company to a multidivisional form, and Thompson does not explain this.

15 Instrumental action is linked to desired outcomes and beliefs regarding cause-effect relations (Thompson, 1967, p. 14).
(B) When belief in a cause/effect relation is incomplete, an assessor will conduct an instrumental test (Thompson, 1967, p. 86).

(C) When standards of desirability are ambiguous, a reference group is set, and a social test is conducted and compared with the reference group (Thompson, 1967, pp. 86–87).

The Japan Quality Award (JQA) Council, which has granted its namesake award since 1995, also recommends conducting similar self-assessments. Specifically, results-based numbers are used for (A). In the case of (B), if desirable results are known, an assessor will analyze the key success factors involved. (C) is known as benchmarking. Thompson notes that instrumental test (B) is preferable to social test (C) and that efficiency test (A) is preferable to instrumental test (B) (Thompson, 1967, Proposition 7.1). However, the JQA states that rather than a preference, the assessment should be conducted as a sequence, with benchmarking (C) done first, followed by the analysis of key success factors (B), and finally by results-based numbers (A). This yields a historical improvement in the results-based numbers (Thompson, 1967, Proposition 7.2a), and benchmarking is performed to identify good and bad parts in comparison with the reference group (Thompson, 1967, Proposition 7.2b). When an organization has no assessment competence, it can rely on an external evaluation (Thompson, 1967, Propositions 7.5, 7.5a, and 7.5b). However, self-assessment is fundamental to the assessment process.

Organizational activation has been a topic of discussion in Japan’s business community post the oil crisis of the 1970s (Takahashi, 1992). JQA’s self-assessment has been proven by many award-winning companies in the past 20 years to have an impact on business innovation in companies that are gradually declining and need organizational activation (Takahashi, 2015a).
Conclusion

As shown above, part one of Thompson’s (1967) book is reconfigured as follows. Growth orientations or growth strategies emerge from technical rationality evaluated by instrumental criteria as organizations grow. For instrumentally reasonable/rational organizations, a consideration of economic criteria reveals that organizational structures such as horizontal departmentalization, vertical hierarchies, and multidivisional forms are necessary to minimize coordination costs. In other words, when discussing growth strategy and a multidivisional structure, business historian Chandler advocated that “structure follows strategy,” although a logical consideration by Thompson reveals that “strategy and structure follow technology.” Any correlation between strategy and structure is a spurious one.17

Thompson uses the term “technology,” which leads to misunderstanding because of its limited application, but that was not originally the case. For example, the JQA assessment has in fact been implemented across all industries. Thompson’s “technology” and technical rationality is not limited to manufacturing but applies to all industries, and the idea that “strategy and structure follow technology” is a universal proposition.

Acknowledgements

This work was supported by JSPS KAKENHI Grant Number 26380454 for FY 2014–2018.

17 Chandler (1962, Introduction) actually stated that organization building follows growth strategy and thus “structure follows strategy,” but this is often given in reverse order, with organization building coming first (Mizuno, 2013).
References


