Transaction Governance Structures of Brick-and-Mortar and Click-and-Order: An Instrument Design Study

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ABSTRACT
Since the inception of the construct of transaction governance structure (TGS), transaction cost economics (TCE) has become an important anchor for the analysis of a wide range of economic and organizational issues. As theory of TCE advances, the perception of TGS has shifted from a polar classification (market/hierarchy) towards a continuum of market-hierarchy [17][20]. Despite the development in conceptual framework, empirical work based on the idea of the market-hierarchy continuum is scarce. Part of the difficulty is the lack of clear defined and operational dimensions of TGS. Although dimensionalization of transaction has received early and explicitly attention, the dimensionalization of TGS is relatively limited. This paper is an initial effort in instrument building. In this paper, we will (1) review the literature on TGS, (2) survey 40 empirical studies from 1982 to 2002, (3) present dimensions of TGS based on Williamson’s work of 1991, (4) run a preliminary test to compare TGSs of brick-and-mortar and click-and-order.

Keywords: Transaction governance structure, industrial economics, contract law, e-commerce.

1. INTRODUCTION
In the recent years, we have observed the broad shifts of TGS in the United States such as a large-scale integration among banks, security firms, and insurance companies [34] and a continuous migration toward market TGS in the computer industry in which component manufacturers are replacing fully-integrated computer manufacturers [23]. This confusing landscape of TGS changes raises questions about reasons for the TGS shift, the nature of the new TGSs, and the influential factors in designing and selecting a TGS. At the macro level, the answer to these questions will help policy makers in developing economic and governmental policies. At the micro level, the answer to these questions will help company managers to make decisions regarding TGS, such as what to buy, where to buy, or how to buy.

The fundamental construct for answering these questions is TGS. Since the inception of the construct of transaction governance structure (TGS), transaction cost economics (TCE) has become an important anchor for the analysis of a wide range of economic and organizational issues. As theory of TCE advances, the perception of TGS has shifted from a polar classification (market/hierarchy) towards a continuum of market-hierarchy [17][20]. Despite the development in conceptual framework, empirical work based on the idea of the market-hierarchy continuum is scarce. Part of the difficulty is the lack of clear defined and operational dimensions of TGS. Although dimensionalization of transaction has received early and explicitly attention, the dimensionalization of TGS is relatively limited. This paper is an initial effort in instrument building. The organization of the paper is as follows. Section 1 is an introduction. Section 2 reviews the literature on TGS. Section 3 surveys 40 empirical studies from 1982 to 2002. Section 4 presents dimensions of TGS based on Williamson’s work of 1991. Section 5 runs a preliminary test to compare TGSs of brick-and-mortar and click-and-order. Section 6 is a conclusion.

2. LITERATURE REVIEW
2.1 Transaction Cost Economics (TCE)
The construct of TGS is defined as the structure that mediates exchanges of goods or services between technology separable entities—businesses, subdivisions of a business, or individual buyers and sellers [46][47]. Ring and Van de Ven further defined TGS as “the legal forms of governance that apply to different kinds of transactions (ranging from markets to hierarchies), and the structural and procedural safeguards that parties negotiate into a transaction” [38]. Traditional TCE perceives TGS from a dichotomous view in which market and hierarchy are mutually exclusive [11][47]. At one end lie purely market-based TGSs, in which price is the invisible hand that mediates supply and demand [40]. At the other end, one finds purely hierarchical TGS, in which a central authority controls and allocates resources [9]. Typically, attempts to explain the selection of a TGS for a particular good or service have been based on comparisons between market and hierarchy transaction costs [11][46][47]. Generally speaking, when asset specificity of a transaction is low, market TGS is more economical and preferable. When asset specificity is high, hierarchy has the advantage of lower governance costs. A substantial amount of research has produced results consistent with transaction cost theory [4][26][27][42][44].
2.2 Network

TEC rests on the premise that market and hierarchy are mutually exclusive. Powell [35] does not agree with this premise or the concept of a market-hierarchy continuum, which is suggested by John and Reve [20]. Powell describes the network as the third independent form of governance structure. Ouchi [30] claims that price, rule, and trust are control mechanisms for markets, hierarchies, and networks, respectively. Bradach and Eccles [7] argue that three control mechanisms (price, authority, and trust) can be combined in a variety of ways under each structure, e.g., price and authority mechanisms under a market structure or a price and authority combination in a hierarchy.

3. REVIEW OF 40 EMPIRICAL STUDIES

1982-2002

This paper reported 40 empirical studies on TGS from 1982 to 2002. These studies had examined the construct of TGS either as an independent variable or a dependent variable. The review of these studies was focused on the dimensionalization of TGS and the type of instrument developed (see Table 1, available from the author upon request).

The majority of studies in 1980’s perceived TGS as dichotomous and developed single-dimension and single-item scales [1][2][3][4][43][44][27]. These dichotomous single-dimension and single-item scales used 1 and 0 to record the decisions such as buy or make, integrate or not integrate, use internal work force or use external agents. Following that, some multichotomous scales were developed [5][15][21][22]. These multichotomous single-dimension and single-item scales measured TGSs into discrete categories (market, joint venture, partner relationships, hierarchy) along the market-hierarchy continuum. In 1990’s, as the perception of TGS shifted from a polar classification (market/hierarchy) towards a continuum of market-hierarchy, multi-dimensional and multi-items instruments were developed to incorporate the variety of cooperative relationships [8][17][19][20][18][29][32][33]. Table 1 categorized the 40 empirical studies into groups according to the types of scale used.

There were two interesting trends among the multi-dimensional instruments. First, several multi-dimensional instruments captured the dimensions of formalization, centralization, flexibility and control [8][19][20]. Such dimensionalization gave a flavor of organization theory from Pugh who provided the theoretical framework for study organization structure [36][37]. According to Pugh and others, “six primary dimensions of organization structure were defined: (1) specialization, (2) standardization, (3 formalization, (4) centralization, (5) configuration, (6) flexibility” [37]. Secondly, dimensions of information exchange and interaction started to appear in middle 80’s [18][29][31][32][33]. This trend was coincided with the time period when global competition intensified, firms moved towards flatter and more horizontal structures, and management emphasized cooperation rather than competition among self-managed teams and among inter-organization alliances [12]. In the same time period, we had seen the new research streams in managing dynamic processes [14], social network analysis [35], and information processing and conflict management [10][28].

4. DIMENSIONS OF TGS

4.1 Williamson’s Framework

There was no consistence on the dimensions of TGS among the previous studies. Different scholars emphasized different dimensions of the construct. In defining dimensions of TGS, this study is going to follow the dimensionalization framework put forward by Williamson [45]. Williamson’s framework was a recent contribution to TCE studies, and it incorporated dimensions of TGSs arrayed on the entire range of the market-hierarchy continuum. Williamson identified the key dimensions that differentiate three generic forms of TGS (market, hybrid, hierarchy). These dimensions are incentive, control mechanisms, adaptability, and penalties.

Adaptation (A) is the ability to take the right actions to adapt to the new equilibrium whenever there are changes in the demand or in supply. Producers and buyers independently and autonomously respond to the price changes to maximize their profits. Administration controls are the level of control and manipulative power gained through monitoring, career rewards, and penalties. Adaptation (A) is the ability to coordinate among interdependent parties to align with a collective goal. According to Williamson [45], firms, hybrid, and hierarchy are governed under different laws—classical contract law, neoclassical contract law, and forbearance law, respectively. The role of court becomes less important from classic to neoclassic to forbearance law. Table 2 (available from the author upon request) exhibits how market, hybrid, hierarchy are different along these dimensions.

4.2 Fit the 40 studies into William’s Framework

In Table 3, the existing dimensions from 40 empirical studies were assigned into the five dimensions defined by Williamson. Although the assignments were subjective and crude, this exercise was helpful in mapping relationships and identifying the dimension that needed further development. As you can see from Table 3, the incentive dimension was underdeveloped. There was limited number of item designed for identifying suppliers’ or buyers’ price sensitivity or
readiness of adjusting quantity when price and demand fluctuated.

Table 3. Assignment Of The Existing Dimensions Into Williamson’s Framework

<table>
<thead>
<tr>
<th>Incentive through price</th>
<th>• Exclusivity [8]</th>
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<tbody>
<tr>
<td></td>
<td>• Pattern of payoffs [32]</td>
</tr>
<tr>
<td>Administrative control</td>
<td>• Monitoring [41]</td>
</tr>
<tr>
<td></td>
<td>• Buyer’s control over supplier decision making [17]</td>
</tr>
<tr>
<td></td>
<td>• Centralization [21]</td>
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<td></td>
<td>• Centralization [20]</td>
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<td>• Centralization [19]</td>
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<td>• Control [19]</td>
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<td></td>
<td>• Financial incentives [8]</td>
</tr>
<tr>
<td></td>
<td>• Monitoring of supplier [29]</td>
</tr>
<tr>
<td></td>
<td>• Operating controls [33]</td>
</tr>
<tr>
<td>Adaptation (A)</td>
<td>• Replaceability of commission income [17]</td>
</tr>
<tr>
<td></td>
<td>• Exit costs [40-A]</td>
</tr>
<tr>
<td></td>
<td>• Exit barriers [8]</td>
</tr>
<tr>
<td></td>
<td>• Restraint in the use of power [18]</td>
</tr>
<tr>
<td>Adaptation (C)</td>
<td>• Collaboration [40A]</td>
</tr>
<tr>
<td></td>
<td>• Collaborative interaction [40-A]</td>
</tr>
<tr>
<td></td>
<td>• Joint action [17]</td>
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<td></td>
<td>• Interactions [20]</td>
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<tr>
<td></td>
<td>• Behavioral transparency [32]</td>
</tr>
<tr>
<td></td>
<td>• Frequency of interaction [32]</td>
</tr>
<tr>
<td></td>
<td>• Flexibility [18]</td>
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<td></td>
<td>• Information exchange [18]</td>
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<td></td>
<td>• Shared problem solving [18]</td>
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<td></td>
<td>• Supplier flexibility [29]</td>
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<td></td>
<td>• Supplier assistances [29]</td>
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<tr>
<td></td>
<td>• Information provided to supplier [29]</td>
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<tr>
<td></td>
<td>• Exchange information [33]</td>
</tr>
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<td></td>
<td>• Sharing benefit TGS and burdens [33]</td>
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<tr>
<td></td>
<td>• Adaptation [31]</td>
</tr>
<tr>
<td></td>
<td>• Types of adjustments [31]</td>
</tr>
<tr>
<td></td>
<td>• Information exchange for long-term planning [31]</td>
</tr>
<tr>
<td></td>
<td>• Information exchange for structural panning [31]</td>
</tr>
<tr>
<td>Contract law</td>
<td>• Buyer’s and supplier’s commitment to the relationship [4A]</td>
</tr>
<tr>
<td></td>
<td>• Formalization [21]</td>
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<tr>
<td></td>
<td>• Expectations of continuity [17]</td>
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<td></td>
<td>• Formalization [20]</td>
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<td></td>
<td>• Formalization [19]</td>
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<td></td>
<td>• Formality [8]</td>
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<td></td>
<td>• Time horizon [32]</td>
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<td></td>
<td>• Expectation of continuity [29]</td>
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<td></td>
<td>• Contractual focus [33]</td>
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<tr>
<td></td>
<td>• Relationship focus [33]</td>
</tr>
<tr>
<td></td>
<td>• Method of enforcement [31]</td>
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5. A PRELIMINARY TEST

5.1 Instrument development and test

The emergence of e-commerce has provided a variety of choices of TGS such as online exchanges, distributor consortia, supply chain networks, auction, and mass catalog compilers [6]. TEC can help us answer the questions of what product is suitable for E-commerce (digital or tangible products), where to buy (brick-and-mortar or click-and-order), or how to buy (auction or private network). In this study, we will conduct a preliminary test on TGSs of brick-and-mortar and click-and-order.

A panel of experts has generated 24 items (see Table 4) along the five dimensions recommended by Williamson [45]. All items were presented with 5-point Likert scale ranging from “strongly disagree” to “strongly agree”. Each item is applied to “online” and “offline” separately and respondents checked their level agreement accordingly. One dependent variable was coded 0 for online and 1 for offline, and five independent variables were summated scales of five dimensions. Each summated scale equaled to the average of measurements of all items of the same dimension. The respondents were college students. Out of all respondents, 20% had shopped online at least 5 times, 30% had shopped online at least 10 times, and 50% had shopped online at least 20 or more times. The sample of 124 was divided into an analysis sample of 102 observations with the remaining 22 observations constituting the holdout or validation sample.

5.2 Result

We performed logistic regression on the data set based on the equation below [16].

\[
 p(y = 1 | x) = \frac{e^{ax+c}}{1 + e^{ax+c}} 
\]

Where:

\[
 ax = a_1 x_1 + a_2 x_2 + a_3 x_3 + a_4 x_4 + a_5 x_5 
\]

\[
e^x \text{ is the base of natural logarithms;}
\]

\[
y \text{ is dependent variable } (0, 1);
\]

\[
x_1, x_2, x_3, x_4, x_5 \text{ is summated variables representing incentive, administrative control, adaptation(A), adaptation(C), contract law respectively.}
\]

\[
a_1, a_2, a_3, a_4, a_5 \text{ were obtained from regressing result (Table 5, available from the author upon request). Thus}
\]

\[
a_x = .187 x_1 + .2503 x_2 + 1.799 x_3 + .692 x_4 + 1.349 x_5 - 19.297
\]

Table 4. Items For Comparing TGSs Of Brick-And-Mortar And Click-And-Order

<table>
<thead>
<tr>
<th>Incentive</th>
</tr>
</thead>
<tbody>
<tr>
<td>• There is a big price discrepancy among the same type of products offered by different sellers.</td>
</tr>
<tr>
<td>• I do a lot of price comparison among different sellers when I’m shipping.*</td>
</tr>
</tbody>
</table>
Administrative control
- A seller has influence over a buyer’s decision-making.
- A buyer has influence over a seller’s decision-making.
- A seller does not know very much about you as a buyer.
- You as a buyer do not know very much about a seller.
- A seller can monitor your shopping behaviors.
- A seller can manipulate your shopping behaviors.
- It is easy for a seller to cheat and misrepresent a product.

Adaptation (A)
- A seller adjusts his price and production quantity according to demand.
- Fluctuation of market demand has little impact on price.
- There are many suppliers making the same or similar products.
- The goal of a seller is to maximize his profit regardless of loss of gain of any other players.
- The goal of a buyer is to minimize his cost regardless of loss of gain of any other players.
- It is easy to become a seller in terms of initial investment and market entry cost.

Adaptation (C)
- Negotiations or discussion between a buyer and a seller is required to complete a transaction.
- Explicit communication is required to coordinate activities among sellers and buyers.
- A seller and a buyer usually settle a problem by cooperation and negotiation.
- I would negotiate and cooperate with a seller.

Contract law
- A supplier and a buyer usually go to a court to settle a dispute.
- A supplier and a buyer usually settle a dispute through discussions, meetings, or arbitration.
- A seller usually has to obey the rules and laws set up by a local community.

* Reserved.

Hosmer and Lemeshow test measured the correspondence of the actual and predicted values of the dependent variable. A better fit would be indicated by a smaller difference in the observed and predicted classification or by a non-significant chi-square value. Our chi-square value was 10.093, which was not significant because $p=0.259$. Table 6 (available from the author upon request) presented the classification result. In the analysis sample, 74% percent of cases were predicted correctly. In the holdout sample, 63% of cases were predicted correctly.

6. CONCLUSION

In summary, perception of TGS advanced from dichotomous to continuous [17][20], from single dimension to multiple dimension [29], from local focus of by-or-make decision [43] to global discussion of international alliances [21][22]. We also observed the influence from other disciplines on TCE, such as organization theory [16A] and information theory [13].

“Big ideas often take a long time to take on definition. Thirty-five years passed between Coase’s 1937 article and efforts to operationalize transaction costs in the early 1970’s (Williamsom, 2000, pp.31)” by [46] and another twenty years passed before Williamson dimensionalized the construct of TGS [45]. The previous theoretical and empirical works have laid a solid foundation for us to bring the research forward. The future research is to conduct empirical studies to verify the construct of TGS, to apply TEC in analyzing the whole range of cooperative relationships, to move TEC beyond traditional commerce into e-commerce.

REFERENCES


[41] Stump & Heide, 1996


