

The IT-Business Equilibrium Model: Understanding the Dynamics between Business Demand and IT Supply

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The factors that could be used to define, measure, and improve IT flexibility are not considered to be well-defined or understood. A theoretical framework for understanding and determining such factors is proposed in this article, which could be used by business and IT leaders to assess their IT flexibility. Organizations can use this framework, termed the IT-business equilibrium model, as a tool to improve their own IT flexibility as a means to improve their IT effectiveness and ultimately achieve sustained competitive advantage for their businesses.

Keywords: *business demand, IT-business equilibrium model, IT elasticity, IT supply, supply-demand*

Introduction and Background

In the past, research studies were conducted to better understand and assess the relationship between IT flexibility, IT effectiveness, and strategic alignment among large IT organizations (Ness, 2005) and between cloud adoption (a kind of IT elasticity/flexibility), IT effectiveness, and strategic alignment among small, medium, and large IT organizations (Chebrolu, 2010). As a result of these analyses, the authors concluded that IT effectiveness (i.e., the ability of IT to deliver systems and solutions that meet or exceed the needs of the business) is influenced by IT flexibility to a greater extent than it is influenced by strategic alignment. While both factors were found to be significant when examined independently, the authors also found that the value of strategic alignment relative to IT effectiveness became statistically insignificant when assessed along with IT flexibility. The significance of this finding for business and IT leaders is that more focus needs to be placed on IT flexibility rather than strategic alignment, via planning, to achieve IT effectiveness that can meet or exceed ever-changing business objectives and move toward sustained competitive advantage. Further, given the limited research available, the factors that could be used to define, measure, and to improve IT flexibility are not considered to be well-defined or understood, possibly resulting in business and IT leaders leaning on that which they have traditionally known best—strategic alignment through planning.

The goal for this research article is to reveal a theoretical framework for understanding and determining the factors that define and measure IT flexibility and that can be further researched and expanded to provide business and IT leaders the information and tools necessary to understand, assess, and improve their own level of IT flexibility toward improved IT effectiveness and ultimately sustained competitive advantage for the business.

This study addresses various aspects of the IT flexibility framework, through the concept termed the IT-business equilibrium model (ITBEM), including a review of prior literature and an explanation and description of the model as used to describe the dynamics between business demand and IT supply—as drivers towards defining, understanding, and ultimately achieving IT flexibility. The information provided through the review of literature and within the model will then lead to a set of overall findings and conclusions that can be leveraged to pave the way for improved understanding of the opportunities for further research in this area, as well as the recognition by business and IT leaders as to the need for further examination of their own state of IT flexibility and for further exploration and refinement of the methods employed within their operation for IT effectiveness, alignment, and sustained competitive advantage.

Statement of the Problem

A gap exists in the scholarly literature as to the possible IT flexibility factors, which could be applied towards improved IT effectiveness, alignment, and sustained competitive advantage. According to the Standish Group (2010), IT project success has been problematic, as evidenced by only 4% of new software development projects succeeding to meet the stated objectives (time, scope, budget), with some improvement noted for packaged applications at 30% and 53% for enhancement (modernization) projects.

Purpose of the Study

The purpose of this positional paper is to establish a theoretical model for beginning research toward the definition, measurement, utilization, and improvement of IT flexibility and to establish a baseline for future research efforts to expand the body of knowledge and practice.

Historical Perspective and Supporting Theories

Economic Supply and Demand

In his 1890 seminal text, *Principles of Economics*, Alfred Marshall framed the economic model of supply and demand, which combines the law of demand and the law of supply (Marshall, 1920) and is relevant to IT-business alignment in that it provides a framework for establishing the need for IT supply to meet business demand (equilibrium). This provides an essential definition for the construct of IT effectiveness.

Crisis Model Theory

Change and transition, of any type, inherently involve destabilization of equilibrium (Chiriboga, 2001; Monk, 1990; Shallow, 2007). A central concept of the crisis theory is the time-limited nature of the crisis state (Monk, 1990), meaning that disequilibrium is not permanent, but rather that a new, normal state of equilibrium is achieved. For instance, in mental health cases, researchers have found that if a patient does not return to a state of equilibrium within 1 to 6 weeks, the patient will begin to stabilize at a different, lower level of functioning and mental health (Monk, 1990)—which also accounts for the brief treatment natures of the crisis model, in that intervention needs to occur quickly and actively.

Complex Adaptive Systems

Complex adaptive systems describes agent groups existing far from equilibrium, interacting and fractionally organized yet able to self-organize to demonstrate a high degree of adaptive capacity in the face of change (Cilliers, 1998; Holland, 2006). This theory could potentially help to explain how

individuals within an IT organization react and adapt to disruptive events (change) to restore a (new) state of equilibrium.

Adaptive Capacity and Energy

Any change that upsets the accustomed pattern of life can cause stress. Stress caused due to adaptation requires what is called adaptive energy in order to allow the body to regain stable equilibrium (Dhillon, 2006). When this energy is depleted, the health of the person suffers. This is similar to the stress caused within IT organizations due to sudden and unexpected changes in business models and strategy (reacting to competition, market, and macro-economic conditions) and hence sudden changes in business demand. Inflexibility is a barrier to adaptability (Beinhocker, 2006) and may therefore lead to disequilibrium in the event of changes in sudden business demand or strategies.

IT-Business Alignment Research

As a means to measure the degree of IT-business alignment, 38 criteria were proposed (Luftman, 2003), which were grouped into following six categories that closely align with the Capability Maturity Model Integration (CMMI) model of process, people, and technology:

1. Communications maturity
2. Competency/value measurements maturity
3. Governance maturity
4. Partnership maturity
5. Technology scope maturity
6. Skills maturity.

Definition of Terms

Unless otherwise cited, definitions are self-developed by the authors for the purpose of establishing the theoretical model.

- **IT-business equilibrium or alignment:** Intersection between the demand and supply curves between IT and business.
- **IT-business equilibrium model, or ITBEM:** Theoretical model conceptualizing the equilibrium, crisis, and disequilibrium cycle pertaining to IT-business alignment as informed (explained) through the crisis and supply-demand theories.
- **IT flexibility or elasticity:** Rapid deployment of technology components enabled through a firm's existing technical and people base (Ness, 2005). Further defined for this study as the ability to return to a state of equilibrium, thus achieving IT-business alignment.
- **Supply-demand:** An economic model commonly applied to determine market-driven pricing (Marshall, 1920). From an IT-business alignment perspective, defined as the ability of IT to deliver technology-based solutions based on the level of business demand.
- **Homeostasis:** Homeostasis is defined as a state of a system that is in stable equilibrium (Homeostasis, 2012).

IT-Business Equilibrium Model

The ITBEM can best be defined as the alignment, or lack thereof, between business demand and IT supply, represented in Figure 1 as the point where A (business demand) and B (IT supply) meet. When this state of equilibrium exists, IT supply can be represented as B_1 , to distinguish this state of alignment from the point where IT supply does not meet business demand, shown as the line labeled as B_2 , defined herein as the state of *disequilibrium*. When a state of disequilibrium exists, the difference is depicted as the gap between A and B_2 —depicted in Figure 1 as the curved line labeled as C. Further, through the use of this model, the theoretical rate of return from B_2 to B_1 can be construed as the level of IT flexibility existing within the firm, consisting of modularity, connectivity, and compatibility (Chebrolu, 2010; Ness, 2005) across the IT management dimensions of people, processes, technology (CMMI, 2007), plus the added dimension of tools, as asserted by the authors through current study on this topic.

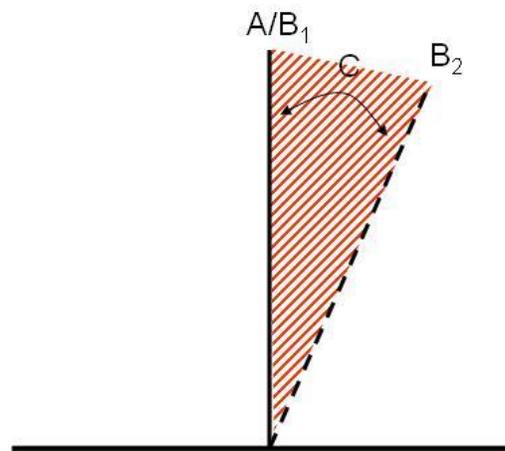


Figure 1: *IT-Business Equilibrium Model Diagram*

Measuring IT Flexibility

Little exists within scholarly literature regarding the measurement of IT flexibility; however, the ability to measure IT flexibility is imperative to understanding the equilibrium-crisis-disequilibrium cycle and the ability of IT executives to achieve optimal IT effectiveness toward IT-business alignment. The following matrix (Figure 2) is proposed as a starting point for measuring IT flexibility and reflects the synthesis of the IT flexibility (Ness, 2005) and CMMI (2007) people-process-technology constructs (plus tools).

Within each of the cells, various IT-specific components could be inserted, weighted, and averaged—leading to an overall IT flexibility score (i.e., 0–100). The power of this matrix is the ability of chief information officers, chief executive officers, and other senior management to assess the ability of IT to meet current and future business demand—with or without a crisis event. The power of this tool expands as additional research is conducted on the various components within each of the matrix cells. It is unlikely that all components would, or could, ever be completely saturated; however, this provides for an ongoing opportunity for research and practice.

	People	Process	Technology	Tools
Modularity				
Connectivity				
Compatibility				

Figure 2: Measuring IT Flexibility

Recommendations

Practitioner-Based Recommendations

For practitioners, the use of the ITBEM and associated IT flexibility matrix provides an optimal approach for measuring and assessing a firm's IT flexibility level within each dimension and overall maturity. This would be ideal for use within a firm's IT organization, by IT consultants, or by software companies seeking to enhance an organization's IT flexibility.

Research-Based Recommendations

For researchers, the ITBEM and associated IT flexibility matrix offers a near-endless opportunity to explore potential IT flexibility components as well as to assess the possible relationships between each component and the IT flexibility factors of compatibility, connectivity, and modularity. Of particular interest for further research is the extension of the IT flexibility dimensions across the CMMI dimensions of people, process, technologies, and tools (added). By combining these two constructs (IT flexibility and CMMI), a very rich and powerful opportunity emerges for scholarly research to contribute to the practice and effectiveness of IT organizations and ultimately toward sustained business competition.

Conclusions

ITBEM has been proposed as a framework for business and IT leaders to measure and improve their own IT flexibility as a means to improve their IT effectiveness and ultimately achieve sustained competitive advantage for their businesses. A matrix tool is proposed as a starting point for measuring IT flexibility and reflects the synthesis of the IT flexibility and CMMI people-process-technology constructs (plus tools). Recommendations are made for practitioners and scholarly researchers for using the IT flexibility matrix to measure a firm's IT flexibility level and for contributing to the body of knowledge on IT effectiveness.

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