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# CLASSIFICATION OF E-COMMERCE OPERATIONS: IMPLICATIONS FOR THEORY DEVELOPMENT

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## ABSTRACT

As we enter this new millennium, e-commerce is touted as one of the basic tenets of the radical transformation in manufacturing and service operations. This gap between the expected outcomes and actual results of IT and e-commerce investments indicates that we lack a clear understanding of the dynamics of this technology. In this research, we will attempt to further our understanding e-commerce, by employing a typology to classify it. The typology can help determine where e-commerce fits in and what its respective properties are.

## FRAMEWORK

In classifying e-commerce, two variables will be employed - the degree of knowledge complexity and the degree of technological complexity. Knowledge complexity is composed of a number of properties including the breath of domain, rate of change of domain(s), depth of domain, comprehensiveness of systems outputs, breadth of information inputs, ambiguity of information inputs, degree of information interdependence with outside organizations, and uncertainty of information inputs. Technological complexity is defined by the diversity of platforms, diversity of technology, database intensity, database location, diversity of information sources, and processor location.

Current e-commerce operations require a high degree of technological complexity given that they employ a diversity of platforms, diversity of technology, high degree of database intensity, distributed database locations, diversity of information sources, and processor locations. In addition, e-commerce also requires a moderate level of knowledge complexity given that it is associated with a moderate level of the following properties: the breath of domain, rate of change of domain(s), depth of domain, comprehensiveness of systems outputs, breadth of information inputs, ambiguity of information inputs, degree of information interdependence with outside organizations, and uncertainty of information inputs.

Given this classification, it will be possible to hypothesize the effectiveness of e-commerce operations as a function of business environment and country type. Depending on the country, industry or company the capacity to implement information systems will vary. In developing countries, ability to sustain a high degree of technological complexity can be difficult, whereas in developed countries such as the U.S., it is relatively easier to sustain systems requiring a high degree of technological complexity.

Hence, in general only the more advanced countries will be able to truly take advantage of the e-commerce revolution. Thus developed countries such as the U.S. and those that have recently industrialized such as Singapore will enjoy a comparative advantage. Among developing countries, only those regions with islands of high technology will be able to effectively use e-commerce.

On the other hand, firms operating in a relatively stable environment require only a low degree of knowledge complexity to function. However, as the environment becomes more dynamic, the degree of knowledge complexity increases. Hence, the types of businesses that will flourish with e-commerce will be those with moderately turbulent environments. Specifically, a firm that has relatively flat production schedules and simple bill of materials such as dairy products might not gain as much with e-commerce. However, firms that customize products such as Dell computers will benefit immensely with e-commerce transactions.

In conclusion, this research will provide a mechanism to classify e-commerce operations. In addition, we develop a theory linking industry environment and a country's level of development to e-commerce effectiveness. The theory indicates that firms operating in relatively turbulent environment in developed countries should implement e-commerce. This research can be of value to both researchers and practitioners. Specifically, classifying e-commerce will allow practitioners to understand the differences and similarities with other information technologies, and correspondingly what changes in investments are needed. In addition, the typology will provide links between environmental conditions and e-commerce effectiveness, hence, managers will be able to determine whether e-commerce is an acceptable model for their specific operations. In addition, this paper can be of value to researchers in that it lays a basis for future empirical research; e-commerce is defined through its systems properties and can be distinguished from other properties. Perhaps, researchers can empirically test the relationship between the environment and e-commerce effectiveness and examine the systems properties of e-commerce.

