

2006

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Recommended Citation

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Do We Need a General Classification Scheme for e-Business Models?

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Abstract

Numerous specific classifications for e-business models exist in the academic literature however there is no general classification scheme. This paper identifies the business model classification schemes present in the electronic commerce literature along with the criteria by which the business models are classified. Drawing on the broader classification literature, the utility of these classifications is examined and a distinction is made between specific and general classification schemes and between typologies and taxonomies.

Keywords

Business models, classification, typologies, taxonomies, e-commerce

INTRODUCTION

In recent years business model research has increasingly been built on the foundations of preceding research. A combination of analytic and archival methods is evident. The development of business model frameworks and ontologies have superseded the basic definitions and lists of business model attributes (Dubosson-Torbay, Osterwalder et al. 2002; Gordijn and Akkermans 2003; Hedman and Kalling 2003; Osterwalder 2004; Pateli and Giaglis 2004; Osterwalder, Pigneur et al. 2005) and dynamic, business model adoption models are emerging (Linder and Cantrell 2000; Afuah and Tucci 2003; Pateli and Giaglis 2005) .

For some years now researchers have been calling for a general classification scheme of business models (Hawkins 2002; Clarke 2004; Pateli and Giaglis 2004; Keen and Qureshi 2005) however progress has been slow. In discussing scientific research Bronowski (1951 p.12) states:

There are three creative ideas which, each in its turn, have been central to science. They are the idea of order, the idea of causes, and the idea of chance.

It is the idea of order that is to be addressed in this paper. The functions and importance of classification schemes will be explored with reference to scientific and social sciences research. A distinction will then be made between typologies that provide specific classifications and taxonomies that produce general classifications. The potential merit and limitations of each will be discussed.

Existing classifications of business models will be analysed according to the characteristics of typologies and taxonomies to support the hypothesis that no taxonomy of business models exists in the academic literature, although the term appears to be used as liberally as the term business model. A case will then be developed to support the construction of a taxonomy of business models.

THE IMPORTANCE OF CLASSIFICATION

In all forms of scientific research, including organisational science research (McKelvey 1982) and behavioural science research (Mezzich and Solomon 1980) , classification of objects within the research domain is an important step towards other research. A good classification scheme forms the foundation of theory development as “Theory cannot explain much if it is based on an inadequate system of classification” (Bailey 1994 p.15).

To advance from concepts to theory, it is necessary to order or classify the objects within the research domain. “Classifications are partway between a simple concept and a theory. They help to organise abstract, complex concepts” (Neuman 2003 p.46). Business models are abstract, complex concepts of which understanding can be enhanced through the development of a general classification scheme.

The importance of classification schemes is not peculiar to scientific research, it is critical to the understanding of objective reality. Recognition of similarities and differences among objects and classification of objects are fundamental steps in the development of childhood reasoning (Piaget 1959).

Classification involves the ordering of objects into groups or classes on the basis of their similarity (Bailey 1994). This ordering of objects into classes provides meaning to reality (Simpson 1961). It also aids our understanding of a domain as "...we do not perceive, remember and talk about each object and event as unique, but rather an instance of a class or concept that we already know something about" (Smith and Medin 1981 p.1).

The action of putting things which are not identical, into a group or class is so familiar that we forget how sweeping it is. The action depends on recognizing a set of things to be alike when they are not identical. We order them by what it is that we think they have in common, which means by something that we feel to be a likeness between them. (Bronowski 1951 p.21)

Recognition of similarities and differences between business models and the development of classes of business models are fundamental to business model research. A business model classification scheme needs to serve a number of functions. In relation to social sciences research in general, Bailey (1994) identifies ten advantages of a good classification scheme. These 'ten advantages' can be thought of as functions of a good classification scheme. Table 1 lists the ten functions of a good classification scheme that have been derived from Bailey's (1994) ten advantages of a good classification scheme.

- | |
|---|
| <ul style="list-style-type: none">• Provide an exhaustive and perhaps even definitive array of types or taxa.• Reduce complexity and achieves parsimony.• Identify similarities among objects and allows a group of objects to be analysed at the exclusion of other, more diverse objects.• Identify differences so that dissimilar objects can be separated for analysis.• Present an exhaustive list of dimensions or characteristics.• Allow types of objects to be compared.• Manage and take stock of types of objects.• Enable the specification of hypotheses concerning relationships between classes of objects and then identify empirical cases.• Permit types to be used as criterion for measurement. (One type can be used as the reference point and others can be measured relative to that criterion.)• Provide versatility. (To meet many needs and display different aspects of the data.) |
|---|

Table 1: Functions of a Good Classification Scheme (Based on Bailey's (1994) Ten Advantages of a Good Classification Scheme)

A good classification scheme organises objects according to their place within the problem domain and depicts relationships between objects. With reference to the biological sciences, Gilmour (1951 p.401) states that "The primary function of classification is to construct classes about which we make inductive generalizations".

In 1998 business model classifications first appeared in the electronic commerce literature (Bambury 1998; Timmers 1998) and many have since followed. It will be seen that these classification schemes are specific classification schemes that serve a limited purpose and that no general, all-purpose classification scheme exists. The need for a general classification scheme for business models has been widely recognised by the e-commerce and business model research community (Hawkins 2002; Clarke 2004; Pateli and Giaglis 2004; Keen and Qureshi 2005).

SPECIFIC VERSUS GENERAL CLASSIFICATIONS

Classifications may be designed to serve multiple purposes or very specific purposes. Those that serve many purposes and provide more meaningful generalisations are referred to as natural or general classifications and those that serve specific or few purposes are referred to as artificial or arbitrary classifications (Simpson 1961; Sokal and Sneath 1963).

McKelvey (1982) in discussing organisational systematics, recognises two basic classification schemes; special classifications and general classifications. Special classifications focus on only one or a few attributes of interest. They are developed with a special purpose in mind and therefore have limited utility. In contrast, general classification schemes attempt to group objects based on all of their attributes.

Specific or special classifications can be developed using typological research and general classifications can be developed using taxonomical research. Although many researchers use the terms interchangeably it is important to distinguish between typologies and taxonomies since they serve different purposes and have their own limitations

and strengths. The section that follows details the characteristics and functions of typologies and taxonomies. Table 2 summarises these characteristics and functions.

Typologies	Taxonomies
Categories (types) are conceptually derived	Categories (taxa) are empirically derived
Few characteristics considered	Many characteristics considered
Reasoning by deduction	Reasoning by inference
Mostly qualitative classifications	Quantitative classifications
Specific/arbitrary/artificial classification	General/natural classification
Provides a basis for only limited generalisations	Provides a basis for generalisation

Table 2: Summary of characteristics and functions of Typologies and Taxonomies

Typologies

Typologies are a product of deductive research. The researcher conceptualises the types that are relevant to the research. These types form the cells of the classification scheme and each cell is labeled (named). The researcher then identifies cases that possess the characteristics deemed essential to fit the cells.

The great advantage of typologies is their ability to simplify complex concepts by classifying objects according to a few, often two, criteria at a time. Furthermore, “[a] sound typology forms a solid foundation for both theorising and empirical research” (Bailey 1994 p 33).

Typological research does however have its limitations. Hambrick (1984 p.28) points out that:

typologies represent a theorist’s attempt to make sense out of non-quantifiable observations...they are largely the product of rather personal insight, they may not accurately reflect reality. Or more likely they may serve well for descriptive purposes but have limited explanatory or predictive power.

Typologies are specific classifications rather than general classifications. They serve limited purposes, therefore it is conceivable that over time a large number of typologies will be developed, each capable of serving a specific purpose.

Typologies are mostly generated through qualitative classification rather than quantitative or statistical analysis (Bailey 1994). Bailey (1994) points out however that typologies can be formed through conceptualising the types and then using cluster analysis to quantify the empirical findings.

Taxonomies

Taxonomies, in contrast to typologies, are derived empirically and are the result of inductive research (Sokal and Sneath 1963) using multivariate analysis (Hanks, Watson et al. 1993). The researcher creates grounded theory by first collecting the data and then generalising to the abstract or conceptual. “A taxonomy begins empirically, rather than conceptually, with the goal of classifying cases according to their measured similarity on observed variables” (M S Lewis-Beck, Series Editor in Bailey 1994 p.v). Unlike typologies whereby the categories (types) are derived conceptually, taxonomic categories (taxa) are derived through cluster analysis.

The term taxonomy, like classification, can be used to refer to a process and the end result. “Taxonomy [the process] is the theoretical study of classification, including its bases, principles, procedures and rules” (Simpson 1961 p. 11).

Taxonomic research involves the identification of a large number of variables on which to gather data. Determination of these variables must be based on existing domain knowledge that has been generated through deductive research. The data are analysed using multivariate analysis to identify the natural groupings (classes). The aim is to minimise within group variance and maximise between group variance thereby creating homogeneous groups. Once these homogeneous groups are created they can be used for a multitude of research applications; within group behaviour can be studied as well as inter-group behaviour.

Arguably the most well known taxonomy is found in the biological sciences. All organisms are identified as belonging to a taxon within the Linnean hierarchy which has been universally accepted in the biological sciences for several hundred years (The basic taxon levels are Kingdom, Phylum, Class, Order, Family, Genus, Species.) (Simpson 1961). This taxonomy identifies each organism according to all of its known characteristics, names it, indicates the degree of resemblance between organisms and shows the relationship of organisms by descent (Sokal and Sneath 1963). It provides a means of ordering all organisms and produces a universally accepted nomenclature for all organisms (Simpson 1961).

There is the potential to create a universally accepted taxonomy of business models that would form the basis of a nomenclature for business models. Unlike the Linnean hierarchy, a business model taxonomy would not order business models by descent but would show the static (phonetic) relationships between objects. The taxons would be determined according to the degree of resemblance between business model variables. Sokal and Sneath (1963 p.265) claim that,

There appears to be no difference between empirical, phonetic classifications of living organisms and those of inanimate objects except that the hierarchies arrived at in classifications of inanimate objects do not necessarily reflect the course of descent with modification.

It might be argued that classification by descent, that is tracing the historic changes in business models, is relevant to research relating to business model dynamics and change models however this is not an issue to be addressed in this paper.

BUSINESS MODEL CLASSIFICATIONS IDENTIFIED IN THE LITERATURE

Based on the definitions of typologies and taxonomies derived from the broader scientific research literature, none of the classifications of business models in the electronic commerce literature are taxonomies. Some authors use the term taxonomy to describe their classification (Bambury 1998; Tapscott, Ticoll et al. 2000; Rappa 2006) and it is not unusual for authors citing various classifications to refer to them as typologies or taxonomies even though the original authors do not use the terms themselves. This liberal use of the terms typology and taxonomy creates misunderstanding and confusion when attempting to understand and compare the various classification schemes.

Hawkins (2002) observes that the literature lacks a systematic approach to the development of taxonomies and that "Recent attempts to create taxonomies of business models mostly amount to no more than random, unrelated lists of business activities that just happen to occur on Internet platforms" (Hawkins 2002 p.1). This view is echoed by Keen and Qureshi (2005). Pateli and Giaglis (2004) provide an analysis of existing business model typologies but conclude that "the underlying need for a holistic and exhaustive taxonomy of the various types of business models is yet to be satisfied" (Pateli and Giaglis 2004 p.308).

Numerous authors provide lists of generic business models that have been observed in practice. Some identify no clear or consistent classification criteria but instead describe business models using unstructured narrative (Bambury 1998; Applegate 2001; Eisenmann 2002; Laudon and Traver 2003; Rappa 2006). Others provide a systematic method of identifying business models using as few as two variables (Timmers 1998; Linder and Cantrell 2000; Tapscott, Ticoll et al. 2000) and as many as four variables (Weill and Vitale 2001; Betz 2002; Afuah and Tucci 2003). Table 2 contains a collection of the more commonly referenced business model classifications that produce a list of business model categories.

Afuah and Tucci (2003) provide an analysis of the business model classifications of Timmers (1998), Rappa (2003) and Eisenmann (2002) according to four variables; profit site, revenue model, commerce strategy and pricing model. This synthesis provides a basis for comparison of typologies and is useful in trying to understand the similarities and differences between typologies since, as mentioned earlier, neither Rappa (2003) nor Eisenmann (2002) use explicit, consistent criteria for classifying business models. Afuah and Tucci (2003) refer to this analysis as a taxonomy however it does not satisfy the definition of a taxonomy of business models provided in this paper. The categories are determined a priori and the analysis is qualitative. The result is effectively a systematically constructed business model typology.

Wang and Chan (2003), recognising the difficulty of comparing various business model classification schemes, provide a graphical analysis of the classifications of Bambury (1998), Timmers (1998), Eisenmann (2002) and Rappa (2003). The analysis results in a typology of three graph models (Gift, Direct Exchange and Indirect) that represent the building blocks of current and evolving Internet business models. Wang and Chan (2003) propose that the two elements, business actors and business transactions, are sufficient to form the foundation of a future taxonomy of

business models. Whether a classification based on so few variables would meet the functionality of a taxonomy is questionable.

Weill and Vitale (2001) produce a highly structured and comprehensive classification of atomic e-business models based on four variables. The authors assert that all e-business initiatives are representable by the finite set of eight atomic e-business models that are the product of their typology. These atomic e-business models are the building blocks of all e-business initiatives. Considerable evidence in the form of case studies is produced to support the assertions of the authors (Weill and Vitale 2002) and subsequent empirical research provides support for the inclusiveness of the typology (2001).

Weill and Vitale (2001) distinguish between e-business models and atomic e-business models. Their typology relates to the atomic e-business models characterised by “strategic objectives, sources of revenue, critical success factors and core competencies required” (Weill and Vitale 2001 p.25). These atomic e-business models can stand alone as an e-business model or they can be aggregated to describe a more complex e-business model. The characteristics of the e-business model include “the roles and relationships among a firm’s customers, allies, and suppliers, the major flows of products, information, and money, and the major benefits to the participants” (Weill and Vitale 2001p.25). Weill and Vitale (2001) do not produce a typology of e-business models, only a typology of atomic e-business models. This creates a restriction as to the usefulness of this classification scheme in identifying and naming business models, however the whole concepts of atomic e-business models does provide the basis of a systematic way of analysing e-business initiatives.

Bienstock et al. (2002) take a view of business models based on the nature of exchange. The result is a classification scheme that allows for business models to be identified according to the number of potential buyers and sellers involved in the transaction, the types of sellers involved in the transaction, the price mechanism, nature of product being exchanged and frequency of the offering. A hierarchical decision tree is constructed resulting in a typology of 40 potential B2C categories and 52 potential B2B categories.

Since Bienstock et al.’s (2002) classification scheme considers only six characteristics it has limitations in terms of utility. Not all of the 92 business model types are labelled however there appears to be the potential to classify and name business models according to the nature of their exchange. There is no evidence to suggest that this typology has been evaluated either analytically or through deductive, empirical research.

Dubosson-Torbay et al (2002) propose a multi-faceted classification based on twelve dimensions of the business model. This approach is developed further by Osterwalder and Pigneur (2005) who propose a three tiered business model ontology. The top layer of the business model ontology consists of four pillars by which business models can be defined. These pillars are product, customer interface, infrastructure management and financial aspects of the business. The four pillars are composed of nine elements, referred to as business model building blocks, that constitute the second layer. The third layer captures instances of the nine elements. Potentially, the nine business model elements could form the basis of business model, taxonomic research.

Author Year of Publication	Timmers (1998)	Bambury (1998)	Linder and Cantrell (2000)	Tapscott, Ticoll et al. (2000)	Applegate (2001)
Referred to by the author(s) as	Current Business Models	Taxonomy	Overview of Operating Business Models	B-Web Taxonomy	None given
Criteria for differentiation	Degree of innovation Degree of integration	No consistent criteria	Core profit making activity Relative position on the price/ value continuum	Degree of economic control Degree of value integration	No consistent criteria
Number of categories and sub-categories	11 categories	2 categories 15 subcategories	8 categories 34 sub-categories (not listed here)	5 categories	4 categories
Business Model Categories	E-shop E-procurement E-malls E-auctions Virtual communities Collaboration platforms Third-party marketplaces Value-chain integrators Value-chain service provider Information brokerage Trust services	Translated real-world business models Mail-order model Advertising-based model Subscription model Free trial model Direct marketing model Real estate model Incentive scheme model B2B Combinations of the above models Native Internet Business Models Library model Freeware model Information barter model Digital products and digital delivery model Access provision model Website hosting and other models	Price model Convenience model Commodity-plus model Experience model Channel model Intermediary model Trust model Innovation model	Agora Aggregation Value chain alliance Distributive network	Focused distributor models Portal models Producer models Infrastructure provider models

Table 2: Business Model Classifications

Author Year of Publication	Weill and Vitale (2001)	Eisenmann (2002)	Betz (2002)	Rappa (2006)	Laudon and Traver (2003)
Referred to by the author(s) as	Typology of Atomic e-Business Models	Generic Internet Business Models	Generic Business Models	Taxonomy of Business Models Observable on The Web	Major Business Models
Criteria for differentiation	Strategic objectives Source of value Critical success factors Core competencies	No consistent criteria	Resources Sales Profit Capital	No consistent criteria	No consistent criteria
Number of categories and sub-categories	8 categories	8 categories	6 categories	9 categories 41 subcategories (not listed here)	7 categories
Business Model Categories	Content provider Direct to customer Full-service provider Intermediary Shared infrastructure Value net integrator Virtual community Whole-of enterprise/ govt	Internet access providers Online portals Online content providers Online retailers Online brokers Online market makers Networked utility providers Application service providers	Strategic finance Strategic enterprise Strategic response Strategic learning Strategic innovation Strategic firm	Brokerage Advertising model Infomediary model Merchant model Manufacturer model Affiliate model Community model Subscription model Utility model	Portal E-tailer Content provider Transaction broker Market creator Service provider Community provider

Table 2: Business Model Classifications (cont)

THE ROLE OF CLASSIFICATIONS IN BUSINESS MODEL RESEARCH

Of the many classifications identified in this paper, those that meet the requirements of a systematically constructed typology, suitable as a basis for deductive, empirical research are those presented by Timmers (1998), Linder and Cantrell (2000), Tapscott et al. (2000), Betz (2002), Afuah and Tucci (2003), Bienstock et al. (2002) and Weill and Vitale (2001) even though the latter deals with atomic e-business models rather than business models.

Each of these typologies adds something to the business model knowledge base and helps achieve parsimony. They also provide a foundation for identifying relevant business model variables for future inductive, empirical research aimed at producing a general classification scheme. Since they consider only a few (and frequently only two) variables, they are limited in terms of versatility. They are designed to suit the particular view or needs of the researcher and cannot be used for multiple purposes.

HOW TO CREATE A GENERAL CLASSIFICATION OF BUSINESS MODELS

It could be argued that the existing business model typologies could be consolidated to create a more comprehensive typology to suit multiple needs but there are problems associated with this. Creating a 'master' typology by aggregating, merging and collapsing categories requires considerable subjective judgment and may result in the loss of important aspects of the individual typologies. Furthermore, a conceptually derived typology that is based on many, as opposed to few, variables, may lose its potential to simplify reality.

It is important to use the correct tool for the job. A typology is well suited to a specific need. Conceptualising a small number of categories based on a few variables and collecting data based on those categories is a practical research method. Any increase in the number of variables considered, results in a disproportionate increase in the level of complexity of the task and the result. In discussing problems associated with constructing typologies based on a large number of variables, Bailey (1994 p.4) points out that,

For example, even if all dimensions [variables] are dichotomous, the formula for determining the number of cells [types] is 2^M , where M is the number of dimensions. Thus for five dichotomous dimensions the typology will contain only 2^5 or 32 cells, but for 12 dichotomous dimensions the number of cells is 2^{12} or 4,096.

It may therefore be better to adopt a methodology such as numerical taxonomy that uses techniques such as cluster analysis that are well suited to such tasks. Taxonomies have the potential to create categories based on many variables in an objective manner (Sokal and Sneath 1963). This is precisely what is required in order to create a general classification of business models.

A business model taxonomy, generated through inductive, empirical research, will create a business model classification scheme based on degree of affinity; in other words, according to the extent of similarity of all identified business model variables. The taxonomy will be self-adjusting. As new instances of business models are incorporated into the taxonomy the analysis will be reperformed and the resulting categories will be modified.

SUMMARY

A proliferation of well structured business model typologies have and will continue to increase our understanding of business models by simplifying complex data and identifying relationships between a small number of variables. These typologies will not, however, provide a widely accepted classification scheme for business models, nor will they provide a universally accepted nomenclature of business models. These functions can only be achieved if a large number of business model variables are considered simultaneously and this can only be done objectively using statistical analysis and in particular, cluster analysis. A taxonomy constructed from a large number of variables derived from the business model attributes and the existing business model typologies has the potential to serve as a general classification of business models. For this to be successful it is necessary to achieve a degree of consensus on what constitutes a business model. Recent research on business model ontologies is contributing to this cause (Gordijn and Akkermans 2003; Hedman and Kalling 2003; Pateli and Giaglis 2004; Gordijn, Osterwalder et al. 2005; Osterwalder, Pigneur et al. 2005). Future research needs include the identification of variables on which to collect business model data and determination of the most suitable structure of a business model taxonomy.

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