CLASSIFICATION IN THE SPOTLIGHT: THE IMPORTANCE OF CLASSIFICATION TO THE PROGRESSION OF BUSINESS MODEL RESEARCH

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ABSTRACT

Classification of research objects is critical to many management research studies with taxonomies and typologies providing the means by which research objects are organized and differentiated from one another. However, the nature and structure of the classifications are frequently presupposed with little attention given to the objectives, functions and characteristics of the classifications, not only to the immediate study but to future related research. I bring to the fore the scientific significance of classification and its role in theory development in organizational science and business model research. The alternative philosophies of classification are described and their relevance to management research proposed. Premised on the need for both deductive and inductive empirical research a case is made for a general classification of business models that can progress the research towards mid-range theory building

Keywords: classification, taxonomy, typology, mid-range theory, business model, research schema
INTRODUCTION

In this paper the nascent field of business model research is used to illustrate the significance of classifications in progressing research from conceptualizations to mid-range theorizing. A business model depicts the value creation and transfer strategies of the firm including relationships with other entities in the value domain.

Business model research is an emerging area of management research that suffers from a lack of empirical research that can pave the way to mid-range theorising and is dominated by studies that investigate and propose definitions, components and frameworks. However, ‘the research community is yet to invent a common language, in terms not only of terminology but basically in terms of conceptualization, for discussing and analyzing business models’ (Pateli & Giaglis, 2004, p.312). The conceptual nature of the research has resulted in there being a myriad of concepts, ontologies and frameworks of business models all of which have merit, but none of which have been universally accepted. The problem is not unique to business model research. Hanks, Watson et al. (1993a, p.11) recognised a similar problem in relation to research into organisational life cycle models concluding that due to ‘the absence of careful empirical analysis, a plethora of conceptually based models have emerged’, and that evaluation of the models could only be achieved through systematic empirical research. Small enterprise and accounting researchers found themselves in a similar position in the late twentieth century recognising that progress would only be made through exploratory, inductive, empirical research (McMahon, 1998).

Existing business model research is predominately conceptualisation based research producing metaphors, definitions, descriptions, simple classifications and explanations of relationships between business model components aimed at producing a coherent unit of analysis. The focus of the research is on the concept itself drawing from established research areas including organisational theory, strategy theory and information systems theory. Frameworks and ontologies of business models provide representations of relationships between business model components some of which are causal models with the potential for explanatory research (Gregor, 2006).

In parallel to the concept-focussed research, studies emerged that focus on the relationships between the business model and other management phenomena such as change management (Chaharbaghi, Fendt, & Willis, 2003; Samavi, Yu, & Topaloglou, 2009; Voelpel, Leibold, Tekie, & Krogh, 2005), adoption factors (Afuah, 2004; Voelpel et al., 2005) and evaluation (Mäkinen & Seppänen, 2007; Seppänen, 2008).

The existing research has progressed the unification of the business model conceptualisation with several recurring themes emerging (Zott, Amit, & Massa, 2011) however because of the highly specific context in which the research is couched it is severely limited in terms of theory building. Findings that can be generalised to the whole population under any circumstances represent the basis for grand theories which are rare (Gregor, 2006; Neuman, 2003). More commonly, generalisations relate to different classes of objects and hold true under specific contexts. These context-bound generalisations form the basis of mid-range theories which explain concepts in the context of their setting (Llewellyn, 2003). Mid-range business model theories are proposed to hold true under particular circumstances and for
particular categories of business models rather than for all contexts or for all instances of business models.

The need to understand what business models are being used in practice and the characteristics that differentiate one from another is evident from the number of classification schemes derived from or applied in the empirical studies. Numerous classification schemes exist, each devised to meet the specific needs of the researcher however there is no exhaustive classification of business models (Keen & Qureshi, 2006; Morris, Schindehutte, Richardson, & Allen, 2006; Pateli & Giaglis, 2004). It is not possible for a single classification scheme to serve all purposes although each well-conceived classification brings knowledge to the area of research (Gilmour, 1951; Gilmour, 1940). Distinguishing one classification from another, evaluating their utility for future research and understanding the underlying decisions on which the classifications are based, is not always possible because to date, very little consideration has been paid to taxonomical issues (Mäkinen & Seppänen, 2007; Morris et al., 2006).

The paper proceeds with an explanation of the relationships between the purpose of a classification and the necessary functions and characteristics of the classification. The connection between the functions and characteristics, and the various philosophies of classification is drawn followed by an overview of classification research in the organisational sciences. The role of classification in business model research is described and a case is made for a general classification of business models that can progress the research to generalisations and mid-range theorising.

Based on the classification theory presented in the earlier sections of the paper a conceptual framework (Classification Design Framework) is proposed that can guide researchers in classification scheme design and articulation. The paper concludes with an appeal for explicit and detailed consideration and articulation of classification design decisions that can encourage cumulative research.

THE UNIVERSAL SIGNIFICANCE OF CLASSIFICATION

Classification is critical to the understanding of objective reality. It involves the ordering of objects into groups or classes on the basis of their similarity and ordering of objects into classes provides meaning to reality (Bailey, 1994; Bailey, 2005; Simpson, 1961). Classification also aids our understanding of a knowledge 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 & Medin, 1981).

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).

For centuries biological scientists have undertaken the theoretical study of classification, taxonomy and, more recently, organizational and social scientists have recognized the importance of classification to their research fields and adopted a more scientific approach to
classification. Classification is a form of analytic theory that contributes to the explanation of simple relationships between objects and attributes of objects.

Embedded in numerous management research papers are classifications of research objects as diverse as activities within the strategy process (Eppler & Platts, 2009) and reasons for financial report restatement (Gertsen, van Riel, & Berens, 2006). Firms are classified according to size (Brews & Purohit, 2007), entrepreneurial orientation (Jambulingam, Kathuria, & Doucette, 2005), industry (Yip, Devinney, & Johnson, 2009) or business model (Baden-Fuller & Morgan, 2010; Sabatier, Mangematin, & Rousselle, 2010). Classifications play an important role in research making it possible to study and make generalizations about discrete, homogeneous groups of objects and, ultimately, propose mid-range theories (Rich, 1992). Without some level of consensus on the classification of objects within a field of research, knowledge accumulation and meta-analysis are impeded (Hollenbeck, Beersma, & Schouten, 2012).

PURPOSES, FUNCTIONS AND CHARACTERISTICS OF CLASSIFICATIONS

Throughout the classification literature, authors allude to the purpose of classification by listing desirable characteristics, objectives or functions often without distinguishing them. These descriptors are interrelated and deserve to be distinguished from one another (Walker, 2003). The objective of classification is the same as the purpose of the classification as it is what the classification will be used for and therefore relates to the user. The functions and characteristics of a ‘good’ classification scheme depend largely on the purpose of the classification; it is necessary to know the purpose of the classification before desirable functions can be identified.

Classifications are often developed to serve a specific purpose such as to provide a means of reference to the groups of objects through nomenclature (Bailey, 1994; Mäkinen & Seppänen, 2007; McKelvey, 1982; Simpson, 1961; Sokal & Sneath, 1963) or to facilitate information storage and retrieval so that data can be accessed and used in future research (Chrisman, Hofer, & Boulton, 1988; McKelvey, 1982). With reference to political strategy, Meznar (2002) points out that a lack of coherence among studies is due, at least in part, to the inability to store and retrieve related research due to the absence of a general classification scheme. Classification provides a foundation for comparative studies, the best classification being one that permits the most useful comparative investigations (Bock, 1973). Once objects are classified, generalizations can be made about homogeneous groups of objects rather than the whole population (Chrisman et al., 1988; Gilmour, 1951; Mäkinen & Seppänen, 2007; Mayr, 1982; Meznar, Chrisman, & Carroll, 1990; Simpson, 1961). The purposes are not necessarily mutually exclusive and a carefully designed classification may serve multiple purposes.

The terms ‘function’ and ‘characteristic’ are used interchangeably throughout the classification literature; however it is helpful to distinguish between these terms. The propensity for a classification to meet its stated purpose depends on functionality and it is the characteristics of the classification that enable this.
Some common functions of classification schemes include the ordering of objects (Bailey, 1994; McKelvey, 1982; Rich, 1992; Simpson, 1961; Sokal & Sneath, 1963), the provision of an exhaustive and, perhaps, even definitive array of types or taxa (Bailey, 1994), to reduce complexity and achieve parsimony (Bailey, 1994; Meznar et al., 1990) or, in contrast, to provide versatility, i.e. suit many needs and display different aspects of the data (Bailey, 1994). Classifications can be designed to identify similarities between objects and facilitate differentiation between objects so that homogeneous groups can be formed (Chrisman et al., 1988). Classifications can also possess the function of identifying ideal types or archetypes that can be used as criterion for measurement: one type can be used as the reference point and others can be measured relative to that criterion (Baden-Fuller & Morgan, 2010; Bailey, 1994).

The characteristics of the classification enable its potential functions. The classification systems might be hierarchically structured meaning that lower classes in the classification system are nested within higher classes (Mayr & Bock, 2002). The classification may generate mutually exclusive groups, present an exhaustive list of object attributes, be conceptually elegant and use as few concepts as possible, and/or be intuitively sensible which means the groups must reflect reality rather than simply be statistically valid (Scott, 1987).

Some functions and characteristics are broadly relevant to all classifications but the relevance of others depends on the purpose of the classification. When designing a classification scheme for a specific purpose, the functions and characteristics necessary for satisfying that purpose must be incorporated into its design. Some functions and characteristics are complementary while others conflict. For example, there is a trade-off between versatility and parsimony. To be useful in multiple settings and for multiple purposes, many object attributes need to be considered in the classification. However, this introduces complexity. A parsimonious classification uses as few distinguishing attributes as possible but this limits its utility. For example, a general purpose classification of objects that is intended for multiple applications requires a large number, perhaps an exhaustive list, of attributes. On the other hand, a classification that is intended for a specific, narrow purpose should, in the interests of parsimony, use as few attributes as possible.

PHILOSOPHIES OF CLASSIFICATION

It is widely recognized that classification is a necessary step in understanding a research area, however throughout history there has been continuous debate about the best way to classify objects, what criteria to use, and what purpose the classification can serve. In this section, a short historical overview of classification philosophies and principles are presented with a view to explaining the issues associated with classification in general and then contextualizing for management research.

Since ancient times, the natural historians worked to ‘bring order to the apparent chaos of the natural world’ (Huxley, 2007, p.12) and for centuries, biologists have understood the importance of classifying objects according to a general, widely accepted classification scheme which facilitates the naming of objects and provides a common language within the entire domain (Huxley, 2007). The importance of classification is not, however, peculiar to biological science research. Researchers in the organizational sciences (Carper & Snizek,
Three distinct theories of classification have emerged over two thousand years of classification research in the natural sciences: essentialism, empiricism and ancestry. The suitability of each theory depends on the purpose of the classification and subject matter. An overview of each theory follows.

**Essentialism**

Essentialism stems from the Aristotelian (384-322 BC) view that there exists a few essential attributes which define the essence of an organism and that, by identifying these attributes, classes of organisms can be created. Classes based on a small number of attributes considered essential to defining the essence of the group are called *monothetic* groups. For objects to qualify for membership of the group they must possess the attribute(s) used to define the group and possession of the attribute(s) is both sufficient and necessary for membership of the group (Bailey, 1994; McKelvey, 1982). Classifications that are the product of essentialist philosophy are called *typologies*.

Arguably the most well known typology was that developed by Carl Linnaeus in 1763. Using a technique called ‘downward classification’ Linnaeus classified organisms firstly as belonging to the plant or animal *Kingdom*, then to the relevant *Phylum*, *Class*, *Order*, *Family*, *Genus*, and *Species*. Although this classification system has recognized shortcomings, it provides a simple, practical classification system that serves the study of natural history. The enduring contribution of Linnaeus’ classification scheme is the binomial naming system (genus-species) for all living organisms that remains in use today (Huxley, 2007; Mayr, 1982).

**Empiricism**

In contrast to essentialism, empiricism entails upwards classification and is based on observations of many attributes. The classification scheme is designed to be exhaustive and free from researcher bias (failings of the Linnaeus hierarchy). Polythetic groups of objects are formed. Polythetic groups ‘have the greatest number of shared character [attribute] states, and no single state is either essential to group membership or sufficient to make an [object] a member of the group’ (Sneath & Sokal, 1973, p.21). Classifications that are the product of empiricist philosophy are called *taxonomies*.

Empirically derived classification is based on Adansonian principles which were largely overlooked until the advent of computer processing in the middle twentieth century that provided the means of handling the large amounts of data necessary to produce such classifications. These neo-Adansonian classifications have come to be known as numerical taxonomy (Sneath & Sokal, 1973). Numerical taxonomy is a form of classification that groups taxonomic units into taxa based on their numerically derived similarity of attributes.

According to neo-Adansonian principles of classification that form the basis of numerical taxonomy, taxonomy is an empirical science and the quality of the classification is directly
related to the number of attributes used to define the taxa and amount of information contained in the taxa. A priori, all attributes have equal weighting and similarity between entities is a function of the similarity between each of their many individual attributes. The correlation of characters differs significantly from one taxa to another and classifications are based on phenetic similarityiii (Sneath & Sokal, 1973).

Numerical taxonomy requires objects to be grouped according to their observed similarity of many attributes. The taxonomic groupings are polythetic, meaning that the members of the group possess ‘a large number of common characters, that each character is possessed by many [objects] in a group, but that no character is possessed by all the [objects] in the group’ (McKelvey, 1982, p.45). Numerical taxonomies evaluate affinity between objects numerically (using multivariate techniques) and order the objects according to their degree of affinity (McKelvey, 1982; Sokal & Sneath, 1963).

Ancestry

Since the middle nineteenth century, classifications in biological science have been phyletic which means they are based on ancestry. Two types of phyletic classification exist, one attributed to Charles Darwin, evolutionismiv and the other, a variation on evolutionism attributed to Hennig (1950) called cladism (Mayr, 1982). According to evolutionism entities are grouped based on their overall ancestral (genetic) affinities and under cladism entities are grouped strictly according to lines of descent emphasizing the recency of branching points. Group members have the same immediate ancestor species (McKelvey, 1982).

Ancestry relates only to living organisms and does not translate well to inanimate objects or to objects that have no discernable ancestry and therefore has little relevance to management research. McKelvey (1982) argues that organizations are social processes that have life-cycle and evolutionary patterns and therefore are suitable for classification based on ancestry although there is a dearth of support for this view. Essentialism and empiricism on the other hand are appropriate for classification of inanimate objects and will therefore be explored and contrasted further.

TAXONOMY V TYPOLOGY

Before proceeding further it is important to emphasize the dual meaning of taxonomy. Taxonomical activities form part of the broader study of systematics which is ‘the scientific study of the kinds of diversity of organisms and of any and all the relationships among them’ (Simpson, 1961, p.7). A taxonomy is an empirically derived classification of objects based on the totality of their observable attributes. The term taxonomy is also used to refer to the ‘theoretical study of classification, including its bases, principles, procedures, and rules’ (Simpson, 1961, p.11).

This dual meaning of taxonomy can lead to confusion and misuse of the term. Researchers who develop a classification schemes carry out taxonomic activity, yet their output, the actual classification schemes, can be typologies or taxonomies.

Essentialist and empiricist theories of classification imply important differences in the taxonomical approaches used to create a catalogue of objects and in the resulting catalogue itself. The utility of those catalogues also differs. A typology is developed with a specific
purpose in mind, is based on only a few attributes and, therefore, has limited utility (McKelvey, 1982). By contrast, taxonomies are the result of grouping objects based on the totality of their observable attributes. 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. Table 1 summarizes the differences between typologies and taxonomies.

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<th>Conceptually Derived Typologies</th>
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| Typologies can take the form of traditional (commonsense) or theoretical classifications (Rich, 1992; Warriner, 1984). Traditional classifications, ‘depend on implicit recognition of the categories referred to, for there are no explicit classificatory criteria’ (Warriner, 1984, p.134). The only function of traditional classifications is to identify and describe generic kinds of objects that exist in the so-called ‘real world’.

Theoretical typologies are derived on the basis of a pre-existing theory such as economics, management, strategy or entrepreneurship theory. The researcher conceptualizes and names the ‘types’ that are relevant to the research and decides, a priori, the few attributes that represent the essence of the object which in turn, depends on the intended purposes of the classification. The result is a deductively-derived classification designed for a specific purpose ‘but no matter how useful they may be in predicting certain features of special interest to particular theories they have limited general utility’ (Warriner, 1984, p.135).

The purely theoretical-conceptual classification may have no empirical equivalents, and may be ideal types or completely hypothetical (Bailey, 1994). Alternatively, theoretical classifications can be populated with empirical cases what Bailey (1994) refers to as conceptual-operational classifications: the categories have been conceptually conceived and then empirical instances of them have been collected. All members of a category must possess the characteristic(s) which define that category. Typologies are mostly generated through qualitative classification rather than quantitative or statistical analysis although they can be formed through conceptualizing types and then using cluster analysis to quantify the empirical findings (Bailey, 1994).

As typologies categorize objects according to a limited number of attributes (often as few as two) they are able to simplify complex concepts. However, their simplicity limits their power to explain or predict phenomena (Hambrick, 1984). The criteria are determined by the researcher based on their personal perspective and bias (Hambrick, 1984) making them purpose-specific classifications. Classification can be specific in three dimensions. The classification can be specific in terms of the taxonomic attributes being considered, the environment or the situation to which it relates in terms of activity and timing. These dimension are not mutually exclusive and the more specific the classification is along each of these dimensions, the less generalisable it is (Chrisman et al., 1988).
A typology is well suited to a specific need, conceptualizing a small number of categories based on a few attributes and collecting data based on those categories is a practical research method. The problem is that any increase in the number of attributes considered will lead to a disproportionate increase in the level of complexity of the task and in the ultimate result of the research itself.

For example, even if all dimensions [attributes] 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. (Bailey, 1994, p.4)

Typologies based on a few, carefully chosen attributes can serve a specific purpose well; however as the number of attributes increases, the efficacy of the classification decreases.

**Empirically Constructed Taxonomies**

A taxonomy is derived empirically from inductive research (Sokal & Sneath, 1963) using cluster or multivariate analysis (Hanks, Watson, Jansen, & Chandler, 1993b) to create taxa (categories) based on a large number of variables. The purpose of taxonomy is to produce a general classification of objects from which generalizations can be made, hypotheses proposed and eventually mid-range theory generated. Eisenhart (1989, p.532) purports that ‘it is the intimate connection with empirical reality that permits the development of a testable, relevant, and valid theory’. It is also argued that a general classification can take the place of contingency theory because it can specify the class of objects to which the theory relates (Carper & Snizek, 1980; McKelvey, 1975). By using a large number of variables the researcher bias that is present in typologies is potentially reduced however there are still many subjective decisions that need to be made. In research fields where little is known about the object of classification and research is exploratory, the researcher must trawl the data using as many variables as practical. The dangers with this approach are that key variables may be overlooked and that irrelevant variables may dominate. The resultant classification may be statistically valid but may not be intuitively sensible.

Where there is little domain knowledge, an alternative to the pure inductive method is to seek expert opinion on variable selection, what Ketchen (2005) refers to as the cognitive approach. In research areas that are more mature, with existing theories in relation to the object of classification, the researcher can utilize that prior knowledge to minimize the chance of irrelevant data obstructing the classification and to ensure all key variables are included. In addition, where causal relationships are known, they need to be taken into account in order to avoid overrepresentation of constructs (Ketchen, 2005). There must still be a large number of variables; however utilizing existing theory to refine the variable set is recognized as beneficial for classifications that are aimed at confirming existing theory.

Variables must be identified and measurement rules determined to allow data to be collected and coded for cluster analysis. The data can be further analyzed using a range of multivariate techniques. The aim is to minimize within-group variance and maximize inter-group variance, thereby creating homogeneous groups. Once created, these homogeneous groups
can be used for a multitude of research applications, enabling the study of both within-group behavior as well as inter-group behavior.

**CLASSIFICATION IN THE ORGANIZATIONAL SCIENCES**

During the mid twentieth century organizational science research became dominated by an empiricist approach which Gergen and Thatchenkery (2004) refer to as the modernist era. The modernist era was dominated by information technology advancement in the form of computerized data processing that facilitated an empirical approach to research. The emphasis was to determine what was actually taking place in the ‘real world’ or as Gergen and Thatchenkery (2004, p.242) put it, researchers were essentially ‘polishers of mirrors’ striving to isolate variables, standardize measures and assess causal relationships. The empirical, modernist emphasis of organizational science has more recently given way to post modern organizational science where the objective is to ‘tell it as it might become’ (Gergen & Thatchenkery, 2004, p.242) rather than how it is; to rely less on the observations of reality and more on potential for change. Even though the emphasis of current organizational research has moved away from empiricism, empiricism continues to play a role albeit a less prevalent role in organizational research.

It is postulated here that research outputs from the empirical era facilitated the move towards postmodern research and that this empirically derived knowledge was required prior to developing the constructionist views. Before attempting to propose theories in relation to nascent fields of research, it is necessary to ‘polish the mirror’ and see what is actually taking place. A critical requirement of the empirical approach to research is the classification of the objects of interest in order that generalizations can be made.

Hanks et al. (1993) claim that empirical research was required to subjugate an explosion of conceptually based organizational life-cycle models and that systematic empirical research was required to evaluate the models.

McKelvey (1982) summarizes the views of other organizational science scholars (Burns, 1967; Carper & Snizek, 1980; Haas, Hall, & Johnson, 1966; Hall, 1977; Pugh, Hickson, & Hinnings, 1969; Pugh, Hickson, Hinnings, & Turner, 1968) who reviewed and analysed typologies of organizations arguing that the typologies were of no use for empirical research because they failed to capture important differences among organizations due to the fact that they rely on only a few organizational attributes. McKelvey (1982) provided the theoretical and methodological foundation for the development of taxonomies of organizations and these methods were applied by several scholars (Rich, 1992). Rich (1992) observes that despite the foregoing, research obstacles that inhibit the construction of a general classification of organizations that can aid generalizations and theory building remain. These obstacles include the development of a generic pool of variables to use in the classification process and the measurement, weighting and methods of collecting the data.

The twentieth century organizational scientists analysed the biological science taxonomy research in ways that can assist with the application of taxonomy to other management research. The theory that was developed by the natural scientists to classify living organisms was adapted to suit an abstract object, the organization.
BUSINESS MODELS AND CLASSIFICATIONS

Business model research finds itself in what Kuhn refers to as its ‘pre-paradigm’ period indicating an immature science that lacks consensus and where ‘competing schools of thought possess differing procedures, theories, even metaphysical presuppositions’ (Bird, 2008). Conceptual differences inhibit research that uses the business model as a vehicle to collect information about other phenomena. Although some evidence of research aimed at unifying the business model concept exists, it is underdeveloped and there is an absence of order in the research field that obscures the path to business model theories.

The precursor to theorising is generalisation whereby the results of inductive empirical research are used to infer general patterns of configurations and simple relationships between variables can be hypothesised and tested. Generalisations are the product of empirical research and ‘...it is the intimate connection with empirical reality that permits the development of a testable, relevant, and valid theory’ (Eisenhardt, 1989 p.532).

In all forms of scientific research, including organisational science (McKelvey, 1982) and behavioural science (Mezzich & 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. To advance research towards theorising, it is necessary to order the objects within the research domain since ‘theory cannot explain much if it is based on an inadequate system of classification’ (Bailey, 1994, p.15). 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, the understanding of which can be enhanced through the development of a general classification scheme.

Numerous business model classifications can be identified in the extant literature however most treat as a ‘given’ the basis of the classification and the principles of the classification system. That is to say, there is a lack of taxonomic research in relation to business models. It has long been recognized that the business model literature lacks a systematic approach to the development of taxonomies and that many of the so-called taxonomies of business models are simply lists of existing business activities, or at best, typologies of generic kinds of business models (Baden-Fuller & Morgan, 2010). The indiscriminate use of the terms typology and taxonomy in the business model literature creates misunderstanding and confusion for those attempting to understand and compare the various classification schemes. The need for a general classification of business models remains unsatisfied.

Early business model classifications are simple traditional (otherwise known as commonsense) classifications that ‘depend on implicit recognition of the categories referred to, for there are no explicit classificatory criteria’ (Warriner, 1984, p.134). The only function of the traditional classifications is to identify and describe business models that exist in the so-called ‘real world’ and since the purpose of the classifications was to identify objects that fit preconceived categories (for examples see Applegate, 2001; Bambury, 1998; Eisenmann, 2002; Laudon & Traver, 2003) the traditional typologies were useful. The traditional
Typologies of business models use no explicit criteria for classification and produce generic types or shorthand descriptions of existing business models (Baden-Fuller & Morgan, 2010) which serves the limited purpose of identification and nothing more. As few as four types and as many as fourteen types of business model are identified in the various traditional classifications.

Advancing from the traditional typologies, a range of theoretical classifications were created to enable comparisons between existing business models. Most of the theoretical classifications use market related criteria such as customer profile (Bienstock, Gillenson, & T Sanders, 2002; Leem, Suh, & Kim, 2004), pricing and profit factors (Afuah & Tucci, 2003; Bienstock et al., 2002; Linder & Cantrell, 2000; Weill & Vitale, 2001), transaction factors (Wang & Chan, 2003), market configuration factors (Tapscott, Ticoll, & Lowy, 2000; Timmers, 1998; Wang & Chan, 2003) and marketing strategy (Weill & Vitale, 2001) to categorise business models. Internal criteria including product related factors (Bienstock et al., 2002; Rajala & Westerlund, 2007; Timmers, 1998), resource related factors (Betz, 2002; Weill & Vitale, 2001) and operational issues (Betz, 2002; Rajala & Westerlund, 2007) also feature in the theoretical typologies.

Some of the theoretically derived typologies are subsequently populated with empirical instances of the types but there are few empirically derived taxonomies of business models present in the literature. The Italian biotechnology industry is the subject of one series of studies (Bigliardi, Nosella, & Verbano, 2005; Nosella, Petroni, & Verbano, 2005) and two non-industry-specific studies involve United States based firms (Malone et al., 2006; Morris et al., 2006).

Although many specific, arbitrary classifications exist in the extant literature (Mäkinen & Seppänen, 2007; Malone et al., 2006; Morris et al., 2006) ‘the diversity in classification schemes, suggest much more progress is needed. In particular, the ability to generalize a given scheme to different types of industries and ventures is limited’ (Morris et al., 2006, p.32). As yet there is no general classification of business models that can form the basis of mid-range theory building.

**A CLASSIFICATION DESIGN FRAMEWORK**

In the interests of encouraging the application of theoretical rigor to the design of classification schemes in management research and communicating their underlying structure to potential users, a conceptual framework for the design of classification schemes is now proposed. Conceptual frameworks guide decision making by providing a structure that incorporates the broad principles of the relevant practice or process. The proposed conceptual framework for classification development can guide the development of future classifications and assist in articulating important information regarding the classification scheme. Based on the classification theory presented earlier in this paper a series of decision steps are identified that lead to a classification outcome.

For taxonomy (the process) to serve a practical purpose, it is necessary to match the theory to the application. This requires the researcher to firstly specify the purpose of the classification. The purpose might be specific or broad; the classification might be required to
serve several purposes or only one. Each purpose necessitates particular functions and characteristics of the classification so the purpose must firstly be recognised.

Depending on the purpose and related characteristics and functions of the classification, the relevant classification philosophy and related principles can be identified. For example, a specific classification that aims only to identify types of organisational structure is consistent with an essentialist philosophy of classification the principles of which include deriving the types conceptually, using as few attributes as possible and forming monothetic groups. Procedures and rules that are appropriate to the philosophy and principles must then be selected. Continuing with the example of a specific classification, one procedure would be to conceptualise the categories. An associated rule might be to specify the minimum and maximum number of categories.

The steps required to design a classification scheme form a Classification Design Framework (CDF) that is depicted in Figure 1. The first two steps in the CDF relate to the application of the intended classification. Steps three to six equate to the definition of taxonomy proposed by Simpson (1961); theory, principles, procedures and rules together form taxonomy, the theoretical study of classification.

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Step 1 State the purpose(s) of the classification: The three broad research purposes of a classification are nomenclature, information storage and retrieval, and generalisations. These purposes are not mutually exclusive and they can potentially be satisfied by a single classification scheme although each may be better served by a specific classification designed solely for that purpose. For example, a general classification of business models is required to provide a foundation for comparative studies and to provide a means of reference to groups of business models through nomenclature. Generalisations can then be made with respect to homogeneous groups of business models as a precursor to mid-range theorising.

Step 2 Identify the necessary functions and characteristics of the classification required to satisfy the purpose(s): The relevant functions and characteristics become a checklist that can assist in both building and evaluating the classification scheme.

The functions desirable in a general classification suitable for making generalisations and comparative studies and providing a naming structure, include the ability to reliably and consistently allocate business models to the appropriate category, to order the business models, facilitate differentiation between business models and produce categories that are collectively exhaustive and mutually exclusive and provide versatility in terms of purpose and over time. The related functions are that it identifies similarities among business models, produces mutually exclusive groups, presents an exhaustive list of key characteristics and it reflect reality.

Step 3 Select the philosophical basis for the classification: The philosophical basis for the classification must be consistent with the functions and characteristics of the classification. For classifications of inanimate objects the choice is between essentialist and empiricist philosophies. Essentialist philosophy of classification requires the researcher to identify the
characteristics of the object or concept under study that capture its ‘essence’. For the essentialist philosophy of classification to be suitable for a general business model classification there needs to be widespread agreement on what constitutes the essence of a business model. Business model research has not reached a level of maturity for this to be settled. The widely varying conceptualisations of business models indicate that the ‘essence’ of the business model is not a shared perception thereby providing no support for an essentialist approach to developing a general classification of business models.

Empiricism, on the other hand, does not rely on agreement of the underlying essence of the concept but instead is based on all identifiable key characteristics. An empirically derived taxonomy groups objects based on overall similarity and, because it relies on observations to form the categories, has potential to reflect reality. The categories are collectively exhaustive and mutually exclusive. Based on the above, an empiricist philosophy would be required for a general business model classification.

**Step 4 Identify classification principles associated with the chosen philosophical basis:** The principles capture the fundamentals of the classification philosophy. These include the number of attributes considered necessary to identify the object, the basis of similarity and differentiation between objects and the choice of monothetic or polythetic groupings.

A general business model classification based on an empiricist philosophy creates polymorphic groupings and a specific business model classification based on an essentialist philosophy creates monothetic groupings.

**Step 5 Choose a procedure consistent with the principles:** The specific procedures are selected according to the choices made in the first four steps of the classification building process. Statistical programs are frequently used to analyse the results of conceptually derived classifications that are based on essentialist philosophy although manual techniques are also used. Modern empirical classification, numerical taxonomy, is principally carried out using computerised statistics programs that perform cluster analysis to identify the taxa based on the observed variables. Cluster analysis is considered appropriate when the research is essentially exploratory (Huberty, Jordan, & Brandt, 2005; Timm, 2002) and ‘where the number of groups, as well as their forms, may be unknown’ (Henry, Tolan, & Gorman-Smith, 2005, p.121).

Table 2 summarises the relationships between theories, principles and procedures and illustrates the decisions in relation to essentialism and empiricism.

```
Insert Table 2 about here
```

**Step 6 Decide the rules to operationalise the procedure:** The rules dictate how the procedures are to be carried out. They include decisions regarding the definition of the objects to be classified. In relation to classifications regarding tangible objects, this is a relatively simple step, however, when the object is abstract and is the product of multiple definitions, the step becomes more complex. Decision rules relating to the selection and
measurement of variables, choice of particular statistical techniques and decision rules associated with those techniques should be made explicit. Some of the decisions that need to be made to implement cluster analysis include; choice of the sampling unit, population and sample size. Variables need to be selected, measured and coded, the clustering method selected and the methods of analysis chosen. The CDF provides a structure of decisions that need to be made to ensure the resultant classification is consistent with the purpose of the classification. The CDF ensures that all important issues have been considered and documented.

CONCLUSION
Classification is an integral part of business model and other management research (Christensen & Carlile, 2009). To progress nascent management research fields such as business model research towards mid-range theory building generalisations must first be made and those generalisations must be based on a sound classification of business models. It is also necessary to understand how existing classification schemes have been developed and the decisions underlying their structure so they can be replicated and further developed.

A classification scheme, like a good theory, is seldom finished. It is only given interim acceptance with the understanding that further studies will tend to elaborate and refine it, or disconfirm it (McKelvey, 1982 p.30).

An overview of the theory of classification has been presented to bring to light the significant differences between classification schemes and their relevance to research. The differences between typologies and taxonomies have been highlighted in order to show how each serves different research needs. Typologies produce specific classifications, derived either through intuition (common sense classifications) or theoretically derived, some populated with ‘real life’ instances of the types and others remaining purely theoretical, ideal types. Taxonomies produce general classifications as a result of inductive, empirical research that takes into account many variables and is based on analyzing many ‘real life’ instances of the object.

Thoughtful consideration of the purpose of the classification scheme that extends beyond the immediate requirement has the potential to create bridges between current and future research. An awareness of the implications of classification design criteria can guide researchers in their choice of classification schemes and knowledge of the principles that underlie existing classification schemes increases their potential for reuse. The CDF is proposed to facilitate the classification decision process and to explicate the decision steps for the benefit of potential users. The pervasiveness of classification throughout all fields of research renders it an important construct worthy of careful and explicit consideration.
REFERENCES


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TABLES

<table>
<thead>
<tr>
<th>Typologies</th>
<th>Taxonomies</th>
</tr>
</thead>
<tbody>
<tr>
<td>The product of essentialist philosophy</td>
<td>The product of empiricist philosophy</td>
</tr>
<tr>
<td>Categories (types) are conceptually derived</td>
<td>Categories (taxa) are empirically derived</td>
</tr>
<tr>
<td>Few attributes considered</td>
<td>Many attributes considered</td>
</tr>
<tr>
<td>Reasoning by deduction</td>
<td>Reasoning by inference</td>
</tr>
<tr>
<td>Mostly qualitative classifications</td>
<td>Quantitative classifications</td>
</tr>
<tr>
<td>Monothetic groupings</td>
<td>Polythetic groupings</td>
</tr>
<tr>
<td>Specific classification</td>
<td>General classification</td>
</tr>
<tr>
<td>Provides a basis for only limited generalizations</td>
<td>Provides a basis for wider generalisation</td>
</tr>
</tbody>
</table>

Table 1

Summary of the Differences between Typologies and Taxonomies (adapted from Lambert, 2006)

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Figure 1: Classification Design Framework (CDF)
<table>
<thead>
<tr>
<th>Philosophy</th>
<th>Essentialism</th>
<th>Empiricism</th>
</tr>
</thead>
<tbody>
<tr>
<td>Associated Principles</td>
<td>• Categories derived conceptually</td>
<td>• Categories derived through observation</td>
</tr>
<tr>
<td></td>
<td>• Few characters</td>
<td>• Many characters</td>
</tr>
<tr>
<td></td>
<td>• Monothetic groups</td>
<td>• Polythetic groups</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Related Procedures</th>
<th>Essentialism</th>
<th>Empiricism</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Conceptualize the categories</td>
<td>• Define the sampling unit and determine the population</td>
</tr>
<tr>
<td></td>
<td>• Define the sampling unit and determine the population</td>
<td>• Discover and measure the variables</td>
</tr>
<tr>
<td></td>
<td>• Identify objects that fit the categories</td>
<td>• Code the variables</td>
</tr>
<tr>
<td></td>
<td>• Analyse the results quantitatively and/or qualitatively</td>
<td>• Form clusters</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Analyse results quantitatively</td>
</tr>
</tbody>
</table>

Table 2
Principles and Procedures for the Development of an Essentialist and an Empiricist Classification Scheme

At about the same time that Linnaeus was proposing his classification scheme, Michel Adanson, a French botanist, produced a ‘natural’ classification scheme designed to be exhaustive and to be free from researcher bias. This classification scheme reflects the principles of John Ray’s ‘natural classification’ (proposed almost a century earlier) in that it is based on observations of many attributes of the organism and it is a compositional (upward) classification Huxley, R. 2007. *The Great Naturalists*. London: Thames & Hudson, Mayr, E. 1982. *The Growth of Biological Thought: Diversity, Evolution, and Inheritance*. Cambridge: Harvard University Press.

Phenet

ics is a ‘system of classification based on similarities between organisms without regard to their evolutionary relationships’ (Collins English Dictionary, 1991, p.1168).