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Assessing the Quality of Qualitative Classifications

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Rigor and Relevance in Management Typologies:

Assessing the Quality of Qualitative Classifications

Martin J. Eppler, Friederike Hoffmann & Roland Pfister

Abstract:

Typologies are a unique form of theory building and can provide orientation to scholars and practitioners alike. However, typologies are often developed without explicitly paying attention to their inherent rigor and relevance issues. In this article, we examine the elements that constitute rigor and relevance in qualitative typologies, particularly in management studies, and illustrate them through two examples from the strategy and from the project management literature respectively. Our analysis reveals that researchers should pay attention to the judicious choice of (discriminatory and impactful) classification principles and focus on the ultimate purpose of their typologies in both academia and practice, as well as on the careful use of an adequate graphic representation of their typology. As a contribution to the study of typologies in management studies we compile, organize, apply, and extend the quality attributes for typologies in this context and show how these attributes can be systematically addressed.

1. Introduction

What types are there? This fundamental question is relevant in many management contexts, whether comparing organizational structures (Sanchez, 1993, Rich, 1992, Mintzberg 1979), identifying choices among different business strategies (Porter, 1980, Miles and Snow, 1987, Morrison & Roth 1992), distinguishing between different co-ordination mechanisms (Picot et al. 1996), or differentiating among competitors (Porac & Thomas 1990). Hence, the extensive use of typologies in management studies is not surprising. We find typologies in research directed to mostly other researchers, such as in literature reviews or, more broadly, in articles on research methods (Bryman, 2006). However, there are also articles mainly directed at practitioners, for example those written on the topic of innovation (Kaufman et al., 2000), project management (Evaristo & van Fenema, 1999), or marketing (Burnham et al., 2003). Typologies help to make sense of such domains by distinguishing items or phenomena based on their similarity. They reduce the complexity of a domain, provide a systematic overview, facilitate detailed comparisons, enable a change of perspectives, and help in structuring observations or imagining new solutions, to name but a few of their advantages for management research and practice (Bailey 1994, Chandra & Tumanyan, 2005, Gregor 2006, Stock & Bauer, forthcoming).

Typologies are one kind of often qualitative or conceptual classification. A classification, according to Bailey (1994), designates the ordering of entities into groups or classes on the basis of their similarity. In this article we examine when typologies can be considered

rigorous and relevant for management research purposes. We thus examine the characteristics that determine the quality of a typology within the realm of management studies. We do so in three steps: First, by exploring the methodological basis of classification in general; second, by reviewing already existing quality criteria for typologies; and third, by examining two typology-based articles in more depth in order to apply the identified rigor and relevance criteria in an exemplary manner. In the final section of the article, we draw conclusions from our findings and formulate guidelines for the construction of relevant and rigorous typologies in management research.

2. Typology Construction as a Research Method

Good management research is both: rigorous in execution and relevant to practitioners (Gelso, 1985; Gulati, 2007), as "only work that is rigorous both theoretically and methodologically and centered on issues of focal concern to a wide community of stakeholders (e.g. managers, government policy makers, trade unionists, and consumer groups) will truly bridge the relevance gap, thereby meeting the double hurdles for management research" (Hodgkinson et al., 2001; Pettigrew, 1997). In quantitative research rigor is often defined in terms of a study's validity, reliability, generalizability, or external validity, as well as replicability (Punch, 2005). The quality of qualitative research, however, may not be expressed by significance levels or "magic numbers" (Pratt, 2009). Hence, the criteria used to evaluate the rigor of qualitative research regard sample selection, triangulation of sources, sensitivity and reflexivity of the researcher, documentation of the research process, and others, as suggested by Corbin and Strauss (1990). These considerations regarding the rigor of qualitative research are often captured in terms such as meaningful coherence, credibility, sincerity, reflexivity, authenticity, transactional validity (see, e.g. Cho & Trent, 2006, Gephart, 2004; Pratt, 2009; Suddaby, 2006, Tracy, 2010, Worren et al. 2002). The relevance dimension is typically captured in terms such as meaningful or significant contribution, usefulness, worthy topic and pragmatic validity (ibid.). The criteria used in this article to assess the quality of conceptual typologies are based on these attributes. They are also derived from the body of literature dedicated to classification methods, such as Bailey (1994), Bowker and Star (1999), or Doty and Glick (1994).

The goals of any classification are the minimization of within-group variance and maximization of between-group variance. A classification, in other words, aims for within-group homogeneity and between-group heterogeneity within a given and clearly delineated domain. This task can be achieved in various ways. A quantitative approach usually consists of proceeding inductively and developing classes from empirical data. Cluster analysis is the most obvious example of this, as it is a statistical procedure that is explicitly designed to place cases into similar groupings. Marketing researchers use cluster analysis to group consumers into various categories according to their spending habits, income levels, and

lifestyle attributes (among other variables). These groupings can then be used to develop a formal taxonomy that can be further tested and applied practically. A qualitative classification approach may consist of a deductive, theory-based, ‘top-down’ framework of ideal types into which items are placed. The latter classification is often referred to as a typology, while the former is usually labeled as taxonomy, although numerous studies use both terms loosely or even interchangeably.

There are several noteworthy qualifications on the distinction between typology and taxonomy. Doty and Glick (1994) define typologies as “conceptually derived interrelated sets of ideal types each of which represents a unique combination of the attributes that are believed to define the phenomenon.” A taxonomy, according to Sanchez (1993), is simply an empirically derived grouping. While a typology may be oriented towards some normative end (such as market success in the case of a typology of business strategies), taxonomies tend to be descriptive. The goals of a taxonomy, according to Chandra and Tumanyan (2005), are to introduce structure into a body of facts, as well as to build a unified and homogeneous view of the domain of interest. As an empirical research method, a taxonomy must thus meet the same quality criteria as other quantitative research methods. It must be a reliable and valid measurement and aggregation instrument. Its application procedure must be robust in the sense that it is replicable and will lead to the same results if applied again in the same manner. However, this is not necessarily true for a typology, as it may emphasize or neglect certain aspects or perspectives for certain purposes. Conceptual typologies can thus be more difficult to assess in terms of their quality than taxonomies. The contribution of this article lies in clarifying and structuring the quality criteria of typologies. To do this, we first start with quality criteria for classification in general and then focus on typologies.

3. Quality Criteria for Typologies

In contrast to mere categorization, classifications are more systematic and stable, as they lead to groups with clear boundaries and inclusion or exclusion rules (Jacob, 2004). According to Bowker and Star (1999), classification refers to the spatio-temporal segmentation of the world. This segmentation, according to most scholars in the field, has to exhibit the following traits: There are consistent, unique classificatory principles in operation; the categories are mutually exclusive (non-overlapping); the system is complete (all items can be placed in a group). These are minimal requirements for a rigorous classification based on the original work of Sneath (1973). Gregor (2006) goes further and states that a high quality classification must also be useful (i.e., it should aid analysis), relevant and contain meaningful and natural category labels and groupings, as well as consist of hierarchies that are appropriate (i.e., the most important divisions are shown at the highest levels). In addition, the logic for placing elements in categories should be clear, just as the characteristics that define each category. Likewise – and now focusing specifically

on typologies – Meyer (2007) proposes validity, simplicity, relevance, and difference as key traits of a typology. The validity of a typology depends on the unambiguous definition of categorization criteria (also referred to as classification principles). It requires that a typology be consistent with established theories in a field. The simplicity criterion refers to the conciseness and comprehensibility of a classification. A classification, in other words, should contain a limited number of categories that are easy to distinguish. The relevance criterion implies that only the most influential items should be included in a typology. According to Meyer (2007), focusing on the important, meaning the most crucial aspect, has a higher priority than building a complete typology. Difference, finally, suggests that a typology should highlight major differences in views, while paying less attention to issues on which more agreement exists. Hence, the focus should be on contradictory assumptions and conflicting norms. Only the aspects with a high discriminatory value should be considered. This proposition is reminiscent of the definition of information Bateson (2000) as “a difference that makes a difference.” Further important criteria for typology building and evaluation - that are sometimes overlapping with Meyer's (2007) criteria - are offered by Hunt (1991) and Doty and Glick (1994), as well as more recently by Jacob (2004) and Chandra and Tumanyan (2005). Doty and Glick (1994) and Jacob (2004) suggest specific requirements regarding group boundaries, membership and typicality. These criteria relate to the clear definition of inclusion and exclusion rules for members of each group in a typology, thus establishing unambiguous group boundaries and to the adequate amount and typical characteristics of members of each group or section in a typology. Further, the criteria apply to groups in a typology and to typologies in general. Hunt (1991) emphasizes the clear scope criterion by asking whether the phenomenon to be classified is adequately specified, and mentions another often forgotten, but crucial quality attribute of a typology, namely its usefulness: Does the typology really solve an important research or management challenge? Is the overall purpose of the typology clear? Hunt's (1991) usefulness criterion appears very similar to Meyer's relevance criterion mentioned earlier. On a more detailed level, one should also consider the group labeling criterion of Chandra and Tumanyan (2005), who extensively discuss the category labels of typologies, which should be unique and unambiguous, therewith adding to the clarity of a typology. These criteria are indicators for both, the rigor and the relevance of a typology, with some criteria measuring specifically rigor, namely validity and difference (Meyer, 2007) as well as group boundaries and membership (Doty & Glick, 1994; Jacob, 2004). The criteria of simplicity (Meyer, 2007), typicality (Doty & Glick, 1994; Jacob, 2004), usefulness (Hunt 1991), and the unique and unambiguous label (Chandra and Tumanyan, 2005) regard the relevance dimension, thus enhancing the practical usability of a typology. An additional relevance criterion that we add to this list concerns the accessible and memorable graphic representation of a typology, as this can increase its impact and usability dramatically – as illustrated by several highly cited graphic typologies, such as those of Mintzberg (1979) or Alavi and Carlson (1992). This

important point will be discussed again in the analysis of two typical management typologies below that we use as illustrative examples.

We summarized the quality measures for management-related conceptual typologies in Table 1. Macro criteria are listed first. They relate to the overall logic or system of a typology. Second, micro criteria are listed, which relate to specific elements of a typology, such as its category labels.

Table 1: Elements of a typology's rigor and relevance

Rigor of a Management Typology	Relevance of a Management Typology
<p>Explicit classification principle: Unambiguous definition of categorization criteria that is consistent with established theories in a field.</p>	<p>Simplicity: The structure of the typology is easy to grasp, as it is concise and comprehensible.</p>
<p>Difference: The groups in the typology are distinct and thus mutually exclusive. The typology highlights the major differences in views, while paying less attention to issues on which more agreement exists</p>	<p>Visual clarity: Adequate, accessible, and memorable graphic representation of the typology and its elements.</p>
<p>Defined scope: The phenomenon to be classified is adequately specified. The typology exhibits an adequate level of granularity and focus.</p>	<p>Usefulness: The typology addresses an important research or practice need. It offers benefits such as overview, dimensions for observation, or complexity reduction.</p>
<p>Membership: It is defined which items belong to a certain category and why, with a specific focus on unique and unambiguous attributes of group members.</p>	<p>Typicality: The categories use typical attributes of the items that make it easier to understand distinctions.</p>
<p>Clear group boundaries: There are explicit and clear inclusion and exclusion rules for items and their group memberships.</p>	<p>Unique and unambiguous labels: The groups are distinctly and clearly labeled. The group labels are mostly self-explanatory.</p>

Having elaborated the benefits of typologies, and having further outlined the dimensions that contribute to the quality of a typology, one should not forget that the classification approach in general has also been heavily criticized (Bowker & Star, 1999) for its limitations. The primary risks associated with classifications are their tendency to render concrete those items, that are in short-term flux, long-term evolution, or poorly understood; and to reify items that are not so neat and tidy in the first place. Further, classifications may have an

inertia that marginalizes alternative viewpoints and under-emphasize important attributes. For example, Chandra and Tumanyan (2005) criticize the loss of information due to generalization inherent in classifications. Classifications can also lead to framing effects. These effects limit creativity and the ability to “think outside of the box” or rather “outside the tree or matrix structure”. Finally, a classification may lead to stereotypical thinking and false dichotomies taking things apart that naturally belong together. These risks, however, are closely linked to the rigor and relevance of a developed typology.

Below, we will examine two different management typologies with regard to the quality criteria of Table 1. The first article is from the domain of strategy, published in the *Strategic Management Journal*, the second one is taken from the domain of project management, published in the *International Journal of Project Management*. Both articles are from highly respected journals and feature a typology as the main contribution. Furthermore, the subject matters featured in both typologies are of great academic and practical relevance. For each article we will first describe the typology and its application context and then evaluate it regarding its rigor and relevance. We conclude each evaluation by summarizing insights for typology construction in management studies.

4. Example One: A Strategic Supplier Typology

Typologies in strategic management are widely used to describe feasible business strategies in an industry. Famous examples of typologies in the realm of strategic management relate to strategy contexts (Mintzberg, 1979), views on strategy (Hamel & Prahalad, 1994), strategic decision making types (Ansoff & McDonnell, 1990) or strategic behavior patterns (Miles & Snow, 1987). Among the most influential typologies in strategic management are probably the broad ones by Abell (1980), Porter (1980) and Miles and Snows (1987). In recent research, the issues addressed have shifted from major strategy overviews to a focus on specific strategic issues, such as supplier relations. In the following paragraphs, we evaluate one such specific typology, namely a classification of strategic suppliers.

Description of the Typology

In their highly cited article, Kaufman et al. (2000) propose a strategic supplier typology based on transaction cost economic principles and Clark and Fujimoto’s (1991) supplier taxonomy for the auto industry (see Figure 1). The authors aim to support original equipment manufacturers’ (OEMs) decision making regarding the type of supplier that they want to cooperate with. At the same time, the authors aim to describe strategic alternatives for small and medium sized manufactures (SMMs), operating as suppliers, therewith opening the focus from OEMs as principal actors to include opportunities for suppliers.

		COLLABORATION	
		Low	High
TECHNOLOGY	Low	<p>I COMMODITY SUPPLIER</p> <ul style="list-style-type: none"> - Spot Market supplier - Low cost, low price priorities - Little or no differentiation <p>n = 59 Av. No. of Employees = 28</p>	<p>II COLLABORATION SPECIALIST</p> <ul style="list-style-type: none"> - Detail-controlled parts supplier - Uses a closed network in each industry - Can be in many industries to maintain customer product information <p>n = 41 Av. No. of Employees = 150</p>
	High	<p>IV TECHNOLOGY SPECIALIST</p> <ul style="list-style-type: none"> - Proprietary parts supplier - Innovation in product technology used to produce high barriers to entry - First mover advantages - Uses design capabilities for competitive advantage <p>n = 35 Av. No. of Employees = 44</p>	<p>III PROBLEM-SOLVING SUPPLIER</p> <ul style="list-style-type: none"> - Black Box supplier - High differentiation - Cost less important - Small runs, high process and labor flexibility <p>n = 65 Av. No. of Employees = 260</p>

Figure 1: A Strategic Supplier Typology (Kaufmann et al., 2000)

The strategic supplier typology developed by the authors is built on two dimensions, each either high or low: "collaboration" on the x-axis and "technology" on the y-axis. The two dimensions and two values form a matrix with four cells, thus establishing four distinct supplier strategies: Commodity Supplier, Collaboration Specialist, Technology Specialist and Problem-Solving Supplier. The commodity supplier uses standardized technologies, competing on the basis of low cost. Neither the supplier nor the customer being depended, switching costs are low. The collaboration specialist also uses standardized technologies, however, the produced products or services meet customer specifications.

The SMMs invest to innovate, still to a degree which avoids dependency. Customers outsource only parts that do not require core manufacturing know-how. Problem-solving suppliers employ advanced technologies and collaborative methods to promote innovation. The suppliers compete based on their ability to develop solutions for process and product issues. The firms are mutually dependent. The technology specialists emphasize technology development and application, while developing weak relationships with customers. The supplier competes on high quality and performance, aiming to attract multiple customers to reduce dependencies. Thus, the supplier invests heavily in firm-specific skills and assets, while the customer may acquire exceptional or unique products without own investments.

While it may be difficult to find severe limitations of a typology that is proposed in an A-level journal and submitted by experienced scholars, it is nevertheless instructive to examine the criteria of rigor and relevance of such a typology and look for ways of improving it further.

Evaluation of the Typology regarding Rigor

The strategic supplier typology is based on two dimensions, which fulfill the criteria of Doty and Glick (1994) and Jacob (2004) of being correctly derived from established and relevant theory in the field. The dimensions are derived from the relation-based school (Aoki, 1984; Baumol et al., 1993; Nelson, 1993; Nelson & Wright, 1992), which regards innovation as a "highly structured activity embedded in networks that span organizational and geographic boundaries." (Kaufman et al., 2000) Collaboration, the first dimension, is essential to innovation in supplier-customer relationships, while the second dimension of technology enables innovation. The proposed typology contains four quadrants, each one describing a different strategic supplier type. As typologies describe ideal types, which reflect a particular combination of organizational attributes (Doty & Glick, 1994), no existing firm may exactly fit the ideal type in practice (Narasimhan et al., 2008; Venkatraman & Prescott, 1990). However, Kaufman et al. (2000) also tested the developed supplier types in a survey of 200 firms, and thus showing the existence of the ideal supplier types.¹ In addition, the authors were able to show that firms in quadrant II and III are generally larger than the much smaller supplier types in quadrant I and IV. Furthermore, the typology does not include any unrelated or rest categories, nor does it confuse by employing an incomplete categorization system. Other core requirements for a consistent typology are fixed, mutually exclusive, collectively exhaustive boundaries, which are non-overlapping (Jacob, 2004). Hence, any firm is either clearly a member of one group or not, based on the predetermined definition of the group. For the strategic supplier typology, that requirement appears to be fulfilled, as the ideal types suggested are broad and common.

Evaluation of the Typology regarding Relevance

The typology fulfills the criterion of simplicity by focusing on four types, one in each quadrant. This is also true regarding the graphic representation of the typology, a simple two-by-two matrix. The matrix, however, does not respect the general convention of positioning the high-high quadrant at the top right quadrant. To be practically applicable, the typology needs to highlight crucial differences. Hence, the question is what both customers and suppliers may gain from this typology. Kaufman et al. (2000) argue that the typology can help customers to identify which kind of supplier they are looking for, while suppliers should use the typology to develop their strategy and change their current position. In addition, the

¹ It is important to note that the typology remains qualitative, even though it was empirically tested. Qualitative typologies are derived from theory and illustrated through empirical data, while quantitative taxonomies are generated inductively from data.

typology highlights the differences among the supplier types and provides evidence by empirically testing the typology, thus showing differences in the quantity of suppliers on the market and their respective average number of employees. Regarding the labels of the four identified supplier types, some appear more self-explanatory than others. The commodity supplier and the technology specialist are self-explanatory, while it is not clear what differentiates the collaboration specialist from the problem-solving supplier. How may wicked problem-solving be enabled without close cooperation and often technologically advanced solutions? From a management perspective, one might also argue that the collaboration specialist could also have been labeled as technology specialist, or the other way round. One could consider the collaboration specialist supplier to be the one who offers most value to a customer by searching for specific solutions, which in most cases is likely to be technological. Thus, when looking at the values of the labels being either high or low, it is not necessarily clear just by considering the label, why the collaboration specialist is low on the technology dimension while the technology specialist is not rated high on collaboration as well. Furthermore, the label of the problem-solving supplier is somewhat confusing, as any customer will expect problem-solving when employing a supplier, whether for commodity parts or advanced technological issues.

Regarding the scope of the typology, the narrow focus of Kaufman et al. (2000) on large firms as customers and smaller and medium sized firms as suppliers may require some further development. While small manufactures act indeed often as supplier to large manufactures, the opposite might hold true as well, especially when the part required is an item of scale. While the evidence found by the authors shows the opposite, some further testing may broaden the established typology in this regard. It thus seems not easy to delineate the ideal scope of a typology. While the typology, due to its clear focus and simple visualization, allows for a first assessment of which supplier a company employs at a given point in time, strategy elaboration for both customers and suppliers may be difficult along the two dimensions offered. While it's important to consider the degree of collaboration which may be achieved and the degree of technological input a supplier can offer, the location of the supplier may be of equal importance for the innovation of new products or processes, as monitoring costs may apply for a distant supplier.

When choosing to visualize a typology using a quadrant with two axes, certain opportunities and dangers arise: As the authors only visualize the four ideal supplier types, the visualization appears clear and simple. However, if the quadrants would visualize the data set used to empirically test the typology, the picture is likely to be different. While it is easy to show that some firms are larger than others simply by adjusting the size of the symbol for each firm to the company size, it also offers to opportunity to position the firms closer or further away from the other quadrants. Hence, even mixed types may appear, for example when a supplier is in a transition period between quadrant II being a collaboration specialist or IV, being a technology specialist towards quadrant III. However, a SMM manager may ask how the transition is possible by simply considering the option of four

supplier types and identifying which type the company currently represents. In order to become a problem solving supplier, it may be necessary to merge with another supplier, which offers complementary knowledge and capabilities.

The authors state that the strategic supplier typology supports both customer firms' decisions as well as strategy forming for suppliers. In order to add to the practical usability of each typology, and thus increase its relevance, it would have been helpful to position exemplary firms in the typology, as one could have learned a lot by visualizing the size of the suppliers, the degree of fit in the ideal type section, as well as the dependency or stickiness of the relationship at one glance. The typology enables insights as to which suppliers may not be the most suitable for innovation, but does not include insights on trade-offs regarding the total costs between the choosing one supplier type over the other.

Insights derived from the Typology's Evaluation

The typology developed by Kaufman et al. (2000) offers helpful guidance for both supplier and customer firms aiming for strategic customer-supplier partnerships, with a specific focus on product and process innovation. The novel approach of including both the customer and supplier perspective along two dimensions, collaboration and technology, allows for broad applicability across industries. The core message derived from and communicated with the typology is that specialized suppliers are associated with innovation. We can learn about three crucial aspects regarding typology building and the practical applicability of typologies in management from the analysis of the strategic supplier typology.

First, and in order to start constructing a typology, it is necessary to identify the right scope of a typology. Kaufman et al. (2000) aimed at constructing a strategic supplier typology valid not only for the auto industry, but one that is applicable across industries. Furthermore, the authors sought to include both the perspective of customers and suppliers. Hence, the scope of a typology should clarify its target audience, its main proposition or insight, and its various uses or benefits.

Second, the empirical test conducted by Kaufman et al. (2000) enhanced the rigor of the typology by adding evidence not only for the existence of the types, but furthermore allowed to generate additional insights regarding the size and total number of suppliers in each quadrant. We would thus suggest collecting empirical evidence for a typology's categories, as not only support may be found, but limitations as well. Further empirical tests of the typology could answer questions related to the location, performance, partnership endurance and innovation success, as well as the satisfaction of the parties involved, which may as well contribute to a further focused typology of strategic suppliers. In a relatively general typology many practical questions will usually remain unanswered.

Third, a careful visualization generally improves the usability and memorability of a typology. In our example, Kaufman et al. (2000) may have used the opportunities of the

chosen visualization form by visualizing also the size of companies, the number of total firms for each quadrant, as well as the exact location in each quadrant. Therewith also the rigor of the typology would have been enhanced, as one could have clearly visualized that there are no mixed types, which would be located in between two or more quadrants. In addition, the authors could have followed the conventional matrix design and placed the cell that is high on both dimensions on the top right. This would have increased the usability of the typology. To summarize our evaluation of this typology, we describe its characteristics using the typology quality criteria discussed in section 3 in Table 2.

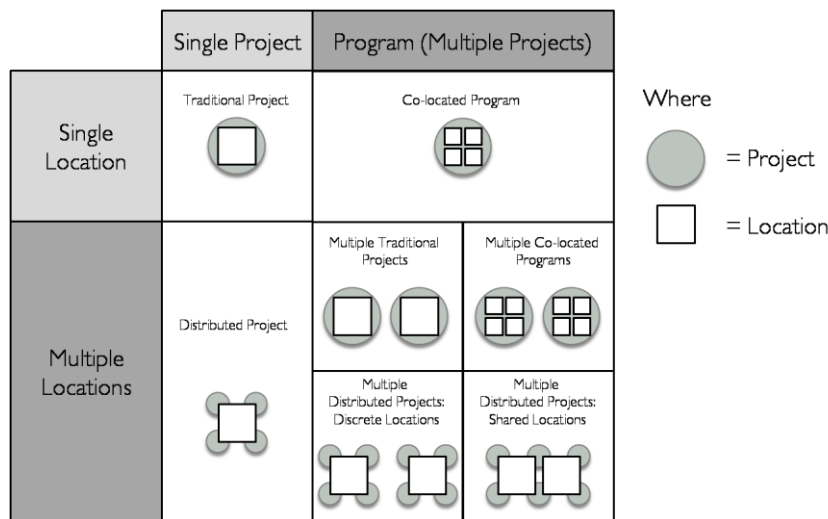
Table 2: Evaluation Summary of the Typology's Rigor and Relevance Aspects

Rigor of a Management Typology	Relevance of a Management Typology
<p>Explicit classification principle:</p> <ul style="list-style-type: none"> • Categorization dimensions derived from relevant and established theory in the field (relation-based school). 	<p>Simplicity:</p> <ul style="list-style-type: none"> • Simple structure with four quadrants only.
<p>Difference:</p> <ul style="list-style-type: none"> • The typology describes and empirically tests ideal types which differ substantially. 	<p>Visual clarity:</p> <ul style="list-style-type: none"> • Adequate graphic visualization for the four ideal types is provided. • Limitation: the high-high quadrant is not positioned in the top right quadrant • Size dimension is not used to make typology more informative.
<p>Defined scope:</p> <ul style="list-style-type: none"> • The scope of the typology and its dimensions is focused on innovation at the firm level, reflected in the combination of organizational attributes of the idea types. • The scope is broad, showing few, rather large differences between ideal types. 	<p>Usefulness:</p> <ul style="list-style-type: none"> • The typology addresses the practical need of finding the right supplier for specific innovation needs.
<p>Membership:</p> <ul style="list-style-type: none"> • Membership is clearly defined by the focus of the supplier type. • There are no unrelated or rest categories. 	<p>Typicality:</p> <ul style="list-style-type: none"> • Typical attributes are used to describe the ideal types. • The differences between the suppliers are highlighted in the typology.
<p>Clear group boundaries:</p> <ul style="list-style-type: none"> • Clear group boundaries with mutually exclusive, collectively exhausting boundaries. 	<p>Unique and unambiguous labels:</p> <ul style="list-style-type: none"> • The labels chosen are clear and distinct, highlighting the major differences between the ideal types.

5. Example Two: A Project Typology

Typologies in project management can provide useful orientation and overview to researchers and project managers alike. This particular article deals with the topic of how emerging trends are changing the way projects are organized and managed, creating new challenges in project management research and practice. Traditionally, project management has focused on the management of projects in a single location either within one organization or among two or more organizations. In their article, Evaristo and van Fenema (1999) propose a classification of project types based on the number of projects and sites involved and investigate the consequences of such schema for project management (see Figure 2).

Figure 2: Project Management Typology (Evaristo & van Fenema, 1999)



Description of the Typology

Evaristo and van Fenema (1999) develop a new classification of projects and propose to use two dimensions. The first dimension is single versus multiple projects, whereas the second dimension indicates the number of sites that a project encompasses. A site is defined as a physical location or a set of physical locations that are close to each other and where professionals are located who are involved in the project. One project can be performed in several sites concurrently, as long as the corresponding actions share the same objectives. The two dimensions form a matrix with four cells and seven characteristics. The outcome of this matrix is a set of seven different types of project management. They can be described as follows:

The most common project type, the traditional project management is one single project which takes place at a single location. The only difference to the so called co-located program is that multiple concurrent projects take place that are, however, still operationally located in a single geographical place. Multiple co-located programs regard cases when multiple sets of projects are located in geographically distant sites. The characteristic of

multiple traditional projects is that there are multiple projects, but only one project in each site. The cases where a single project is distributed among multiple locations are called distributed projects. The equivalent type – with the exception that there are multiple projects distributed over different locations – is called multiple distributed projects.

In the second part of their article the authors raise the question of how likely it is that those project forms may evolve with business needs, time, and the availability of better information technology tools. They propose likely paths where this evolution may happen and make predictions about which change path is easier for a company involved in project management that decides to change from one project type to another. Their observation is that a project can evolve from one site to multiple sites or from one project to multiple projects but not both concurrently. Predictions on what paths are more likely add value for two reasons: One, because whichever techniques are developed or adapted to the new situations can now take that evolution into consideration and two, because there is a knowledge gap to move from one project type to the next. In some evolution paths, this gap is apparently too wide to be bridged and therefore the likelihood of failure is considerably higher.

Evaluation of the Typology regarding Rigor

The theoretical basis for the dimensions of the typology is rooted in existing project management literature. The model comprises two core dimensions capturing the essence of new challenges to project management. Those challenges are raised by virtual projects which involve people cooperating from internationally distributed sites and even different organizations (Adams & Adams, 1997; Odenwald, 1996).

The formal goal of a classification is to both minimize within-group variance and maximize between-group variance (Bailey, 1994). If we remind ourselves of the before mentioned example with the two different-sized companies, we clearly see that the criterion of group homogeneity is not yet achieved. Projects of different sizes differ too much from each other and their specifications are too heterogeneous that they could be considered members of the same group (for the purpose of addressing them with the same project management approach). This conclusion is supported by the differing degrees of formality of these types of projects: The larger a project is and the more people are involved in it, the higher the degree of required formality in management tends to be. In simpler terms: the lower the number of resources which contribute to a project, the more informal its management approach. This heterogeneity makes it very hard, if not impossible, to derive common applicable management techniques from the typology. If this typology is intended to give project managers guidelines on how to manage projects which either take place at multiple locations, or give them advice on how to manage several projects at the same time, then this classification will be in fact too generic. As mentioned before, the prerequisites and the challenges for small versus big projects simply differ too much. Perhaps the authors' quest for simplicity leads to the neglect of such important variables as project size or

organizational boundaries of a project. The graphic format and corresponding constraints of a matrix may have contributed to this fixation on two attributes only.

Evaluation of the Typology regarding Relevance

When we develop typologies in the management context, we have to be aware of the final purpose for which the classification will be ultimately used. The attributes we choose should be guided by the needs and constraints of the application context. They will differ dramatically based on their main purpose: a typology can be used as a tool to explain causes or make predictions or only to distinguish types for clarity's or overview's sake (see Doty & Glick, 1994; Rich, 1992). In applied management theory, the attributes of a typology will most likely be used as a systematic foundation for management decisions. For example, to analyze competitors, assess opportunities or, identify gaps. Let us thus look at the implications of the proposed typology for managerial decisions and actions as an evaluation strategy. This can give us a better assessment of the merits of the proposed typology for project management.

The proposed project typology unambiguously adheres to the criterion of clarity. The focus on the two dimensions 'number of projects' and 'number of sites' is simple and the attributes used are easy to understand. This is also due to the simple and familiar structure of a matrix based on two juxtaposed attributes. The dimension number of projects consists of the two categories single projects and multiple projects managed concurrently (Payne, 1995; Van Der Merwe, 1997). As most projects discussed in the project management literature fall under these two categories, the criteria of Jacob (2004) to derive the dimensions from established and relevant theory in the field is fulfilled. The problems identified within the seven types always deal with the problems of resource allocation and communication, emerging from the fact that a project either has several sites or a manager has to coordinate multiple projects. The distinction among different types of projects suggests that different techniques may need to be developed to deal with the added complexity embedded in the projects. However, limiting the dimension of location to geographic distance may be somewhat short sighted. Distribution of projects does not necessarily imply that they have to take place at a geographical distance. If one thinks of a large company with various business divisions, the inter-divisional aspect might play a more dominant role than the pure geographic aspect. A company often has different business divisions as a result of mergers and acquisitions or because the company operates in different business areas. Those divisions therefore do not share a common past and, most of the time, have a different culture. Communication between divisions, combined with complex boundaries of areas of responsibility might make communication and coordination efforts more difficult than intra-divisional, even between different locations. It nevertheless cannot be denied that the expected future predominance of physically distributed projects makes it essential to understand the problems and possible solutions associated with them. According to Meyer (2007), relevance is one of the four criteria that a good typology has to

fulfill. This means that only the most influential items should be included and that the focus on important attributes should be weighted higher than completeness. But the aforementioned reduction of the project location to a geographic location is overly reductive at the expense of relevance. The typology thus does not score high on the relevance dimension.

Using the number of projects as the other dimension poses some problems as well. Besides the fact that most companies are running more than one project at the same time, the size of a project in terms of resources and budget might most likely be a more significant determinant for potential problems or program management techniques. To illustrate this, it's best to imagine a small and a large company: They both execute several projects at their headquarters. While the program manager in the small company runs several small projects with little resources and low complexity, the responsible at the large company supervises various important projects. According to the proposed typology – as they both take place at a single location and encompass more than one project – they would both be called co-located programs. The difference in size of the projects though makes it difficult to assume that they face the same kind of problems and consequently require for the same management skills and techniques. The increase in complexity originates in the complexity of each project rather than in the counted number of projects. Consequently, the granularity of this typology is somewhat low to be of high usefulness. Evaluating the quality of a typology can thus not be done simply on formal terms, as this example shows. One has to address the reality supposedly mapped by the typology and scrutinize the classification in this way. This and other insights derived from the project typology are discussed below.

Insights derived from the Typology's Evaluation

Our evaluation of this typology, based on its ultimate use and key classification quality criteria, reveals that – while it has merits in clarifying crucial project differences in terms of project number or locus – it falls short with regard to completeness and relevance, as well as its discriminatory power. What we can learn from this example regarding typology building for management theory is, in our view, fourfold: As a first lesson learned or classification imperative one should always look at each individual classification attribute to see whether it can really fully capture the most relevant part of the described phenomenon, as in our analysis of the location attribute above. Sometimes, this may lead to splitting up a single classification attribute into two or more attributes, which then capture the vital aspects of a phenomenon more accurately. Second, we advocate the use of real-life (counter-) examples, as our contrast between a large and a small organization above showed, in order to test the discriminatory power of a typology for management. If a typology fails to discriminate among radically different examples that have differing action or decision implications, then it must be revised.

Third, a classification should always be 'test-driven' in different application contexts to examine its ultimate added value or where it may require a refinement regarding its

attributes. This can lead to additional evidence for the typology’s merit that may even be included in the subsequent publication. Fourth, one should – in the development stage of a typology – actively experiment with different graphic representations of the typology, in order not to commit too soon to the constraints of a given visualization format, like the two attributes limitation of the matrix structure in the above project management typology. Applying these simple procedures can ultimately improve the quality of a typology in applied management theory. The findings are summarized in Table 3.

Table 3: Evaluation Summary of the Typology’s Rigor and Relevance Aspects

Rigor of a Management Typology	Relevance of a Management Typology
<p>Explicit classification principle:</p> <ul style="list-style-type: none"> • Categorization dimensions derived from relevant and established project management literature. 	<p>Simplicity:</p> <ul style="list-style-type: none"> • Quite simple structure with four main quadrants, and a divided quadrant on the bottom right.
<p>Difference:</p> <ul style="list-style-type: none"> • The typology describes different types of project management which differ in terms of number of projects and location and proposes likely paths of evolution of the project types. 	<p>Visual clarity:</p> <ul style="list-style-type: none"> • Adequate graphic visualization for the seven identified types is provided. • Limitation: the quadrant on the bottom right is divided into four sub-groups. • Constraint on two dimensions imposed by the matrix format may be too narrow.
<p>Defined scope:</p> <ul style="list-style-type: none"> • The scope of the typology and its dimensions is focused on the number of projects and the number of locations. • The granularity is somewhat low to be of high usefulness. 	<p>Usefulness:</p> <ul style="list-style-type: none"> • The typology clarifies crucial project differences in terms of project number or locations. • The typology might be too generic for project management purposes.
<p>Membership:</p> <ul style="list-style-type: none"> • Membership is clearly defined by the focus on the two dimensions number of projects and number of locations. • No unrelated/ rest categories. 	<p>Typicality:</p> <ul style="list-style-type: none"> • Typical attributes are used to describe the different forms of project management.
<p>Clear group boundaries:</p> <ul style="list-style-type: none"> • Clear group boundaries with mutually exclusive, collectively exhausting boundaries. • But: Criterion of group homogeneity is not achieved. 	<p>Unique and unambiguous labels:</p> <ul style="list-style-type: none"> • The groups are distinctly and clearly labeled and self-explanatory.

Conclusion and Implications

Typologies can be extremely useful research contributions for both theory development and for managerial practice. Treating the creation of a typology as a genuine research method per se is a first step towards making typologies better contributions to management science. To unleash their full potential, however, typologies must meet certain quality criteria. The traditional criteria of rigor and relevance are still applicable to this type of qualitative research instrument, but they require a careful and differentiated application, as exemplified above. Regarding the relevance dimension, typologies need to be devised with a clear end in mind. The drawn distinctions must be differences that make a difference (to management researchers or practitioners). It was the great pragmatist, methodologist and educator John Dewey (1920) who articulated this need in his 'Reconstruction in Philosophy': "Things have to be sorted out and arranged so that their grouping will promote successful action for ends. Convenience, economy and efficiency are the bases of classification." This quote is still a useful guideline for researchers developing management-bound typologies. But besides this general guideline, further criteria need to be considered and applied, such as those related to rigor, i.e., a clearly delineated scope, replicable inclusion and exclusion rules etc. In the following, we provide a short summative checklist derived from the criteria review above and the insights derived from the two evaluated typologies. They can guide researchers who employ conceptual typologies as one of their research tools. We thus recommend closely evaluating existing typologies using the following minimal quality attributes and guidelines:

Typology Rigor

- **Explicit Classification Principle:** Make the applied classification principles explicit and motivate their choice through both existing theory (rigor) and managerial needs (relevance).
- **Difference:** Focus on differences among items that make a difference. Highlight crucial distinctions that have analysis or action implications. Choose attributes that maximize the relevant differences within and between groups.
 - **Defined Scope:** Clearly delineate and explain the scope of the developed typology.
 - **Membership:** Define explicit and exhaustive (unambiguous) rules for allocating items to groups.
- **Clear group boundaries:** Define the boundaries of groups by specifying what is beyond their limits.

Typology Relevance

- **Simplicity:** Make the structure of your typology as simple as possible, while paying attention not to impose unwanted constraints on the ensuing grouping.
- **Visual Clarity:** Give the typology an accessible, fitting and memorable graphic representation. Do not choose a format prematurely and consider its constraints (affordances) and effects on the groupings. Experiment with different formats before

deciding on a definitive graphic form, such as matrices, trees, Euler or Venn diagrams, cubes, etc. Use the visualization of the typology as a tool to identify additional insights about the groups.

- **Usefulness:** Keep the uses or main benefits of the typology in mind. Who is your main audience - scholars, practitioners or both? How will they most likely use the proposed typology?
- **Typicality:** Highlight typical members or attributes of each group to make it more easily understandable.
- **Unique and unambiguous labels:** Make sure all group labels are clear, self-explanatory and clearly distinct from one another.

Keeping in mind the potential risks and limitations of typologies, future research should focus on elaborating and testing these guidelines. Another research avenue consists of developing visualizations suitable to represent typologies for different purposes, i.e. matching representation types such as matrices or tree structures with typology purposes, constraints, and contexts. Typologies are still too often seen as self-evident starting points and are presented without any indication regarding procedural standards. Our contribution has prepared the ground for a wider consensus on the key quality criteria for research-based typologies. We have compiled and applied quality attributes and corresponding guidelines to foster the rigor and the relevance of a typology. If these guidelines are respected and further developed, then typologies can unleash their full potential and move from a currently minor research tool that is often only seen as a preliminary step, to a main stream and generally accepted research method with high theoretical and practical value.

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