A Critical Review of the Science and Practice of Competency Modeling
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Abstract

As an alternative to traditional job analysis, the practice of competency modeling may be appealing to scholars and practitioners of human resource development (HRD) to serve as the foundation for many HRD activities. Among some of its advantages are a more explicit focus on performance and development that is aligned with organizational strategy, fuller integration with human resource systems, and a focus on broad work roles and functions instead of discrete jobs. Unfortunately, the use of competency models is often hindered as a result of conceptual ambiguity, a lack of methodological rigor in the development of such systems, and psychometric issues. The current integrative literature review seeks to clarify the practice of competency modeling within the context of HRD through a critical analysis of its foundations, conceptual and definitional issues, and potential barriers to use while providing the current state of the science and best practices.

Keywords

competency modeling, competencies, work analysis

Although the practice of job analysis has long been perceived as a fundamental prerequisite to many organizational activities (e.g., selection, performance appraisal, training and development; Sackett & Laczo, 2003), some have noted that the practice may be largely outdated given the vast changes that have occurred within the business environment in recent decades (e.g., Lawler, 1994; Schippmann et al., 2000). Specifically, these authors have pointed to the replacement of jobs by more flexible and boundaryless work roles, increased competition and fast-paced change from globalization, and
flatter, more adaptable organizations. Within this same context, the practice of competency modeling has become increasingly popular, frequently as an alternative to traditional job analysis (Schippmann et al., 2000). The appeal of competency models largely stems from the explicit focus on deriving high-performance behaviors from organizational strategies and goals, often using the organization’s own language to generate buy-in and enhance ease-of-use (Campion, Fink, Ruggeberg, Carr, Phillips, & Oldman, 2011). Despite the potential benefits, however, the science of competency modeling has often lagged behind the practice. As a result, competency modeling has suffered from a large degree of conceptual confusion, a lack of methodological rigor, and dubious psychometric quality (Schippmann et al., 2000).

The current integrative literature review seeks to clarify the practice of competency modeling through a critical analysis of its foundations, conceptual and definitional issues, and potential barriers to use, while providing the current state of the science and practice. Such a review is warranted largely due to the fact that, despite continued conceptual confusion and potential issues, competencies remain popular and continue to form the basis for a wide range of human resource development (HRD) activities, such as assessment centers (e.g., Chen & Naquin, 2006), employee development and training (e.g., Rothwell & Lindholm, 1999), career development (e.g., Gfroerer, 2000), leadership development (e.g., Naquin & Holton, 2006), managing organizational change (e.g., Vakola, Soderquist, & Prastacos, 2007), and the alignment of multiple HRD functions (e.g., Gagani, McLean, & Braden, 2006; Iles, 1993; Meriot, 2005). Despite the potential appeal among HRD scholars and practitioners, however, there has been little examination of what competencies are, how they should fit into an overarching competency model, and what the best practices for developing that model ought to be (for an exception, see Le Deist & Winterton’s, 2005, competency typology); for instance, fewer than 40 scholarly sources matched a recent keyword search for competency modeling and HRD, and of these, only a scant handful speak to understanding the process of competency modeling. Instead, the focus tends to rest largely downstream on the development and training systems for which competencies serve as the foundation. This review attempts to shift the focus back on the development of competencies and competency models by reviewing and integrating the literature on competency modeling from across multiple fields of study and demonstrating how those lessons may be applied to the field of HRD.

**Research Aims and Method**

In the sections that follow, the practice of competency modeling is critically reviewed along four key dimensions. First, the historical background and early development of competency modeling is considered to better understand its foundations and the way in which these early efforts have contributed to current challenges. Next, issues related to the conceptual clarity of competency modeling are addressed, as this aspect remains one of the chief obstacles in terms of advancing science and theory. These sections will expand on previous efforts (e.g., Le Deist & Winterton, 2005; Schippmann et al., 2000)
aimed at understanding what a competency is, what competency modeling is and does, and how the practice ought to be used. A third aspect that warrants discussion is the psychometric quality of inferences in competency modeling applications. Finally, practical issues related to competency modeling will be addressed, including legal defensibility, integration into human resource systems and development. In following this roadmap, the overarching goal will be to establish the current state of the science in comparison both to typical and best practices, and address the implications for HRD.

To comprehensively address the various aspects of competency modeling practice identified above, a thorough review of the literature was conducted using multiple approaches. First, broad searches were conducted using electronic databases, including PsycINFO, Business Source Premier, and ABI/Inform. In all three of these databases, the search string “competenc* model*” was used to provide broad spectrum coverage of the various terms that may have been used by authors, such as competency models, competencies modeling, competence model, and so forth. The two terms were used in tandem in an attempt to avoid sources that referenced competencies in ways that were unrelated to competency modeling. Search results were also restricted by date, using the publication date of McClelland’s (1973) work that introduced the modern notion of competencies; by type, returning only peer-reviewed or scholarly sources; and by language, restricted to articles written in English.

From this basic search, PsycINFO returned 1,309 results, Business Source Premier returned 467 results, and ABI/Inform returned 186 results. To locate potentially relevant sources among these results, a review of titles and abstracts was conducted that used the following exclusion criteria: development of competencies in fields unrelated to organizational settings (e.g., developmental psychology, clinical assessment, health care and aging, cultural or social competence); descriptions of specific competencies, and/or in relation to specific contexts, rather than speaking to the broader practice of competency modeling; competency models beyond the level of the individual (e.g., organizational competencies). Inclusion criteria, on the other hand, involved competency modeling best practices or current practices, either from a scientific or applied perspective; competency models applied to a wide range of organizational activities (e.g., human resource development, selection, training, assessment); and conceptual or review articles focused on definitional issues related to competency modeling, including typologies and operationalizations.

This first screening resulted in roughly 50 articles with relevance to the practice of competency modeling. Several additional search strategies were then used to supplement these results. To capture relevant articles not found using keyword search strategies, as well as to capture scholarly or edited books and chapters, the reference lists of the collected articles were manually reviewed. Additionally, searches were conducted using the Web of Science Cited Reference Search to identify recent articles that have cited popular sources within the competency modeling area, using for example, Schippmann et al.’s (2000) task force report and Lawler’s (1994) article as the cited sources. Finally, a broad search using the same terms noted above was run using Google Scholar to capture any remaining relevant books and articles. These strategies
yielded an additional 16 sources (a complete list of these sources, including those not directly cited in the current work, is available from the author upon request).

**A Historical Look at Competencies**

Prior to addressing the conceptual ambiguity that surrounds the modern practice of competency modeling, it is perhaps useful to first understand the way in which the practice has historically developed. The origin of competency modeling is commonly credited to the work of David McClelland (1973). In spite of several flaws in the original paper (e.g., failure to explicitly define what a “competency” is; lack of presentation of empirical support in favor of competency testing, criterion sampling, or the assessment procedures of either; presentation of evidence that on reexamination contradicts primary assertions; ignoring evidence in support of traditional assessments, such as intelligence; Barrett & Depinet, 1991), McClelland’s thinking remains highly influential. Indeed, several aspects merit additional consideration as they not only highlight the initial development of competency modeling but also provide a degree of foreshadowing for the challenges that competency modeling has faced.

Criticizing traditional tests of intelligence and personality traits for their inability to effectively predict and capture performance outside of educational contexts, McClelland (1973) instead advocated a system of competency-based testing. At its core, this competency-based approach emphasizes the importance of criterion sampling to effectively capture the behaviors that differentiate good performance from poor performance, and then incorporating those criterion samples or “competencies” into the testing process. Recognizing that overly specific criterion samples would quickly become too numerous to be useful when multiple occupations are considered, McClelland (1973) advocated the use of competencies that were broader and would be “more generally useful in clusters of life [and job] outcomes,” such as communication skills or moderate goal setting (p. 9). Interestingly, the term competency appears to be used at times to refer to the output from the criterion sampling process (e.g., a demonstrable behavior) and at others to refer to cognitive skills (e.g., reading, writing, calculating) and personality traits (e.g., patience). This early conceptual confusion unfortunately will continue to be reflected throughout the course of the development of competency modeling (Schippmann et al., 2000).

McClelland also explicitly acknowledged the critical role that a detailed analysis of the work to be performed should play in developing competencies. To know what effective performance is, he noted, one is required to find out what an individual actually does through a “careful behavioral analysis of the outcomes” and the tasks an individual completes (McClelland, 1973, p. 8). The resulting criterion samples of effective performance can then be incorporated into tests in the form of competencies to be demonstrated. The advantage to this process lies in creating a direct link between behavioral competencies and performance outcomes, rather than relying on inferences drawn from certain trait or intelligence factors (McClelland, 1973). In turn, this link contributes to the overall face validity of the competency-based test and provides individuals with a clearer sense of the required levels of performance that need to be
developed. Unfortunately, it will become clear that contemporary practice has often faltered in terms of validly linking competencies to performance through such rigorous work analyses (Schippmann et al., 2000).

Although McClelland’s (1973, 1994) work has had much influence on the development of competency modeling, two related areas of research must also be acknowledged for their contributions: understanding and assessing managerial performance; and the development of core competencies at the organizational level (Prahalad & Hamel, 1990). First, the process of understanding and assessing managerial performance has provided fertile ground for thinking in terms of competencies, rather than tasks. The work of supervisors, managers, and executives typically involves more “soft” (i.e., interpersonal) skills, fewer directly observable behaviors, and requires more adaptability in response to changes in the internal and external environments. Such complexity tends to preclude the use of traditional job analysis, which is often task- or activity-focused (Sackett & Laczo, 2003). Instead, researchers began to develop alternative methodologies, including the critical incident technique (Flanagan, 1954) and the related behavioral event interview (Boyatzis, 1982), to capture behaviorally based dimensions of managerial and supervisory performance. Closely related to the developments in the area of job analysis for managers, leadership assessment centers also began to arrange managerial performance into broad behaviorally based dimensions (Bray, 1982; Finkle, 1976) as an alternative to focusing on tasks. Taken together, both of these developments illustrate the growing influence of taxonomies of broad managerial characteristics or competencies, helping to bring the attribute-focused nature of competency modeling into the mainstream (cf. Schippmann et al., 2000).

Prahalad and Hamel’s (1990) introduction of core competencies can be seen as further contributing to the mainstream popularity of competency-based thinking as well as cementing the importance of organizational strategy within competency models. In contrast to the form of competencies discussed thus far, core competencies exist at the organizational level of analysis and are characteristics that allow an organization to rapidly adapt and innovate (Prahalad & Hamel, 1990). As Schippmann et al. (2000) suggest, the increased focus on organizational competencies in the popular presses, and the increasing speed of changes in the world of business, likely encouraged a parallel increase in interest for individual competencies that could support the development of an organization’s strategy and core competencies (e.g., Lawler, 1994). Despite the surge in popularity, however, the continuing lack of a strong empirical foundation has resulted in a number of criticisms and challenges to the use of competency modeling as a sustainable tool (Rowe, 1995; Schippmann et al., 2000). In the sections that follow, competency modeling and its challenges are evaluated, beginning with an attempt first to clarify some of the conceptual ambiguities surrounding the practice.

**Toward Conceptual Clarity**

Despite some initial theoretical grounding, competency modeling has typically suffered from a good deal of conceptual confusion, due in part to the number of diverse
traditions that have informed the practice (e.g., assessment centers, job analysis; Schippmann et al., 2000); different uses of the term in different cultural contexts (e.g., United States, United Kingdom, mainland Europe; Le Deist & Winterton, 2005); issues related to defining competencies at multiple levels of analysis and specificity (Meriot, 2005); the wide use of the term “competency” in the general lexicon; and as practitioners began to adopt the practice ahead of the science (Schippmann et al., 2000). As researchers have caught on, however, more attempts have been made to reach some form of consensus about how to define and implement competency models (e.g., Campion et al., 2011; Sanchez & Levine, 2009). Providing a framework around which this research can be organized, three interrelated dimensions will be addressed: form (“what is it?”); function (“what does it do?”); and appropriate use (“how ought it to be effectively used?”). The question of form will consider the ways in which competencies, as the chief component of competency modeling, have been defined and operationalized. This question is distinct but related to the question of function, or the role competency modeling does or should have within organizations. Finally, issues related to appropriate use and implementation are considered, reviewing best practices that are both theoretically and empirically based.

What Is a Competency?

As an appropriate starting point, the conclusions of the Society of Industrial and Organizational Psychology (SIOP) Job Analysis and Competency Modeling Task Force (Schippmann et al., 2000) are considered. Their report summarizes the results of a literature review of common definitions along with the perceptions of subject matter experts as to what a competency is. While the short answer is an apparent lack of consensus even among experts, a deeper analysis suggests several dimensions along which the definitions tend to differ. First, and perhaps most evident, are the differences in whether a competency should represent some combination of knowledge, skills, abilities, and other characteristics (KSAOs) or is more accurately thought of as a behavioral measure or capability. The second aspect pertains to the breadth of what is included in a competency. While some argue for basic knowledge, skills, and abilities (Mirabile, 1997), others advocate broader conceptualizations, including motivation, beliefs, values, and interests (e.g., Chen & Naquin, 2006; Fleishman, Wetrogan, Uhlman, & Marshall-Mies, 1995), or motives, traits, self-concepts, attitudes, and values (Spencer, McClelland, & Spencer, 1994). Finally, the definitions tend to differ in the degree to which they explicitly acknowledge the differentiating potential of competencies for high performers (Mirabile, 1997), or as being merely useful in achieving work objectives (e.g., adequate performance; Green, 1999). The differences noted above led Schippmann et al. (2000) to conclude that the term competency may have “no meaning apart from the particular definition with whom one is speaking” (p. 706).

A worthwhile question then becomes assessing the extent to which the field has evolved since the Task Force’s report was published nearly 12 years ago; has the conceptual confusion worsened, improved, or remained in stasis? In forming an answer,
an updated list of commonly cited “competency” definitions was generated based on a review of the business and psychology literatures (see Table 1). First, the question of whether competencies are appropriately thought of as KSAOs or behavioral capabilities seems to have been resolved by the majority of sources, acknowledging that both ought to be included as distinct aspects of competencies. For example, Soderquist, Papalexandris, Ioannou, and Prastacos (2010) have developed a typology that, in addition to dimensions for management versus functional and general versus specific competencies, differentiates between skill-based and behavioral competencies. Second, the breadth of competencies also seems to have somewhat solidified around conceptualizations of KSAOs (as opposed to pure knowledge, skills, and abilities, or KSAs), although other characteristics have also been added that did not appear in Schippmann et al.’s (2000) review. For example, Athey and Orth (1999) include characteristics at higher levels of analysis (i.e., team, organization), in line with the alignment function between individual and organizational competencies, and several have included process variables as well (e.g., Bartram, 2004; Athey & Orth, 1999). Additionally, in a recent review of both European and US conceptualizations of competency, Le Deist and Winterton (2005, p. 39) suggest a metacompetence aspect, as one that “facilitates the acquisition of the other substantive competences” such as cognitive (knowledge) competence, functional (skills and abilities) competence, and social (behaviors and attitudes) competence. Finally, it is worth noting that the definitions collected here reflect a greater emphasis on high levels of performance and effectiveness, perhaps reflecting the growing need for effectively managing human capital in increasingly service-based economies, and the role of competencies within such environments. This trend is particularly relevant to HRD and its focus on human performance and development.

Revisiting Schippmann et al.’s (2000) original conclusion, it may yet be the case that the specific definition—or perhaps more accurately, operationalization—of a competency will change depending on with whom one is speaking; however, the basic parameters within which that competency is established—the definition, so to speak—seem now to be agreed on by a majority of the field. One caveat that is worth noting in the above comparisons, however, is the lack of applied perspective to corroborate the more recent list of definitions in the literature. In the absence of subject matter expert interviews, however, several of the available definitions that were selected are provided by practitioners in applied-focused outlets (e.g., Hayton & McEvoy, 2006; Parry, 1996, 1998), although they should likely be understood as optimal as opposed to typical illustrations. With a clearer consensus and understanding of how competencies themselves are defined, the following section focuses more closely on the practice of competency modeling, particularly how it is used in organizations, and for what purposes.

**What Is Competency Modeling?**

At the most general level, the practice of competency modeling is described as an attribute-based form of work analysis, a family of techniques to which the largely...
activity-based technique of job analysis also belongs (Sackett & Laczo, 2003). Acknowledging that job analysis and competency modeling may be used interchangeably by some within the HRD field (cf. Burnett & Dutsch, 2006; Chen & Naquin, 2006), it is important to bring to light the ways in which the practices differ from each other, primarily as a way of understanding what competency modeling is (Campion et al., 2011; Sanchez & Levine, 2009; Schippmann et al., 2000). Although there are some differences in the frameworks that are used to compare job analysis and competency modeling, most authors tend to agree on a general distinction between the two practices. Job analysis tends to focus on describing work activities

Table 1. A Comparison of Common Definitions of the Term of Competency.

<table>
<thead>
<tr>
<th>Source</th>
<th>Definition of competency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athey and Orth (1999)</td>
<td>A set of observable performance dimensions, including individual knowledge, skills, attitudes, and behaviors as well as collective team, process, and organizational capabilities, that are linked to high performance, and provide the organization with sustainable competitive advantage.</td>
</tr>
<tr>
<td>Bartram (2004)</td>
<td>Sets of behaviors that are instrumental in the delivery of desired results or outcomes. Also, a repertoire of capabilities, activities, processes, and responses available that enable a range of work demands to be met more effectively by some people than by others.</td>
</tr>
<tr>
<td>Campion et al. (2011)</td>
<td>Collections of knowledge, skills, abilities and other characteristics that are needed for effective performance in the jobs in question.</td>
</tr>
<tr>
<td>Catano (1998); Soderquist et al. (2009)</td>
<td>The knowledge, skills, and abilities that underlie effective or successful job performance, which are observable, measurable, and distinguish superior from average performance.</td>
</tr>
<tr>
<td>Chen and Naquin (2006)</td>
<td>The underlying individual work-related characteristics (e.g., skills, knowledge, attitudes, beliefs, motives, and traits) that enable successful job performance, where “successful” is understood to be in keeping with the organization’s strategic functions.</td>
</tr>
<tr>
<td>H. C. Frese (interviewed in Hayton &amp; McEvoy, 2006)</td>
<td>A combination of skills, attitudes, and behaviors that an individual or an organization is competent at, that is, the ability to deliver, perform (a set of) tasks with relative ease and with a high level of predictability in terms of quality and timeliness.</td>
</tr>
<tr>
<td>Mansfield (1996)</td>
<td>A detailed, behaviorally specific description of the skills and traits that employees need to be effective in a job.</td>
</tr>
<tr>
<td>Parry (1996, 1998)</td>
<td>A cluster of related knowledge, attitudes, and skills that affects a major part of one’s job (i.e., one or more key responsibilities); that correlates with performance on the job; that can be measured against well-accepted standards; and can be improved via training and development.</td>
</tr>
</tbody>
</table>
as they currently exist, establishing typical performance for those activities, often
without addressing issues of alignment within the organization (Sanchez & Levine,
2009, 2012). Competency modeling, on the other hand, focuses heavily on future
roles that align with a strategic plan and defining maximum performance in those
roles through worker attributes. It may also exist at a range of levels of analysis within
an organization, from attributes common to a particular role to attributes of an occupa-
tional group or even an entire organization. At the highest level, competencies may
be used to guide the culture and competitive advantage of an organization (Martone,
2003; Ordóñez de Pablos & Lytras, 2008). Perhaps most importantly, the job-spanning
characteristic of competencies can be used to align human resource systems, rather
than relying on different systems for different functions and occupational groups
(Schippmann et al., 2000).

Campion et al. (2011) also illustrates some of the potential differences that have
contributed to the popularity of competency modeling over job analysis. For example,
competency models tend to be better at catching executives’ attention by using organi-
zational language and emphasizing high performance behaviors; take the form of
organizational development interventions with a top-down approach; and provide
models that are easily depicted or illustrated. Job analysis, on the other hand, tends to
be viewed much more as a mundane and technical task, whose applicability is typi-
cally limited to isolated human resource activities, rather than widespread organiza-
tional change and development. However, one must also acknowledge the shortcomings
that stem from these differences. Schipppmann et al. (2000) note the lack of method-
ological rigor in typical competency modeling practices; the only practice in which
competency modeling outscored job analysis was in terms of aligning business goals
and strategies. Otherwise, job analysis tended to exhibit greater rigor in terms of meth-
odology, completeness and detail of analytic context, as well as the validation and
reliability processes. Part of such rigor can be attributed to the objectivity of task state-
ments (as opposed to somewhat more subjective worker attributes), the difficulty in
forecasting the future through strategic planning, and the dominant measurement
approach within each practice. Whereas job analysis relies largely on a latent trait
approach, and its associated focus on measurement reliability and validity, compe-
tency modeling may best represent more of a global clinical judgment where multiple
constructs are represented in a single score (Sanchez & Levine, 2009).

Despite the tradition in the literature of contrasting competency modeling and job
analysis, these tools may be more similar in practice than portrayed in theory, which in
turn may be contributing to some of the confusion regarding what competency model-
ing is and does. Rather than treating job analysis and competency modeling as distinct
practices, for instance, it may make more sense to conceptualize them as variations of
a general framework of work analysis techniques. As several researchers have argued
(Sackett & Laczo, 2003; Schipppmann et al., 2000; Sanchez & Levine, 2012), the use
of specific techniques is largely dependent on the choices one must make given the
purpose of the analysis. Some of these choices may include a work- versus worker-
orientation, required level of specificity and detail, a descriptive versus prescriptive
approach, and utilizing KSAs versus KSAOs (Sackett & Laczo, 2003). Given these dimensions, a traditional job analysis would be the result of a detailed, KSA-focused, work-oriented, descriptive approach. On the other hand, a typical competency model would reflect a general, KSAO-focused, worker-oriented, prescriptive approach. Although there are minimal similarities between these archetypal scenarios, one might easily envision other combinations in which the work analysis attributes become more blended and the lines between competency modeling and job analysis are blurred. For example, a potential approach may require a worker-oriented approach that is focused on KSAs and is largely descriptive, while another may opt for a work-oriented approach that is more general and prescriptive. The full array of such possibilities led Sanchez and Levine (2009) to conclude that the “goals of TJA [traditional job analysis] and CM [competency modeling] may be confounded in field applications” (p. 53). With this understanding, rather than continuing to delineate differences between the practices, a more appropriate tack to achieve a greater conceptual understanding may be to briefly address the ways in which competency modeling activities are best practiced, including methods “borrowed” from job analysis.

**Conceptually Oriented Best Practices**

There are two broad domains of best practice recommendations that contribute to a greater understanding of competency modeling: identifying competencies and then building competency models. As should come as no surprise, especially given McClelland’s (1973) original recommendation, many scholars have advocated the use of traditional job analysis methods to identify competencies (Campion et al., 2011; Lucia & Lepsinger, 1999; Meriot, 2005; Rodriguez, Patel, Bright, Gregory, & Gowing, 2002). From a conceptual point of view, it is important to distinguish the separability of the data collection method from the practice of competency modeling, in that it is incorrect to assume that competency models inherently lack rigor from a methodological standpoint (Schippmann et al., 2000). Rather, in cases where job analysis methods are used appropriately (e.g., multiple methods for data collection, clear definitions of constructs, use of employee surveys), the resulting competency models may be just as valid as traditional job analyses. For instance, Lievens, Sanchez, and De Corte (2004) found that the addition of job analysis methods (i.e., task related information) increased the quality of inferences about competency requirements from job descriptions. Although this practice appears to be straightforward, competency modeling’s historical reputation as a “quick and easy” process conducted by individuals without much analytic training may work to the detriment of attempts to include more rigorous methods (Schippmann et al., 2000).

The second set of best practices concerns the construction of a competency model following the initial process of data collection. The basic “anatomy” of a competency when put to paper involves establishing a name or label, providing a detailed definition of that label in clear behavioral terms, and outlining detailed descriptions of varying proficiency levels (Campion et al., 2011). In following this formula, one is likely
to avoid common pitfalls that have traditionally led to confusion in understanding competencies. For example, one is less likely to implement models with overly broad or nonspecific competency buzzwords, such as “business awareness,” that tend not to relate to performance in any valid or measurable way (Sackett & Laczo, 2003). Relatedly, understanding the anatomy of a competency supplements earlier theoretical definitions of the concept by anchoring those definitions with specific and observable behavioral indicators. These behavioral indicators are also typically grouped into varying levels of proficiency, which can be either general (e.g., novice, intermediate, expert) or organizationally specific (e.g., System Analyst I, II, III). The inclusion of proficiency levels and their associated anchored rating scales allows competency models to be used directly in a wide range of human resource systems, including performance management, and development and training. Such scales may also be directly applied to the creation of assessment tools within selection systems (Lucia & Lepsinger, 1999) or assessment centers (Chen & Naquin, 2006). Conceptually, this aspect of the competency anatomy differentiates the practice from more traditional work analysis approaches.

There have also been a number of structures proposed to help conceptually organize and manage an organization’s competency system. Common forms have included approaches based on hierarchies (e.g., Ennis, 2008; Gagani et al., 2006; Lucia & Lepsinger, 1999) and typologies (e.g., Le Deist & Winterton, 2005; Soderquist et al., 2010). Soderquist et al.’s (2010) typology, for instance, allows an organization to organize job analytic data based on the extent to which competencies are focused on organizationally specific versus general characteristics, on managerial versus functional characteristics, or on behaviors versus skills. The benefit of using a typology to organize competencies allows an organization to appropriately balance different forms of competencies, for example, managerial and functional competencies for technical management roles. They also add to the growing recognition that competencies, as currently defined, include a wide range of individual and other attributes. In many ways, hierarchies simply extend the logic of typologies, arranging competencies types according to the extent that they are foundational or innate (e.g., personality, intelligence), progressing to more specific competencies that are acquired through education and work, and finally encompassing those that are industry, organization, and occupation specific (Ennis, 2008). This form of organizing competencies allows organizations to more easily identify which competencies may be required at hire versus those that can be developed through training, as well as providing a roadmap for the sequential development of competencies, from foundational to more specific attributes. Although these structures are intended to accomplish somewhat different objectives, they both illustrate the wide range of potential conceptualizations of competencies, as well as how those competencies relate to one another in the larger context of a competency system.

A consideration of these organizing structures, as well as the definitions and practices discussed earlier, tends to illustrate the forward progress that has been made toward resolving conceptual issues within competency modeling. Indeed, many of
Schippmann et al.’s (2000) recommendations for strengthening the practice of competency modeling seem largely to have been answered by this subsequent theoretical work (e.g., incorporate functional and technical competencies into models, match the level of specificity to the required application, and using multiple forms of descriptor content). In the following section, competency modeling is addressed from a psychometric rather than conceptual perspective, as this has also typically been a contentious domain.

A Psychometric Perspective on Competency Modeling

Although issues related to the conceptualization of competency modeling have by far dominated the research literature, a closely related topic that has begun to receive attention is the psychometric quality of competency models. There are at least two potential reasons why the validity and reliability of such models have come under question. The first is related to a general lack of methodological rigor and development. As the authors of the SIOP Task Force report note, “The majority of competency modeling efforts are unlikely to include any effort to evaluate the consistency and reproducibility of the results” (Schippmann et al., 2000, p. 725). Indeed, a review of several early practitioner recommendations (e.g., Green, 1999; Mansfield, 1996; Mirabile, 1997; Parry, 1996) reveals very little in the way of suggested validation strategies and assessments of reliability. Since the Task Force’s report, however, there is some indication that the tide has begun to turn, particularly as more individuals with formal training in work analytic methods have begun to develop competency models. For example, descriptions of rigorous methodologies and a focus on content validation procedures are provided by Rodriguez et al. (2002), documenting the development of the U.S. Office of Personnel Management’s (OPM) competency modeling system, and Catano, Darr, and Campbell (2007), describing a similar system for the Royal Canadian Mounted Police. In both cases, traditional job analysis methods (e.g., ratings of frequency and criticality by supervisors and incumbents, validation against actual or supervisor-rated performance, and assessments of the reliability) were applied to a competency model development effort to achieve psychometric soundness.

The second, more substantive issue pertaining to the psychometric quality of competency modeling involves the extent to which valid and reliable inferences can be drawn for competencies in the first place (e.g., Lievens et al., 2004; Morgeson, Delaney-Klinger, Mayfield, Ferrara, & Campion, 2004). The argument here is based in the thinking that specifying requirements for a job can be done either indirectly, where a series of intermediate judgment steps are completed (as in traditional job analysis), or directly, where requirements are estimated globally and without the help of such incremental judgments (as in competency modeling; cf. Morgeson & Campion, 2000). In the case of the latter, a “large inferential leap” is required when judging competencies from broad job descriptions and organizational strategy, typically resulting in lower levels of quality (Lievens & Sanchez, 2007, p. 813). For example, Morgeson et al. (2004) found that competency ratings were significantly more inflated.
than similar task-related statements, largely as a result of the inclusion of nonapplicable competencies. They proposed that this effect may be a function of the difficulty of observing and verifying competencies as opposed to tasks, as well as the opportunity on the part of the rater to engage in self-presentation processes. Lievens et al. (2004) also found support for the potentially low quality of competency ratings, operationalized as discriminant validity and interrater reliability. This effect, however, was less pronounced among experienced raters (i.e., supervisors, incumbents, HR professionals) than among inexperienced raters (i.e., students); that is, the former were less variable in their ratings and better able to discriminate among the relative importance of each competency across jobs.

While these results may suggest the dubious quality of competency ratings, several interventions have been proposed to maximize the psychometric soundness of such ratings. Based on the previous discussions, increased methodological rigor and the implementation of intermediate steps (e.g., frequency and criticality ratings, task information) in the inference process can both result in higher quality ratings. Furthermore, Lievens and Sanchez (2007) found that rater training can have a positive effect on the quality of ratings. Trained raters, compared to those that did not receive training, had higher levels of interrater reliability, made finer distinctions among competencies, and were more accurate in selecting essential versus nonessential competencies. Despite such safeguards, however, there is evidence to suggest that the quality of ratings may still vary based on the target job or cluster of competencies (Lievens et al., 2004; Lievens & Sanchez, 2007), potentially as a function of the observability of certain work. In examining this issue further, Lievens, Sanchez, Bartram, and Brown (2010) found that lower levels of interrater agreement may indeed be attributable to valid differences in how jobs are approached, varying as a function of idiosyncratic approaches to role definition, occupational complexity, observability, and the absence of external constraints. In light of such findings, the application of traditional psychometric standards to the practice of competency modeling may require additional consideration and development, particularly as its use in selection, promotion, and compensation systems increases. Although such rigor is certainly not required in all settings, the following sections address how psychometric concerns may emerge in applied settings and how the purpose of the competency model may affect the extent to which such concerns are relevant (cf. Sanchez & Levine, 2009 for arguments against “validating” competency models when used primarily as a strategy-based tool).

**Practical Applications of Competency Modeling**

The preceding discussion of the quality of competency inferences offers a fitting segue for considering the practical implications of the soundness of competency modeling in three broad domains: legal defensibility, whole-system integration, and HRD practices in particular. The first will consider the ways in which the practice of competency modeling stands up to current legal guidelines and recommended best practices. The second topic will then focus on the ways in which competency modeling is
best leveraged by aligning an organization’s human resource systems. Finally, the third will speak directly to the role of competency modeling within HRD.

**Legal Defensibility**

Consistent with a running theme in the previous sections, the practice of competency modeling does not inherently lack the type of methodological rigor required for legal defensibility. However, concerns should remain given that typical practice may yet differ from the recommendations provided in the literature (Campion et al., 2011; Hayton & McEvoy, 2006). As Singh (2008) notes, legal precedence in the United States (e.g., *Albemarle Paper Co.* v. *Moody; Griggs v. Duke Power Co.* ) has resulted in a trend toward thorough work analyses and documentation, both areas in which competency modeling practice tends to be lacking (Schippmann et al., 2000). Furthermore, the questionable psychometric quality of competency-based inferences, especially when certain safeguards are lacking (Lievens & Sanchez, 2007), may be worrisome given the emphasis in the *Principles for the Validation and Use of Selection Procedures* (Society for Industrial and Organizational Psychology, 2003) on establishing reasonable psychometric characteristics.

An additional consideration based in the *Uniform Guidelines on Employee Selection Procedures* (Equal Employment Opportunity Commission, Civil Service Commission, Department of Justice, & Department of Labor, 1978), requiring the documentation of a “business necessity” or “job-relatedness,” may emerge as a double-edged sword. While the link between certain competencies and business strategy and goals may satisfy this requirement more tangibly than a set of task statements (Campion et al., 2011), it may also be difficult to demonstrate that abstract competencies are in fact necessary for a given job or role (e.g., a results-focused orientation; Sackett & Laczo, 2003). It is also unclear at this point, the extent to which the predictions associated with strategic planning may be accepted by the courts as a valid and documented “business necessity” (Singh, 2008). Despite the clear potential for legal challenges to the typical practice of competency modeling, the proper use of rigorous methodology, safeguarding techniques, and documentation should allow a system to be legally defensible.

At this point, it is also worth mentioning that the extent to which a system must be legally defensible depends largely on its intended use. For example, an organization only using a competency model to influence behavior in strategic directions (e.g., as an organizational development or training intervention) will not require an extreme amount of thoroughness or validation processes (Sanchez & Levine, 2009). However, an organization wishing to use a competency model to align all of its human resource systems (e.g., selection, assessment, training, compensation) will be required to follow much more rigorous methods (Rodriguez et al., 2002). Other factors that will influence the amount of rigor with which a competency model is built may include the degree to which work is routinized and/or task based, and the potential for legal reviews to be brought (Schippmann et al., 2000). For example, if work is fairly routinized or a
competency model is being constructed for a highly litigious environment, it may be easier and safer to rely on more rigorous job analysis methods, or to include task-statements into the overall competency model. With any work analysis technique, the methods of competency modeling must match the purpose for which the results will be used (Sackett & Laczo, 2003; Sanchez & Levine, 2012), which is particularly true from a legal standpoint.

Alignment of Human Resource Systems

As mentioned in the previous paragraph, competency models may be designed for a number of purposes within the organizational context. Although some applications have focused on a specific use, like training (Parry, 1998) or assessment (Bartram, 2004; Chen & Naquin, 2006; Rothwell & Lindholm, 1999), the greater benefit from competency modeling is achieved by integrating multiple systems across a unified base (e.g., Iles, 1993; Lawler, 1994; Lee, Park, & Yang, 2010; Lucia & Lepsinger, 1999; Schippmann et al., 2000). In this manner, competency models remove the barriers that often arise between fragmented human resource functions, each of which may be relying on their own tools and languages; the competencies and their associated behavioral indicators become a common language across all functions (Campion et al., 2011). This process has the benefit of providing clear connections between hiring and promotion decisions, training and development curricula, and performance management expectations. Outside of the traditional functions, competency models can also be applied to organizational development programs within HRD, guiding and influencing the same behaviors that are rewarded by the human resource systems, and ensuring that those behaviors align with the organization’s larger strategy (Sanchez & Levine, 2009). When used effectively, these competency-based systems are able to provide organizations with a flexible and dynamic base for generating competitive advantage (Soderquist et al., 2010), or transformation into an adaptable “learning organization” (Athey & Orth, 1999).

Realizing these benefits, however, requires a best practice approach to competency model development. One challenge that needs to be addressed is maintaining the balance between applications that require specific competency information and those that may require only broad competencies (Lucia & Lepsinger, 1999). For example, performance appraisal and selection systems require highly specific data in order to delineate differences in performance levels among candidates. Organizational change initiatives or developmental goals, on the other hand, may work best with only a few, easy-to-remember keywords that will motivate behavior. To balance these needs, Campion et al. (2011) recommend establishing models with a fewer number of highly detailed competencies, and/or hierarchies of competencies and subcompetencies. In this manner, the competency model remains internally consistent, but can be somewhat customized depending on the range of desired uses. For instance, Rodriguez et al. (2002) describe the development of an integrated, competency-based human resource system, in which separate systems were designed for HR decision makers and for end
user employees. Although they were based on the same general competency model, the HR system provided the detailed information needed to manage the organization’s various human resource functions, while the end user system provided more general information that assisted employees in their own career development and self-assessment. Thus one of the chief benefits of such integration efforts is placing the same information in the hands of decision makers and employees, as well as ensuring that the information is consistent with the organization’s strategy and goals.

**Implications for HRD Scholars and Practitioners**

In addition to noting the potential for the alignment of human resource systems, there are several implications that stem more directly from an HRD perspective. First, there is a high degree of conceptual overlap between the notions of competency modeling and the development of HRD as a theoretical field of study. Providing a concise definition of the field, Swanson (2001) writes that “HRD is a process of developing and/or unleashing human expertise through organizational development and personnel training and development for the purpose of improving performance . . . including the organization, work process, and group/individual levels” (p. 304). Within the context of this definition, competencies appear to be well suited to serve as the vehicle through which human expertise may be “unleashed” in the pursuit of performance, particularly in contrast to traditional job analysis, which typically neither has the same strategic, high performance-based focus nor speaks to the full range of individual differences that may capture expertise (e.g., behaviors, motives, traits, other characteristics). Along these lines, one may make the argument that competency modeling ought to represent one of the foundational activities of HRD, serving as the basis on which training and development systems may be constructed.

Indeed, as noted in the introduction, the application of competencies has shown to be useful in the development of training and assessment centers, employee and career development initiatives, leadership development, and organizational change (e.g., Chen & Naquin, 2006; Gagani et al., 2006; Gfroerer, 2000; Iles, 1993; Naquin & Holton, 2006; Rothwell & Lindholm, 1999; Vakola et al., 2007). This is not to say, however, that the use of competency modeling is straightforward, evidenced by many of these authors noting the high levels of confusion surrounding the precise definition of competencies. As a result, one of the largest implications of the current review is to attempt to clarify the theoretical boundaries on the construct of competency modeling, so as to facilitate the use of competencies in a range of HRD activities and avoid the confusion that has typically characterized the field to date. This aim is particularly important given the central role that competencies may play within HRD and the historical tendency by many to use the term ‘competency’ in fundamentally different ways (cf. Meriot, 2005). On this latter point, bringing together the diverse literature surrounding competency modeling, across HRD and related fields, represents a critical first step in transforming competencies into a clearly understood phenomenon, and encouraging their application in a wide range of developmental settings.
Another implication flowing from the definition provided by Swanson speaks to the encompassing approach of HRD to account for performance in organizational, process-based, and individual terms. Whereas prior approaches to work analysis largely focused on work performance, competencies allow for the type of expanded conceptualizations put forth by HRD scholars, as they link together individual performance competencies and organizational strategy. Although the flexibility of competencies defined in this sense have not been without their challenges, the current review has attempted to provide HRD scholars and practitioners with guidance on the development of rigorous and robust competency models that may be validly linked to strategy. Often missing from early competency models, for instance, was the notion of hierarchical competencies to capture different aspects of performance (e.g., Gagani et al., 2006) or relying on typologies to ensure that appropriate domains of performance were being targeted (e.g., Meriot, 2005). Thus another major implication of the current review acknowledges the complexity of competency models for HRD scholars and practitioners, while providing a theoretical and/or best-practice approach concerning how such competency models may be implemented.

As a final implication, primarily directed toward practitioners, it appears that the popularity of competency models may only be expected to continue growing (cf. Campion et al., 2011). As a result, executives within organizations may start inquiring as to whether a competency model may be appropriate for a particular HRD project. It falls to the HRD practitioner, then, to be able to provide a scientific, best-practice-based perspective on the practice of competency modeling. This review is intended to provide that practitioner with the tools and major decision points that would be required for implementing a valid competency model given the requirements of the current project and the context of the organization in question.

**Conclusion**

Although traditional job analysis has historically been positioned as a foundational activity within human resources and organizational development, its applicability to the changing landscape of business appears to be limited, vis-à-vis flatter and more role-based organizations and an increasing emphasis on strategy and human capital as a competitive advantage (Sanchez & Levine, 2012). For many, a popular alternative emerged in the form of competency modeling, which offers several benefits to organizational decision makers and HRD professionals in particular—serving as the foundation on which training and development programs can be created to encourage superior performance while maintaining a strong link to the overall strategy and direction of the organization. Unfortunately, the science supporting competency modeling has often lagged behind the practice, largely as a function of its rapid rise in popularity, leading some to question its viability as a practice (cf. Schippmann et al., 2000). Indeed, despite its near 40-year history in the literature, competency modeling has typically been fraught with issues of conceptual ambiguity, lack of methodological rigor, and dubious psychometric quality. Furthermore, a review of the HRD literature
reveals that few attempts have been made to resolve these issues, despite the use of competency modeling in a range of development programs. Although some progress has clearly been made, both in terms of supporting science and best practices (cf. Campion et al., 2011), the literature remains rather fragmented and unable to resolve the confusion that has historically surrounded competency modeling. This integrative literature review is therefore an important step forward, in assessing the current state of the science and practice of competency modeling. This review has resulted in establishing a clearer conceptualization of competencies and competency modeling, practices to ensure the psychometric quality and rigor of such models, and a roadmap to navigate issues related to legal defensibility, integration into human resource systems, and implications for HRD scholars and practitioners.

First, an analysis of competency definitions across the literature reveals a substantial degree of solidification around those knowledge, skills, abilities, behaviors, and other characteristics, at the individual or group level of analysis, that contribute to high performance aligned with an organization’s strategy. Examining the application of competencies, through competency modeling (and most frequently in contrast or opposition to job analysis), reveals that one must explicitly consider the purposes and goals of the competency model, which drive choices about methodology and implementation (e.g., worker vs. task focus, prescriptive vs. descriptive approach). Considered in this light, the boundaries between competency modeling and job analysis may become less clear in practice than are typically described in the literature, and put a larger emphasis on the need to tailor competency models to the particular context in which they are applied. Second, practices were reviewed that supported the validity of competency modeling from a conceptual (e.g., use of typologies and hierarchies of competencies) or psychometric (e.g., easing inferential leaps, training to enhance rigor) perspective. Finally, competency modeling was reviewed from the perspective of legal defensibility—which remains an open question but highlights the need to match the rigor of the model to the likelihood of legal challenges—and the potential for competency modeling to provide a vehicle to align human resource systems within an organization, acknowledging the likely need to generate tiered or hierarchical models.

Synthesizing these conclusions as they relate the use of competency modeling by HRD scholars and practitioners, it becomes clear that competency modeling is not a “simple fix,” as it was perhaps once perceived. Rather, competency models ought to be approached with an understanding of the theoretical boundaries of competencies, an acknowledgement of the explicit relationship between the context in which the competency model will be applied and the choices regarding the design of that model, and a consideration of factors that will influence the required amount of structure, documentation, and rigor. In this way, the current review provides a path toward realizing the benefits of competency modeling—linking together individual and organizational development and performance—while avoiding the pitfalls of the past in terms of blindly applying a competency model across different organizational settings and contexts.
The current review also raises several questions for future research on competency modeling. Given the approach advocated above, in terms of thinking about competency modeling as a series of decision points as opposed to a single methodology, future research may benefit from integration within a more general work analysis framework (e.g., Sackett & Laczko, 2003; Sanchez & Levine, 2012; also see Schippmann et al., 2000). Such research would be able to leverage the cross-fertilization of different forms of work analysis into more robust end products, similar to emerging work that has borrowed on the more rigorous methods of job analysis while retaining the strategic role-based focus of competency modeling (e.g., Catano et al., 2007; Rodriguez et al., 2002). Moreover, the realization that job analysis and competency modeling represent varying degrees of a general work analysis process moves the field away from continued attempts to differentiate between archetypical examples of the two and allows more focus to be placed on the appropriate application of varying competency model–like or job analysis–like models. This latter point becomes particularly important given the observation that real world applications often take the form of blended approaches (Sanchez & Levine, 2009). Ultimately, such research would bring the science of competency modeling closer to such real world applications and ought to be more beneficial to scholars and practitioners alike.

A further implication suggests that, despite a growing consensus regarding the conceptualization of competencies and competency modeling, there remains the potential to further refine these concepts, the first step of which lies within this type of review of the literature. For example, Athey and Orth (1999) introduced the concept of competencies at multiple levels of analysis (i.e., collective or team processes in addition to individual competencies); unfortunately, little if any work to date has considered competencies in this manner nor strived to understand how these different levels of analysis may interact over time. Given that successful job performance in some instances may be as much determined by successful teams as successful individuals, this appears to be a worthy goal of future research. Other potential avenues that have emerged from this review suggest that more research may benefit the application of competencies through theoretically justified competency model structures, similar to the hierarchies and typologies discussed earlier. Although the introduction of these structures has been well established in the competency modeling literature, research has yet to examine the influence that such structures may have on various outcomes of the competency model (e.g., buy-in, adoption and implementation, management and development of talent, organizational performance) and the mechanisms through which they may be used to achieve the largest benefit. Such research could be further integrated into acknowledged best practices (Campion et al., 2011), in an attempt to arrive at a more robust science of competency modeling that is able to support the practice. Through many of these implications, the purpose of this review is reiterated: as an attempt to integrate the body of literature on the science and practice of competency modeling and to do so in such a way so as to encourage the clarity and usefulness of the concept, while similarly providing scholars and practitioners with recommendations and avenues for future research and practice.
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