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Roman Bechtel*

Calculating Human Capital: The Market Based Valuation of the Human Resource**

According to the Resource Based View of strategic management, analyzing the human resource of a specific firm in terms of its potential to serve as a source of a sustainable competitive advantage requires an examination of – among others – the resource value. The question of how to parameterize this value, i.e., how to calculate human capital, straightly leads to an integration of RBV reasoning with market based models of the competitive environment at the factor and product market side. However, there seems to be a tacit consent among strategy scholars that the only adequate market mechanism to be used for resource valuation is the product market with the economic rents effectively created there. Yet this regularly ends in a tautology criticism of the RBV. It thus is the particular purpose of this paper to examine what market mechanism really is the adequate one to use for the calculation of human capital. For this, a deductive methodology is used. In advancing the idea of a product market orientation, one encounters some major dilemmas ultimately leading to the conclusions that a product market based resource valuation is neither useful nor possible and that the resource value must be measurable independent from any product market success – thus invalidating the tautology criticisms at the same time. This is in direct and flagrant contradiction to the prevailing academic view. As a consequence of this, e.g., “Value Added Approaches” and “Return Based Approaches” of Human Capital Management are discredited as not conform to theoretical requirements and not useful for practical business management, whereas factor market based methods alone prove helpful.

Key words: **Human Capital Calculation, Competitive Advantage,
Resource Based View (RBV), Market Based View (MBV)**

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1. Introduction

“Our employees are our greatest asset.” – such statements can often be found on corporate websites, in business and social responsibility reports. They are supposed to underline the relevance of a firm’s human capital embodied in its employees possibly being a strategic success factor. However, as long as management is not able to answer the provocative counter question “What is the monetary value of this human capital?” with definite figures, the above commitment is easily unmasked as a platitude. If “What you can’t measure, you cannot manage.” holds true, no adequate management behavior would be able to follow. Thus, in practice, the credibility of such statements requires quantitative methods for the calculation of human capital.

“Human resource management has, as one of its central tenets, the assumption that employees are the single most important asset of the organization.” (Poole/Jenkins 1996, 9) – such statements programmatically outline the common understanding of state-of-the-art business research in the field of strategic human resource management, highlighting the employees as (most) important resource for corporate success (e.g., Bartlett/Ghoshal 2002; Boxall 1996; Pfeffer 1995; Ridder/Conrad 2004; Swart/Kinnie/Purcell 2004; Wright/Dunford/Snell 2001; Wright/McMahan/McWilliams 1994). However, this statement as well remains purely normative as long as a firm’s human resource – with its idiosyncratic attributes holding for a possible competitive advantage – necessarily requires a valuation, but not provided by academics. Thus, in scientific research, only a theoretically consolidated calculation of human capital allows to go beyond nonbinding (and nonscientific) postulates.

These deficits lead to the need for a further specification of the value attribute ascribed to a firm’s human resource. Such numerical or even monetary calculation of corporate human capital is a constitutive prerequisite for examining whether and to what extent it can be the source of a sustainable “human capital advantage” (Boxall 1996, 66) for the firm compared to its competitors. With this end in mind, the calculation of human capital forms the basis for a managerial optimization of a given human resource stock and, as such, may be understood as the key challenge for Human Capital Management (HCM).

This task manifests an issue for strategic management research; with respect to the analysis and explication of sustainable competitive advantages, Resource Based View (RBV) and Market Based View (MBV) of strategic management are commonly used throughout literature in order to identify underlying key success factors:

- The RBV, as an inside/out perspective, focuses on a firm’s internal strategic resources, not least its employees with their personal (intellectual, physical, and motivational) and social-interactive skills and characteristics.
- The MBV, as an outside/in perspective, focuses on a firm’s external environment, thus taking into account various stakeholders and market requirements determining the given business context.

Accordingly, with the rivaling resource based Chicago and the market based Harvard schools (e.g., Rühl 1994, 32), for strategic management research two renowned schools of thought emerged. The ongoing discourse between representatives of both perspectives manifests itself exemplarily in the 2001 “Academy of Management Re-

view” articles written by RBV sceptics Priem and Butler (2001a; 2001b) and RBV proponent Barney (2001). However, the mutual completion of both perspectives (then perceived as complementary) is widely postulated in many papers (e.g., Bamberger/Wrona 1996, 141; Knyphausen 1993, 786; Ossadnik 2000; Priem/Butler 2001a, 31 + 35; 2001b, 64). Eventually abandoning the erroneous assumption that both schools of thought were incompatible, a real integration of their key ideas seems possible since they are clearly contrasting, but not precluding each other. This integration ability of RBV and MBV notably starts looming in the context of Human Capital Management as well (Bechtel 2006).

Nevertheless the actual realization of such an integration of both perspectives remains controversial when it comes to the valuation of a strategic resource. Since “human capital” exists as a mere construct which is supposed to represent the value of a company’s human resource one faces surprising vagueness, considerable ambiguity and problematic inconsistency in terms of an adequate value construct and respective guidance for the actual calculation. Once the original RBV thinking helped to identify the specific endogenous human resource of a firm as strategically relevant, the MBV is supposed to provide some useful methodology for the calculation of the respective resource value. However, it remains unclear, “how” to calculate the human capital.

This leads to the overall aim of this paper: to further clarify the market based valuation of the human resource. In as much as MBV theory suggests a reference to the respective markets of the concerned firm, principally one can think of two diametrically opposed orientations: towards the product market side versus towards the factor market side. Out of the – human resource owning – firm perspective, the former is a selling market for outputs (i.e., products or services), the latter is a buying market for inputs (i.e., in this case employees – understood as “factors of production”). However, there seems to be a tacit consent among strategy scholars that the only adequate market mechanism to be used for resource valuation is the product market (whereas the factor market is systematically ignored).

Accordingly, a product market based calculation logic applies to many of the most popular human capital quantification methods. Different authors subsume the respective approaches under the so called “Output Models” (Ackermann 2003), “Market Capitalization Methods” and “Return On Assets Methods” (Sveiby 2004), “Market Value Approaches”, “Value Added Approaches”, and “Return Based Approaches” (Scholz/Stein/Bechtel 2006) respectively. All these approaches calculate human capital on the basis of future rents to be generated by the firm’s personnel; thus – varying from method to method in the terminology only – they always refer to market performance measures, value added calculations, market capitalizations, outputs, yields, revenues, earnings, profits, or returns. Some most prominent examples are the human capital approaches of “Calculated Intangible Value” (Stewart 1997, 226-229), “Knowledge Capital” (Strassmann 1998), the “ROI of Human Capital” (Fitz-enz 2000, 336-37), the “Human Capital Pricing Model” (Bender/Röhling 2001), and the Boston Consulting Group’s “Workonomics” (Strack/Villis 2004). Roughly speaking, these approaches view rents (already or to be) generated as a measure for return on human capital employed. However, such a product market based calculation seems to represent tautological reasoning of the sort that product market results are

used for the operationalization of human resource value as well as of competitive success. This clearly underlines this paper's particular contribution because the tautology criticism – if true – necessarily delegitimizes some 20-30 human capital calculation methods.

Since principally both, product and factor markets come into question for the calculation of human capital, it is the particular purpose of this paper to examine, what market mechanism really is the adequate one to use for the calculation of human capital according to the basic premises of the underlying RBV and MBV perspectives – and thus the right one to be used in business practice. For this, the widely postulated product market mechanisms – with the human resource being the object of price formation – are taken as given for the valuation. Based on some background information concerning the theoretical basics of Human Capital Management, Resource and Market Based View of the firm, the state-of-the-art of the market based resource valuation is shortly reflected. The main part of the paper then examines in detail whether and to what extent product markets in fact can serve as the conceptual fundament for human capital calculation. For this purpose, a deductive methodology is used whereby conclusions are derived from existing theoretical building blocks. Key insights and an approach to a promising market based solution are then brought together before the paper ends with some short conclusions.

2. Theoretical background

2.1 Human Capital Management (HCM)

The concept of human capital originates in the fundamental research done by Schultz (1962; 1971), Becker (1964) and Mincer (1958; 1974). Then still being a topic for economists, but not for management theorists, human capital represented – besides land and capital – the production factor of “labor”. Hereby, for the factor “labor” it is characteristic that manpower is incorporated in the human body so that human being and human capital cannot be separated from each other (Machlup 1984, 423).

The historical basis for a transformation into the context of business management is to be found in the first efforts to establish a so called “Human Resource Accounting” (e.g., Flamholtz 1974; Flamholtz/Bullen/Hua 2002; Hekimian/Jones 1967; Hermanson 1964). This transfer of human capital theory into “real business world” starting in the 1960s, rather failed in the first instance due to difficulties in consenting on how to put monetary values on a company's human resource. Nevertheless, these early efforts stayed topical until today as is evident by having a look into any state-of-the-art HR textbook.

A “renaissance” of the human capital concept came with the prevailing knowledge society thinking (e.g., Bleicher/Berthel 2002; Drucker 1992) in the 1990s: In the business context, knowledge management and the concept of organizational learning (e.g., Probst/Raub/Romhardt 1997; Senge 1990; Wiig 1997) paved the way for an interest in all facets of knowledge – including the personal knowledge incorporated in individuals and the workforce as a whole. This new interest was pushed not the least by the practice (e.g., Edvinsson 1997; McConnachie 1997; Mouritsen/Larsen/Bukh 2001; Petrash 1996; Saint-Onge 1996; Skandia 1995; 1998). It resulted in a dramatically increasing awareness for the firm's “intellectual capital” and its “intangible assets”.

This is particularly reflected in easy to read publications like, e.g., the books from pioneers Edvinsson/Malone (1997), Roos et al. (1997), Stewart (1997), Brooking (1998), Sveiby (1998), and Lev (2001) – dedicated to the yet undiscovered, invisible, hidden and immaterial but nevertheless valuable assets. Thus bringing together various intangible assets – like brand images, supplier networks, customer relations, and employees' intellectual ability – “Intellectual Capital Management” concerns many disciplines within business research: e.g., accounting, finance and controlling, auditing, marketing as well as human resource management. Naturally, the focus of HRM's intangible assets thinking lies on the people working for a firm – thus representing this firm's human resource. Focusing on these people's intellectual ability being of core relevance for 21st century value creation (and not longer solely on their physical skills), the human resource indeed started to be perceived as an “intangible” company asset. This ultimately led to the concept of “Human Capital Management”, whereby human capital – besides (internal) organizational and (external) relational capital – was classified as one of the main intangible factors of success for the firm. With this in mind, it was nothing but consequent for Scholz (2003) to have called up the HR community in an editorial to this “German Journal of Human Resource Research” (“Zeitschrift für Personalforschung”, ZfP) to further intensify research efforts in the field of HCM.

Focusing on the human resource then being key for the explanation of sustainable competitive advantages, the calculation of human capital is crucial to the credibility of this resource's prominent status. Accordingly, there emerged a whole variety of approaches, methods, techniques, and formulas – all of them somehow quantifying the value of a firm's human resource, which is described here as the “calculation of human capital”. Currently, roughly 40-50 stand-alone conceptual approaches for the calculation of human capital can be differentiated (see for synoptical overviews, e.g., Barthel/Gierig/Kühn 2004; Bodrow/Bergmann 2003, 70-136; Bontis 2001; Scholz/Stein/Bechtel 2006, 51-210; Sveiby 2004; Upton Jr. 2001, 21-58).

2.2 Resource Based View (RBV)

The Resource Based View of strategic management (e.g., Barney 1991; 2001; Wernerfelt 1984) refers to Penrose's (1959) seminal work “The Theory of the Growth of the Firm”. The RBV's more practice oriented specifications – Competence Based View (e.g., Prahalad/Hamel 1990; Sanchez/Heene 1997), Knowledge Based View (e.g., Nonaka 1994; Spender 1996), and Organizational (Collis 1996; Ulrich/Wiersema 1989) or Dynamic Capabilities View (Teece/Pisano/Shuen 1997) – then ultimately made it the new management paradigm of the 1990s. This resource based school of thought concentrates on the search for internal success factors, i.e., firm resources as endogenous determinants of competitive superiority. Such resources serve as the “source” of a potential competitive advantage; it then remains the task for management to implement and execute strategies finally realizing resource based superior rents. This leads to the following causal chain:

Firm resources → (Resource based) strategy → (Sustainable) competitive advantage.

The RBV is based on two main premises constituting the competitive position of the firm within its market (Barney 1991, 101; Peteraf 1993, 180-186):

1. Heterogeneity assumes that firms within an industry dispose of differing stocks of strategic resources – thus causing idiosyncratic resource endowments.
2. Imperfect mobility of resources – being a necessary condition for enduring resource heterogeneity – means that strategic resources cannot be traded in markets and freely transferred between firms respectively.

When a firm is implementing a value creating strategy which is not simultaneously implemented by any competitors, then it is said to have a competitive advantage. This competitive advantage is said to be sustainable when – at the same time – the competitors are unable to duplicate the benefits of the firm's strategy (Barney 1991, 102).

In order to evaluate a specific resource's potential to really be the source of a sustainable competitive advantage, Barney (1991, 105-112) identified four resource attributes that can be understood as empirical indicators:

- The resource must be valuable, i.e. helping the firm to implement strategies for the exploitation of opportunities and/or the neutralization of threats.
- The resource must be rare, i.e. not available for a large number of (potential) competitors and thus forming the basis to reach more than just competitive parity.
- The resource must be imperfectly imitable, i.e. competitors not possessing the resource cannot obtain it too easily. This can be ascribed to several barriers to imitation (Barney 1991, 107-111; Collis 1996, 142-145; Dierickx/Cool 1989, 1507-1509; Granovetter 1985; Lippman/Rumelt 1982, 418-421; Reed/DeFillippi 1990), e.g.: unique historical conditions, causal ambiguity, social complexity, and interconnectiveness of complementary resources that are specifically embedded in a firm.
- The resource must be imperfectly substitutable, i.e. for the resource there must be no strategically equivalent resource being itself either common or imitable.

Resource value and scarcity are necessary conditions for a competitive advantage, i.e. for superior rent creation; being imperfectly imitable and imperfectly substitutable – as ex post limits to competition (Peteraf 1993, 182) – are necessary conditions for this advantage's sustainability, i.e. for the preservation of rents created.

Looking at a firm as a collection of resources inspired many scholars to introduce their own definitions for the term “(strategic) resource” and respective resource classifications. The resulting spectrum of existing definitions thus has become more and more manifold, inconsistent and even controversial. This entails the obvious risk that the RBV might lose its power as a concept for the explanation of sustainable competitive advantages in strategic management theory. Following the premise above of firms disposing of idiosyncratic, immobile firm resources, it is indispensable to differentiate between “inputs” and “resources”: In this sense, for the RBV a “resource” is compulsorily characterized by the attributes introduced above constituting heterogeneity in an industry, thus explaining the possible achievement of a sustainable competitive advantage (Freiling 2001, 84) – value, scarcity, imperfect imitability, and imperfect substitutability. Beyond this, in a much broader sense, all other imaginable (material and immaterial) “input factors” are homogeneous, marketable and hence not relevant for the achievement of a sustainable competitive advantage. This clarification is nonetheless still in line with all standard resource classifications since they all explicitly consider

material as well as immaterial factors and they all consider the human resource as one central source of advantage. With the focus on the human resource of a firm and its calculated value, i.e. the human capital, Wright, McMahan, and McWilliams (1994, 317) clarify “that the source of sustained competitive advantage lies in the human resources themselves, not the practices used to attract, utilize and retain them”.

In order to assess whether the human resource of a specific firm is indeed the source of a sustainable competitive advantage, the four resource attributes have to be checked. However, as Warren (1999, 6) states, none of them are black-and-white, but each applies to some degree. Since unique historical conditions, causal ambiguity, and social complexity have determined the resulting idiosyncratic HR configurations of firms, the attributes of scarcity, imperfect imitability, and imperfect substitutability, for the human resource tendentially are perceived as taken for granted (Stock 2004, 242-243; Wright/McMahan/McWilliams 1994, 307-312). Furthermore based on the premises that value “is the fundamental component determining the extent of competitive advantage” and that it is the market environment “that determines the degree of value held by each firm resource in the RBV” (Priem/Butler 2001a, 29), the main concern of the resource analysis lies exclusively with the value of the human resource, i.e. the calculation of human capital – meaningfully measured as a static characteristic at a certain point in time.

However, just this need for the valuation of a firm’s (human) resource reveals the major deficiency of the RBV as identified by many theorists (e.g., Al-Laham 2003, 130; Burmann 2001, 176; Engelhardt/Freiling 1998, 570): The theoretical key concept of a “valuable resource” remains vague and inoperable – which makes it difficult for managers to identify, assess, develop, exploit and preserve respective success potential (thus torpedoing RBV’s applicability). This harsh criticism of the lack of a satisfying substantial operationalization of the resource value construct is argumentatively linked to the statement at the beginning of this paper, “What you can’t measure, you cannot manage.” Bearing this in mind, assessing a specific firm’s human resource in terms of its potential for achieving a sustainable competitive advantage inevitably calls for the calculation of human capital. When Barney (2001, 42 + 51), summarizing the state of the discussion, underlines that the value of a particular resource is determined exogenously by the specific market context of a firm, this suggests recourse to mechanisms of market valuation.

2.3 Market Based View (MBV)

The Market Based View of strategic management originates in the theory of Industrial Organization (e.g., Scherer 1980; Stigler 1968) with Mason (1939; 1957) and Bain (1962; 1968) as pioneers of the 1950s and 1960s having constituted the Structure-Conduct-Performance paradigm. According to this paradigm, a firm’s market based performance (and thus a possible competitive advantage) is determined by the industry structure given and the resulting strategic business conduct, functioning as an intervening variable (e.g., Pickering 1974; Woodward 1970). This leads to the following causal chain:

Structure → Conduct → Performance.

The research focus thus lies on the environmental market setting in which firms operate. Following this approach, in the 1980s Porter (1980; 1985) came up with his concept of five “strategic forces”, from then on being the fundament for the MBV school of thought. No longer with the industry as a whole in mind, the MBV focuses on strategic groups of firms that are characterized by similar strategic behavior within a certain market (Cool/Schendel 1988; Newman 1978). This perspective looks at the markets driving strategic conduct: Market mechanisms pervade all parts of the firm so that opportunities in the market determine management action, i.e. the systematic analysis of five forces structurally constituting the firm’s business environment is a precondition for success. Based on the analysis of a firm’s market structure, deducting and implementing respective strategies forms the conduct component. With this the MBV emphasizes the aspect of strategic choice much further than the deterministic contingency thinking of classical Industrial Organization research (Miller 1988, 281-282). For this purpose, Porter (1980; 1985) developed his “generic strategies” for achieving competitive advantage.

According to the MBV reasoning, the value of a resource derives from given market requirements: A market based calculation of human capital utilizes the mechanisms of supply and demand in the market so that the formation of prices then ultimately brings about a value that can be interpreted as the market determined human capital of a specific firm.

State-of-the-art management theory is almost consistently characterized by an exclusive focus on the selling market side. The market for outputs – with products and customers – then usually forms the basis for any human capital calculation: either using extrapolations of historical market performance measures or – which is prevailing – using subjective projections of future expectancy values (based on estimated probabilities). The calculation of human capital then is a retrograde procedure: market performance measures, e.g., cash flows, resulting from human resource endowment and employment in the production process are discounted to present value. In this sense, the value of the human resource is calculated on the basis of the more or less successful employment of strategic resources, including the human resource, which is reflected in market performance, i.e. in created outputs and generated rents. This approach follows the hypothesis that a firm’s human capital is strongly correlated to its market performance and resulting market valuations. Thus, market profitability becomes an indicator for human capital. This logic applies to all “Market Value Approaches”, “Value Added Approaches”, and “Return Based Approaches” of human capital calculation – comprising about 20-30 different methods.

3. State-of-the-art: Market based resource valuation

For the calculation of human capital, the assessment of a firm’s human resource value means bringing about relative objectivity in terms of inter-subjectivity. With this intention, resource valuation is about establishing a testable and practicable convention that generates numerical (ideally monetary) figures according to precisely specified instructions. However, for the concept of resource value, strategic management literature offers a wide range of (inconsistent) interpretations – often enough referring to identical sources:

- Barney (1991, 106) states: “resources are valuable when they enable a firm to conceive of or implement strategies that improve its efficiency and effectiveness”.
- Black and Boal (1994, 132) interpret value as “the fit of the resource or factor to strategy combined with the fit of the strategy to the external environment”.
- Oliver (1997, 705, Table 2) detects a duality between factor and product markets according to which resource value is defined “externally by factor and product markets”.
- Slater and Narver (1998, 1003) focus on customer perception: “An organization has a foundation for sustained competitive advantage when it possesses skills or resources that provide superior value to customers and that are difficult to imitate.”
- Rugman and Verbeke (2002, 770) declare that resources must be “valuable to customers”.
- Peteraf and Bergen (2003, 1028) note: “The value of a resource derives from its application in product markets.”
- And particularly referring to human capital, Lengenick-Hall and Lengenick-Hall (2003, 50) propose that value “refers to the degree to which the human capital lowers costs or provides increased service or product features that matter to customers.”

As the above examples may indicate, in the course of the ongoing debate over the resource value attribute, a step-by-step convergency towards a product market based, i.e. efficiency based, value construct was reached – at the same time endogenizing the previously exogenous, demand oriented output markets into the RBV (Priem/Butler 2001a, 29-31) as the source determining resource value.

Product market based resource valuation is then based on market performance measures documenting the firm’s profitability. This correlation of resource value with financial market performance (as an indicator for competitive success) leads to the concept of economic rent: Superior performance ultimately results in above normal or superior rents. This is reflected in equifinal strategic business objectives, namely “achieving a sustainable competitive advantage”, “maximizing the economic performance” or “gaining organizational rent”.

However, this regularly provokes scholars to attest with powerful arguments the RBV’s tautology, according to which the core logic of the RBV was circular in stating: A resource to which a high resource value is attributed with reference to this resource’s value creation in the product market, will ultimately contribute to the achievement of a competitive advantage – itself being reflected in successful value creation in the product market (Al-Laham 2003, 129-130; Moldaschl/Fischer 2004, 127; Mosakowski/McKelvey 1997, 66 + 69-79; Porter 1991, 108; Priem/Butler 2001a, 27-28; 2001b). This statement was – by its construction – always true by logic, and therefore cannot be falsified empirically:

- “As with scarcity, we suggest that value poses a dilemma of operationalization. In this case, the operational challenge is that of establishing an independent opera-

tionalization of value that is not tied to the *ex post* incidence of rent generation” (Mosakowski/McKelvey 1997, 71, italics in the original).

- “What actually constitutes the value of a resource, however, is not clarified. The representatives of RBV get caught up in a tautology here: a competitive advantage results from superior resources and their combination; which resources (resource combinations) are superior is shown *ex post* by rents achieved as a result of a competitive advantage (...)” (Moldaschl/Fischer 2004, 127).

Confronted with this substantial criticism, theorists do well to test and try to falsify the hypothesis that product markets (and rents achieved there) provide the adequate mechanism for the valuation of strategic resources or, more specifically, provide the right mechanism for the calculation of human capital. The argument is that the market based calculation of human capital is tautological if human resource value and competitive success are defined in the same terms.

4. Dilemmas of a product market based human capital calculation

Although it is commonly advocated to base the calculation of human capital on product markets in management theory and practice, a profound conceptual specification of this proposition is still missing. In trying to advance this idea, one ultimately encounters some major dilemmas.

4.1 Dilemma of intangibles’ incalculability

The first dilemma resulting from the proposition to calculate human capital with reference to product markets, is closely related to the intangible character of human capital. Since immateriality or intangibility are key attributes of the human resource’s inherent intellectual potential (and thus being key to the explanation of this resource’s value), there exists no simple and direct mechanism for price formation. However, still faced with the need for quantifying the human asset, many proponents of human and intellectual capital management suggest linking resource valuation with product markets. According to this rather popular view, the intangible value of the human resource can only be stated after its conversion into tangible products: “Of course, we don’t own our customers or our employees, and the value they provide to our company cannot be considered a measurable asset until it’s captured and converted into something that the company can own – any new knowledge or skill that can be reused or applied in other areas, from new learning processes to new systems, policies and procedures” (Barchan 1998, 14). This can be translated into the following causality: A firm’s employees are able to improve its organizational capital which in turn leads to value creation and financial performance, manifested in marketable products. The respective financial measures then allow inferences on the monetary value of human capital. This relation became programmatic for Skandia, one of the world’s leading companies in the field of intellectual capital management, having chosen “Human Capital in Transformation” (Skandia 1998) as the title of its 1998 Intellectual Capital Prototype Report. This materialization and the respective financial outcomes (at the same time being a precondition for a further upgrading of the existing human capital basis) is called a “virtuous cycle” by Stewart (1995, 99). With this relation in mind, Johnson (2002, 416) summarizes: “A prevailing feature of the original intellectual capi-

tal paradigm that has gained attention in both business practitioner and academic circles is that knowledge assets, in order to be valuable to the firm, must be made explicit or 'structuralized' to be owned and then profited on by a firm."

This approach therefore suggests an indirect calculation of resource value with recourse to the tangible outputs of resource deployment. But virtually negating the calculability of intangible resources' intrinsic values in the stage of their immateriality reduces all attempts of "measuring intangible assets" to mere catchwords.

This leads to the dilemma of intangibles' incalculability: It is paradox, if the recourse to product markets for tangible outputs, instead of calculating the value of the intangible resources (which are inputs into the production process), induces de facto the incalculability of the human resource value itself. As a matter of fact, the claim to value immaterial resources – including a firm's human resource – necessarily demands a calculation only while in the stage of intangibility; however, not acknowledging the immanent value of the human resource reduces any intention to calculate human capital to absurdity.

4.2 Dilemma of proportionately isolating success contributions

The above considerations end straight away in a second dilemma. The creation of value inside the firm is based on the successful interaction of a variety of resources. The attempt to quantify human capital with recourse to the monetary value of the produced outputs leads to a problem in principle: Deriving the value of one specific firm resource from overall product market performance, i.e. from the economic value of outputs and rents, requires the precise recalculation of each single resource's contribution to overall business performance. In the context of human capital calculation, this calls for an isolation and pro rata calculation of the human resource's portion in achieved performance.

However, the problem of measuring the specific performance contribution of different resources lies in the arbitrary nature with which underlying resources are to be identified as relevant (for performance generation) as well as in the relative weightings to be applied. This becomes clear if one thinks of a typical production process; there it seems to be impossible to decide to what extent the resulting market performance is to be traced back to high-end production systems, an excellent marketing mix, outstanding brand image, unique distribution channels or to the qualified workforce. A proportionate attribution of measured performance to the human resource and to other tangible and intangible resources will – in business practice – always admit arbitrary interpretations. Moreover, this task will be the more subjective because every firm represents a unique bundle of rent generating resources. Thus such an approach seems highly speculative and imprecise – and thus hardly acceptable or practicable.

This intuitively plausible argumentation becomes all the more evident by making reference to intellectual capital management reasoning whereupon no single component of a firm's intellectual capital is able to generate value by its own, but this ability is based on the interaction with other intangible assets. This leads to the conclusion that it is almost impossible to analytically disentangle the specific value contribution of the human resource, because interconnectedness with complementary value creating resources is fundamentally characteristic (Mouritsen 2003, 21-23). As Edvinsson and

Malone (1997, 145-146) delineate: "(...) corporate value does not arise directly from any of its Intellectual Capital factors, but only from the interaction between all of them. Second, and just as important, is that no matter how strong an organization is in one or two factors (say a powerful and dynamic organization or a brilliant staff), if the third factor is weak or, worse, misdirected (say, the wrong customer base), that organization has no potential to turn its Intellectual Capital into corporate value." Furthermore one has to consider the time component labeled as "intangible effectiveness lag" by Stoi (2003, 178), reflecting that it takes some time between an investment in human capital and resulting changes in market performance.

Through what was said before it becomes obvious that the disentanglement of single performance generating factors of success is not only a "technical" problem, but a logical one: It contradicts the assumed value creating interdependency of the underlying factors, according to which one component's value cannot be calculated without reference to all other components. This same argumentation can already be found in Lev and Schwartz' (1971, 110) work pointing out that "in real life, input factors are interdependent and there is probably no practical way of dividing the total contribution among them."

With reference to the assumptions of the RBV, this combination of different resources whose individual value contributions cannot be precisely isolated exactly forms the theoretical basis for explaining the sustainable protection of competitive advantages – then termed social complexity and causal ambiguity. Additionally it is reasonable to expect that the resulting output produced by means of a variety of reciprocal input factors is more than the sum of all outputs produced by using each of the input factors separately (Barney/Wright 1998, 39). As "A cake requires the ingredients plus their relationships among them for a successful result." (Black/Boal 1994, 134), it seems to be impossible to evaluate the individual value contribution of one specific factor of success. Thus it becomes obvious that a precise delimitation of human resource based future results necessarily must fail in any firm.

Finally it is important to notice that (human) resource based value creation is not only perceivable as monetarily quantifiable output, since there are other forms of value added besides the one observable in financial figures (Mayo 2001, 215); e.g., inside the firm for other departments and business units and outside the firm for suppliers, banks, the public or other stakeholders. This kind of value added beyond product markets shows up, e.g., in a better company image, successful knowledge sharing, and the establishment of network structures. While a characteristic of non-profit-organizations, this "other" sort of value added is typical for profit-maximizing firms as well. Neglecting these forms of value added with the exclusive focus on directly quantifiable results in a firm's product markets ignores important facets of value creation. As a consequence, calculating human capital solely referring to the value added documented in sales figures uses a questionable basis for calculation.

This leads to the dilemma of proportionately isolating success contributions: It is paradox to attempt a causation based breakdown of achieved results for a single resource used in the production process if the realization of resulting returns is just ascribed to the interlacement of the conglomerate of underlying resources. Since the causally ambiguous and socially complex interaction of interconnected resources hin-

ders the isolation of resulting performance effects, a return based derivation of human capital is impossible; this applies all the more, insofar as the added value is not entirely represented in monetary figures.

4.3 Dilemma of the partial impossibility of a retrograde resource valuation

The third dilemma of a product market based calculation of human capital principally calls into question the retrograding quantifiability of resource values based on product market figures. Whereas the evidence provided above for the sheer impossibility of proportionately isolating success contributions is based on the difficulties of deriving human resource value from existing performance measures in practice, the following explanations discuss the question, whether and to what extent such performance figures are “available” at all.

The RBV approach assesses the conditions under which certain resource configurations can lead to sustainable superiority. Yet a sustainable competitive advantage is partly considered a necessary but not sufficient condition for the realization of sustained superior performance (Powell 2001, 877). The complete underlying reasoning is as follows (Bamberger/Wrona 1996, 136):

Heterogeneity → Valuable and rare competitive resources → Competitive advantage
→ Sustainability and appropriability → Durable above normal rents.

This leads to the following conclusion: In as much as a competitive advantage does not necessarily cause above normal rents, the assessment of a specific resource’s value cannot rely on realized rents, since achieving them is decoupled from the actual existence of an eventual competitive advantage. On the contrary, the valuation of a strategic resource necessarily must be possible absolutely detached from rent figures. Thus, a retrograde resource valuation based on the performance realized at the product market is – at least partially – impossible.

This reasoning must be referred to the concept of rent appropriability, defined as the firm’s ability to effectively appropriate the returns resulting from its resource based competitive advantages (Bamberger/Wrona 1996, 139; Coff 1999; Collis 1996, 145-147; Grant 1991, 128-129): Even controlling a valuable strategic resource generating a competitive advantage is for the resource owner no guarantee for rents. This fact makes it essential to assess separately a resource’s value attribute and a firm’s ability to achieve superior rents and to appropriate them.

However, such reasoning is quite detached from Penrose’s (1959) original intention: Focusing on the question how to make use of resources for the installation of isolating mechanisms against competitors in order to generate rents, and thus stressing the facet of comparative value appropriation rather than the facet of value creation (Rugman/Verbeke 2002, 778) called theorists’ attention to the achievement of sustainable competitive advantages. Compared with this, Penrose’s (1959) “Theory of the Growth of the Firm” is “a theory of value creation rather than value appropriation” (Rugman/Verbeke 2002, 778), causally ascribing firm growth to resource utilization. The consideration of economic rents and their appropriability (usually in conjunction with the concept of shareholder value) hence is rather some interpretive projection of the classical resources approach. This is why strategy textbooks differ on answering

“whether a competitive advantage can exist if rent does not accrue to the owners” (Coff 1999, 131).

Yet by defining a competitive advantage as the realization of rents for the owner of a resource, i.e. operationalizing the construct of competitive advantage with the help of rents, the problem of the partial impossibility of a retrograde resource valuation seems basically to be solved. This is the reasoning in most RBV papers so that “achieving an advantage will automatically result in higher performance” (Reed/DeFillippi 1990, 90). Appropriability is an implicit given there.

Nevertheless the logically deduced impossibility of a retrograde, product market based resource valuation holds true because of the significant difference between possessing a resource and putting it to value creating use: Since there is per se no correlation between both, i.e. owning a resource predicates nothing over the future success of using this resource, one has to differentiate between both aspects. This calls for assessing to what extent management succeeds in economically using a resource in terms of realizing a competitive advantage in the market. This simple and fundamental fact, which however is for the discussion on resource valuation regularly ignored, emphasizes the relevance of strategic management: Analogous to the above described “conduct” component, managerial manipulation is the key to the value creating realization of a resource based sustainable competitive advantage; since there is no automatism, it is essential what a firm makes of its resources. Achieving rents for a firm then is not only possible due to possessing valuable resources, but also due to knowing how to deploy them competitively, i.e. the capability to make optimal use of them. Since strategic conduct is not a mechanistic determinism inside the “black box” firm, it reflects the specific configuration of the firm’s top managers – with their age, education, career paths, team structures, values and beliefs. This is documented in Hambrick and Mason’s (1984) “Upper Echelons Model” which describes the causality between firm performance and managerial actors. Given resource endowments then define the managerial room for maneuver as enablers, but do not determine management totally – thus allowing enough space for strategic choices: “Competitive advantage, whatever its source, ultimately can be attributed to the ownership of a valuable resource that enables the company to perform activities better or more cheaply than competitors” (Collis/Montgomery 1995, 120). As the catalyst for the transformation of resources into output (Mahoney 1995, 92), management is then the key to gaining a competitive advantage – as proven, for instance, empirically by Wiklund and Shepherd (2003). The other way round, wrong strategies and mismanagement will cause competitive failure in spite of promising resource stocks; i.e., managerial talent is a limiting factor (Kor/Mahoney 2000, 116-117).

The above argumentation generally applies to any strategic firm resource. With regards to the deployment of the human resource and linking to the idea of a “human capital advantage” (focusing on HR stocks), strategic HRM (focusing on HR process capabilities) is then about achieving a “human process advantage”; the combination of HR (strategic resource) and HRM (management conduct) then eventually aims at a “human resource advantage” (Boxall 1996, 66-67).

Adner and Helfat (2003), by speaking of a firm’s “Dynamic Managerial Capabilities”, emphasize the idea that it is the task of managers to make adequate use of stra-

tegic resources in terms of value creation at the product market. Nevertheless it remains completely irrelevant for the valuation of the resource itself whether, and if so, to what extent the resource in question evokes strategic managerial conduct, i.e. the realization of a competitive advantage: Resource value and resource deployment are separate matters. For this reason, the problem of a partial impossibility of a retrograde resource valuation remains unsolved since product market performance allows inferences on the “intervening variable” management, but not directly on resources.

Lastly, the impossibility to value unexploited potential manifests the irreconcilable logical discrepancy between a product market based resource valuation and RBV theory: As mentioned before, intangible resources are typically called “hidden assets”. Characterized as such, it is a challenge for the management not to overlook them as factors of success, but rather to become aware of their intrinsic values. Thus, strategic considerations clearly demand for an analysis of all, even only potentially relevant factors. Valuing even such (potential) resources whose actual competitive relevance is not reliably attested (yet) is then imperative. These potentially relevant factors may be used by the firm – as well as they may remain idle; they may be mobilized by management and can be understood as opportunities, not as guarantees for future competitive advantages (Schmid/Kutschker 2002, 1242). Idle resources then do not contribute to firm performance, but they bear the potential to do so. Whether or not management will make use of this potential, is completely irrelevant for the *ex ante* resource value analysis. But for sure it is logically impossible then to refer to rents generated at the product market since these rents will possibly arise in future only – only after the resource will have been deployed.

This leads to the dilemma of the partial impossibility of a retrograde resource valuation: It is paradox to try a product market based resource valuation using performance figures derived from resource deployment since these figures possibly do not exist at all. For this, there are three reasons:

- Valuable resources can lead to achieving competitive advantages; but competitive advantages do not necessarily result in above normal rents for the resource owner as long as the question of rent appropriability remains unanswered.
- Taking rent appropriability as given, management failure hinders competitive advantages in spite of existing (but not ideally deployed) valuable resources.
- And even valuable resources do not necessarily lead to competitive advantages, namely if their intransparent potential effectiveness as hidden resources hinders their deployment.

These arguments logically disprove the reasonableness and adequacy of all such approaches for the calculation of human capital that turn out to be inoperable and impracticable due to their retrograde and deterministic basis conception.

4.4 Dilemma of ex ante decisional irrelevance

The underlying reasoning of the fourth dilemma of a product market based human capital calculation is closely related to the idea introduced above of “potentially” relevant success factors.

RBV theory so far is largely characterized by its efforts to reconstruct superior firm performance following the motto “show me a success story and I will show you (uncover) a core competence” (Williamson 1999, 1093). Such – often empirical – ex post rationalizing helps identifying those resources that explain the past performance of a firm, thereby suffering a lack of (ex ante) predictive power in terms of resources’ future competitive suitability (Amit/Schoemaker 1993, 33; Foss 1999, 740). The resulting problem is quite obvious: Since competitive environments are assumed to be changing in ways that are imperfectly predictable, “resources that have been strategically valuable in the past may be different from those that will prove to be strategically valuable in the future” (Sanchez 1997, 942). A static ex post analysis (based on product market results) will then struggle with revealing impulses for strategic ex ante decision making (before actual results accrue). Thus, both the conceptual relevance and practical usefulness of ex post resource analysis to ex ante strategizing is clearly limited (Sanchez 1997, 942). Further, not disposing of a stable correlation between product market results and resource values ex ante eliminates any (strategically relevant) product market based human capital calculation. At the same time, this is why for the largely retrospective RBV it is sporadically postulated to further strengthen its prescriptive content, i.e. to forecast resource based future scenarios as a contribution to strategic decision making (Freiling 2001, 78).

But even if it was possible, a product market based calculation would not be of much use: As a part of the strategic planning process, management has to decide which resources to deploy at all. Just as any other factor of production, at a certain point in time, a specific (future) resource is in the stage of still being unused and idle. It is then a key task for the management to decide whether or not to start deploying this specific resource at all (or further push its current deployment). This decision is to be based on an analysis of the attributes characterizing a resource’s competitiveness – among others: its value. Thus it is in terms of managerial planning inevitable that the valuation of the resource in question takes place before this resource is deployed in the process of value creation. This is the only way to avoid trial-and-error strategies concerning the selection of resources to be used. The calculation of human capital must then be possible without an actual deployment of the human resource in a certain market environment, i.e. ex ante.

This reasoning traces back to the “unused productive services”, being a source of competitive advantage, as described by Penrose (1959, 85): It is a pool of – for the moment – still unused factors which ultimately may unfold their competitive power. Quite similar considerations characterize Cyert and March’s (1963, 36-38) construct of “organizational slack”, paraphrasing redundant capacities not fully used up in daily production. With these concepts in mind, it becomes obvious that valuing a resource means just specifying its potential to ultimately serve as a source of a sustainable competitive advantage. This precludes a product market based ex post valuation. The only way out then would be a recourse to ex ante “estimated” rent figures. However, in combination with the difficulty discussed above of proportionately isolating success contributions, this again would lead to speculation and arbitrariness – thus hindering an exact calculation of human capital.

This leads to the dilemma of ex ante decisional irrelevance: It is paradox that the valuation of a strategic resource based on rents that were created with the help of deploying just this resource lacks any strategic ex ante relevance for managerial decision making, since such a valuation necessarily is only able to review ex post stock values. Such a calculation method would provide managerially irrelevant information. It thus obviously logically contradicts the intention of strategic management, and hence must be rejected. Consequently, the value of a resource as one of its central characteristics must be conceptualized independently from the evaluation of resulting rents, i.e. the quantification of a possible competitive advantage in the product market.

5. Key insights and approach to a solution

Thinking of a market based resource valuation, one principally could refer to one of two different markets: the product market and the factor market. The former is the one usually declared to exclusively provide the adequate valuation mechanisms – be it in strategic management research or in the context of Human Capital Management. However, the argumentative deduction of some paradox consequences of a product market based human capital calculation lead to its ultimate rejection due to its impracticability and logical impossibility. This can be summarized in four major – usually either ignored or misjudged – findings for the RBV discussion and for HCM:

1. A resource valuation making a circuit via product markets by taking the transformation of intangibles into tangible outputs as a basis is not practicable since, firstly, it abandons the aspiration of the intangible resource's own immanent value, and secondly, it implies a purely deterministic correlation between inputs and outputs.
2. In addition, such a valuation leaves unanswered the question of resource specific proportionate performance contributions and also ignores value creation effects that are not reflected (and not even reflectable) in monetary figures derived from product market success.
3. It is useful for strategic management purposes to assess the value of a specific resource which is expected to bear the potential to be the source of a (future) sustainable competitive advantage, precisely in the case that this resource does not yet serve as such a factor of success at the moment of resource value quantification. This valuation taking place ex ante the resource's rent generating deployment is of indispensable use for planning, decision making, forecasting, and controlling.
4. It is necessary to assess resource value without information about its impact on rent generation at the product market since the value attribute is one of the constitutive characteristics of any strategic resource so that this attribute logically must be operationalizable without recurring to the subsequent rent generation. This non-retrograde proceeding is mandatory since the mere disposition of valuable resources does not necessarily cause superior rents, in that the question of rent appropriability remains unanswered apriori and the derivation of competitive advantages depends on the strategic management conduct (being itself a relevant variable in the process of rent generation).

This leads to the conclusion that many scholars' postulation for a product market based resource valuation, i.e. referring to rents effectively generated, is neither useful nor possible. In terms of resource valuation, the attested and widely criticized exogenous status of customer attitude at the product markets (Al-Laham 2003, 130; Priem/Butler 2001a, 29-31) remains necessarily and with good reason outside the RBV model.

The value of a strategic resource thus must be measurable independent from any product market success. This conclusion is in direct and flagrant contradiction to the prevailing academic view. Against this background all attempts to "endogenize" product market mechanisms do not enrich the RBV but cause its tautology:

Firm resource → (Sustainable) competitive advantage → Rents created at the product market → Product market based resource valuation.

Contrary to this tautological reasoning, a factor market based valuation ignores performance results. Instead the resource value is autonomously assessed with reference to the input side:

Firm resource → (Sustainable) competitive advantage → Rents created at the product market. Isolated therefrom: factor market based resource valuation.

If and only if the value attribute is not operationalized on the basis of product market figures but on the basis of factor market data, the tautology charge directed against the RBV is unjustified. This conclusion holds for the human resource being the object of a human capital calculation as well as for any other conceivable strategic firm resource.

As a consequence of this, "Market Value Approaches", "Value Added Approaches", and "Return Based Approaches" of Human Capital Management – all of them referring to the product market side – are discredited as not conform to basic theoretical requirements and not useful for practical business management. In contrast, factor market based approaches seem more suitable.

In this sense, the "market based" view is not merely a "marketing based" view of the firm – exclusively focusing on the markets for products and services, with competitors and customers as sole actors –, but rather a holistic approach taking into account all relevant markets. This insight is, for example, reflected in Pfeffer and Salancik's (1978) Resource-Dependence-Approach. The operational challenge of establishing an independent operationalization of resource value that is not tied to rent generation (Mosakowski/McKelvey 1997, 71) then opens up an alternative focus on factor markets. It is thus advisable to examine the factor market side in terms of its applicability for an exogenous extension of the RBV model. This calls for some short comment on the conceptual disparity of factor and product markets.

According to RBV reasoning, a firm is not characterized by clear-cut deterministic input/output relations so that there is no simple symmetry between factor and product markets. If such a symmetry existed, for the calculation of human capital the optional reference to either factor or product market mechanisms would ultimately lead to the same results. Precluding product market mechanisms would then cause the analogous preclusion of factor markets as a basis for calculation. However, the ex-

change value of a strategic resource in the factor market (i.e., its price) is not likely to be the same as this resource's value-in-use in any given firm.

But the suggested reference to the factor market side seemingly reveals an inconsistency: The assumed existence of a buying market for the human resource implies its tradability. Since the tradability of a resource obviously contradicts the RBV's premises of imperfect mobility and heterogeneity, the human resource then could not be a strategically relevant resource contributing to the achievement of a sustainable competitive advantage: efficient markets would, as a great leveler, quickly cause the homogenization of all firms' resource endowments in the market (Teece 2000, 11). Whereas if the human resource was non-tradable, a factor market based calculation of the resource value – taking tradability as a prerequisite – would necessarily fail. This requires for calculation reasons the “fictive tradability” of personnel by recourse to the constitutive elements of this resource: For the human resource, representing the collective workforce of a firm, this leads to the focus on the individual employees. They are “tradable” in a market: the labor market, being a specific type of a factor market. This competitive market offers mechanisms of demand and supply for manpower, whereby specific conditions are collectively and individually negotiated and ultimately agreed by contract (Voß/Pongratz 1998, 131). The aggregation of all these contractual relations constitutes for one single firm its human resource, thus inducing a fictive or indirect tradability of the firm's human resource for valuation purposes. In this sense, the labor market is a market for personnel which is then seen as a strategic factor market for the firm.

This specific factor market provides a mechanism for the matching of supply and demand for labor with resulting individual related – but usually not individual – prices. Resource value can then be derived via aggregation over all employees of a firm. However, this simulation has one drawback: “Not even human resources can provide the basis for a competitive advantage if the skills at issue can be accessed by all in an open labour market” (Teece 2000, 11). Bearing this in mind, the individual employee might not exceed the status of a commodity (although Lazear's (2003) recent “Skill-Weights Approach” seems to deliver convincing contraindications); nevertheless the human resource of a firm, representing the collective of all employees, retains its status as a strategic resource due to the specific bundling of knowledge and capabilities distributed over many people who – embedded in a specific firm's infrastructure – in their collectivity cause the idiosyncrasy of the human resource: Mobile individuals hired in the homogeneous external labor market as (human) factors of production are the basic parameter of the immobile human resource; by entering into the firm they pass an implicit refinement process that makes them a constitutive part of the collective workforce – which is then seen as a strategic firm resource, the human resource.

The firm disposes of property rights with regard to employees' productive capabilities on the basis of labor contracts. The wages and salaries to be paid by the firm can then be interpreted as factor market based rentals for the thus secured manpower (Machlup 1984, 423). They are the monetary equivalent of expected productivity contributions, since “services of knowledge and skills embodied in people are traded on well-developed rental markets – namely, labor markets” (Rosen 1975, 201). According

to that it can be assumed “that individuals are systematically paid in proportion to the services of their knowledge” (Rosen 1975, 201). Wages and salaries then reflect a continuous market based valuation of a firm’s employees since they are monthly rentals for the temporary, namely limited to working hours, and partial, namely limited to their contractually regulated productivity contributions, disposability of manpower.

In terms of practical relevance, a factor market based calculation of human capital does not refer to “effectively” paid wages and salaries; rather it draws on generalized data containing average information about an industry or a country for specific groups of employees, e.g., with homogeneous educational profiles, jobs, functions, tasks, or responsibilities. This idea already dates back to Lev and Schwartz’ (1971) valuation approach, using such reference figures in order to avoid individual, non-representative and non-market influences to wages to distort the calculation of human capital. A recent approach further specifying this basic idea is the “Saarbrücken Formula” (Scholz/Stein/Bechtel 2006): According to this concept, human capital is seen as a stock value, therefore not taking into account the capital usage (i.e., productivity, as measured at the product market), but focusing on how the human resource is constituted. All in all, the above conceptual remarks as well as some already existing, noteworthy practical calculation methods clearly demonstrate the legitimacy and the possibility of a factor market based (monetary) human resource valuation.

6. Conclusions

In as much as the question of how to assess the value of a strategic resource remained widely unanswered to date, the reasoning of this paper provides some theoretical framework for practical calculation efforts. At the same time, expectations towards a further integration of both management perspectives, Resource and Market Based View (Rühli 1994, 51), were confirmed.

In order to specify the market based valuation of strategic resources, suggested product markets were tested in terms of their adequacy for this purpose. However, this form of a market orientation proved not practicable. On the contrary, taking factor markets as a basis for calculation seemed much more suitable. Respective valuation basics were sketched with reference to employees’ wages and salaries as the only acceptable foundation for the calculation of human capital. This can be stated in the following axiom of human capital calculation: The valuation of a specific firm’s strategic human resource refers exclusively to the labor market’s pricing mechanisms. Put another way: All existing product market based human capital calculation methods turn out to be completely disqualified.

This paper solely focused on the adequate valuation of the human resource, thereby not primarily considering all aspects of resource deployment. Nonetheless one can derive a conclusion which is obviously not clear in state-of-the-art management research: The valuation of resources discussed here refers to the factor market side, the examination of these resources’ resulting competitive effectiveness (based on resource deployment) refers to the product market side. The former asks for the competitive potential, the latter asks for realized competitive success. This conceptual clarification helps avoiding the confusion of qualitatively different indicators, namely

quantified resource value (descriptive state variable) and quantified resource advantage (success figure).

Although a conceptual combination of strategic HRM and RBV is recently quite popular (e.g., Boxall 1996; Coff 1997; Colbert 2004; Ridder/Conrad 2004; Wright/Dunford/Snell 2001; Wright/McMahan/McWilliams 1994), there remain enough topics sketching the next steps for future research:

- the further theoretical specification of the above recourse to the external labor market;
- the empirical validation of such a factor market based human capital calculation, e.g. in the form of approaches such as the “Saarbrücken Formula”;
- the more detailed investigation of the Dynamic Managerial Capabilities aspect of resource utilization, i.e. the realization of resource based strategies in terms of the deliberate composition of specific resource configurations on the basis of a (static) analysis of the human resource (this means a less structure focused and more process focused RBV);
- the intensified comparison of input/output relations: Since strategic management has to prove efficiency and since resource advantages are useless unless turned into product market performance, it makes sense to assess the relation between resources (valued *ex ante* at the factor market) and outputs (valued *ex post* at the product market, in the form of rents generated). In this sense, the question of what a firm makes of its human capital is an essential part of a holistic Human Capital Management framework.

Since it could be shown that the claimed tautology of the RBV proves unsubstantiated, this further legitimates the RBV school of thought. At the same time, it may contribute to a further easing of tension between pure RBV and MBV theorists by showing the way for an adequate integration of both perspectives.

In particular, this paper may then provide guidance to HR academics in their efforts to further elaborate decent human capital calculation methods that do not contradict the conceptual cornerstones of strategic management theory. Delayed in time, this should be reflected in useful outcomes for practitioners: Conceptually misleading approaches fade away, whereas a considerably reduced number of remaining methods is continuously improved – and ultimately calls HR managers’ attention in their search for sensible calculation methods.

As Barney and Wright (1998, 40) stress, knowing the economic value of a firm’s human resource is a necessary precondition for any strategic management of the HR function. An economic valuation is then no end in itself, but creates transparency and awareness, it supports rational decision making and reduces subjective arbitrariness. And: Calculating human capital ultimately legitimates good HR management in times of short-sighted cost-cutting programs.

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