



Value relevance of human capital information

Human capital
information

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Abstract

Purpose – The purpose of this paper is to investigate if human capital information voluntarily provided by German companies is value-relevant.

Design/methodology/approach – By means of word-based content analysis, human capital information is extracted from German companies' annual reports. Subsequently, the value relevance of the disclosed human capital information is analyzed by applying two established valuation models.

Findings – The results show that human capital information is value-relevant. Especially, information on qualification and competence issues is positively associated with firm value. Nonetheless, the disclosed information does not lead to short-term changes in market value. Consequently, human capital information is value-relevant but not immediately.

Practical implications – First, companies can improve their valuation on the capital market by disclosing information on their human capital. Second, standard setters can use this paper's results in defining relevant information categories for human capital disclosures. Third, the amount of human capital disclosures is increasing over time.

Originality/value – This study explicitly evaluates the value relevance of the overall (especially nonfinancial) human capital information voluntarily provided in corporate annual reports.

Keywords Human capital, Content analysis, Value relevance, Voluntary disclosure, Germany, Annual reports, Corporate governance

Paper type Research paper

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1. Introduction

In our knowledge-based economy, successful companies' most important assets are intangible (e.g. Edvinsson and Malone, 1997; Lev, 2001; Stewart, 1997). Especially an organization's human capital can be regarded as a valuable resource and as a key factor for sustainable competitive advantages (Günther *et al.*, 2003; Huselid, 1995; Pfeffer, 1994; Prahalad and Hamel, 1990; Wright *et al.*, 1994, 2001). However, companies only disclose limited information on this resource. A reason might be incomplete legal regulations in the field of human capital disclosures. Consequently, investors and other stakeholders cannot fully ascertain their investment objects' value-adding potential (Lev and Zarowin, 1999). The results are information asymmetries between internal and external parties, agency and transaction costs, as well as possible market inefficiencies (An *et al.*, 2011; Healy and Palepu, 2001).

Efficient capital market theory suggests that share prices always reflect all publicly available information (Fama, 1970, 1991; Fama *et al.*, 1969)[1]. Therefore, investors, analysts, and other capital market participants factor the available information into decisions on whether or not to buy or to sell the relevant firm's stocks (Abhayawansa and Guthrie, 2012; Acland, 1976; Lev, 2001; Wyatt, 2008). Consequently, it can be

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assumed that investors will use human capital information for their investment decisions if this information will be regarded as relevant and reliable; that is, human capital information will be assumed value relevant.

The value relevance of disclosures on intangible assets – and human capital – has been the focus of several previous studies (for an overview see Striukova *et al.*, 2008; Wyatt, 2008). Most of these have focussed on intangible assets in general. Thus, they also considered information on companies' structural (internal) and relational (external) capital (e.g. Abdolmohammadi, 2005; Barth *et al.*, 2001; Canibano *et al.*, 2000; Holthausen and Watts, 2001; Lev, 2001; Maines *et al.*, 2002, 2003; Schiemann and Günther, 2007; Uyar and Kilic, 2012; Vafei *et al.*, 2011; Wang, 2008). The studies that solely focussed on human capital disclosures mostly considered very special aspects of such disclosures, for instance employee stock option costs or information on managerial skills. As yet, no study has explicitly evaluated the value relevance of the overall (especially nonfinancial) human capital information provided in corporate annual reports.

The purpose of this paper is to find out if capital markets value voluntarily disclosed human capital information, and – if so – which specific information is value relevant. Against this background, a human capital disclosure index is constructed. It is based on data which have been extracted from corporate reports by means of content analysis. Subsequently, established valuation models are being used for analyzing whether the disclosed human capital information is reflected in share price. Furthermore, it is investigated if the disclosed human capital information leads to short-term changes in share price.

The results of the analysis show that human capital information is value relevant. Especially information pertaining to qualification and competence issues is positively associated with firm value. However, disclosure of human capital information does not cause any changes in share price within the analyzed time frame. Hence, human capital information is value relevant but not immediately.

The study at hand contributes to a better understanding of human capital disclosure and its implications for capital markets.

First, it contributes to understanding the role that (voluntary) disclosures play in capital markets: the provision of human capital information helps to reduce information asymmetries arising between the firm and the capital market; if investors receive the demanded human capital information, they can better evaluate the disclosing company's financial condition (Healy and Palepu, 2001; Leuz and Verrecchia, 2000).

Second, this study contributes to human capital theories by helping to identify human capital's primary components. The positive valuation of qualification and competence issues is in line with human capital theories; they also focus on these issues (see Blaug, 1976).

Finally, the study helps to identify the information that such disclosures have to offer their addressees for reducing potential information asymmetries (Healy and Palepu, 2001). This could be of interest to standard setters when they define what information companies should disclose on human capital issues.

The paper is structured as follows: in Section 2, the relevant theory is reviewed and the hypothesis to be tested is derived. Section 3 contains the study design and methodology. Section 4 presents the results, as well as a discussion and interpretation of these. The study concludes with a summary, a description of its limitations, and an outlook for further research.

2. Theory and hypothesis development

Human capital and the resource-based view of the firm

Within the strategy literature, the discussion of what contributes to corporate success has moved away from external positioning in the industry (e.g. Porter, 1998). Literature has focussed on the availability of organizational resources as the main drivers of competitive advantages (Barney, 1991; Penrose, 1959; Wright *et al.*, 1994, 2001). Companies hold these resources, which are bundled in a unique and dynamic way. If such resources are rare, hard to imitate, nonsubstitutable, and reside within the organization, they can be the main drivers of corporate success (Barney, 1991).

In the industrial age, competitive advantages have mostly been based on physical and financial resources. These resources have become increasingly easy to imitate (Lev, 2001). Today, future organizational success is mostly based on intangible values (Edvinsson and Malone, 1997; Lev, 2001; Spender and Grant, 1996; Stewart, 1997; Sveiby, 1997; Teece, 1998). According to Lev (2001), intangibles are claims to future benefits which do not have a physical or financial embodiment. Basically, these intangible values consist of an organization's structural, relational, and human capital (Edvinsson and Malone, 1997): structural capital relates to internal structures and processes; relational capital considers an organization's relationship with its external stakeholders; human capital refers to an organization's potential with regard to its workforce. Human capital constitutes the other intangible values' lynchpin, as they cannot create value without it.

Human capital includes the employees' accumulated qualifications and competencies, as well as their motivation to use these (capability and willingness to perform; see Schultz, 1961; Becker, 1964). As the early works of Smith (1776), Mincer (1958), Schultz (1961), and Becker (1964) show, human capital theories have long recognized the human factor's overall importance. In short, these theories propose that economies, organizations, and/or individuals can improve their performance, efficiency, and remunerations through investments in education (Blaug, 1976). Moreover, human capital theories – as well as economic theory – argue that sustainable economic growth and competitiveness solely depend on creating innovations. Thus, they finally depend on human capital (Barro, 2001; Bontis, 1998; Solow, 1956; Mankiw *et al.*, 1992; Zingales, 2000).

Against the background of human capital theories and the resource-based view of the firm, human capital must be regarded as a central factor behind organizations' competitiveness. It is one of its most valuable resources (Chadwick and Dabu, 2009; Günther *et al.*, 2003; Huselid, 1995; Pfeffer, 1994; Prahalad and Hamel, 1990; Snell *et al.*, 1996; Wright *et al.*, 1994, 2001)[2]. Therefore, capital market participants might increasingly recognize human capital's relevance for corporate performance.

Value relevance of information

Capital market theory supposes that capital market participants use all relevant available information when making their investment decisions (Beaver, 1981; Fama, 1970, 1991; Fama *et al.*, 1969). That is, traded values are supposed to always reflect all the available information on the relevant firm. Recent publications show that research on capital markets supports a "semi-strong" form of market efficiency with share prices – on average – being assumed to reflect all publicly available information (Beaver, 1981; Fama, 1970, 1991; Fama *et al.*, 1969).

In general, information is defined as value relevant if it has a predicted association with equity market values (Barth *et al.*, 2001). Value-relevant information thus directly

influences a firm's market value. Hence, value relevance research examines the association between the provided information and equity market values by assuming that these values reflect the investors' aggregated beliefs (Ball and Brown, 1968; Barth *et al.*, 2001).

Human capital disclosure and value relevance of the provided information

Human capital disclosure can be regarded as the information a company discloses about its workforce's knowledge, capabilities, and motivation. It is voluntarily disclosed by means of relevant communication channels. However, external reporting is mostly focussed on financial data. Consequently, like other intangible resources, human capital is not adequately considered outside the financial implications (Canibano *et al.*, 2000; Lev, 2001; Lev and Zarowin, 1999; Stewart, 1997). This might be caused by a lack of easy measurability and objectivity of human capital measures (Günther *et al.*, 2003). Furthermore, human capital cannot be activated as an asset. Consequently, a large portion of a company's resources does not appear on the balance sheet (Lev, 2001; Stewart, 1997). Several scholars have therefore called for wider disclosure of information on human capital and other intangible resources (e.g. Maines *et al.*, 2002, 2003).

Since information on companies' human capital is only partially available, investors are not clearly aware of these companies' value-adding potential (Lev and Zarowin, 1999). This results in information asymmetries, which can create costs by introducing adverse selection into transactions between the buyers and sellers of firm shares (Leuz and Verrecchia, 2000). Consequently, the nonprovision of information about human capital can lead to a discrepancy between external parties' valuation of companies and their true financial situations (Healy and Palepu, 2001). The results are potential agency and transaction costs, a misallocation of resources as well as possible (capital) market inefficiencies (Akerlof, 1970; Coase, 1937; Jensen and Meckling, 1976; Lev, 2001).

Increased levels of human capital disclosure can reduce the possibility of information asymmetries (An *et al.*, 2011; Diamond and Verrecchia, 1991; Leuz and Verrecchia, 2000; Lev, 2001). The recipients of information are enabled to gain better insights into human capital potentials and properties. Hence, it becomes easier to assess a company's value creation potential and financial condition (Bukh, 2003; Healy and Palepu, 2001; Lev, 2001; Van der Meer-Kooistra and Zijlstra, 2001). Providing information thus leads to reduced agency and transaction costs as well as to improved resource allocation (Botosan, 1997; Botosan and Plumlee, 2002; Healy and Palepu, 2001).

A great body of empirical literature endorses this view, while touching on various issues (for an overview see Wyatt, 2008): Bell *et al.* (2002), for example, find that employee stock-option-related costs are value relevant. Ballester *et al.* (2002) examine the proportion of US labor costs that are relevant for investors. Furthermore, Abdel-Khalik (2003) finds that information on the managerial skills of executives is value relevant. By using accounting measures, Lajili and Zéghal (2005, 2006) construct indices of human capital productivity and efficiency, and relate these to stock performance. They find that labor costs disclosed in financial statements are potentially useful for evaluating human capital. In addition, various different studies also find that human capital management practices are related to higher firm performance in various areas (e.g. Huselid, 1995; Huselid *et al.*, 1997; Ichniowski *et al.*, 1997; Wyatt, 2008).

As a result, it can be assumed that human capital information is highly relevant for investors' valuation and their investment decisions: they factor the available human capital information and the presumed consequences into their decisions to buy and sell (Acland, 1976; Gamerschlag and Möller, 2011; Lev, 2001; Wyatt, 2008). Consequently, this valuation will be reflected in the companies' share prices:

H1. Human capital information is value relevant to the stock market.

3. Design of the study and methodology

Sample construction

The present study is focussed on Germany for two reasons: comparability (i.e. exclusion of institutional differences) and the country's voluntary disclosure environment. Human capital reporting might be affected by different institutional settings[3]. In order to generate a homogenous data set, this study concentrates on corporations with an identical political and societal background. It is focussed on German companies since Germany has only relatively few requirements regarding human capital disclosures[4].

The study focusses on the German DAX, MDAX, and SDAX. These three indices include the 130 largest listed German companies (see Deutsche Börse, 2010). The sample is focussed on the index composition as of the end of 2008. Four reporting periods between 2005 and 2008 have been considered[5]. The study concentrates on annual reports as these may be regarded as the most important instruments for communication between a company and the capital market (Abdolmohammadi, 2005; Abeysekera, 2006; Guthrie *et al.*, 2004). Only reports provided in English have been considered[6]. Since some companies' reports were not available for all the years (e.g. if a company entered one of the indices after 2006), the sample was thus shortened by 35 observations. In total, 485 observations were obtained[7]. Further 81 observations were lost due to missing information for some sample companies. For example, for some industries (banks, insurance, and technology) net income was not available. The final data set for analysis consists of 369 valid firm-year observations.

Content analysis

This analysis is focussed on the human capital information that corporate reports transmit and which the sample companies provide to their stakeholders. Similar to previous studies, content analysis is applied for quantifying the amount of human capital information in the reports.

Content analysis is a method of codifying written text into various groups or categories on the basis of selected criteria. It assumes that frequency is an indication of the subject matter's importance (Abdolmohammadi, 2005; Guthrie *et al.*, 2004; Krippendorff, 2004). Its objective is to generate a numerically based summary of a chosen message set (Krippendorff, 2004; Neuendorf, 2002). The existing literature (e.g. Abdolmohammadi, 2005; Abhayawansa and Guthrie, 2012; Gamerschlag *et al.*, 2010; Guthrie *et al.*, 2004; Cordazzo, 2007; Michelin, 2011) suggests that content analysis provides valid results for corporate reporting research. It allows the researcher to evaluate the extent of various items' disclosure – especially since information on human capital is mostly provided in a qualitative way (Günther *et al.*, 2003).

A key issue in content analysis is the unit of analysis. A unit is an identifiable component of communication through which variables are measured (Holsti, 1969;

Krippendorff, 2004; Neuendorf, 2002). Depending on the unit of analysis, there are several ways of applying content analysis, for instance, by counting words, sentences or sections, or by reading the whole text (Neuendorf, 2002). Another possibility is to use advanced software packages to extract information from reports (e.g. Chen and Bouvain, 2009). In line with other corporate disclosure research (e.g. Gamerschlag *et al.*, 2010; Vafei *et al.*, 2011), this study uses words as the unit of analysis. Identifying specific terms in texts can be regarded as the most reliable form of content analysis: It always yields the same results in repeated trials and it can be easily replicated by other researchers (Abdolmohammadi, 2005). Furthermore, the coder is not required to provide subjective judgment. The PDF reader's word count function was used for counting the words after manually checking the validity of the count function's results.

For defining the keywords, the framework of Möller *et al.* (2011) was applied. This framework is based on the study by Abdolmohammadi (2005) and other studies carried out against the background of intellectual capital disclosures in general (see April *et al.*, 2003; Bontis, 2003; Bozzolan *et al.*, 2003; Brennan, 2001; Bukh *et al.*, 2005; Cordazzo, 2007; Davey *et al.*, 2009; Flöstrand, 2006; Garcia-Meca, 2005; Guthrie *et al.*, 2004, 2009; Guthrie and Petty, 2000; Mention, 2011), and human capital disclosures in particular (see Abeysekera and Guthrie, 2004; Olsson, 2001).

When deriving the keywords, both singular and plural forms were considered (competence/competencies). The keywords were classified into three categories: those containing information regarding the workforce's "qualification/competence" and regarding its "motivation/commitment." Additionally, a perspective on "personnel" information was added due to the fact that human resource management practices are essential for human capital's future development (e.g. Huselid, 1995; Huselid *et al.*, 1997; Ichniowski *et al.*, 1997). As shown in Table I, the framework contains a total number of 27 keywords.

Valuation models

Value relevance studies use various valuation models (e.g. Barth *et al.*, 2001; Schieman and Günther, 2007). Typically, equity market values are used as the valuation benchmark to assess how well specific accounting amounts reflect information that investors might have used (Barth *et al.*, 2001). In line with previous studies (e.g. Barth *et al.*, 1998; Barth and Clinch, 1998; Goodwin and Ahmed, 2006; Liang and Yao, 2005; Kallapur and Kwan, 2004; Wang, 2008; Wyatt, 2008), a model based on Ohlson's (1995) model and its subsequent refinements was employed (Feltham and Ohlson, 1995, 1996; Ohlson, 1995, 1999). This model is based on the assumption that a company's value equals book value plus a linear function of the current abnormal earnings and the scalar variable representing other information (Barth *et al.*, 2001; Ohlson, 1995). The model examines price or market value levels. It identifies how well particular accounting amounts are reflected in firm value (Barth *et al.*, 2001). The model was employed in the following way:

$$SP = f(BVE/S; NI/S; HCRDISC; YR; IND)$$

where SP is the share price (of common shares); BVE/S is the book value of equity per share; NI/S is the net income per share; and HCRDISC is a human capital disclosure index. It can be interpreted as the "other information" contained in the model; YR and IND signify year and industry dummies.

Category	Keyword
Qualification/competence	Brain power Competence Competencies Education Expertise Intangible skills Intelligence Know-how Knowledge Learning Qualification Specialist Training
Motivation/commitment	Absence Career Employee retention Employee satisfaction Employee turnover Entrepreneurial spirit Motivation Staff turnover
Personnel	Diversity Empowerment Human resource Personnel Recruiting Recruitment

Table I.
Keywords for the
content analysis

An alternative approach for assessing value relevance lies in examining changes in share price. This return-based approach determines the causes of changes in firm value over a specific period of time (Barth *et al.*, 2001). In line with previous literature (e.g. Barth *et al.*, 1998, 2001), the following model was applied:

$$RET = f(NI/S; DNI/S; DHCRDISC; YR; IND)$$

where RET is the return per share; DNI/S is the change in the net income per share; DHCRDISC is the change in the human capital disclosure index; and NI/S (net income per share), YR (year), and IND (industry) are as previously defined.

Dependent variables

With regard to the price levels model, the share price (SP) of common shares was used as the dependent variable in the regression. It represents the closing price of the last day of the quarter in which the relevant company's annual report was published. This information was taken from Thomson One Banker (2009).

In the return-based analysis, the return per share (RET) is used as the dependent variable. The return measure was calculated as:

$$RET = ([SP_t - SP_{t-1}] + DIV/S)/SP_{t-1}$$

where SP_t (share price in date t) is the closing price of the last day of the quarter in which the relevant company's annual report was published; SP_{t-1} (share price in

date $t-1$) is the closing price of the last day of the previous quarter; DIV/S is the corresponding company's dividend payment per share during the previous year. This information was taken from the Deutsche Börse (2010) web site.

Independent and control variables

The book values of equity per share (BVE/S) as well as net income per share (NI/S) were used for the independent variables. These two variables were calculated: the book values of equity, net income, as well as the number of shares outstanding are available at Thomson One Banker (2009). Change in net income per share (DNI/S) was defined as the net income per share (NI/S) minus the net income per share (NI/S) of the previous year.

The human capital information provided in the analyzed annual reports was used as the "other information." Therefore, four variables were compiled. These variables are based on the information extracted from the provided reports by means of content analysis and based on the defined keywords:

$$\text{HCRTOT} = \text{HCRQC} + \text{HCRMC} + \text{HCRPS}$$

where HCRTOT is the total quantity of human capital disclosure; HCRQC is the amount of disclosed information with regard to "qualification/competence" issues; HCRMC is the amount of disclosed information with regard to "motivation/commitment" issues; and HCRPS is the amount of information provided on "personnel" issues (total number of keywords found in the analyzed report).

All the variables were identified for every company and each year. Thus, the indices reflect the number of hits when searching for all keywords in each category.

However, shareholders also take other disclosures of the relevant companies into account. To control the resulting effects, the number of hits was divided by the analyzed reports' number of pages as a measure for these other disclosures.

The change in total disclosure (DHCRTOT) was defined as the HCRTOT minus the HCRTOT of the previous year. The sub-indices (DHCRQC, DHCRMC, and DHCRPS) were defined similarly.

The year and industry dummies represent control variables. The Deutsche Börse's (2010) classification was used to classify the sample companies into 18 industries (see Table AI in Appendix). This fine segmentation was necessary since human capital disclosures – like other disclosures – differ between industries (Möller *et al.*, 2011; Striukova *et al.*, 2008). Thereafter, dummy variables were applied to differentiate between industries and years. Table II offers a summary of the data sources, the dependent and independent variables, as well as their abbreviations.

4. Results and discussion

Descriptive statistics and correlations

Table III shows the descriptive statistics after adjusting the outliers at the 2.5 level[8]. The table indicates that most variables' dispersion is on an acceptable level.

In line with recent literature (e.g. Mention, 2011), the results show that the amount of human capital disclosure is increasing over time. The total disclosure index (HCRTOT) increased from 7,300 hits in 2006 to more than 10,600 hits in 2009[9]. This trend is mostly caused by an increase in disclosures on qualification and competence, as well as on personnel issues. Figure 1 displays these developments.

Table IV shows the Pearson correlations for the dependent as well as the independent variables. Panel A shows the correlations of the variables needed for

Variable	Abbreviation	Measure Explanation	Sources
Share price	SP	Share price at the end of the reporting period (quarter), dependent	Thomson One Banker (http://banker.thomsonib.com/)
Return per share	RET	Return per share (including dividend payments), dependent	Thomson One Banker (http://banker.thomsonib.com/), calculated
Book value of equity per share	BVE/S	Book value of equity per share, independent	Thomson One Banker (http://banker.thomsonib.com/), calculated
Net income per share	NI/S	Net income per share, independent	Thomson One Banker (http://banker.thomsonib.com/), calculated
Total disclosure index	HCRTOT	Extracted from the reports by means of content analysis, independent	Provided reports
Disclosures on qualification and competence issues	HCRQC	Extracted from the reports by means of content analysis, independent	Provided reports
Disclosures on motivation and commitment issues	HCRMC	Extracted from the reports by means of content analysis, independent	Provided reports
Disclosures on personnel issues	HCRPS	Extracted from the reports by means of content analysis, independent	Provided reports
Change in the total disclosure index	DHCRTOT	HCRTOT minus HCRQC of the previous year	Provided reports, calculated
Change in disclosures on qualification and competence issues	DHCRQC	HCRQC minus HCRQC of the previous year	Provided reports, calculated
Change in disclosures on motivation and commitment issues	DHCRMC	HCRMC minus HCRMC of the previous year 1/0, independent	Provided reports, calculated; Deutsche Börse (www.boerse-frankfurt.com)
Year dummies		1/0, independent	

Table II.
Source of data

applying the price-levels model with share price as the dependent variable. The matrix reveals a strong positive relationship between share price (SP), the book value of equity per share (BVE/S), and the net income per share (NI/S). Furthermore, the four disclosure indices are positively correlated to each other. This means that companies usually disclose information on all three aspects of human capital if they decide to disclose at all. However, no significant correlation can be identified between the disclosure indices and share price (SP).

Panel B of Table IV illustrates the correlations of the variables required for the return analysis with the calculated return measure as the dependent variable. The correlation matrix indicates a positive correlation between the return (RET) measure and net income per share (NI/S). Furthermore, a positive correlation can be identified between net income per share (NI/S) and changes in net income per share (DNI/S).

	<i>n</i> statistic	Minimum statistic	Maximum statistic	Mean statistic	SD statistic	Skewness Statistic	SE	Kurtosis Statistic	SE
<i>Panel A</i>									
SP	477	2.30	130.5	34.45	30.61	1.60	0.11	2.18	0.22
BVE/S	470	2.06	77.89	18.93	16.90	1.92	0.11	3.68	0.23
NI/S	371	-2.46	21.64	3.48	4.53	2.33	0.13	6.22	0.25
HCRTOT	483	0.15	0.99	0.43	0.19	0.97	0.11	0.72	0.22
HCRQC	483	0.04	0.65	0.23	0.14	1.20	0.11	1.17	0.22
HCRMC	483	0	0.10	0.03	0.02	1.15	0.11	1.16	0.22
HCRPS	483	0.04	0.35	0.17	0.08	0.49	0.11	-0.38	0.22
Valid <i>n</i>	369								
<i>Panel B</i>									
RET	476	-0.59	0.80	0.02	0.27	0.33	0.11	0.99	0.22
NI/S	371	-2.46	21.64	3.48	4.53	2.33	0.13	6.21	0.25
DNI/S	252	-12.01	6.68	-0.17	3.03	-1.77	0.15	6.38	0.31
DHCRTOT	354	-0.22	0.28	0.01	0.11	0.25	0.13	0.11	0.26
DHCRQC	354	-0.15	0.18	0.01	0.08	0.15	0.13	-0.05	0.26
DHCRMC	354	-0.05	0.04	0.00	0.02	-0.25	0.13	0.22	0.26
DHCRPS	354	-0.10	0.10	0.00	0.05	0.12	0.13	-0.03	0.26
Valid <i>n</i>	237								

Table III.
Descriptive statistics after truncation at the 2.5 level

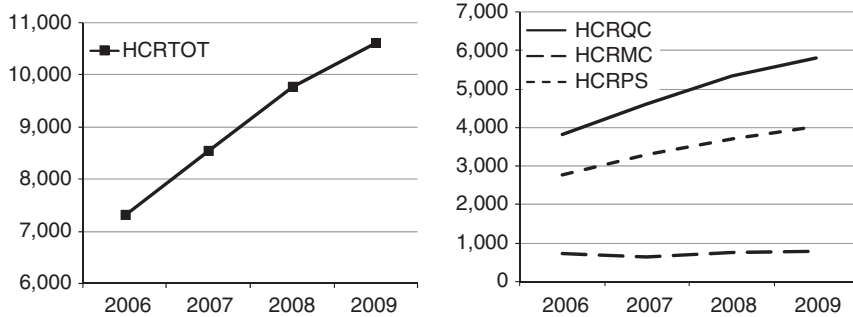


Figure 1.
Descriptive results of the content analysis

Notes: Content analysis based on keywords; number of hits for all companies

Notes: Content analysis based on keywords; number of hits for all companies

Further positive correlations exist between most disclosure indices. No significant correlation can be identified between the disclosure indices and the return measure (RET).

Hence, the results of the univariate analysis show no significant correlations between the compiled disclosure indices and the applied market value measures – neither for the price levels nor for the return model.

Regression analysis: value relevance of human capital information

Table V presents the results of the regression analyses. Columns (A) and (B) contain the results for the price levels model with share price (SP) as the dependent variable. Book value of equity per share (BE/S), net income per share (NI/S), and the human capital disclosure indices are used as independent variables. Furthermore, year dummies

		SP	BVE/S	NI/S	HCRTOT	HCRQC	HCRMC	HCRPS
<i>Panel A</i>								
SP	Pearson's correlation							
	Significance (two-tailed)	1						
BVE/S	Pearson's correlation	0.675**						
	Significance (two-tailed)	0.000	1					
NI/S	Pearson's correlation	0.576**	0.783**					
	Significance (two-tailed)	0.000	0.000	1				
HCRTOT	Pearson's correlation	0.084	0.012	0.018				
	Significance (two-tailed)	0.066	0.794	0.763				
HCRQC	Pearson's correlation	0.071	0.005	-0.032	0.900**			
	Significance (two-tailed)	0.122	0.915	0.536	0.000	1		
HCRMC	Pearson's correlation	0.059	0.006	-0.035	0.467**	0.362**		
	Significance (two-tailed)	0.200	0.894	0.502	0.000	0.000	1	
HCRPS	Pearson's correlation	0.015	-0.024	0.039	0.656**	0.307**	0.182**	1
	Significance (two-tailed)	0.740	0.608	0.454	0.000	0.000	0.000	
<i>Panel B</i>								
RET	Pearson's correlation							
	Significance (two-tailed)	1						
NI/S	Pearson's correlation	0.050*						
	Significance (two-tailed)	0.333	1					
DNI/S	Pearson's correlation	0.157	0.293**					
	Significance (two-tailed)	0.013	0.000	1				
DHCRTOT	Pearson's correlation	0.003	-0.088	-0.017				
	Significance (two-tailed)	0.955	0.130	0.795	1			
DHCRQC	Pearson's correlation	0.037	-0.058	-0.028	0.866**			
	Significance (two-tailed)	0.486	0.324	0.664	0.000	1		
DHCRMC	Pearson's correlation	0.032	-0.100	0.007	0.389**	0.198**		
	Significance (two-tailed)	0.555	0.085	0.919	0.000	0.000	1	
DHCRPS	Pearson's correlation	-0.036	-0.071	0.16	0.595**	0.213**	0.102	1
	Significance (two-tailed)	0.500	0.221	0.804	0.000	0.000	0.056	

Notes: *,**Significant at the 0.05 and 0.01 level, respectively

Table IV.
Correlations – dependent
and independent variables

(YR07-YR09; 2006 is the benchmark), as well as industry dummies (BASIC-UTILI; AUTOM is the benchmark) are included in the regression. The analysis reveals a strong connection between share price (SP) and book value of equity per share (BVE/S), as well as with net income per share (NI/S). Also, the analysis detects strong year effects (YR08 and YR09). Significant industry effects can only be identified for TRANS (negative) and UTILI (positive).

Column (A) reveals that human capital disclosures are positively related to the sample companies' market value; the provided information is positively associated with share price (see the total human capital disclosure index (HCRTOT) in column (A)). A closer look at the sub-categories of the disclosed human capital information (see column (B)) reveals that it is primarily the information on qualification/competence issues (HCRQC) which is value relevant. It is positively associated with share price (SP). Information on motivation/commitment (HCRMC), as well as on personnel issues (HCRPS) is not significantly associated with share price.

Columns (C) and (D) show the return-based model's results. Return per share (RET) is used as the dependent variable. Net income per share (NI/S), change in net income per share (DNI/S), and changes in the human capital disclosure indices are used

	(A) SP		(B) SP		(C) RET		(D) RET	
	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability	Coefficient	Probability
Constant		**		**				
BVE/S	0.505	***	0.506	***				
NI/S	0.208	***	0.210	***	0.022		0.023	
DNI/S					0.079		0.079	
HCRTOT	0.084	**						
HCRQC			0.085	*				
HCRMC			0.032					
HCRPS			-0.024					
DHCRTOT					-0.022			
DHCRQC							-0.016	
DHCRMC							0.034	
DHCRPS							-0.045	
YR07	-0.010		-0.008					
YR08	-0.145	***	-0.146	***	-0.409	***	-0.424	***
YR09	-0.348	***	-0.348	***	-0.445	***	-0.450	***
BASIC	-0.059		-0.057		0.140	*	0.138	*
CHEMI	0.078		0.079		0.092		0.092	
CONSU	0.065		0.081		0.084		0.081	
CONSTR	-0.020		-0.013		0.088		0.083	
FINAN	0.021		0.017		0.083		0.081	
FOODB	-0.026		-0.025		0.102		0.100	
INDUS	0.085		0.084		0.171		0.168	
MEDIA	0.057		0.060		0.111		0.111	
PHARM	0.029		0.031		0.025		0.025	
RETAI	-0.010		-0.005		0.050		0.049	
SOFTW	0.055		0.054		0.022		0.023	
TELEC	-0.022		-0.018		0.013		0.013	
TRANS	-0.088	*	-0.081	*	0.023		0.025	
UTILI	0.074	*	0.073	*	0.026		0.022	
Adjusted R ²	0.52		0.52		0.11		0.11	
F-value (probability)	20.80	***	18.98	***	2.57	***	2.35	***
n	367		367		235		235	

Notes: SP, Share price; RET, return per share; BVE/S, book value of equity per share; NI/S, net income per share; DNI/S, change in net income per share; HCRTOT, total amount of disclosure; HCRQC, amount of disclosures with regard to qualification and competence issues; HCRMC, amount of disclosures with regard to motivation and commitment issues; HCRPS, amount of disclosures with regard to personnel issues; DHCRTOT, change in HCRTOT; DHCRQC, change in HCRQC; DHCRMC, change in HCRMC; DHCRPS, change in HCRPS; YR07-YR09, year dummies for 2007-2009; BASIC, industry dummy (basic resources); CHEMI, industry dummy (chemicals); CONSU, industry dummy (consumer); CONSTR, industry dummy (construction); FINAN, industry dummy (financial services); FOODB, industry dummy (food and beverage); INDUS, industry dummy (industry); MEDIA, industry dummy (media); PHARM, industry dummy (pharma); RETAI, industry dummy (retail); SOFTW, industry dummy (software); TELEC, industry dummy (telecommunication); TRANS, industry dummy (transportation and logistics); UTILI, industry dummy (utilities); column (A) contains the results of the regression using SP as the dependent and HCRTOT as an independent variable; column (B) shows the results of the regression using SP as the dependent and the (sub)disclosure indices HCRQC, HCRMC, and HCRPS as independent variables; column (C) illustrates the results of the regression using RET as the dependent and HCRTOT as an independent variable; column (D) illustrates the results of the regression using RET as the dependent and the (sub)disclosure indices HCRQC, HCRMC, and HCRPS as independent variables; *, **, ***significant at the 0.1, 0.05, and 0.01 level, respectively

Table V.
Regression analysis –
value relevance of human
capital information

as independent variables. Furthermore, year dummies (YR08-YR09; 2007 is the benchmark), as well as industry dummies (BASIC-UTILI; AUTOM is the benchmark) are considered in the regression.

The results presented in columns (C) and (D) do not show any relationship between the changes in the human capital disclosure indices and the applied return measure (RET). Thus, it seems that changes in market value are not affected by human capital disclosures.

Overall, the hypothesis is confirmed by the studies' results: human capital information is value relevant for equity investors; it is associated with equity market values. But disclosing more human capital information does not directly lead to any capital market reactions. In other words: human capital information is value relevant, but not immediately. Investors rather incorporate the provided human capital information in their long-term investment decisions.

However, this study provides specific evidence that investors regard human capital as an important organizational resource – at least in the long run; against the background of the resource-based view, they consider information on human capital as relevant additional information about (future) corporate success. Thus, this value-relevant information is reflected in share price.

Nevertheless, human capital information seems to have no influence on short-term changes in market value. For the capital market other information – e.g. macroeconomic developments – might be more relevant for evaluating traded stocks. This is in line with the assumption that human capital does not immediately affect corporate financial performance; it rather takes effect through various cause and effect relations over a long period of time (Gamerschlag and Möller, 2011; Marr *et al.*, 2004).

This study contributes to literature and theory in the following ways:

- (1) It elaborates corporate disclosures' role in capital markets: as stated at the beginning, providing human capital information can help to reduce information asymmetries arising between the firm and its shareholders. It further reduces information asymmetries among potential buyers and sellers of firm shares (Leuz and Verrecchia, 2000); by receiving the demanded human capital information, investors can better evaluate the disclosing company's financial condition. This influences the company's valuation on the capital market. Specifically, the amount of human capital information with regard to qualification/competence issues affects market value. This finding is in line with previous research, which identified voluntary reporting activities as crucial for the functioning of capital markets (e.g. Botosan, 1997; Botosan and Plumlee, 2002; Healy and Palepu, 2001)[10].
- (2) This study contributes to human capital theory and the resource-based view of the firm: on the one hand, it helps to pinpoint human capital's primary components. Investors regard information on the workforce's qualifications and competencies as particularly relevant. Therefore, these issues can be assumed to be the most important drivers behind corporate success – at least with regard to human capital. This is in line with human capital theories; they generally identify qualification as the main driver behind individuals, organizations, and societies' benefits (Blaug, 1976). On the other hand, information on qualification/competence is also associated with the arguments offered by the resource-based view (or rather the knowledge-based view) of the firm (Grant, 1996; Spender, 1994; Spender and Grant, 1996). Investors regard the disclosed qualification and competence issues as organizational resources.

- (3) Furthermore, this paper makes three main contributions to practice:
- A: companies can use these findings to influence their value since human capital disclosures may lead to improved shareholder value. Therefore, companies should make use of such voluntary disclosures. This finding corresponds to other studies' results: firms committing to increased levels of disclosure garner economically and statistically significant benefits (e.g. Lambert *et al.*, 2007; Leuz and Verrecchia, 2000). Moreover, economic resources appear to be allocated to those firms that disclose more (human capital) information (Anderson and Frankle, 1980). However, companies should be aware that the disclosed information is reliable. Otherwise it could potentially be harmful for the company as well as for the recipients of such information.
 - B: the findings can be used by standard setters to advance corporate reporting toward human capital issues (Schiemann and Günther, 2007). Since information on human capital is gathered as well as valued by capital market participants, companies should be committed to disclose related information. Against this background, standard setters can use these paper's results in defining relevant information categories for human capital disclosures. Especially information regarding qualification and competence issues should mandatorily be included in corporate annual reports.
 - C: the amount of disclosed human capital information has been increasing over time. Especially information on qualification/competence, as well as on personnel issues has been more and more disclosed by German companies. Investors, analysts, and other capital market participants need to consider this development and should be aware of the resulting valuation effects.

5. Conclusion and outlook

Human capital can be regarded as an important driver of long-term corporate financial performance. It is often referred to as an organization's most important resource. But most companies do not provide meaningful information about their human capital. Hence, investors cannot clearly determine these companies' value-adding potential. The results are information asymmetries. Human capital disclosures can reduce these information asymmetries by providing capital markets with the necessary information. Investors are assumed to incorporate the available information in their investment decisions. Thus, proactively disclosed human capital information is assumed to be reflected in share price. Accordingly, human capital information might be value relevant.

In line with previous research, two established valuation models were applied for determining the value relevance of human capital information. By means of content analysis, the human capital disclosures provided by the 130 largest listed companies in Germany were analyzed. More than 82,000 pages of annual reports were considered by generating four disclosure indices. These indices were used for detecting the provided human capital information's association with firm value.

The results show that the provision of human capital information is value relevant, but not immediately. There is a positive association between the disclosed human capital information and share price. Especially information on

qualification/competence issues has a positive association with firm value. Capital market participants therefore incorporate the available human capital information in their long-term investment decisions. These findings are in line with recent studies' results which also identified an overall positive relationship between voluntary disclosures and firm value (e.g. Abdolmohammadi, 2005; Anam *et al.*, 2011; Uyar and Kilic, 2012; Vafei *et al.*, 2011). Companies can use human capital reporting to improve their valuation on the capital markets – particularly if they provide information on their workforce's qualification/competence. However, human capital disclosures seem to have no impact on short-term changes in market value. Other information or developments might be better suited to explain such changes in share prices.

As with all empirical studies, this study is subject to limitations. First of all, the industry classification is open to criticism. Some industries are represented by only three or even fewer companies. Furthermore, some measures – especially net income per share – were not available for three industries. As a consequence, the sample lacked these industries. This might have biased the results. Further limitations arise from the way content analysis has been applied. Using keywords as units of analysis may be an inappropriate methodology, as words are detached from their contextual backgrounds. Finally, the cultural as well as regulatory aspects should not be generalized since only one country was researched.

Despite these limitations, the results provide interesting insights into the value relevance of human capital information. Additional research should consider the information content in more detail. In particular, the relevant aspects in respect of qualification and competence issues might be of interest. There seems to be a substantial value potential from the investors' perspective. Moreover, human capital disclosures and their internal and external effects on all their addressees have to be examined in detail. For example, their effects on (potential) employees or on customers should be analyzed. Merely considering capital market implications might not be sufficient for identifying the opportunities which might arise from such disclosures.

Notes

1. Please note that the terms “share price,” “firm value,” and “company value” are used interchangeably; differences between the terms are only a question of scaling.
2. As a result, the “knowledge-based view” as well as the “core competence” approaches emerged. Both refer to the enhancement of the resource-based view to human capital (see Grant, 1996; Nonaka, 1994; Nonaka and Takeuchi, 1995; Spender, 1994; Spender and Grant, 1996; Sveiby, 1997). Following these approaches, employees can no longer be considered as a cost to be minimized – the view taken in the industrial era. They have to be seen as a resource to nurture and optimize since value creation results from treating employees as an asset; solely considering them as a cost factor (or trying to profit from labor exploitation) probably results in value extraction – at least in the long run (Abhayawansa and Abeysekera, 2008).
3. Providing information on human capital issues is closely related to voluntary sustainability (or corporate social responsibility (CSR)) disclosures. Among other aspects, CSR also considers labor issues (for an overview see Carroll, 1999, 2006; De Bakker *et al.*, 2005). CSR and similar disclosures are assumed to differ between countries (Matten and Moon, 2008).
4. For instance, according to DRS 15, companies have to disclose information which might have a substantial impact on firm value. Thus, companies are encouraged to provide information (or at least “some” information) on their human capital if this could have an impact on the company's value.

5. The composition of the SDAX changes frequently, as companies continuously enter or leave the index. Considering more than four reporting periods would have disproportionately shortened the number of observations in the sample.
6. All companies in the sample provide their annual reports in English, as well as in German.
7. On the whole, 82,000 annual report pages have been analyzed.
8. Truncation of the data is necessary to deal with skewness in the original data file.
9. During the same period, the average number of pages in the analyzed reports increased from 150 in 2006 to 188 pages in 2009.
10. Corporate disclosures have to be credible and reliable (Healy and Palepu, 2001). But according to Gelb and Strawser (2001), disclosures are good measures for “real” actions. Thus, it should constitute credible information – even if it might be disclosed unaudited.

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Appendix

Industry sector	Abbreviation	Number of companies
Automobile manufacturers	AUTOM	7
Banks	BANKS	4
Basic resources	BASIC	3
Chemicals	CHEMI	12
Construction	CONSTR	5
Consumer	CONSU	8
Financial services	FINAN	19
Food and beverage	FOODB	1
Industrial	INDUS	32
Insurance	INSUR	3
Media	MEDIA	6
Pharma	PHARM	8
Retail	RETAI	8
Software	SOFTW	1
Technology	TECHN	1
Telecommunication	TELEC	1
Transportation and logistics	TRANS	8
Utilities	UTILI	3
Total		130

Source: According to Deutsche Börse (2010)

Table AI.
Number of companies
per industry sector

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