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Hurdles for the Voluntary Disclosure Of Information on Intangibles – Empirical Results for "New Economy" Industries

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Hurdles for the Voluntary Disclosure of Information on Intangibles – Empirical Results for "New Economy" Industries

by Thomas W. Guenther, Dirk Beyer, Jutta Menninger[1]

Abstract

Intangible resources are gaining increasing importance in western economies. Our paper is focusing on possibilities and limits of reporting on intangible resources seen from the company's point of view. We examine 343 German listed corporations of the German C-DAX indices for industries where intangible resources play a significant role for the business models of the companies. The study analyses the relevance of intangible resources in relation to tangible and financial resources for the company's strategy based on Porter's concepts of the value chain and the competitive forces (relevance). The relevance of intangibles is compared with the intensity of the focus within the company's internal control system. In the third step, the importance within the (external) reporting system is considered (disclosure). Finally the company's perception of the sensitivity regarding information about intangible resources on the capital market is analysed.

JEL-Classification: C12, G32, M41

Keywords: Reporting, Intangibles, Voluntary Disclosure, Information Systems, Internal Control System

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1 Relevance of Reporting on Intangibles

The importance of intangible assets like brands, customer relationships, knowledge or organisational capabilities is increasing in most western economies. Recent concepts like knowledge management or intellectual capital management underline the growing importance of these „soft" production factors. The financial as well as the managerial accounting are still focusing on „hard" production factors, especially the production area with its typical physical and tangible assets and the finance and investment area with financial assets.

Concepts like the Skandia navigator[2], the Intangible Assets Monitor[3], the Intellectual Capital Navigator[4], the Value Chain Scoreboard[5] and the Intellectual Capital Report[6] (Austrian Research Center, 2000 and Maul, 2000) have been developed to find a structure for reporting on intangible resources. Capital market research shows what indicators for intangible resources have an impact on the capital market[7].

Some companies such as *Skandia*, *Celemi International*, *WM-data AB*, *KREAB*, *Jacobson & Widmark*, *Carl Bro a/s*, *Coloplast a/s* or *Deutsche Bank AG* started to deliver additional information complementing the financial reporting. The *Austrian Research Center Seibersdorf* has created a "balance sheet for knowledge" that informs on the value of the knowledge management activities of an organization.

Standard setting bodies and different kind of organizations think about expanding financial reporting to a more informative business reporting. In 1994 the Special Committee on Financial Reporting (often called the Jenkins committee) submitted the Comprehensive Report demanding a re-orientation of financial reporting on information needs of investors and promoted a stronger future-orientation and focus on non-financial items[8]. The Business Reporting Research Project of FASB is based on the results of the Jenkins committee and examines best practices of voluntary disclosure of additional information like that demanded by the Jenkins committee or any other information[9]. The FASB is currently working on a new project "Disclosure about intangible assets". The Global Reporting Initiative tends to develop a framework for reporting on sustainable development integrating economic, social and environmental indicators[10]. The Danish Agency for Trade and Industry conceptualized a guideline for the development of intellectual capital statements.[11] Auditing companies started initiatives for a more capital market oriented reporting.[12] A broader reporting on intangibles is one common objective of all these developments.

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[2]   See Edvinsson and Malone (1997), pp.65.
[3]   See Sveiby (1997), pp. 11.
[4]   See Stewart (1997).
[5]   See Lev (2001), pp. 105.
[6]   See Austrian Research Center (2000) and Maul (2000), pp. 2009.
[7]   See e.g. Lev / Sougiannis (1996), pp. 107, Aboody / Lev, (1998), pp. 161, Deng / Lev / Narin (1999), pp. 20 and Lev / Sougiannis (1999), pp. 419.
[8]   See AICPA (1994).
[9]   See FASB (2001).
[10]   See e.g. GRI (2002).
[11]   See Danish Agency for Trade and Industry (2000).
[12]   See e.g. Eccles et al. (2001).

In Germany the work force „Intangible Values in Accounting" of the German Schmalenbach-Association started to develop concepts and approaches for a reporting on intangibles[13]. The Schmalenbach workforce "External Reporting" demands disclosure on intangibles as part of value reporting.[14] Nevertheless, reporting on intangibles so far is not a top issue for financial and managerial accountants in Germany.

2 Aims of the Study and Study Design

In the last decade different approaches on classification, measurement and reporting formats for intangibles had been developed by academics, consultants and users. Some innovative companies especially in Scandinavian countries started with reporting on intangibles in practice.

From our point of view, it's now time to look on the potential users of such reporting frameworks on intangibles - the companies. As a broad application within companies is poor at the moment, the objective of our study is to examine the opportunities and hurdles for reporting on intangibles in German companies on a cross-sectional basis seen from the companies' perspective. We examine in detail:

- What *external factors (environment)* and *internal factors (resources)* influence the long-term success of the company ?

- What intangibles within the internal factors are relevant for a company's success ?

- Does the *internal control system* consider intangibles ?

- How are different types of intangibles *measured or evaluated* in the internal control system?

- How does the *external reporting system* disclose information on intangibles ?

- What are the most relevant *hurdles for the external disclosure* of information on intangibles ?

- How do companies evaluate the *information processing of capital markets* concerning intangibles ?

- Are there any differences between different types of industries (*industry bias*) ?

In the context of our survey, *intangible resources* (short form: intangibles) are defined to be the non-material and non-financial resources a company can exploit for longer than the current reporting year (distinguishing from current expenses or costs). *"Intellectual property"* are those intellectual resources that are legally protected, like brand names, patents or licences. Intangible resources become *"intangible assets"* if they fulfil the asset definition of the current standards (e.g., IASC Framework § 49, IAS 38.7 and SFAC 6 §§ 25 and 26) and legislation (e.g., the regulations in corporate law in Germany). From our point of view, *"intellectual capital"* comprises all intangible resources of a company.

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[13]   See Arbeitskreis Immaterielle Werte im Rechnungswesen (2001), pp. 989 and Arbeitskreis Immaterielle Werte im Rechnungswesen (2003).
[14]   See Arbeitskreis Externe Unternehmensrechnung (2002), pp. 2340.

Figure 1:   Classification of Intangible Resources in the study

Customer Capital	Human Capital
Brands Customer Relations Company Name / Image Structure of Sales & Distribution Cooperation Franchise Partnerships	Technological Know How Education Process Know How Experience Innovations Adaptability Corporate Culture
Innovation Capital	Process & Structural Capital
Patents Copyrights Technological Know how Brands Protected Labels Licences	Information Systems Corporate Culture Networks Locations Investor Relations Process Know How

There are different approaches to classify intangible resources. Edvinsson / Malone and Stewart classify in Human Capital, Structural Capital and Customer Capital.[15] Bontis uses Relational Capital in a wider sense instead of Customer Capital[16] and Sveiby classifies in internal structure, external structure and people's competence.[17] The workforce "Intangibles in Accounting" separates seven categories of intangible resources.[18] For our study we found the classification in customer capital, human capital, innovation capital and structure or process capital helpful as the approach comprises all other classifications. As can be seen from Figure 1 some categories of intangible resources overlap (e.g., technological know how, process know how, corporate culture) as they cannot be allocated directly to one of the categories.

The design of the study is shown in Figure 2.

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[15]   See Edvinsson/Malone (1997) and Stewart (1997).
[16]   See Bontis (1998), pp. 63.
[17]   See Sveiby (1997).
[18]   Innovation Capital, Human Capital, Customer Capital, Supplier Capital, Investor Capital, Process Capital und Location Capital. See Arbeitskreis Immaterielle Werte im Rechnungswesen (2001), pp. 990.

Figure 2:   Design of the study (in brackets relevant chapters of this article)

Explanation: ⟷   Interaction empirically tested
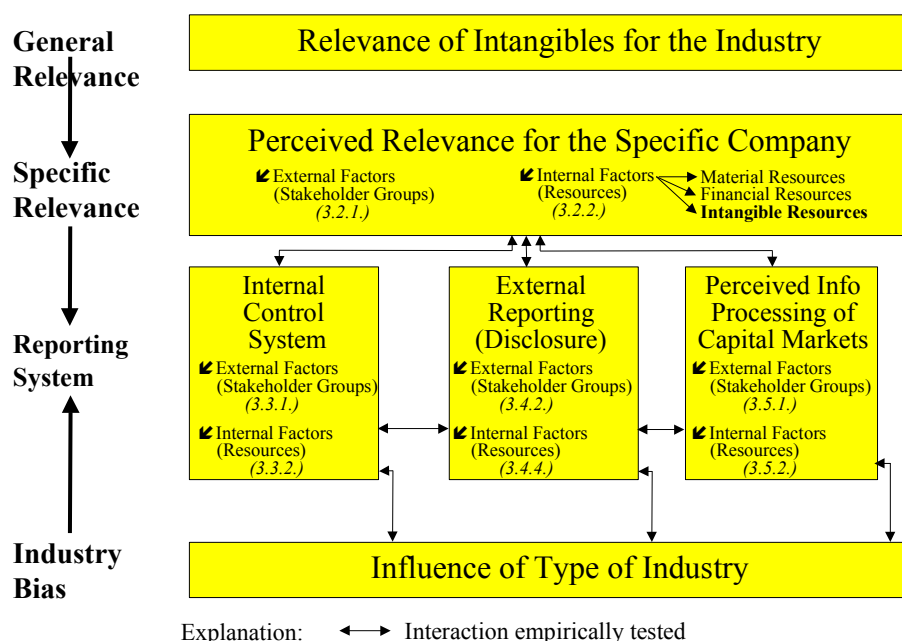
For our study we focused on those industries where intangibles play in general a major or dominant role **(general relevance of intangibles)**. As we want to focus on the value relevance of reporting on intangibles and as we want to examine in further studies the impact on stock market returns we concentrate on corporations quoted on the German capital market. Therefore, we selected the five sections „Media", „Technology", „Pharmaceuticals / Health Care", „Software" and „Telecommunications" from the CDAX industry indices. For all of these five industries we assume an intensive use of intangibles like customer value, know how, patents, licences, structural and organisational capital. Due to that pre-selection of companies the general relevance of intangibles is regarded to be given and not further explored.

For a specific company, the relevance of several categories of intangibles may differ. Therefore we analyse the **specific relevance** of intangibles for the business success of a company performing an environmental analysis (stakeholder analysis) from a market based view combined with an analysis of the internal resources from a resource based view. This specific relevance is now compared with content and structure of the **internal control system** and within the **external reporting system (disclosure)**. Finally the company's perception of the processing power of **capital markets** with regard to information on intangibles is elaborated.

Eccles et al. use a system of gaps, which seems to be similar to the SERVQUAL approach of quality measurement in the service industry[19], as a framework to analyse the potentials and limits of value reporting[20]. Our framework of analysis follows the information flow from the company's environment to the company and from the company to the external capital market. It is very close to the FASB framework presented in the Business Reporting Research Project[21]. The four elements of our design can be integrated in this flow concept (Figure 3). Similar to the gap approach we ask what hurdles may prevent companies from a broader disclosure of information on intangible resources. Based on results of previous studies on brand management[22] and on performance measurement systems[23] we derived five possible hurdles of non-disclosure:
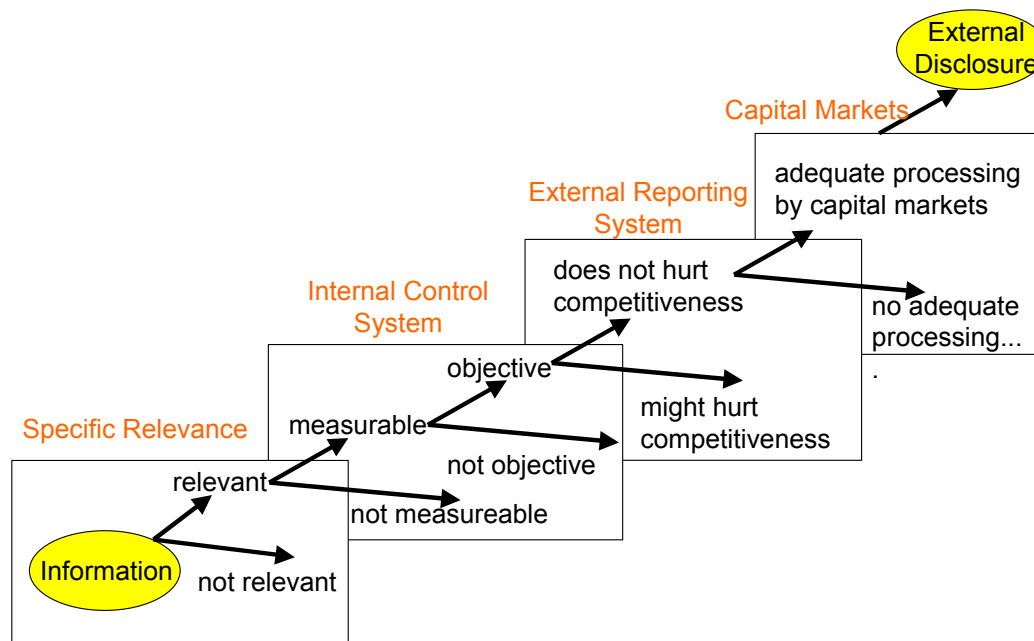
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[19]   See Zeithaml / Parasuraman / Barry (1990), p. 26.
[20]   See Eccles et al. (2001), p. 130.
[21]   See FASB (2001), p. 13.
[22]   See e.g., PriceWaterhouseCoopers / Sattler (1999) and Günther / Kriegbaum-Kling (2001).

Figure 3:   Flow of Information and Elements of Analysis in the Study

First of all, information has to be seen as relevant for the future development of the company, to be content of internal or external reporting. The **relevance of information** can be assessed from an external perspective, looking at the company's environment (market based view) or from an internal perspective, looking at the company's value chain and underlying resources (resource based view). If information is regarded to be relevant, it should become content of the **internal control system**. Different criteria have been developed to describe the quality of measurement concepts (reliability, validity, objectivity, financial measurability, efficiency) and were tested empirically[24]. Even if an information can be measured within an (internal) reporting system, the company might not disclose that information because it might be interesting for competitors and could harm the company's competitive position. Another reason might be that the information which is seen to be relevant from the management's point of view is assumed to be not adequately represented in the information processing of the capital market. In the capital market research literature this is described as the information content of an information. This list of hurdles might not be complete and the sequence of hurdles might alter too. Nevertheless it represents major obstacles for disclosure and integration of information in reporting systems in our already cited previous studies.

The analysis of case studies[25] might be an adequate research method to get in detail knowledge on the implementation and design process of reporting systems for specific companies, but does not promote our objective to identify general opportunities and hurdles for the disclosure on intangibles for a broad sample of companies. Therefore, we perform a cross-sectional analysis using written questionnaires.

To develop a consistent concept for the design of the questionnaire, we did several interviews with CEOs and CFOs of companies of the population and with consultants of auditing companies working in that industries **(pre-testing)**. The main survey was finally done between February and May 2002.

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[23]   See Günther / Grüning (2002).
[24]   See e.g., Grüning (2002), pp. 134.
[25]   See e.g., Johanson / Martensson / Skoog (2001), pp. 407.

The scale of the variables is primarily nominal or ordinal. All ordinal variables are measured in interval scale to allow the use of statistical methods for interval scaled data.[26] To examine interactions between variables, we performed contingency and t-tests. We performed all tests at a given level of significance of $\alpha = 0.05$. Furthermore, an α-value of 0.01 is connected with high significance. We could not test causal models because of the stringent requirements on the size of the sample. Despite the quite satisfying response rate of the study, the limited sample required the use of exact Chi-Square-tests instead of asymptotic tests. Exact tests recalculate the distribution for the test variable based on the sample data and therefore avoid the assumption of normal distribution for the Chi Square test values. We used SPSS with the additional module "exact tests" for performing statistical tests and analyses.

Because of space considerations, we present here only the most important results of the comprehensive study. For every item in the study we tested for the bias from the type of industry on the data. Results on the industry bias are only presented if the assumed independence from the type of industry could be significantly rejected. We also restrict the description of our tests to only the most relevant test parameters (df = degree of freedom, test variable and value (e.g., $\chi^2 = 2.453$), level of significance α and Cramer's V, to express the strength of the interaction in the case of significance).

3 Results

3.1 Structure of the Sample

Our population finally consists of all 343 companies of the five selected CDAX industries. The structure of the population and the sample can be seen in Figure 4. 24 % of the population responded to the investigation (response rate) and finally 54 questionnaires (return rate 16 %) could be used for the analysis. The response rate and the return rate are quite satisfying for this type of empirical research.

Figure 4: Industry Structure of the Population and Sample

Industry (CDAX-Index)	Equivalent SIC Main Group	Frequency in Population	Share of Population	Frequency in Sample	Share in Sample	Return Rate within the Industry
Software	73	132	38%	16	29%	12%
Technology	35 and 36	92	27%	15	28%	16%
Pharmaceuticals / Health	28 and 80	48	14%	9	17%	19%
Media	27 and 78	47	14%	8	15%	17%
Telecommuni-cation	48	24	7%	6	11%	25%
Total		**343**	**100 %**	**54**	**100 %**	**16 %**

Using a Chi-Square-Test, we found that the structure of the industry had no significant influence on companies' response behaviour in the sample (industry response bias; Statistics: degree of freedom (df) = 4; $\chi^2 = 3.263$, $\alpha = 0.521 > 0.05$).

Analysing the type of business model used by the company (as indicated by the respondents) no major distortion could be found in the sample. Due to missing data in databases the busi-

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[26] The distance between the numerical values is proportional to the difference of respective intensities. Therefore, the scales are called equidistant or interval scales. All scales used in this study that contain numerous attributes are interval scales. The attributes were selected such that intervals between two attributes are perceived equally (by German speaking people; here an English translation of these attributes is used.). For an empirical test of equal intervals of German wordings see Rohrmann, 1978, pp. 222.

ness model structures of population and sample could not be compared (business model response bias).

Figure 5:   Structure of Business Models in the Sample

Business Model	CDAX Industry					Total	%
	Media	Technology	Pharma / Health	Software	Telecom-munication		
Production	2	6	3			**11**	**20,4 %**
Trading	1			1		**2**	**3,7 %**
Service	4	1	2	4	1	**12**	**22,2 %**
R & D		1		7	4	**12**	**22,2 %**
Combination of different business models		7	4	4	1	**16**	**29,6 %**
Other	1					**1**	**1,9 %**
Total	**8**	**15**	**9**	**16**	**6**	**54**	**100,0 %**

Within the sample small companies with annual sales[27] of less than 100 Mill. € are the biggest group (61 % of the sample). The structure of the sales categories in the sample can be seen from Figure 6. Whereas in the software industry smaller companies are dominating, the size structure of the other industries is more balanced.

Figure 6:   Structure of Sales in the Sample

Consolidated Sales 2001	CDAX Industry					Total	%
	Media	Techno-logy	Pharma / Health	Soft-ware	Telecom-munication		
< 100 Mill. €	4	6	5	14	4	**33**	**61,1%**
100 ≤ Sales < 315 Mill. €	2	5	1	2		**10**	**18,5 %**
315 ≤ Sales < 1,000 Mill. €		2	1			**3**	**5,6 %**
Sales ≥ 1,000 Mill. €	2	2	2		2	**8**	**14,8 %**
Total	**8**	**15**	**9**	**16**	**6**	**54**	**100,0 %**

A bias by the size of the company on the response rate (size response bias) could not be found, therefore the assumed independence of the size structure of the population and the sample could not be rejected (Statistics: $df = 3$; $\chi^2 = 4.026$, $\alpha = 0.259 > 0.05$).

These bias tests give no indication that the response might be significantly influenced by the size or the type of industry of the companies in the sample. Therefore, within the pre-selected population of the „intangible" sectors the sample can be assumed to be representative.
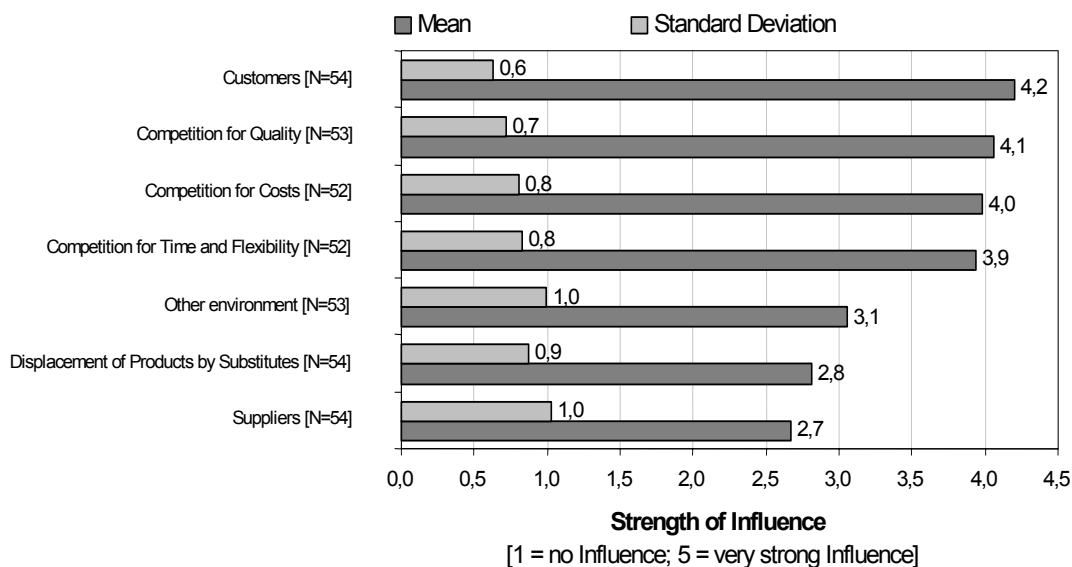
3.2   Critical Success Factors for the Companies

To assess the specific relevance of information on intangibles the companies were asked what the major internal or external critical factors for their success are.

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[27]   Measured as sales in the consolidated statements of the fiscal year 2001.

3.2.1 External success factors (Environment)

Using Porter's model of the competitive forces[28], the intensity of the impact of external factors on the company's success was analysed (Environmental Analysis, Stakeholder Analysis). A comparison of the mean values shows that customers and competitors are the major external success factors for the companies. The factors with the highest means also show the lowest deviation values (Figure 7).

Figure 7:   The relevance of external factors for the company's success

3.2.2 Internal Success Factors (Resources)

To meet external demands by the stakeholders in the company's environment the company uses its own or acquired resources (resource based view). The companies were asked what type of resources has what strengths of impact on the company's business success. The resources were classified according to Figure 8 using the classification of intangibles shown in Figure 1.

Comparing the means, a t-test shows that the four most important external factors, i.e., customers and all analysed dimensions of competition, are rated significantly at a higher level than the other three factors (Statistics: $\alpha < 0.01$ for all comparisons in t-tests[29]).

Analysing the influence of the industry type on the relevance of external factors, the general picture is confirmed even if there are minor differences between industries, as competition and customers are the dominant success factors in all analysed CDAX sectors (see Figure 31 in the Appendix).

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[28]   See Porter (1979), p. 141
[29]   Due to limited space here only the summary of the t-test statistics is given.

Figure 8: Structure of Resources of the Company in the study

Tangible resources	Machines, buildings, inventories etc.	„Classical" measurement objects
Financial resources	Conditions for collection of new capital, e.g., rating, cost of equity etc.	
Intangible resources		
Human Capital	Knowledge and competence of work force, business climate etc.	
Innovation Capital	Product, service and process innovation like patents, technology, processes etc.	
Customer Capital	Brands, customer relations, image, co-operations etc.	„Modern" measurement objects
Process / Structural Capital	➢ Direct value adding processes, e.g., operations, procurement, logistics	
	➢ Supporting processes, e.g., infrastructure, information systems, organisation	

Using the structure of resources mentioned above, we got the following results.

Figure 9: The relevance of internal factors for the company's success
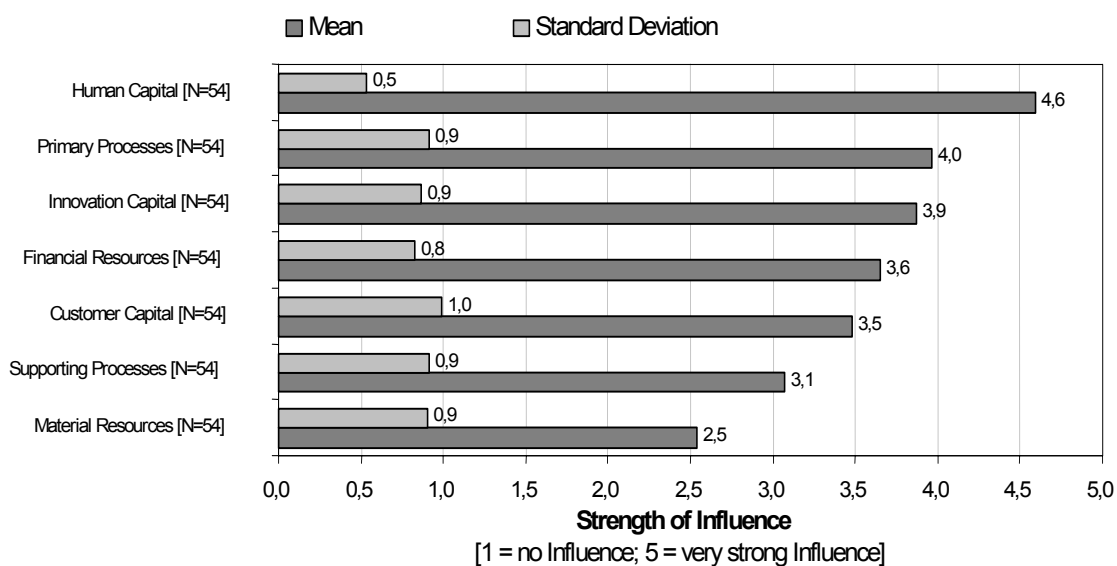
Looking at the total sample, human capital is by far the most relevant internal factor with a significant lower deviation in relation to the other factors (Statistics: $\alpha < 0.01$ for all compared factors in t-tests)[30]. These results underline the overwhelming importance of employees for the company's performance. In addition value added processes as part of the process/structural capital and innovation capital play a major role too followed by financial resources and customer capital. Surprisingly, the material resources are not ranked high. The reasonable importance of the financial resources can be explained by the fact that some of the companies are "new economy" companies which are listed on the German New Market. They often have been founded recently and have a very high demand for capital. As financial and managerial accounting are traditionally focusing on financial and material resources, some need for reconfiguration of internal information and reporting systems as well as for the ex-

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[30]   Due to limited space here only the summary of the t-test statistics is given.

ternal reporting can be seen. We will further analyse, if these companies did change their internal or external reporting according to the stated relevance of "modern" measurement objects.

Separating the results by industry, human capital is the most relevant internal factor in all industries. Innovation capital is highly relevant in the technology and pharmaceutical/health sector, whereas value-added processes are important in the technology, pharmaceutical/health and software industry. Material resources are ranked very low in the software and telecommunication industry (Figure 32).

3.3 Internal Control System

In this chapter we analyse how the internal and external success factors are reflected in the internal control system of the responding companies. To enable comparisons we used the same structure (stakeholder analysis and resource based view).

3.3.1 Measuring external factors (environment) within the internal control system

As Figure 10 shows, a quantitative (either financial or non-financial but quantitative) measurement is dominating in cost related areas, which is not surprising as cost accounting and cost-oriented decision making (e.g., budgeting, variance analysis, pricing etc.) is one of the major areas within the internal control system. In all other areas the measurement is mostly qualitative. About one quarter of the companies is not at all regarding competition for time and flexibility, suppliers, substitutes and other environmental issues. The differences between "competition for cost" and all other critical success factors are statistically significant using partial Chi-Square-Tests between all variables. Figure 33 in the appendix shows the statistical results in a triangle matrix. This indicates measurability might be a real hurdle for disclosure of information on most of the external factors. An industry bias is statistically not significant.

*Figure 10: Measurement of external factors within the internal control system
(modus values in bold characters)*

Information on external factors (environment) for control purposes	Only quantitative measurement	Qualitative and quantitative measurement	Only qualitative measurement	Not regarded	*N*
Competition for Cost	**47%**	6%	40%	7%	*53*
Competition for Quality	17%	6%	**62%**	15%	*53*
Competition for Speed and Flexibility	17%	0%	**60%**	23%	*53*
Customers	23%	8%	**58%**	11%	*52*
Suppliers	10%	6%	**42%**	42%	*52*
Displacement of Products by substitutes	8%	0%	**71%**	21%	*52*
Other Environment	17%	6%	**52%**	25%	*52*

We also tested the hypothesis that the measurement of external factors is independent from its perceived relevance. As shown in Figure 11 this hypothesis can only be rejected for the ex-

ternal factors suppliers and substitutes, those environmental issues having the lowest impact on the companies' success. Analysing the residuals, we found that these less relevant factors are not regarded or only regarded on a qualitative level. For all other external factors, companies seem not to focus stronger on issues in their internal control systems they perceive themselves to be highly relevant for their future development **(information gap)**.

Figure 11: Test for independence between relevance and measurement of external factors within the internal control system

External factor:	χ^2 **Value**	**df**	**Exact level of significance (α error)**	**Rejection**	**Cramers V** (Strength of the interaction if significant)
Competition for Cost	4.780	9	0.831	no	---
Competition for Quality	13.940	9	0.138	no	---
Competition for Speed and Flexibility	3.824	6	0.739	no	---
Customers	7.506	6	0.255	no	---
Suppliers	23.299	12	**0.000**	yes	0.386
Displacement of Products by substitutes	18.572	8	**0.039**	yes	0.423
Other Environment	12.207	12	0.445	no	---

3.3.2 Measuring internal factors (resources) within the internal control system

The dominance of traditional measurement systems like cost accounting or financial accounting that concentrate primarily on material and financial resources and directly value adding processes can also be seen looking at the measurement of internal factors within the internal control system. Especially intangibles like human capital, innovation capital, customer capital and supporting processes (structural capital) are dominated by qualitative data. A relatively high percentage of companies does not consider these factors at all. There are no significant influences by the type of industry the respondents are belonging to.

Figure 12: Measurement of internal factors within the internal control system (modus values in bold characters

Information on internal factors (resources) for control purposes	Only quantitative measurement	Qualitative and quantitative measurement	Only qualitative measurement	Not regarded	*N*
Material Resources	**76%**	0%	9%	15%	*53*
Financial Resources	**74%**	7%	13%	6%	*53*
Human Capital	15%	6%	**60%**	19%	*53*
Innovation Capital	15%	2%	**57%**	26%	*53*
Customer Capital	17%	4%	**53%**	26%	*53*
Primary Processes	**47%**	6%	28%	19%	*53*
Supporting Processes	30%	6%	**34%**	30%	*53*

The statistically significant differences, especially between material and financial resources on one hand and the other intangible resources on the other hand (see Figure 34 in the ap-

pendix), confirm the hypothesis of a significant **hurdle due to measurement problems** for intangibles. Companies will have problems to report on intangibles for capital markets if they do not know how to measure intangibles adequately and if they do not measure intangibles at all.

The hypothesis of an independence between the perceived relevance of an internal factor (resource) and the way of measurement within the internal control systems could not be rejected for all types of resources. This means that the companies' internal control systems do not reflect differences in relevance of the companies' resources for their business success. In addition to an information gap on the side of the company's environment, we also derive an **information gap** concerning a companies' own resources.

Figure 13:   Test of independence between relevance and measurement of internal factors in the internal control system

Internal factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the interaction if significant)
Material Resources	10.065	8	0.297	no	---
Financial Resources	6.030	9	0.774	no	---
Human Capital	12.360	6	0.080	no	---
Innovation Capital	10.653	9	0.263	no	---
Customer Capital	13.454	12	0.286	no	---
Primary Processes	6.808	9	0.666	no	---
Supporting Processes	10.658	12	0.587	no	---

3.3.3   Perceived Measurability of specific intangible resources within the internal control system

The companies were asked to assess the measurability of specific intangible resources in general. The modal values show that only patents, licences and self-developed software are assessed to be monetarily measurable by the companies with a high percentage. Most of the other intangible resources are considered only to enable a non-monetary measurement. A high percentage of respondents denies the general measurability of specific intangible resources like social and environmental competence or organisational capabilities at all (Figure 14).

For the non-monetary measurement of intangibles descriptive models and deductive models (performance measurement systems models derived from a general company objective like the Balanced Scorecard) can be distinguished. A non-monetary measurement is denied for patents, brands, licences and self-developed software which is quite consistent with the already stated monetary measurability of these intangible resources (for the monetary measurement see Figure 14). Descriptive models are seen to be adequate for social competencies, environmental competencies, network/alliances and organisational capabilities. The companies state that deductive models are especially applicable for quality assurance models (e.g., the EFQM model) (Figure 15).

Figure 14:   Measurability of specific intangible resources (Modus values in bold characters)

General measur-ability of intangible resources	Non-monetarily measurable	Both (monetarily and non-monetarily measurable)	Monetarily measurable	Not measurable	*N*
Patents	23%	23%	**42%**	12%	*48*
Staff know how	**72%**	8%	2%	18%	*49*
Brands	**33%**	11%	29%	27%	*48*
Licences	27%	13%	**56%**	4%	*48*
Self developed software	19%	18%	**45%**	18%	*51*
Customer relations	**70%**	10%	6%	14%	*50*
Supplier relations	**59%**	10%	4%	27%	*49*
Data bases	**57%**	6%	11%	26%	*47*
Technology (not patented)	**59%**	8%	12%	21%	*49*
Sales channels	**60%**	6%	15%	19%	*47*
Credit rating	**66%**	11%	11%	12%	*44*
Quality assurance systems	**75%**	8%	4%	13%	*48*
Social competence	**60%**	2%	0%	38%	*47*
Environmental competence	**59%**	2%	0%	39%	*46*
Networks / Alliances	**67%**	2%	4%	27%	*48*
Organisational capabilities	**60%**	2%	0%	38%	*47*

Figure 15:   Suitability of non-monetary measurement models (Modus values in bold characters)

Methods for the non-monetary measurement of intangibles	Suitability of descriptive models	Suitability of deductive models	Suitability of descriptive and deductive models	Both models are not adequate	*N*
Patents	23%	19%	4%	**54%**	*48*
Staff know how	41%	**35%**	4%	20%	*49*
Brands	29%	11%	4%	**56%**	*48*
Licences	17%	19%	4%	**60%**	*48*
Self developed software	17%	14%	8%	**61%**	*51*
Customer relations	32%	**40%**	8%	20%	*50*
Supplier relations	28%	**35%**	6%	31%	*49*
Data bases	32%	28%	4%	36%	*47*
Technology (not patented)	37%	26%	4%	33%	*49*
Sales channels	30%	30%	6%	34%	*47*
Credit rating	41%	32%	5%	23%	*44*
Quality assurance systems	31%	**48%**	4%	17%	*48*
Social competence	**47%**	13%	4%	36%	*47*
Environmental competence	**39%**	22%	0%	39%	*46*
Networks / Alliances	**46%**	21%	2%	31%	*48*
Organisational capabilities	**41%**	15%	6%	38%	*47*

The monetary measurement can be based on historical costs or on the valuation of future returns (e.g., by using DCF approaches). In general both methods are rejected by a broad majority of the companies for most of the different types of intangibles. Only for patents, licences and self-developed software the "rejection" rate is below 40 % of the respondents. For all three categories historical costs are regarded as a way of getting monetary values. Clear votes for the valuation of the profit potential in relation to historical costs can be seen for patents, customer relations, technology, sales channels and credit ratings. For patents, a relatively high percentage of 38 % of the companies prefers a monetary value based on the future returns. Interestingly, for brands where a lot of different brand valuation tools (e.g., the valuation approaches of Sattler[31] or from consulting companies like PwC, GfK, Interbrand, Nielsen or Semion) had been created in recent years, companies still have the feeling of not having an adequate valuation tool.

Figure 16:   Suitability of monetary measurement models (Modus values in bold characters)

Methods for the monetary measurement of intangibles	Historical costs	Future profit potential	Suitability of both (historical costs and future profit potential)	Both are not adequate (historical costs and future profit potential)	*N*
Patents	19%	**38%**	8%	35%	*48*
Staff know how	2%	6%	2%	**90%**	*49*
Brands	15%	21%	4%	**60%**	*48*
Licences	25%	36%	8%	31%	*48*
Self developed software	30%	29%	4%	37%	*51*
Customer relations	0%	**14%**	2%	**84%**	*50*
Supplier relations	2%	8%	4%	**86%**	*49*
Data bases	8%	9%	0%	**83%**	*47*
Technology (not patented)	6%	**14%**	0%	**80%**	*49*
Sales channels	4%	**17%**	0%	**79%**	*47*
Credit rating	2%	**21%**	0%	**77%**	*44*
Quality assurance systems	4%	4%	4%	**88%**	*48*
Social competence	0%	0%	2%	**98%**	*47*
Environmental competence	0%	0%	2%	**98%**	*46*
Networks / Alliances	0%	4%	2%	**94%**	*48*
Organisational capabilities	0%	0%	2%	**98%**	*47*

3.4   External Reporting

In this chapter we will discuss the companies' attitudes towards a public disclosure of information on intangibles in the financial reporting (external reporting). As standards are given by national legislation (e.g., German commercial law) or international standard setting bodies (e.g., SFAS 141,142 or IAS 38), we concentrate on the voluntary disclosure of information in addition to legal requirements.

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[31]   See Sattler (1997).

3.4.1 Relevance of general accepted accounting principles for the voluntary external disclosure

Stating on the relevance of general accepted accounting principles of financial reporting for the voluntary disclosure of information on intangibles, a strong confirmation of all five accounting principles with high means and low standard deviation can be concluded (Figure 17). The accountings principles had been derived from the German Gaap Framework[32]. This underlines that the companies prefer to have the same standards for voluntary information as for mandatory information. There seems to be less space for more subjective information (e.g., using indicator models with indicators for softer aspects like customer satisfaction, company image etc.), partial disclosure (e.g., focusing on the needs and requirements of every company) or differently defined indicators (e.g., the different possibilities to define innovation rate or percentage of new customers). We have doubts if there might be decision useful information on intangibles if the strict traditional accounting principles are just transferred to the voluntary disclosure on intangible resources.

Figure 17:   Relevance of General Accepted Accounting Principles for Voluntary Disclosure on Intangibles (Scale: 1: not relevant to 5: very relevant)

Relevance of Accounting Principles	Mean	Standard deviation	*N*
Trueness / Reliability	4,8	0,4	*54*
Fair presentation	4,6	0,5	*54*
Completeness	4,3	0,8	*54*
Consistency	4,3	0,7	*54*
Materiality	4,2	0,8	*54*

3.4.2 Disclosure of information on external factors (environment)

Information regarding suppliers or substitutes are often not disclosed at all. If information are given, it's primarily on the corporate level and not on the more specific segment level (Figure 18). Segment reporting seems to be concentrated on mandatory and on financial information.

Considering the scale of the information that is delivered by the company, Figure 19 shows that pure qualitative information[33] is dominating for all external factors despite of suppliers and substitutes. Here – in the modus – no information is given at all. For cost related competition (e.g., information in the income statement) and for customers (e.g., information in segment reporting) companies indicate that they deliver some quantitative information.

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[32]   See e.g., Coenenberg (2000), pp. 59.
[33]   Qualitative information is information which is neither monetary (e.g., in terms of $ or EURO) nor cardinal scaled (e.g., percentage figures, volumes etc.) data.

Figure 18: Level of disclosure of external factors (modus values in bold characters)

Disclosure on external factor:	Only at corporate level	At corporate and segment level	Only at segment level	No disclosure at all	*N*
Competition for Cost	**55%**	17%	12%	16%	*51*
Competition for Quality	**50%**	16%	12%	22%	*50*
Competition for Speed and Flexibility	**43%**	16%	8%	33%	*49*
Customers	**52%**	19%	19%	10%	*52*
Suppliers	32%	8%	4%	**56%**	*50*
Displacement of Products by substitutes	37%	10%	6%	**47%**	*51*
Other Environment	**65%**	12%	2%	21%	*48*

Statistical Tests show that the independence between the scale of disclosure on the critical success factors "competition for cost", "competition for quality", "competition for speed and flexibility" and "customers" on one side and all other external factors on the other side can be significantly rejected (see Figure 35). A bias due to the type of industry is statistically not significant.

Figure 19: Scale of disclosure of external factors on corporate level (modus values in bold)
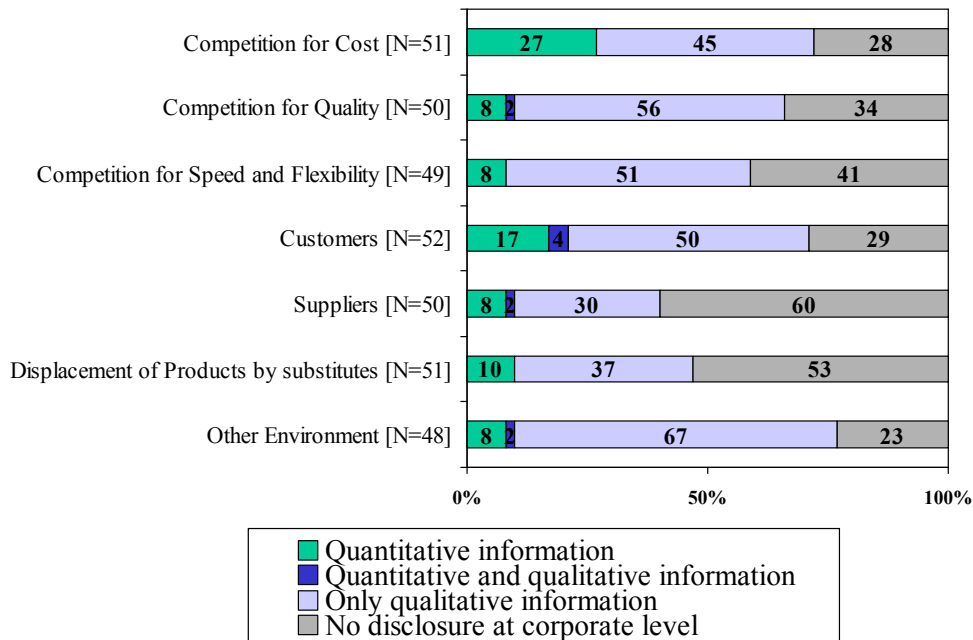
Testing for the interaction between perceived relevance of external factors and the level of disclosure (i.e., corporate vs. segment level), the hypothesis of independence could not be rejected for all types of external factors (see Figure 36 in the appendix). In addition, chi-square tests showed that the independence of perceived relevance and the scale of disclosure (i.e., qualitative vs. quantitative information) can not be rejected too (see Figure 37 in the appendix). Similar to the results for the internal control system, we conclude that the external re-

porting does not reflect differences in relevance of external factors properly. An **information gap** can also be derived for the external reporting.

Figure 20: Test of independence between measurement of external factors in the internal control system and scale of disclosure in the external reporting

External factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the interaction if significant)
Competition for Cost	8.105	6	0.226	no	---
Competition for Quality	19.072	9	0.064	no	---
Competition for Speed and Flexibility	0.797	4	0.956	no	---
Customers	21.052	9	**0.017**	yes	0.371
Suppliers	4.635	9	0.863	no	---
Displacement of Products by substitutes	1.766	4	0.828	no	---
Other Environment	2.497	9	0.992	no	---

One might postulate if this information gap is the consequence of the missing consistence within the internal control system. This hypothesis is based on the **management approach** which means that those information should be disclosed that is also used for internal control purposes. However, if the level of the internal control system is poor, a substantial voluntary reporting must also be limited. The results in Figure 20 show, that the independence of the scale of disclosure within external reporting from the measurement within the internal control system can only be rejected for the external factor "customers". So in general the management approach is rejected and external reporting for external factors seems not to be influenced by the underlying internal control system.

Figure 21: Scale of disclosure of external factors on segment level (modus values in bold)

Scale of disclosure on external factor:	Quantitative information	Quantitative **and** qualitative information	Only qualitative information	No disclosure at segment level	N
Competition for Cost	14%	0%	16%	**70%**	*51*
Competition for Quality	4%	0%	24%	**72%**	*50*
Competition for Speed and Flexibility	4%	0%	20%	**76%**	*49*
Customers	12%	6%	19%	**63%**	*52*
Suppliers	6%	2%	4%	**88%**	*50*
Displacement of Products by substitutes	2%	0%	12%	**86%**	*51*
Other Environment	2%	2%	10%	**86%**	*48*

Breaking down the scale of disclosure at segment level, a huge majority of the companies indicates that information on external factors for segments is not disclosed at all (Figure 21). Limited qualitative information can be found for all competition related factors and for information on customers. Again, due to information given in segment reporting on profitability

and on segment structure some limited quantitative information is given for cost competition and customers.

3.4.3 Hurdles for the disclosure of information on external factors (Environment)

To analyse what might be reasons for the non-disclosure of some external factors or the concentration on the aggregated corporate level, we asked the companies about the major hurdles for an extension of the disclosure on external factors. The percentages are in relation to the number of all responding companies (Figure 22).

Consistently, the **relevance** of any additional reporting on supplier relations is denied as this is not seen as a major external factor by the companies (see Figure 7 for the relevance of external factors). The same conclusions, but with a lower percentage of irrelevance, can be drawn for the substitutes and for other environmental factors. Related to the stated high relevance of competition and customer relations for the success these external factors are not seen to be irrelevant for voluntary reporting.

Measurement difficulties and **problems with the objectivity** of the information are regarded to be hurdles for disclosure to a certain degree for all external factors, but are not dominating. The major hurdle seems to be the fear of the companies to **harm their own competitive position**, if they disclose to much relevant information. This holds especially for information on competitors, customers and substitutes. To our surprise, companies stated that the information processing by parties addressed by voluntary disclosure is adequate.

Figure 22: Hurdles for the expansion of voluntary disclosure on external factors

Argument against the expansion of disclosure on the specific external factor	External Factor				
	Competitors	Customers	Suppliers	Displacement of Products by substitutes	Other Environment
Missing Relevance	○ (6%)	○ (9%)	●●●● (40%)	● (17%)	● (19%)
Missing Measurability	●● (22%)	● (11%)	●● (29%)	●● (24%)	●● (29%)
Might harm competitive position	●●● (39%)	●●●● (57%)	●● (26%)	●●● (37%)	● (13%)
Problems with Objectivity	●● (24%)	● (17%)	●● (22%)	●●● (33%)	●●● (30%)
No adequate processing by users of information	○ (5%)	○ (7%)	○ (7%)	○ (2%)	○ (14%)

Legend:

Percentage of respondents	Symbol
0 up to less than 10 percent	○
10 up to less than 20 percent	●
20 up to less than 30 percent	●●
30 up to less than 40 percent	●●●
40 percent and more	●●●●

3.4.4   Disclosure of information on internal factors (resources)

Looking at internal factors, the resources a company uses, most companies disclose information only at the corporate level. Information on intangible resources like human capital, innovation capital, customer capital and process capital is not disclosed at all by a significant share of the companies. This conflicts with the stated relevance of these intangibles for the company's success (Figure 23).

Figure 23:   Level of disclosure of internal factors (modus values in bold characters)

Disclosure on internal factor:	Only at corporate level	At corporate and segment level	Only at segment level	No disclosure at all	*N*
Financial Resources	**73%**	13%	2%	12%	*52*
Human Capital	**59%**	11%	4%	26%	*53*
Innovation Capital	**64%**	9%	4%	23%	*53*
Customer Capital	**52%**	11%	8%	29%	*52*
Primary Processes	**56%**	7%	8%	29%	*52*
Supporting Processes	**47%**	8%	4%	41%	*51*

Consistent with the chosen research method, the content and the intensity of the disclosed information was not examined as the focus of the study is on the structure of the information and its consistence with the relevance and the internal control system. Information on material resources was not regarded in this question as financial reporting is traditionally concentrating on material resources.

Figure 24:   Scale of disclosure of internal factors on corporate level (modus values in bold)

Scale of disclosure on internal factor:	Quantitative information	Quantitative **and** qualitative information	Only qualitative information	No disclosure at segment level	*N*
Financial Resources	**60%**	8%	19%	13%	*52*
Human Capital	11%	2%	**57%**	30%	*53*
Innovation Capital	19%	2%	**53%**	26%	*53*
Customer Capital	6%	2%	**56%**	36%	*52*
Primary Processes	19%	0%	**44%**	37%	*52*
Supporting Processes	12%	0%	43%	**45%**	*51*

Examining the scale of the data given at the corporate level, we found that quite understandable information on financial resources is delivered quantitatively. However, reporting on intangibles is mostly qualitative, if information is given at all. These differences between financial resources and intangible resources is statistically significant (see Figure 38). More than 50 % of the companies report only in qualitative terms on human capital, innovation capital and customer capital. For primary and supporting processes 19 % and 12 % of the re-

spondents give quantitative information, whereas 44 % and 43 % give qualitative data (Figure 24). This not only underlines that voluntary reporting on intangibles is poor, but that the quality of the data is primarily qualitative, which means nominal descriptions or some ordinary data like "customer satisfaction has increased". It is quite obvious that this is not adequate for a further processing of the data and a thorough analysis of this resources that were ranked with a high relevance by the companies. An influence due to the type of industry on the results neither holds statistically for the level nor for the scale of disclosure.

Looking at the segment level for any resource more than 80 % of the participants indicate that information on this level is not at all disclosed. Though it seems to be difficult for the companies to disclose information on the corporate level, a break-down of that information on the segment level seems to be far out of reach. This holds also for financial resources where only 12 % give quantitative information on the segment level which has to be seen in the light of a often centralised finance function in the company concentrated at the corporate level.

For the level of disclosure of information on resources, a linkage with the perceived relevance of these resources could not be statistically significantly proven for almost all types of resources. Only for financial resources a significant relation can be stated (see Figure 39 in the appendix). A similar result we got for the interaction of scale of disclosure and perceived relevance (see Figure 41 in the appendix). Again, we conclude to have an **information gap** for external reporting.

Postulating again the **management approach** for the structure of external reporting, an independence of the scale of disclosure within external reporting from the measurement of the companies' resources in the internal control system can be rejected statistically significantly (Figure 25). Looking at the level of disclosure (i.e., corporate vs. segment level) the relationship with the internal control system is significant for human capital, primary processes and supporting processes (see Figure 41 in the appendix). Material resources are not regarded as the level and scale of external reporting is legally determined. For reporting on resources and especially for reporting on intangibles the external reporting seems to follow the data available for internal control purposes. Looking at the descriptive statistics this level can be assessed to be poor, resulting in a low level reporting within the internal control system as well as for external disclosure **(data constraints)**.

Figure 25: Test of independence between scale of disclosure and measurement of internal factors in the internal control system

Internal factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the interaction if significant)
Financial Resources	20.540	9	**0.022**	yes	0.366
Human Capital	35.447	9	**0.000**	yes	0.477
Innovation Capital	60.419	9	**0.002**	yes	0.622
Customer Capital	29.711	9	**0.017**	yes	0.441
Primary Processes	25.086	6	**0.000**	yes	0.496
Supporting Processes	27.801	6	**0.000**	yes	0.527

3.4.5 Hurdles for the disclosure of information on internal factors (Resources)

To examine the hurdles for the limited structural disclosure of information on resources, companies were asked for the major hurdles according to the derived hurdle structure in Figure 3. Additional information on financial resources was divided according to the structure of the capital in costs of equity and the debt rating of the company. The latter influences the cost of debt capital. Primary and supporting processes were regarded together. Again the percentages are related to the total sample.

There seem to be no major hurdles for disclosure of additional information on cost of equity or debt ratings. However, intangible resources like human capital, innovation capital and customer capital have to face severe hurdles due to missing measurability, harm on competitive position and objectivity. This conflicts with the high relevance of these factors for the companies' success. A tremendous **information gap** may result. For processes the hurdles are seen as well but with a lower percentage of answers. This might be due to the fact that processes have been the target of process management tools like business process reengineering or activity based costing in the 90s. This resulted in a fond of information on processes which is available within the internal control system (see the results in Figure 12).

Figure 26: Hurdles for the expansion of voluntary disclosure on internal factors

Argument against the expansion of disclosure on the specific internal factor	Internal Factor					
	Cost of equity	Debt rating	Human capital	Innovation capital	Customer capital	Processes
Missing Relevance	○ (7%)	○ (9%)	○ (9%)	○ (9%)	● (11%)	● (18%)
Missing Measurability	○ (9%)	● (17%)	●●●● (45%)	●●● (38%)	●●● (38%)	●●● (30%)
Might harm competitive position	○ (9%)	● (17%)	●● (23%)	●●● (30%)	●●●● (53%)	●● (26%)
Problems with Objectivity	○ (9%)	○ (9%)	●●●● (52%)	●●● (33%)	●●● (30%)	●●● (37%)
No adequate processing by users of information	○ (2%)	○ (2%)	●● (20%)	● (11%)	● (11%)	●● (23%)

Legend:

Percentage of respondents	Symbol
0 up to less than 10 percent	○
10 up to less than 20 percent	●
20 up to less than 30 percent	●●
30 up to less than 40 percent	●●●
40 percent and more	●●●●

3.4.6 Assessment of the company's own reporting quality

The companies were asked, whether or not the company's current financial reporting is delivering a fair view of the company. 79% of the respondents agreed which means that only a mi-

nority of the companies feels any room or need for a further expansion of the external reporting. The companies are quite satisfied with their current level of reporting.

3.5 Information processing on the capital markets

The last step in the flow of information is the use of information by addressees. Some of the most important addressees are current or potential investors, which represent the capital market. The question is whether or not voluntary disclosure of information on intangibles can support the information processing of the external capital market.

Despite of the fact that the satisfaction with the company's reporting is quite high, 78 % of the respondents regarded themselves in spring 2002 to be undervalued. Only 2 % of the companies said that they are overvalued. However, the thesis of the independence of the perceived over- or undervaluing from the perceived quality of the company's reporting can not be rejected (df = 2; $\chi^2 = 4.128$, $\alpha = 0.164 > 0.05$). One of the reasons might be that the capital market is not able to adequately process the information delivered by the companies. This is now examined.

3.5.1 Sensitivity of the capital market reaction on information on external factors (Environment)

The companies assessed the sensitivity of the capital market on information about external factors. The results are shown in Figure 27.

Figure 27: Assessment of sensitivity of capital market on information on external factors (modus values in bold characters)

External factor	N	The reaction of the capital market on information on the specific external factor is ...			
		... not to be seen.	...to low.	...adequate.	...to strong.
Competition for Cost	48	33%	21%	**38%**	8%
Competition for Quality	48	**40%**	25%	31%	4%
Competition for Speed and Flexibility	48	**48%**	19%	29%	4%
Customers	48	12%	27%	**44%**	17%
Suppliers	47	**53%**	13%	30%	4%
Displacement of Products by substitutes	46	37%	2%	**44%**	17%
Other Environment	46	24%	7%	**39%**	30%

The answers vary significantly (for statistical results see in detail Figure 43). Due to the close relation with material resources represented quite fairly in the income statement and in the balance sheet, information on cost related competition is processed adequately by the capital market, seen from the companies' point of view. 65 % of the respondents consider informa-

tion on quality competition and 67 % data on competition for speed and flexibility either not reflected or to low reflected by the capital markets. We can postulate that information on quality and time issues are not given by traditional external reporting and can therefore not be processed by investors. The same results and explanation hold for information on suppliers. Here we have to consider that suppliers were – in average – regarded to have only medium influence on the success of the company (relevance). For information on substitutes or other environmental factors, where the companies stated in average only a medium relevance, the sensitivity is regarded adequate with some bias on "reaction can not be seen".

Probably due to different business systems used, the sensitivity of the capital markets differs between industries for "competition for quality" ($\chi^2 = 22.811$, df = 12, $\alpha = 0.025$, Cramers V = 0.398), for "competition for speed and flexibility"($\chi^2 = 20.828$, df = 12, $\alpha = 0.047$, Cramers V = 0.380) and for "suppliers" ($\chi^2 = 25,265$, df = 12, $\alpha = 0.011$, Cramers V = 0.4235).

Ranked first in relevance, customer specific information is partly given in segment reporting and in additional voluntary information and information processing is seen to be adequately by 44 % of the companies. Nevertheless, 39 % (12 % with "reaction can not be seen" plus 27 % with "to low" reaction) of the companies consider customer related data not adequately represented. On one hand information on the structure and potential of customers, their power of negotiation and customer life time value could help to improve that situation from the information supply side. On the other hand information has to be demanded, processed and reflected on the capital market adequately which according to our study currently is – from the companies' point of view – not the case.

Chi-square tests show that the independence of perceived relevance and perceived sensitivity of external factors can not be rejected (Figure 42 in the appendix). From the companies' point of view, the capital market seems not to be able to process relevant issues properly **(information processing gap)**.

One of the possible reasons for the information processing gap might be the quality of the external reporting. We tested both the scale of the disclosed information (qualitative vs. quantitative) (Figure 46 in the appendix) and the level for which information is given (corporate or segment level) (Figure 47 in the appendix). The statistics show that the independence hypothesis could not be rejected. The sensitivity of the reaction of the capital markets seems not to be influenced by the quality of external reporting.

3.5.2 Sensitivity of the capital market reaction on information on internal factors (Resources)

With regard to the sensitivity on information on internal factors (resources), we got the following pattern (Figure 28).

For material and financial resources, the sensitivity of the capital market is regarded to be quite adequate with high percentages of 55 % for material resources and 62 % for financial resources. Nevertheless, for all intangible resources a high percentage of the companies assess a not existing or to low reaction on information about human capital (68 % = 33% + 35 %), innovation capital (66 % = 27 % + 39 %), customer capital (62 % = 33 % + 29 %), primary processes (67 % = 43 % + 24 %) and supporting processes (70 % = 50 % + 20 %). The differ-

ences between material / financial resources and intangible resources again are statistically significant (see Figure 44). An industry bias is only significant for the customer capital ($\chi^2 =$ 22.147, df = 12, α = 0.031, Cramers V = 0.405).

Figure 28: Assessment of sensitivity of capital market on information on external factors (modus values in bold characters)

Internal factor	N	The reaction of the capital market on information on the specific external factor is ...			
		... not to be seen.	...to low.	...adequate.	...to strong.
Material Resources	42	31%	9%	**55%**	5%
Financial Resources	47	6%	19%	**62%**	13%
Human Capital	46	33%	**35%**	30%	2%
Innovation Capital	44	27%	**39%**	27%	7%
Customer Capital	45	**33%**	29%	**33%**	5%
Primary Processes	46	**43%**	24%	33%	0%
Supporting Processes	46	**50%**	20%	30%	0%

Again we tested the interaction between the perceived sensitivity of the capital markets and the perceived relevance of information on companies' resources. The independence can be rejected for "financial resources" and "primary processes". For these two factors a relation between relevance and sensitivity of capital market reaction can be deducted. Nevertheless, for all other resources, and especially for intangible resources, a relationship between perceived relevance and perceived sensitivity on capital markets can not be derived (Figure 45). We conclude, that the **information processing gap** is confirmed for information on intangible resources.

Figure 29: Test of independence between perceived sensitivity of the capital market and the scale of disclosure for information on internal factors

Internal factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the interaction if significant)
Financial Resources	5.606	9	0.791	no	---
Human Capital	8.981	9	0.359	no	---
Innovation Capital	14.733	9	0.115	no	---
Customer Capital	9.538	9	0.358	no	---
Primary Processes	10.256	4	**0.035**	yes	0.334
Supporting Processes	9.672	4	**0.039**	yes	0.328

Analysing the impact of the scale (qualitative vs. quantitative data; Figure 29) of external reporting on the sensitivity of the reaction of the capital markets, the independence hypothesis was rejected for "primary processes" and "supporting processes". For all other resources the disclosure of specific information seems to have no relationship with the perceived sensitivity of the capital market. This could mean that the poor level of disclosure for this both items results in an non existing or inadequate sensitivity of the capital markets. For the interaction

with the level of disclosure (corporate vs. segment level; Figure 30) the independence can be rejected for all intangible resources. Poor data corresponds with poor or no reaction.

Figure 30:   Test of independence between perceived sensitivity of the capital market and the level of disclosure for information on internal factors

Internal factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the interaction if significant)
Financial Resources	12.835	9	0.202	no	
Human Capital	35.638	9	**0.001**	yes	0.508
Innovation Capital	23.850	9	**0.008**	yes	0.425
Customer Capital	20.062	9	**0.016**	yes	0.385
Primary Processes	12.457	6	**0.044**	yes	0.368
Supporting Processes	15.949	6	**0.006**	yes	0.421

4 Conclusions

The study reveals some interesting insights in the limits and possibilities of reporting on intangible resources by companies which can be allocated to the "new economy". For these companies intangible resources play a major role in the business systems. As results of our study, we like to draw the following conclusions:

- The most critical factors **(external factors)** for the companies' success for all industries are customer relations and the competitive edge. Substitutes, suppliers and other items of a company's environment have only medium **relevance**.

- Looking at the company's **resources**, human capital is ranked with very high relevance followed by process capital, innovation capital, financial resources and customer capital. Surprisingly, material resources are perceived to have only medium **relevance** for the company's success.

- Within the internal control system, the external factor "competition for cost" is primarily measured quantitatively, whereas for all other external factors qualitative data is dominating. The measurement of external factors for controlling purposes is independent from the relevance of the critical success factor. Relevant information is not included properly **(information gap)**.

- Concerning the resource based view, it is no surprise that material and financial resources are measured quantitatively. For intangible resources qualitative approaches are dominating. Only for primary processes like production or operations quantitative data is used. We confirm an **information gap** also on the resource side which is caused by measurement problems for most of the intangibles.

- Only for **patents**, **licences** and **self-developed software**, the companies perceive a possibility of monetary measurement which should be primarily DCF approaches and – indicated with a lower percentage – historical costs. For **brands** where a lot of different approaches have been developed, a deep insecurity about the appropriate method can be stated as most of the companies deny a monetary as well as a qualitative measurement.

For all other intangibles a dominance of qualitative measurement techniques is indicated by the companies.

- For a voluntary external disclosure of information on intangibles, companies tend to transfer the same **general accepted accounting principles** used for financial reporting. We doubt that this will be possible, as a complete and fair presentation of all intangible resources might not be realizable, especially considering materiality. This perception of the companies might be a **hurdle** for a broader voluntary reporting on intangibles as the targeted standards for disclosure might not be realistic.

- **Disclosed information** on critical success factors is primarily at the corporate level and dominated by qualitative data. The **management approach** is not confirmed as external reporting is not related to the measurement within the internal control system.

- The primary hurdles for a broader voluntary disclosure is the fear that these information might **harm the competitive position**. This holds especially for information on competitors, customers and substitutes.

- **Information on resources** is primarily disclosed on the corporate level. Information for financial resources is dominated by quantitative data whereas information on intangibles is qualitative. We confirm, that here relevant data is not disclosed **(information gap)** and that external reporting seems to be restricted by the poor level of data available for internal control purpose **(data constraints)**.

- Hurdles for the disclosure of information on resources are the **missing measurability**, a possible negative impact on the **competitive position** and **limited objectivity**.

- The **reaction of the capital market** on additionally disclosed information is generally perceived to be too low or not existing. This holds especially for all information on intangible resources. A relationship between relevance of information and sensitivity can not be derived. Level and scale of disclosed information are also not related with the sensitivity. Only for the intangibles we get high linkages with the external reporting. But here, this means that a low level of voluntary disclosure corresponds with a low or not existing sensitivity **(information processing gap)**.

Generally, despite of the significant relevance of intangibles and of other critical success factors, the impact on internal control systems, external disclosure and information processing of the capital markets is poor. Significant hurdles in all three systems prevent relevant information from being further evaluated and processed. From our point of view, it's no surprise that voluntary disclosure of information on intangibles is so poor. Much seems to be done to reduce these multiple hurdles.

References:

Aboody, D. / Lev, B. (1998): The Value-Relevance of Intangibles: The Case of Software Capitalization, in: Journal of Accounting Research, Supplement, 1998, pp. 161-191.

AICPA (1994) (ed.): Improving Business Reporting – a Customer Focus, Meeting Information Needs of Investors and Creditors, New York 1994.

Arbeitskreis „Externe Unternehmensrechnung" der Schmalenbach-Gesellschaft für Betriebswirtschaft e.V. (2002): Grundsätze für das Value Reporting *(Principles of Value Reporting)*, in: Der Betrieb, Vol. 55, No. 45, 2002, pp. 2337-2340.

Arbeitskreis „Immaterielle Werte im Rechnungswesen" der Schmalenbach-Gesellschaft für Betriebswirtschaft e.V. (2001): Kategorisierung und bilanzielle Erfassung immaterieller *Werte (Classification and Recognition of intangible resources)*, in: Der Betrieb, Vol. 54, No. 19, 2001, pp. 989-995

Arbeitskreis „Immaterielle Werte im Rechnungswesen" der Schmalenbach-Gesellschaft für Betriebswirtschaft e.V. (2003): Freiwillige externe Berichterstattung über immaterielle Werte *(Voluntary Disclosure about Intangibles)*, in: Der Betrieb, Vol. 56, erscheint Frühjahr, 2003.

Austrian Research Center (2000): Intellectual Capital Report 1999, research report of the Austrian Research Center, Seibersdorf 2000.

Bontis, N. (1998): Intellectual capital: An Exploratory Study that Develops Measures and Models, in: Management Decisions, Vol. 35, No. 2, 1998, pp. 63 –76.

Coenenberg, A.G. (2000): Jahresabschluss und Jahresabschlussanalyse *(Financial Reporting and Financial Statements Analysis)*, 17. Ed., Landsberg/Lech: mi-Verlag 2000.

Danish Agency for Trade and Industry (2000): A Guideline for Intellectual Capital Statements, Copenhagen 2000.

Deng, Z. / Lev, B. / Narin, F. (1999): Science & Technology as Predictors of Stock Performance, in: Financial Analysts Journal, May/June, 1999, pp. 20-32.

Eccles, R.G. / Herz, R.H. / Keegan, E.M. / Philipps, D.M. H. (2001): The Value Reporting™ Revolution – Moving Beyond the Earnings Game, New York: Wiley/VCH 2001.

Edvinsson, L. / Malone, M. S. (1997): Intellectual Capital: Realizing Your Company´s True Value By Finding Its Hidden Brainpower, New York: HarperCollins Publishers, 1997.

Financial Accounting Standards Board (FASB) (ed.): Business Reporting Research Project, 2001.

Global Reporting Initiative (GRI) (ed.): Sustainability Reporting Guidelines, Boston, MA 2002.

Grüning, M. (2002): Performance Measurement Systeme als Managementwerkzeug (*Performance Measurement Systems as a Management Tool*), Diss., Deutscher Universitätsverlag: Wiesbaden 2002.

Günther, T. / Kriegbaum-Kling, C. (2001): Brand Valuation and Control: An Empirical Study, in: Schmalenbach Business Review, Vol. 53, October 2001, S. 263-294.

Günther, T. / Grüning, M. (2002): Performance Measurement – The German Experience, in: FSR Forum, special edition on Performance Measurement, October 2002, University of Rotterdam.

Johanson, U. / Martensson, M. / Skoog, M. (2001): Measuring to understand intangible performance drivers, in: European Accounting Review, Vol. 10, No. 3, 2001, pp. 407-437.

Lev, B. (2001): Intangibles: Management, Measurement, and Reporting, Washington D.C.: Brooklyn Institution Press, 2001.

Lev, B. / Sougiannis, T. (1996): The Capitalization, Amortization and Value-Relevance of R&D, in: Journal of Accounting and Economics, February 1996, pp. 107-138.

Lev, B. / Sougiannis, T. (1999): Penetrating the Book-to-Market Black Box: The R&D Effect, in: Journal of Business, Finance and Accounting, April/May 1999, pp. 419-449.

Maul, K.-H. (2000): Die Wissensbilanz als Teil des handelsrechtlichen Jahresabschlusses – Wissensbilanzen dargestellt am Beispiel des Jahresabschlusses von Hochschulen (*The knowledge balance sheet as a part of the financial statements – knowledge balance sheets presented as the example of the financial statements of universities*)', in: Deutsches Steuerrecht, Vol. 47, No. 38, pp. 2009-2016.

Porter, M. E. (1979): How Competitive Forces Shape Strategy, in: Harvard Business Review, Vol. 57, March/April, 1979, pp. 137-145.

PriceWaterhouseCoopers / Sattler, H. (1999): Praxis von Markenbewertung und Markenmanagement in deutschen Unternehmen (*The Practice of Brand Valuation and Brand Management in German Companies*), 1999.

Rohrmann, B. (1978): Empirische Studien zur Entwicklung von Antwortskalen für die sozialwissenschaftliche Forschung (*Empirical Studies for the Development of Scales for Research in Social Sciences*). In: Zeitschrift für Sozialpsychologie, Vol. 9, No. 3, 1978, pp. 222-245.

Sattler, H. (1997): Monetäre Bewertung von Markenstrategien für neue Produkte (*Monetary Valuation of Brand Strategies for new Products*), Schäffer Poeschel: Stuttgart 1997.

Stewart, T. A. (1997): Intellectual Capital: The New Wealth of Organizations, London: Nicolas Brealey Publishing 1997.

Sveiby, K. E. (1997): The New Organizational Wealth: Managing and Measuring Knowledge-Based Assets. San Francisco: Berrett-Koehler Publishers 1997.

Zeithaml, V. A. / Parasuraman, A. / Berry, L. (1990): Delivering Quality Service: Balancing Customer Perceptions and Expectations, New York: Free Press 1990.

Appendix:

Figure 31: Relevance of external factors by industry (High Relevance: Mean Values > 4.0 in bold characters; Low Relevance: Mean Values < 2.0 in Cursive Mode)

External Factor	Value	CDAX Industry				
		Media	Technology	Pharma / Health	Software	Telecommu-nication
Competition for Cost	Mean	3.857	**4.067**	**4.444**	3.733	3.833
	N	7	15	9	15	6
	Standard deviation	0.6901	0.8837	0.7265	0.8837	0.4082
Competition for Quality	Mean	**4.000**	**4.067**	**4.444**	3.875	**4.000**
	N	7	15	9	16	6
	Standard deviation	0.5774	0.7037	0.7265	0.8062	0.6325
Competition for Time and Flexibility	Mean	**3.714**	**4.267**	**3.778**	3.800	**4.000**
	N	7	15	9	15	6
	Standard deviation	0.7559	0.7037	0.8333	0.9411	0.8944
Customers	Mean	**4.250**	**4.267**	4.000	**4.250**	**4.167**
	N	8	15	9	16	6
	Standard deviation	0.4629	0.5936	0.8660	0.5774	0.7528
Suppliers	Mean	3.250	3.200	2.667	*1.937*	2.500
	N	8	15	9	16	6
	Standard deviation	1.1650	1.0142	0.7071	0.5737	1.2247
Substitutes	Mean	3.000	2.600	2.889	3.000	2.500
	N	8	15	9	16	6
	Standard deviation	1.1952	0.8281	1.0541	0.7303	0.5477
Other Environment	Mean	3.125	3.071	3.778	2.625	3.000
	N	8	14	9	16	6
	Standard deviation	0.8345	0.7300	0.6667	1.3102	0.6325

Figure 32: *Relevance of internal factors by industry (High Relevance: Mean Values > 4.0 in bold characters; Low Relevance: Mean Values < 2.0 in Cursive Mode)*

Internal Factor	Value	CDAX industry				
		Media	Technology	Pharma / Health	Software	Telecommu- nication
Material Resources	Mean	2.875	2.933	3.111	*1.937*	*1.833*
	N	8	15	9	16	6
	Standard deviation	1.1260	0.7988	0.7817	0.5737	0.4082
Financial Resources	Mean	3.625	3.667	4.000	3.438	3.667
	N	8	15	9	16	6
	Standard deviation	0.9161	0.8165	0.8660	0.7274	1.0328
Human Capital	Mean	**4.625**	**4.667**	**4.444**	**4.688**	**4.333**
	N	8	15	9	16	6
	Standard deviation	0.5175	0.4880	0.5270	0.4787	0.8165
Innovation Capital	Mean	3.375	**4.067**	**4.111**	3.875	3.667
	N	8	15	9	16	6
	Standard deviation	1.0607	0.7988	0.7817	0.8851	0.8165
Customer Capital	Mean	3.875	3.333	3.111	3.813	3.000
	N	8	15	9	16	6
	Standard deviation	0.8345	0.8997	0.7817	1.0468	1.2649
Direct Value Added Processes	Mean	3.375	**4.133**	**4.111**	**4.063**	3.833
	N	8	15	9	16	6
	Standard deviation	1.5059	0.7432	0.7817	0.7719	0.7528
Supporting Processes	Mean	3.125	3.467	3.444	2.500	3.000
	N	8	15	9	16	6
	Standard deviation	1.1260	0.7432	0.8819	0.8165	0.6325

Figure 33: *Interaction between external factors in the internal control system (significant results in coloured cells)*

External factors							
Internal Control System	Competition for Cost	Competition for Quality	Competition for Speed and Flexibility	Customers	Suppliers	Displacement of Products by substitutes	Other Environment
Competition for Cost	---	α=0.085 df=9 χ^2=15.041	α=0.195 df=6 χ^2=8.522	α=0.152 df=9 χ^2=13.166	α=0.465 df=9 χ^2=8.793	α=0.837 df=6 χ^2=3.189	α=0.366 df=9 χ^2=9.838
Competition for Quality		---	α=0.048 df=6 χ^2=12.355	α=0.013 df=9 χ^2=22.076	α=0.002 df=9 χ^2=29.754	α=0.044 df=6 χ^2=13.406	α=0.000 df=9 χ^2=36.988
Competition for Speed and Flexibility			---	α=0.011 df=6 χ^2=16.396	α=0.002 df=6 χ^2=20.680	α=0.003 df=4 χ^2=15.852	α=0.062 df=6 χ^2=11.764
Customers				---	α=0.000 df=9 χ^2=57.350	α=0.018 df=6 χ^2=16.012	α=0.000 df=9 χ^2=49.605
Suppliers					---	α=0.035 df=6 χ^2=14.030	α=0.001 df=9 χ^2=32.992
Displacement of Products by substitutes						---	α=0.001 df=6 χ^2=23.948

Figure 34: *Interaction between internal factors in the internal control system (significant results in coloured cells)*

Internal factors							
Internal Control System	Material Resources	Financial Resources	Human Capital	Innovation Capital	Customer Capital	Primary Processes	Supporting Processes
Material Resources	---	α=0.039 df=6 χ^2=14.674	α=0.281 df=6 χ^2=7.273	α=0.206 df=6 χ^2=9.548	α=0.246 df=6 χ^2=7.871	α=0.661 df=6 χ^2=4.293	α=0.427 df=6 χ^2=5.999
Financial Resources		---	α=0.766 df=9 χ^2=5.910	α=0.061 df=9 χ^2=20.601	α=0.003 df=9 χ^2=32.774	α=0.563 df=9 χ^2=7.859	α=0.209 df=9 χ^2=11.941
Human Capital			---	α=0.000 df=9 χ^2=41.896	α=0.002 df=9 χ^2=31.068	α=0.007 df=9 χ^2=25.413	α=0.008 df=9 χ^2=24.388
Innovation Capital				---	α=0.000 df=9 χ^2=61.823	α=0.001 df=9 χ^2=31.517	α=0.007 df=9 χ^2=26.208
Customer Capital					---	α=0.011 df=9 χ^2=21.121	α=0.105 df=9 χ^2=14.449
Primary Processes						---	α=0.000 df=9 χ^2=94.389

Figure 35: *Interaction between external factors in external reporting (significant results in coloured cells)*

External factors							
External Reporting	Competition for Cost	Competition for Quality	Competition for Speed and Flexibility	Customers	Suppliers	Displacement of Products by substitutes	Other Environment
Competition for Cost	---	α=0.000 df=6 χ^2=35.851	α=0.000 df=4 χ^2=23.569	α=0.005 df=6 χ^2=17.146	α=0.830 df=6 χ^2=3.483	α=0.466 df=4 χ^2=3.947	α=0.065 df=6 χ^2=10.771
Competition for Quality		---	α=0.000 df=6 χ^2=48.510	α=0.048 df=9 χ^2=20.365	α=0.456 df=9 χ^2=7.353	α=0.147 df=6 χ^2=10.210	α=0.000 df=6 χ^2=28.300
Competition for Speed and Flexibility			---	α=0.011 df=6 χ^2=16.523	α=0.080 df=6 χ^2=13.233	α=0.019 df=4 χ^2=11.232	α=0.000 df=6 χ^2=31.636
Customers				---	α=0.000 df=9 χ^2=43.029	α=0.014 df=6 χ^2=16.410	α=0.264 df=9 χ^2=10.631
Suppliers					---	α=0.063 df=6 χ^2=12.504	α=0.534 df=9 χ^2=6.675
Displacement of Products by substitutes						---	α=0.022 df=6 χ^2=15.245

Figure 36: Test of independence between perceived relevance and level of disclosure of external factors

External factor:	χ² Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the inter-action if significant)
Competition for Cost	3.000	9	0.953	no	---
Competition for Quality	10.789	9	0.314	no	---
Competition for Speed and Flexibility	4.464	9	0.903	no	---
Customers	2.330	6	0.915	no	---
Suppliers	10.026	12	0.608	no	---
Displacement of Products by substitutes	7.077	12	0.844	no	---
Other Environment	12.099	12	0.366	no	---

Figure 37: Test of independence between perceived relevance and scale of disclosure of external factors

External factor:	χ² Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the inter-action if significant)
Competition for Cost	4.559	6	0.674	no	---
Competition for Quality	3.800	9	0.889	no	---
Competition for Speed and Flexibility	3.208	6	0.790	no	---
Customers	9.838	6	0.153	no	---
Suppliers	11.319	12	0.460	no	---
Displacement of Products by substitutes	6.236	8	0.620	no	---
Other Environment	12.410	12	0.351	no	---

Figure 38: Interaction between internal factors in external reporting (significant results in coloured cells)

Internal factors					
Internal Control System	Financial Resources	Human Capital	Innovation Capital	Customer Capital	Primary Processes	Supporting Processes
Financial Resources	---	**α=0.715** df=9 χ²=6.012	**α=0.576** df=9 χ²=7.634	**α=0.915** df=9 χ²=3.607	**α=0.132** df=6 χ²=9.758	**α=0.040** df=6 χ²=12.820
Human Capital		---	**α=0.005** df=9 χ²=58.458	**α=0.001** df=9 χ²=61.494	**α=0.161** df=6 χ²=8.804	**α=0.021** df=6 χ²=14.576
Innovation Capital			---	**α=0.000** df=9 χ²=70.146	**α=0.001** df=6 χ²=20.245	**α=0.002** df=6 χ²=20.053
Customer Capital				---	**α=0.008** df=6 χ²=16.717	**α=0.118** df=6 χ²=10.812
Primary Processes					---	**α=0.000** df=4 χ²=50.430

Figure 39: Test of independence between perceived relevance and level of disclosure for information on internal factors

Internal factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the inter-action if significant)
Financial Resources	18.391	9	**0.032**	yes	0.343
Human Capital	4.498	6	0.528	no	---
Innovation Capital	5.389	9	0.789	no	---
Customer Capital	18.836	12	0.114	no	---
Primary Processes	12.168	9	0.203	no	---
Supporting Processes	11.513	12	0.420	no	---

Figure 40: Test of independence between perceived relevance and scale of disclosure for information on internal factors

Internal factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the inter-action if significant)
Financial Resources	14.762	9	0.092	no	---
Human Capital	7.155	6	0.224	no	---
Innovation Capital	4.778	9	0.903	no	---
Customer Capital	9.819	12	0.545	no	---
Primary Processes	5.429	6	0.516	no	---
Supporting Processes	9.651	8	0.286	no	---

Figure 41: Test of independence between level of disclosure and measurement of internal factors in the internal control system

Internal factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the inter-action if significant)
Financial Resources	5.431	9	0.651	no	---
Human Capital	38.838	9	**0.000**	yes	0.499
Innovation Capital	15.930	9	0.096	no	---
Customer Capital	12.069	9	0.200	no	---
Primary Processes	44.085	9	**0.000**	yes	0.537
Supporting Processes	37.769	9	**0.001**	yes	0.502

Figure 42: Test of independence between perceived relevance and perceived sensitivity of capital market reactions for external factors

External factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the inter-action if significant)
Competition for Cost	10.322	9	0.321	no	---
Competition for Quality	16.984	9	0.064	no	---
Competition for Speed and Flexibility	5.258	9	0.824	no	---
Customers	10.760	9	0.304	no	---
Suppliers	11.980	12	0.449	no	---
Displacement of Products by substitutes	13.118	12	0.292	no	---
Other Environment	9.761	12	0.683	no	---

Figure 43: Interaction between external factors within the perceived sensitivity of the capital market (significant results in coloured cells)

External factors							
Sensitivity of Capital Markets	Competition for Cost	Competition for Quality	Competition for Speed and Flexibility	Customers	Suppliers	Displacement of Products by substitutes	Other Environment
Competition for Cost	---	α=0.000 df=9 χ²=57.821	α=0.000 df=9 χ²=59.099	α=0.039 df=9 χ²=17.335	α=0.000 df=9 χ²=33.507	α=0.005 df=9 χ²=22.799	α=0.725 df=9 χ²=6.586
Competition for Quality		---	α=0.000 df=9 χ²=103.931	α=0.531 df=9 χ²=8.285	α=0.000 df=9 χ²=54.135	α=0.046 df=9 χ²=21.610	α=0.492 df=9 χ²=8.784
Competition for Speed and Flexibility			---	α=0.465 df=9 χ²=8.867	α=0.000 df=9 χ²=63.388	α=0.003 df=9 χ²=32.111	α=0.125 df=9 χ²=13.776
Customers				---	α=0.227 df=9 χ²=11.587	α=0.172 df=9 χ²=12.649	α=0.052 df=9 χ²=16.449
Suppliers					---	α=0.046 df=9 χ²=22.243	α=0.030 df=9 χ²=17.816
Displacement of Products by substitutes						---	α=0.000 df=9 χ²=30.875

Figure 44: Interaction between internal factors within the perceived sensitivity of the capital markets (significant results in coloured cells)

Internal factors							
Internal Control System	Material Resources	Financial Resources	Human Capital	Innovation Capital	Customer Capital	Primary Processes	Supporting Processes
Material Resources	---	α=0,036 df=9 χ²=18,677	α=0,275 df=9 χ²=10,753	α=0,265 df=9 χ²=11,258	α=0,004 df=9 χ²=25,416	α=0,499 df=6 χ²=5,644	α=0,269 df=6 χ²=7,533
Financial Resources		---	α=0,316 df=9 χ²=10,742	α=0,111 df=9 χ²=14,029	α=0,401 df=9 χ²=9,607	α=0,697 df=6 χ²=4,273	α=0,235 df=6 χ²=8,085
Human Capital			---	α=0,000 df=9 χ²=63,909	α=0,016 df=9 χ²=27,773	α=0,000 df=6 χ²=30,195	α=0,000 df=6 χ²=24,781
Innovation Capital				---	α=0,000 df=9 χ²=37,103	α=0,001 df=6 χ²=21,8,8	α=0,005 df=6 χ²=17,604
Customer Capital					---	α=0,013 df=6 χ²=15,163	α=0,023 df=6 χ²=14,077
Primary Processes						---	α=0,000 df=4 χ²=62,257

Figure 45:   *Test of independence between perceived relevance and perceived sensitivity of capital market reactions for internal factors*

Internal factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the interaction if significant)
Material Resources	13.053	12	0.345	no	---
Financial Resources	23.247	9	**0.011**	yes	0.406
Human Capital	3.343	6	0.910	no	---
Innovation Capital	9.212	9	0.395	no	---
Customer Capital	17.141	12	0.126	no	---
Primary Processes	11.695	6	**0.048**	yes	0.357
Supporting Processes	6.606	8	0.637	no	---

Figure 46:   *Test of independence between perceived sensitivity of the capital markets and scale of disclosure in external reporting*

External factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the interaction if significant)
Competition for Cost	8.255	6	0.226	no	---
Competition for Quality	6.079	6	0.457	no	---
Competition for Speed and Flexibility	6.642	6	0.377	no	---
Customers	7.288	9	0.649	no	---
Suppliers	7.442	9	0.570	no	---
Displacement of Products by substitutes	10.823	6	0.105	no	---
Other Environment	7.881	9	0.520	no	---

Figure 47:   *Test of independence between perceived sensitivity of the capital markets and level of disclosure in external reporting*

External factor:	χ^2 Value	df	Exact level of significance (α error)	Rejection	Cramers V (Strength of the interaction if significant)
Competition for Cost	9.240	9	0.434	no	---
Competition for Quality	7.492	9	0.616	no	---
Competition for Speed and Flexibility	9.315	9	0.431	no	---
Customers	12.911	9	0.162	no	---
Suppliers	12.018	9	0.221	no	---
Displacement of Products by substitutes	6.797	9	0.603	no	---
Other Environment	12.377	6	**0.049**	yes	0.384