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Configurational analysis of firms' performance: Understanding the role of Internet financial reporting☆

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ABSTRACT

Internet Financial Reporting (IFR) is the disclosure of financial information through corporate websites. Although a vast amount of the literature analyzes the determinants of IFR, the literature does not adequately address the economic consequences of IFR. This study fills this gap in the literature by answering the following research question: Which configurations of the IFR and the firm's age and risk lead to high or low performance? To answer this question, this study analyzes the impact of IFR through longevity and risk on the Tobin's Q of firms. A fuzzy-set qualitative comparative analysis (fsQCA) sets the methodological ground to explore the role of IFR on the firms' performance. The fsQCA's results indicate that several combinations of IFR with risk and longevity are configurations for high performance. Further, the results show three different configurations for low performance. These configurations stress the importance of IFR on low-performing firms.

1. Introduction

With the development of the agency theory in the 1980s, the disclosure of corporate information has become increasingly important to firms. This importance lies in the need to reduce the theoretical agency costs from the information asymmetry that exists between the firms' managers and stakeholders (Jensen & Meckling, 1976). The typical channels that firms have used to disclose financial information to investors are printed annual reports, press releases, analyst briefings, and conference calls (Debreceny, Gray, & Rahman, 2002). Nevertheless, the rapid growth of Internet technology in the last decade has allowed firms to use new tools to disclose and disseminate financial and investor-related information. In fact, the use of the Internet globally drives firms to disclose information in a timelier manner, to a larger number of users, and in a more cost-effective way (Debreceny et al., 2002). In this context, a new strand of the literature on the disclosure of financial information investigates the use of the Internet as a tool that firms use to disseminate information to stakeholders. The literature refers to the disclosure of this type of information through corporate websites as Internet Financial Reporting (Ali Khan & Ismail, 2011).

Although a large body of the literature analyzes the determinants of IFR (e.g., Debreceny et al., 2002; Ettredge, Richardson, & Scholz, 2002; Kelton & Yang, 2008; Martson & Polei, 2004), the research needs to further analyze the economic consequences of IFR (Internet Financial Reporting). The literature on IFR indicates that technologies and corporate websites might contribute to the flow of voluntary disclosures to stakeholders. Consequently, this enhancement in disclosure transparency could influence investors' decisions, which in turn might affect the firms' performance (Hodge, Kennedy, & Maines, 2004; Trabelsi, Debreceny, & Limer, 2014). Accordingly, this study examines under what conditions IFR in conjunction with longevity and risk affects the firms' performance and aims to understand how the disclosure of financial information through the Internet might be relevant to the market. The following research question guides the development of this study: Which configurations of the IFR and the firm's age and risk lead to high or low performance?

In order to measure IFR, this study develops an index that comprises a list of criteria from the literature (Kelton & Yang, 2008; Martson & Polei, 2004; Pierchegger & Wagenhofer, 1999). A total of 63 content-related and presentation-related items make up the IFR. Among these, 50 content-related items (CIFR) comprise information about investors, social responsibility disclosures, timeliness of information, contact details, and other information. The remaining 13 items belong to the presentation-related category (PIFR) and regard technological features and the websites' usability.

This study collects its data from 78 nonfinancial firms on the FTSE100 between March and April of 2014. Using the information available on different websites, this study computes the IFR for each firm. The fuzzy-set qualitative comparative analysis (fsQCA) establishes the basis for exploring the role of IFR, together with longevity and risk in firms that achieve high or low performance using the Tobin's Q as the measurement.

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This study contributes to the research on IFR and corporate governance in several ways. First, the study analyzes the value of financial disclosure via the Internet as a corporate governance mechanism. Although several empirical works provide evidence on the different determinants of IFR, the majority of the literature does not explore the economic consequences of this type of disclosure. Second, this study develops a new index for IFR that different firms' stakeholders can apply to assess the IFR of firms. Third, this study provides information regarding the content and the presentation of financial information by nonfinancial firms on the London Stock Exchange. Fourth, using the fuzzy-set approach to qualitative comparative analysis, this study explores the influence of corporate governance mechanisms such as the IFR in combination with risk and longevity on a firm's performance in a holistic approach. This holistic fsQCA approach could contribute positively to the discussion on the impact of the IFR on performance, thus enhancing this body of the literature.

Following the introduction, Section 2 presents the theoretical background. Next, Section 3 explains the methods used to conduct the empirical work. Section 4 presents the data analysis and results, and Section 5 discusses these results and presents the conclusions and limitations.

2. Prior research on Internet financial reporting

The IFR research contains some studies that are mainly descriptive, although others investigate the determinants and characteristics of corporate Internet reporting (Martson & Polei, 2004). Most of the descriptive studies of the late 1990s demonstrate a general increase in the use of the Internet as a way of disseminating mandatory and voluntary disclosures to stakeholders (Lymer, 1999). These studies are generally country specific and attempt to give an overview of the way firms use the Internet to disclose information without analyzing the determinants or factors of such a use (Brennan & Kelly, 2000; Gowthorpe & Amat, 1999; Hedlin, 1999; Martson & Polei, 2004).

Since the early 2000s, a new strand of literature investigates the association between different explanatory variables and the level of IFR. The existing literature agrees that the amount and presentation of information disclosures to investors via the Internet has a positive relation with the firm's size (Ettredge et al., 2002; Kelton & Yang, 2008; Martson & Polei, 2004; Pierchegger & Wagenhofer, 1999). In contrast, the majority of studies find that profitability has no relation with the level of IFR (Ettredge et al., 2002; Martson & Polei, 2004).

Regarding the impact of corporate governance mechanisms on the IFR, Kelton and Yang (2008) analyze the association between IFR and different dimensions of governance. The authors conclude that the level of a firm's IFR has a negative association with managerial ownership and has a positive association with the board's independence and the audit committee's financial expertise. The majority of these studies use a disclosure index in order to measure the IFR that they base on a list of criteria that the Web-based disclosure literature develops (Deller, Stubenrath, & Weber, 1999; Martson & Polei, 2004; Pierchegger & Wagenhofer, 1999).

Despite the growing literature on the IFR, less research exists regarding the consequences of the IFR on market valuation. In the context of the capital market's efficiency, Antweiler and Frank (2004) conclude that stock message boards on the Internet are useful information to the market, although Bushee, Matsumoto, and Miller (2003) suggest that "webcast" conference calls via the Internet increase the amount of informedness and consensus in the market. Duque and Pinto (2008) report that the disclosure of price-sensitive events via the Internet are value relevant for the market because the information reaches all investors in a timelier manner. More recently, Garay, González, Guzmán, and Trujillo (2013) find that better Internet-based corporate disclosure practices have a positive relation with the firm's valuation. Further, the results of Trabelsi et al. (2014) show the association between voluntary disclosures in corporate websites and future revenue, future earnings, and the contemporaneous stock return.

The literature shows that a relation exists between a firm's profitability and its size (Beck, Demirgüç-Kunt, & Maksimovic, 2005). In turn, size and age are usually alternative measures of the same underlying phenomenon. Coad, Segarra, and Teruel (2013) give evidence that higher levels of productivity and profitability reflect that firms improve with age. Regarding systematic risk, Chen, Cheng, and Hite (1985) conclude that Tobin's Q (as a proxy of a firm's market power) and systematic risk have a negative relation.

In line with previous IFR research, this study puts forward the following research propositions:

Proposition 1. Different combinations of the firms' risk, age, and Internet Financial Reporting lead to the high performance of firms.

Proposition 2. Different combinations of the firms' risk, age, and Internet Financial Reporting lead to the low performance of firms.

Proposition 3. Configurations for high performance and for low performance are symmetrical.

3. Methods

3.1. IFR construction

In order to measure IFR, this study establishes a list of 63 criteria that come from the literature (e.g., Kelton & Yang, 2008; Martson & Polei, 2004; Pierchegger & Wagenhofer, 1999). The appendix presents the final IFR list. The study uses this list to evaluate the firms' websites in terms of content and presentation by analyzing the type of information the firms disclose and the technological features and usability of their websites.

The IFR list supports the codification of each criterion into one or zero (yes/no or fulfilled/ not fulfilled) that results in a score for each firm's website. The analysis normalizes the score to between 0 and 100 and interprets the score as the level of fulfillment of the IFR criteria (Pierchegger & Wagenhofer, 1999). This index has two subindices: CIFR that represents the level of content and PIFR that represents the ways the website presents information.

3.2. Overview of the fsQCA approach

Regression models usually estimate a dependent variable by using a set of independent variables, whereas the fsQCA analyzes cases in order to identify conditions that lead to the outcome of interest (Schneider, Schulze-Bentrop, & Paunescu, 2010). The literature often refers to these conditions as causal conditions (Schneider et al., 2010) that combine with one another to produce an outcome. The corporate governance literature shows contradictory results because this literature considers each variable individually (Misangyi & Acharya, 2014). However, more than one combination might exist and "configurations allow picturing equifinality, that is, the possibility for several ways to lead to the same outcome" (Kulins, Leonardy, & Weber, 2016, p. 1). Thus, the fsQCA constitutes an alternative approach to understanding high- and low-performing firms.

3.3. Sample

This study uses data on 78 FTSE100 nonfinancial organizations because this index consists of the largest firms in the United Kingdom. The rationale for choosing such firms is the fact that the IFR literature focuses mainly on US firms, but studies European firms less. Additionally, this choice allows this study to apply the findings to a relevant set of firms without generalizing the fsQCA results beyond the cases under study (Misangyi & Acharya, 2014). The sample period for the data is

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between March and April 2014. This study computes the index for each firm by using the information available on the firms' websites.

3.4. Calibration of causal conditions and the outcome

The fsQCA has to calibrate all of the data into fuzzy variables that indicate the membership values. These values range from zero to one, with 0.5 being the cross-over point that defines the qualitative distinction of being "in the set" or "out of the set" (Schneider et al., 2010). Each calibration requires a threshold to distinguish full membership, the cross-over point, or non-membership (Misangyi & Acharya, 2014). The literature sets the theoretical basis for establishing the thresholds for calibration (see Table 1).

The CIFR and PIFR present the values for the calibration thresholds for these variables in Table 1. The study establishes the thresholds for the calibration of age membership (Chollet, Géraudel, Khedhaouria, & Mothe, 2016; Ragin, 2008): firms with an age equal to or below the 5th percentile (two years) are fully out, firms with an age equal to or above the 95th percentile (49 years) are fully in, and the cross-over is the median value (26 years).

The beta is a measure of the volatility, or the systematic risk of a security in comparison to the market as a whole (Amit & Wernerfelt, 1990; Lintner, 1965):

$$Beta = \frac{Cov(R_i, R_m)}{\sigma_m^2} \quad (1)$$

with R_i = Stock Return, R_m = Market Return, and σ_m^2 = Market Variance.

A beta equal to one indicates that the security presents the same risk as the market portfolio. The cross-over point for this condition is one, the full membership is above the 95th percentile (which in this case is 1.68), and the non-membership is below the 5th percentile (which in this case is 0.33).

The literature of corporate governance frequently uses the Tobin's Q (MTQ) as a measure of performance (Gompers, Ishii, & Metrick, 2003; Morck, Shleifer, & Vishny, 1988). Although the MTQ has some limitations, this measure accounts for the investors' viewpoints by considering a forward-looking perspective (Demsetz & Villalong, 2001). The following equation is the calculation of the MTQ:

$$MTQ_i = (BVA_i + MVE_i - BVE_i)/BVA_i \quad (2)$$

where the MTQ is the Tobin's Q, BVA is the book value of total assets, MVE is the market value of common equity (stock price times the number of common shares outstanding), and BVE is the book value of equity.

An MTQ equal to one indicates that the market value of the security solely reflects the firm's assets (assets book value). Therefore, the cross-over value is one. The full membership is above the 95th percentile (3) and the non-membership is below the 5th percentile (0.5). Table 1 presents the statistics and calibration thresholds for the causal conditions and the outcome.

4. Data analysis and results

After calibrating the cases into fuzzy-variables, this study analyzes the data with the fsQCA software. In Table 2, the study creates the truth table, which is a data matrix (Fiss, 2011) that presents all possible logical combinations. After deleting the logical remainders without any solution, 11 different combinations exist. Because the research often establishes the threshold for consistency at 0.8 (Misangyi & Acharya, 2014), and all solutions provide consistency over that threshold value, the study does not delete any solutions. The threshold for identifying the combinations that lead to the outcome of zero or one is the natural break in the raw consistency scores (Crilly, Zollo, & Hansen, 2012; Fiss, 2011). This study sets that value at 0.93 (see Table 2).

Within the scope of the fsQCA, sufficiency means that a combination of conditions (age, beta, CIFR, and PIFR) is a subset of high-performing firms or low-performing firms (Misangyi & Acharya, 2014). The fsQCA presents three solutions as outputs: a complex solution, a parsimonious solution, and an intermediate solution (Fiss, 2011; Ragin, 2008). If the causal condition appears in the intermediate and in the parsimonious solutions, this study considers the condition a "core" condition, and if the causal condition only appears in the intermediate solution, the study considers the condition a "peripheral" condition (Fiss, 2011). Tables 3 and 4 report the intermediate solution that the fsQCA software produces for high-performance and low-performance outcomes, respectively. Both tables use a large ● to denote the presence of a core condition and a large ○ to denote the absence of a core condition. A small ● represents the presence of peripheral conditions, and a small ○ means the peripheral conditions are not present. These designations follow, for example, Crilly et al. (2012) and Misangyi and Acharya (2014).

4.1. High-performance configurations

The overall solution consistency and coverage are above the threshold value of 0.75 (see Table 3). This value means that the results indicate equifinality, in the sense that different configurations of causal conditions lead to the high performance of firms. The sufficiency analysis shows three solutions with consistencies higher than the threshold value of 0.8 where some conditions are core and others are peripheral.

4.1.1. Solution 1 (Year • CIFR).

Solution 1 indicates that 90% of the firms that are older and that present content information on the Internet reach high performance, regardless of their risk and the presentation of the information on the Internet (consistency = 0.9). The raw coverage is 0.57 and means that each causal condition of this solution (year and CIFR) explains 57% of the firms' high performance. This solution indicates that reporting corporate content information through the Internet is sufficient for older firms to achieve high performance.

4.1.2. Solution 2 (Year • Beta)

Solution 2 is highly consistent (consistency = 0.83), which means older firms with higher levels of risk achieve high performance, regardless of the disclosure of information on the Internet (both in terms of content and presentation, i.e., CIFR or PIFR). The raw coverage is 0.37;

Table 1
Descriptive statistics and calibration of causal conditions and the outcome.

		Descriptive statistics				Calibration		
Code	Description	Mean	Std	Max.	Min.	Fully out	Cross-over	Fully in
CIFR	Content Internet Financial Reporting	0.65	0.10	0.86	0.36	0	0.5	1
PIFR	Presentation Internet Financial Reporting	0.64	0.14	0.92	0.23	0	0.5	1
Beta	Business or unsystematic risk	0.95	0.41	1.74	0.25	0.33	1	1.68
Year	Firm's longevity	28.7	17	49	1	2	26	49
MTQ	Tobin's Q	1.76	1.01	6.12	0.09	0.5	1	3

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Table 2
Truth table for the outcome performance (logical remainders not listed).

Year	Beta	CIFR	PIFR	MTQ	Frequency of cases	Consistency
1	0	1	0	1	1	0.98
1	1	0	1	1	1	0.97
1	1	0	0	1	1	0.97
1	1	1	0	1	2	0.96
1	0	1	1	1	21	0.96
0	0	1	1	1	16	0.93
1	1	1	1	1	10	0.93
0	1	1	0	0	3	0.91
0	0	0	0	0	1	0.90
0	0	1	0	0	4	0.89
0	1	1	1	0	12	0.89

thus, each causal condition of this solution (year and beta) explains 37% of the firms' high performance.

4.1.3. Solution 3 (~Beta • PIFR • CIFR)

Solution 3 shows that 94% of the firms with lower levels of risk that disclose content information on the Internet and their presentation is usable (CIFR and PIFR) achieve high performance, regardless of their age (consistency = 0.94). The raw coverage of 0.6 means that each causal condition of this solution (~Beta, PIFR, and CIFR) explains 60% of the firms' high performance. This solution indicates that being a low-risk firm that reports corporate content information through the Internet and the presentation is usable (CIFR and PIFR) is sufficient for achieving high performance.

4.2. Low-performance configurations

The fsQCA usually analyzes the sufficient conditions that lead to the absence of the outcome (Misangyi & Acharya, 2014). In this analysis, the fsQCA discloses different configurations from those that lead to high performance. Table 4 reports the intermediate solution that comes from the fsQCA algorithm. The solution indicates that three possible configurations exist that lead to low performance.

4.2.1. Solution 1 (Beta • ~PIFR)

The first solution indicates that firms with higher levels of risk and less usable presentations achieve low performance, regardless of their age and the disclosure of content information on the Internet (consistency = 0.76 and raw coverage = 0.61). This solution shows that being a high-risk firm that does not present corporate information through the Internet is sufficient for achieving low performance.

4.2.2. Solution 2 (~Year • ~CIFR • ~PIFR)

The second solution shows that newer firms that do not have corporate information content and presentation through the Internet achieve low performance, regardless of whether they have high or low risk (consistency = 0.76 and raw coverage = 0.45). This solution indicates that being a newer firm that does not have corporate information content and a presentation through the Internet (CIFR and PIFR) is sufficient for achieving low performance.

Table 3
Sufficient configurations for high performance.

	High-performance solutions		
	1	2	3
Year	●	●	
Beta		●	◯
CIFR	●		●
PIFR			●
Consistency	0.90	0.83	0.94
Raw coverage	0.57	0.37	0.60
Unique coverage	0.02	0.02	0.17
Overall solution consistency:	0.86		
Overall solution coverage:	0.76		

Note: ● = core causal condition present; ● = peripheral causal condition present; ◯ = core causal condition absent.

Table 4
Sufficient configurations for low performance.

	Low-performance solutions		
	1	2	3
Year		○	●
Beta	●		●
CIFR		◯	◯
PIFR	◯	○	
Consistency	0.76	0.76	0.80
Raw coverage	0.61	0.45	0.47
Unique coverage	0.07	0.06	0.04
Overall solution consistency:	0.73		
Overall solution coverage:	0.71		

Note: ● = core causal condition present; ● = peripheral causal condition present; ◯ = core causal condition absent; ○ = peripheral condition absent.

4.2.3. Solution 3 (Beta • Year • ~CIFR)

The third solution shows that older firms with higher levels of risk that do not disclose corporate information content through the Internet achieve low performance, regardless of whether they have a usable presentation on the Internet (consistency = 0.80 and raw coverage = 0.47). This solution indicates that being an older, high-risk firm that does not report content information through the Internet is sufficient for achieving low performance.

5. Discussion and conclusion

This study aims at understanding the role of IFR on a firm's performance. Although several factors influence performance, this study looks at whether adding the IFR to two other important antecedent conditions (longevity and risk) for performance could successfully typify high and low performance in terms of Tobin's Q. The findings of this study contribute to the enhancement of the current understanding of the role of IFR on performance. In fact, this study advances the research toward a holistic examination of the typologies of a firm's performance by considering the IFR and these two other antecedents.

The results indicate that older firms with a high content-related index achieve high performance. This is in line with some of the findings of Coad et al. (2013), who conclude that older firms are larger, have lower debt ratios, and boast higher levels of productivity. Often, the literature considers the firm's size and age as alternative measures of the same phenomenon (Coad et al., 2013), and this literature demonstrates that a positive relation exists between size and the IFR. Therefore, older firms that invest in the dissemination of financial information via the Internet have positive results in the market and achieve higher performance. On the other hand, the literature's findings also indicate that combinations of risk and IFR also lead to high performance for a firm.

Although IFR subindices are not present for high-risk firms, the disclosure of information by low-risk firms and the way they present this information influences how investors acquire that information, which leads to high performance (Hodge et al., 2004; Kelton & Yang, 2008). Martson and Polei (2004) identify a negative relation between systematic risk that the authors measure with the beta and the IFR. Managers can act in a discretionary manner regarding the disclosure of financial information, which indicates that high-risk firms have no incentive to disclose this information on their website (Lewellen, Park, & Ro, 1996; Martson & Polei, 2004). These three different configurations support Proposition 1.

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A second set of configurations explains the low-performance outcome. The findings indicate that a low IFR presence leads to low performance for either newer or older firms as well as for high-risk firms, which demonstrates the importance of IFR in typifying low performance. The last configuration (BETA • YEAR • ~CIFR) highlights the importance of CIFR and is somehow counterintuitive. In fact, this solution shows that long-standing firms with high risk that do not report content information on the Internet is a sufficient condition to achieve low performance. This finding reinforces the relevance of IFR. The three configurations for low performance support Proposition 2.

Furthermore, when comparing those configurations with the ones that lead to high performance, the role of IFR appears to be stronger for low performance, because either the CIFR or PIFR conditions or both are always absent in the three solutions for low performance. This finding stresses the relevance of assessing the IFR along with the traditional financial variables to evaluate low performance in firms. On the other hand, when comparing configurations that lead to high performance to the ones that lead to low performance, those are different and not symmetrical. Therefore, the findings of this research do not support Proposition 3.

This study has several important contributions. First, the study analyzes the value of financial disclosure via the Internet. Although several empirical works provide evidence on the different determinants of IFR, the literature barely explores the consequences of this type of disclosure. Second, this research provides information regarding the content and the presentation of financial information (CIFR and PIFR, respectively) that FTSE100 nonfinancial firms provide. This information shows that an IFR index could be useful to other researchers, managers, investors, or organizational stakeholders to assess the level of Internet financial disclosure by firms. Further, using the fsQCA, the study explores the influence of the firm's characteristics (such as risk and longevity) and the IFR on performance by adopting a holistic approach. In fact, this holistic fsQCA approach contributes positively to the current debate on the impact of IFR on performance, which extends this body of the literature.

Although the fsQCA might be appropriate for understanding complex causal relations (Fiss, 2011), this study also has certain limitations. First, the sample size is a limitation, is country-specific, and comprises only large firms; all of which limit the general applicability of results. Further research could verify and extend the results of this study. On the other hand, future research could extend the analysis of the relation between IFR and a firm's performance by examining the direction of causality between these two variables.

Appendix A

Item		%
I—Content		
A—Investor-related information		
Profit and loss account	47	59%
Cash flow of funds	47	59%
Statement of changes in stockholders' equity	45	57%
Notes to the accounts	45	57%
Management report/analysis	54	68%
Auditor report	30	38%
Interim statements	77	97%
History of annual report	38	48%
Share price history	40	51%
Share price performance in relation to stock market index	67	85%
Summary of key ratios	38	48%
Summary of financial data	38	48%
Reporting by line of business	48	61%
Reporting by region	43	54%
Shareholder structure	31	39%
Link to regulators/supervisors	59	75%
Calendar of events of interests	79	99%
Dividend history	77	97%
Earnings estimates	24	30%
Trends in the industry	35	44%
Discussion of corporate strategy	71	90%
Market share	23	29%
Growth in investment	40	51%
Corporate governance principles	73	92%
Annual shareholders meeting info	78	100%
Code of conduct and ethics	72	91%
Members of the board	79	100%
Analyst forecast	22	28%
Listing of firms' analysts	47	59%
Board members compensation	32	41%
Info. about share option programs	19	24%
Text of speeches, presentations	76	96%
B—Social responsibility disclosures		
Environmental report	77	97%
Employee social, safety, health report	70	89%
Commercial sponsoring	68	86%
Noncommercial community involvement	74	94%
Corporate responsibility report	50	63%
C—Timeliness of information		
Current press releases or news	78	100%
Current share price	76	96%
Pages indicate the latest update	16	20%
Monthly or weekly sales	9	11%
D—Contact details and other information		
E-mail to investor relations	76	96%
Investor relations phone number	76	96%
Investor relations address	67	85%
Frequently asked questions	62	78%
Link to Facebook page	36	46%
Link to Linkdin	33	42%
Link to Twitter	48	61%
Link to any blog page	17	22%
II—Presentation		
E—Technological features		
Hyperlinks inside annual report	78	100%
Financial data in editable format	23	29%
Annual report in pdf-format	78	99%
Annual report in html-format	45	57%
Graphic images	72	91%
Chat room	0	0%
Flashes	72	91%
Sound files	57	72%
Video files	46	58%
F-Usability of web site		
Help information	25	32%
Table of content	73	92%
Internal search engine	74	94%
Different Languages	11	14%

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