

# The Development of Intensity Index to Investigate Intangibles Disclosure

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**Abstract**—In recent years, accounting researchers have increasingly focused their efforts on investigating voluntary disclosure. However, there are some methodological issues such as coding reliability, the unit of analysis and the unit of measurement that hinder interpretation and comparisons across studies. This paper responds to this call and contributes in two principal ways. First, the paper introduces the concept of information intensity by developing an in-depth measure of the level and type of disclosure. Second, the paper provides a more powerful examination than prior literature of both cross-sectional variation in the level of disclosure and measurement of the economic magnitude of the difference in disclosure. It is the objective of this paper to provide a more precise, continuous measure of disclosure level and types particularly intangibles disclosure.

**Index Terms**—Intangibles, intensity, voluntary disclosure.

## I. INTRODUCTION

Intangible resources have been recognised as the most important value drivers in the current economy in ensuring a firm's survival, its competitive position and its future growth [1]-[5]. Seetharaman *et al.* [6] have proposed how 'p-economy' (production orientated) differs from 'k-economy' (knowledge-based). In the 'p-economy', hard assets such as labour, capital and land were regarded as the important factors of production to determine the value of corporations [3], [7]. The 'k-economy', on the other hand, has been variably described as the post-industrial economy; new economy; service economy; knowledge society; knowledge-intensive economy; new industrial age; information age; or idea era [8].

With regard to intangibles information, a stream of research has been conducted to determine the level of voluntary disclosure by firms. These studies have examined documents such as annual reports, prospectuses and presentation materials to analysts in order to provide understanding regarding what and how much intangibles information is disclosed by firms. Besides providing an overview of intangibles disclosure, prior research also focuses on the association between intangibles disclosure and various firm-specific factors such as firm size, industry type, ownership structure and board structure. However, prior studies have documented inconsistent results regarding the

types of intangibles information disclosed and the level of disclosure. The current state of intangibles disclosure literature, therefore, warrants further investigation so that issues that hamper the consistencies of results can be addressed and more conclusive evidence can be drawn.

Responding to calls by Kauffman and Schneider [9] and Davison and Skerrat [10] that future research is required on how external stakeholders are provided with information on intangibles and how firms approach the task of producing their corporate reports in disclosing intangibles information, this study establishes, explores and demonstrates the concept of intensity of disclosure, to indicate the strength of intangibles information presented by firms.

## II. LITERATURE REVIEW

In a corporate reporting context, companies seek to find ways of capturing the attention of their corporate report readers. Guthrie and Petty [11] argue that annual reports are regarded as highly useful sources of information because managers of companies commonly signal what is important through this reporting mechanism. Ideally, the annual report is a vital instrument designed to tell the story of a company, its objectives, where the company succeeded or failed, and what the company intends to do in the future [12]. The annual report, as Toms [13] argues, is the obvious place for signalling disclosures (p. 262). Annual reports of listed companies, which have often become a source of raw data for voluntary disclosure studies, have also served as an instrument for observing managerial disclosure behaviour [14]. The utilisation of narrative sections in annual reports by firms to disclose voluntary information gives them an opportunity to signal intangibles information.

Reviewing prior research on discretionary disclosure, Merkl-Davies and Brennan [15] claim that discretionary disclosures either: (1) contribute to useful decision making by overcoming information asymmetry between managers and investors; or (2) constitute opportunistic behaviour whereby managers exploit the information asymmetry situation through biased reporting or impression management.

Impression management predominantly occurs in less regulated narrative disclosures [16]. In this regard, a range of impression management tools are utilised by managers such as selectivity in graph choice [17]-[18], presentation emphasis [19] and thematic manipulation [20]-[22] to draw a reader's attention to the content of the documents. However, it is argued in this paper that managers might also use impression management tools to overcome information asymmetry problem by facilitating investors to make

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better-informed decisions. Thus, some impression management tools might be selected responsibly by managers in disseminating information to improve readers' understanding of the corporate reports by providing stronger signals.

The extant literature adopts a variety of approaches to the analysis of narratives in annual reports, which includes subjective ratings, disclosure index studies, thematic content analysis, readability studies and linguistic styles [23]. However, Beattie et al. [23] argued that these approaches are one-dimensional and little consideration is given to the type of disclosure made in relation to the topic. This paper attempts to address these concerns.

### III. METHODOLOGY

Disclosure index studies are based on the general principles of content analysis. As a technique, this methodology seeks to determine patterns in the presentation of data and their meanings in a systematic, objective and reliable analysis [24].

This paper introduces the intensity index, which indicates the strength of intangibles information presented by firms. Intensity of disclosure is concerned with the way firms emphasise information in order to capture a reader's attention, particularly to notice the intangibles information featured in the documents. Consistent with Beattie and Jones [17], Unerman [25], Davison and Skerrat [10] and Abdul Halim and Jaafar [26], visual representations are regarded as more intense communication tools compared to textual disclosures. Further, quantitative disclosures represent more intense signals compared to qualitative disclosures because they are more objective and informative [27]. Firms may also emphasise certain information provided by prominent location/positioning of information, use of special characters and/or more emphatic types of font [16]. Repetition of information is also considered as presentation emphasis to aid the memory of readers [28]. These techniques, when combined, indicate the strength of intangibles information conveyed by firms. Stronger signals are presumably better at informing readers and ensuring that the readers are more engaged with the information.

Detailed coding rules are needed to capture the relevant information in annual reports. To address the methodology issues addressed earlier, this study examines both textual information and visual materials with specific coding rules to increase the transparency of the intangibles categories which, therefore, results in a more reliable data analysis.

#### A. Narrative Material Analysed

The analysis of annual reports focuses on the narrative sections that are most likely to contain voluntary intangibles information such as cover and back pages, company highlights, chairman's statement, CEO review, Management Discussion and Analysis and excludes sections subject to regulatory requirements such as the auditor's report, the director's report, corporate governance statements and director's declaration and remuneration report.

#### B. Variety, Extent and Intensity of Intangibles Disclosure

The variety of disclosure is concerned with different types

of intangibles information which was captured through 24-item categories derived from prior literature [29], [30]. The extent of disclosure is concerned with the amount or number of disclosures and it was obtained by measuring the absolute frequency of occurrence of each intangibles information. It was measured by counting the number of sentences for textual disclosures and captions/titles/rows for visual and tabular disclosures for each intangibles disclosure found in annual reports. The intensity of disclosure is measured on four dimensions: (1) type of disclosure; (2) nature of disclosure; (3) emphasis through presentation effects; and (4) emphasis through repetition of information.

Table I shows two categories of intangibles disclosures which are text and visual disclosures. Text refers to information presented in textual form. Visuals are categorised as graphs and charts, tables, figures and diagrams and pictures, which include photographs, paintings and drawings. Visual images are regarded as more intense than information presented in text, hence, represent more powerful signals. Since visuals do not have natural grammatical sentences like written text, the intangible information presented is captured based on the captions/titles of the visual images. Particularly, for graphs, charts, figures and diagrams, their titles, per sentence were chosen as the basis for coding and measurement. For tables, one row was regarded as one sentence and was chosen as the basis for coding. Since a table can convey information about single intangible item or multiple items, one row was regarded as independent of another and deserved separate counts. For pictures, captions adjacent to the pictures were regarded as the basis for coding, per sentence. In this paper, charts, graphs, tables, figures, diagrams and pictures are weighted equally and there is no attempt to rank visual representations in terms of their relative intensity. Further, one cannot be certain that graphs are better than other types of visual or otherwise and, therefore, equal weighting is considered appropriate. In this study, textual disclosures are coded and scored 0 and visual disclosures (graphs, tables, figures, diagrams and pictures) are scored 1.

TABLE I: TYPE OF DISCLOSURE

Type of disclosure	Category	Definition	Unit of measurement
Text		Information presented in textual form.	Sentence
Visual	Graphs and charts	Information presented in graphs and charts.	Title, per sentence
	Tables	Information presented in tables.	One row is equivalent to one sentence
	Figures and diagrams	Information presented in figures and diagrams.	Title or caption, per sentence
	Pictures	Information presented in pictures and photos.	Caption, per sentence

The nature of disclosure is categorised as qualitative or quantitative disclosure. Quantitative disclosures provide information of a non-financial nature but that has numerical value (non-financial quantitative) and disclosures which are monetary that relate to actual financial numbers (financial quantitative). On the other hand, qualitative disclosures relate

to information expressed in terms other than quantitative terms, with no numerical value attached [31], [32]. Quantitative disclosures are regarded as superior to qualitative information. However, non-financial and financial quantitative disclosures are weighted equally and there is no attempt to rank financial and non-financial quantitative disclosures in terms of their relative intensity. Therefore, in this paper, both financial and non-financial quantitative disclosures are regarded as quantitative disclosures, which are superior to qualitative disclosure.

Emphasis through presentation effects is defined as the emphasis provided by prominent location/positioning of information, special character use and/or type of font to indicate the degree of prominence and the detail is shown in Table II. Location/positioning of information is concerned with the position of intangibles information found in the annual reports and the prospectuses. It can either be in the headlines, sub-headings or in the body of text. Special character information includes information in bullet points and numbered lists. Information presented in bullet points and numbered lists is considered as independent ideas and, therefore, one bullet point or item in a numbered list is considered as one sentence.

Type of font represents information in bold text, italic or underlining. Information presented in the headline and sub-headings indicates a higher degree of prominence compared to information located in the body of a text and, therefore, represents stronger signals. This type of information is scored 2. Information presented in bullet points/ numbered lists and/or presented in bold text, italic or with any special effects indicates a higher degree of prominence compared to information presented in a plain text and, therefore, represents more intense signals. In this study, information presented in bullet points/numbered lists and bold text/italic is given the same score of 1, and intangibles information presented in a body of a text and in plain text is scored 0.

TABLE II: EMPHASIS THROUGH PRESENTATION EFFECTS: LOCATION/POSITIONING OF INFORMATION, SPECIAL CHARACTERS AND TYPE OF FONT

Presentation effects	Sub-category	Definition
Headline and sub-headings		Information placed in the headline and the sub-headings. This type of information represents the most emphasised information compared to information positioned in the body of a text.
Special characters	Bullet points and numbered lists	Information presented in bullet points and numbered lists.
Type of font	Bold text, italic, underlining	Information presented in bold text, italic, underlining or with other special effects. This type of information represents the most emphasised information compared to information presented in plain text.

The final intensity measure is captured through repetition of information. Repetitive messages are considered more

powerful than information featured only once. In the present study, consistent with Brennan *et al.* [16], a statement is considered to be repeated even where there is a slight variation in one or two words in the two statements.

TABLE III: INTENSITY OF DISCLOSURE AND ITS MEASUREMENT

Intensity of disclosure	Measurement
Type of disclosure	0 = Text 1 = Visual
Nature of disclosure	0 = Qualitative disclosure 1 = Quantitative disclosure
Emphasis through presentation effects: location/positioning, special character and type of font	0 = Information in a body of text /plain text 1 = Bullet points, numbered lists, bold text, italic, underlining 2 = Headlines and sub-headings
Emphasis through repetition	0 = No 1 = Yes for each instance of repetition
Total intensity of disclosure	Visual + Quantitative + Special characters + Headlines + Repetition

Table III summarises the intensity of disclosure and its measurement. The table shows that the scores for the individual intensity dimension for each company are totalled to arrive at the overall intensity score. However, a high intensity score does not necessarily indicate strong signals are conveyed to investors. This is because the intensity scores might be associated with the extent of disclosure where firms with a higher amount of disclosure might receive a higher intensity score. For example, a company with 10 disclosures might have their intangibles information in four special characters and, therefore, scored four for intensity. In another instance, a company that recorded 100 disclosures might have 10 disclosures in special characters and score 10 for the intensity. By looking at only the absolute intensity score, it appears that a company that scored 10 has a higher intensity score where it has emphasised only 10 per cent of its disclosures in comparison to 40 per cent in the first example. Therefore, to bring analytical rigour and to control for the difference in the extent of disclosure, the intensity score for each company is measured in proportion with its extent of disclosure. In this case, a company that scored four for intensity out of 10 disclosures may have a relative score of 0.4 which is higher than a relative score for a company that scored 10 for intensity out of 100 disclosures (0.1). This is perhaps the most reliable way of measuring the intensity of disclosure. Thus, for the purpose of the study, the intensity of disclosure is calculated using both absolute intensity scores as well as its relative intensity scores in proportion to extent of disclosure.

### C. Developing the Coding Instrument – An Illustrative Example

This sub-section presents and summarises the detailed coding and recording rules to identify and collect the data from annual reports. These rules delineate the steps taken in identifying intangibles disclosure in annual reports and prospectuses of the sample companies, followed by how these intangibles items are coded and measured to arrive at the total variety, extent and intensity scores. The data consist of the annual reports of the 60 Australian companies who had

capital-raising in 2011. Signalling theory posits that firms signal various important messages to improve investors' decision-making. In the event of capital-raising, firms are expected to signal incremental information such as on their intangibles to meet investors' information needs. Drawing ideas from impression management literature which provides evidence that some impression management tools create a favourable impression, it is expected that some impression management tools would also have a role in signalling information.

The process of coding and recording voluntary disclosure of intangibles information is done as follows.

- 1) Read the down-loaded document in its entirety to establish understanding about what is disclosed in the document.
- 2) Initial coding is recorded on-screen. This involves the identification of intangibles item in each sentence or visual representations in the annual reports according to intangible categories.
- 3) Each disclosure is transferred to Microsoft Excel and was coded to a specific category from 24 items with 1 refers to item 1 and so on.
- 4) Intangibles information identified in textual form is coded '0'. A caption for a graph is coded '1'; each row for table is coded '2'; caption for figures and diagrams is coded '3' and caption from pictures is coded '4'.

• Example 1

The following diagram would be categorised as information relating to customers (item 20 in the intangibles classification). This diagram recorded the caption 'consumers' as one count.



Fig. 1. Consumers.

(Source: Envestra Limited Annual Report 2006, p. 7)

• Example 2

For pictures and photographs, caption adjacent to the picture is recorded per sentence, regardless of the size or the number of individuals in the pictures.



Fig. 2. Photo -Mark Osborne taking a process sample for density measurement.

(Source: Newcrest Mining Limited Annual Report 2006, p. 10).

For this photograph, the caption 'Mark Osborne taking a

process sample for density measurement' would be categorised as information relating to employees (item 8 in the intangibles classification), per sentence.

- 5) For each coded disclosure, the nature of information is assessed, whether it is qualitative, non-financial quantitative or financial quantitative. Qualitative information is coded '0', non-financial quantitative is coded '1' and financial quantitative is coded '2'.

• Example 3

The following sentence would be categorised as non-financial quantitative as it contains numerical value. This information relates to growth prospects and planned initiatives (item 23 in the intangibles classification).

*'There was a strong volume growth of 24% in the high value add custom container segment and ongoing improvement' (Source: AMCOR Limited Annual Report 2008, p. 3)*

• Example 4

The following sentence could be categorised as financial quantitative in nature as it contains monetary value. This information relates to expected efficiency and savings (item 24 in the intangibles classification).

*'Following the commissioning period, the initial cost reductions from the new mill are expected to be \$40 million per annum'. (Source: AMCOR Limited Annual Report 2008, p. 2)*

- 6) For each coded disclosure, the degree of prominence of information is assessed. Information presented in plain text is coded '0' and information presented in bullet points, numbered lists or bold text is scored '1'. A score of '2' is awarded for information presented in the headlines and sub-headings.

• Example 5

The intangibles information can be positioned at the headline, sub-headings or in the body of a text. Also, information can be featured as bullet points or numbered list and/or in bold text, italic or underlining.

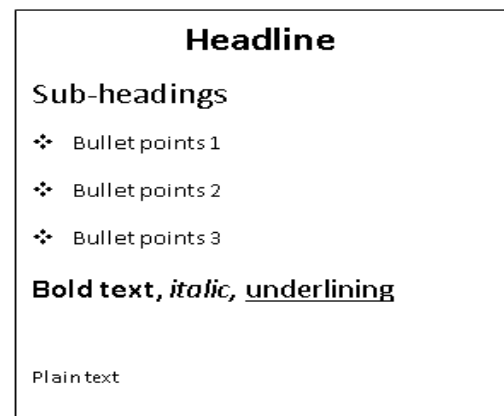


Fig. 3. Presentation effects.

Information presented in plain text is coded '0' and information presented in bullet points, numbered lists, bold text and/or underlining is scored '1'. A score of '2' is awarded

to information presented in headline and sub-headings. To arrive at the total score for emphasis, both scores for special characters and headlines are added.

- 7) Also, for each coded disclosure, the information is assessed whether it is a repetitive message or not. Even if there is a slight variation in one or two words, a disclosure is considered to be repeated. A repeated sentence is scored '1' each time it is repeated.
- 8) For type of disclosure, captions for visual materials coded during initial coding, i.e. graph, figure and diagram and pictures/photographs are scored '1'. For nature of disclosure, non-financial and financial quantitative disclosures are scored '1' to arrive at total intensity score.
- 9) The scores for type of disclosure, nature of disclosure, and emphasis are then totalled to arrive at intensity of disclosure.
- 10) To arrive at variety of disclosure, the number of categories recorded for each company is totalled where a maximum possible score is 24; which represents at least one disclosure on each of the 24 intangibles categories.
- 11) To get the extent of disclosure, the number of disclosures is counted for each company.

The reliability of the coding instrument and reliability of coders have been considered and dealt with carefully. A test-retest of the coding was done by the author from ten randomly selected annual reports and two prospectuses. The dates on which the documents had been coded had been recorded so it was an easy matter to ensure that the documents to be recoded were drawn from different dates within the initial coding period. In addition to that, to ensure reliability of the coder, an independent coder was appointed to code ten per cent of the sample. The training session for the independent coder involved three hours of studying the definitions of categories of intangibles and the coding rules. Six annual reports and three prospectuses, which is equivalent to 10 per cent of each group, were then recoded. On completion of the recoding, the results were considered in detail; for each item coded, whether by the author or the independent coder, the categories of classification and the several intangible items were discussed. This reliability test has, therefore, indicated a very high order of consistency in the original coding and, thus, results in a reliable analysis.

Table IV shows that the discovery and learning phase recorded the highest number of disclosures (1,323) and information about *employees* dominates the category with 490 disclosures. . For example, Downer EDI Limited, an industrial firm, disclosed the following sentence about its employees.

*"We have over 21,000 skilled employees who have a driving passion to be the best they can be."*

*Downer EDI Limited Annual Report 2006, p. 2*

Besides information about *employees*, Table IV indicates that information about *management philosophy and corporate culture* is also among the most reported intangible items in annual reports. For example, Lend Lease Group, a real-estate company, shared the following vision with the public.

*"Our vision is to be the leading global property company."*

*Lend Lease Group Annual Report 2008 p.4*

Brand values and reputation represent the company name and its favourable position in the market. For example, St. George Bank disclosed this particular sentence about awards received.

*"SGB is recognised as 'Business Bank of the Year' in Money Magazine's Consumer Finance Awards in June 2006."*

*St. George Bank Annual Report 2006, p.31*

Featured below are some of the examples of intangibles information presented by firms in their annual reports using various intensity measures.

TABLE IV: NUMBER OF DISCLOSURES OF INTANGIBLES ITEM IN ANNUAL REPORTS

Intangible item	Number of disclosures
<b>Discovery and learning</b>	
Research and development	16
Organisational infrastructure/process	135
Management philosophy and corporate culture	347
Business alliances and joint venture	88
Supplier integration	6
Communities of practice	95
Spill-over utilisation	4
Employees	490
Training and development of employees	80
Education of employees	11
Work-related knowledge and competencies	41
Entrepreneurial spirit	10
<b>Total for discovery and learning</b>	<b>1,323</b>
<b>Implementation</b>	
Intellectual property (Patents, Trademarks and Copyrights)	9
Licensing agreements and contracts	45
Know-how	9
Internet and online activities	18
Clinical tests, beta tests and pilot tests	11
<b>Total for implementation</b>	<b>92</b>
Commercialisation	
Brand values and reputation	171
Distribution channel and marketing	15
Customer and customer satisfaction	78
Market shares	63
Growth prospects and planned initiatives	130
Product pipeline dates	32
Expected efficiency and savings	23
<b>Total for commercialisation</b>	<b>512</b>
<b>Total</b>	<b>1,927</b>

- Example 1: Photograph (employees)



Fig. 4. 'Richie O'Callaghan controlling the underground drill rigs.' (Newcrest Mining Limited Annual Report 2006, p. 15).



- Example 2: Photograph (Communities of practice)



Fig. 5. 'St George is proud to sponsor the Taronga Park Zoo 'S. George Zoomobile' which helps educate the community about Australian wildlife by providing hands-on experiences to over 16,000 people each year.' (St. George Bank Limited Annual Report 2006, p.36).

- Example 3: Quantitative information (training and development of employees)

*"A total of 2,800 training hours involving 460 employees have been completed covering topics including leadership, coaching, managing performance and communication."*  
(Sims Metal Management Annual Report 2008, p.20)

- Example 4: Repetition (management philosophy and corporate culture)

This information was featured in the headline:

*"Over the coming year we are determined to further re-focus our attention on creating shareholder wealth".*

The same piece of information was repeated again in the body of the text:

*"Over the coming year we are determined to further re-focus our attention on creating shareholder wealth".*  
(Downer EDI Limited Annual Report 2006, p.6)

With respect to annual reports, narrative sections provide an opportunity for managers to exercise their discretion in featuring relevant and important information. It has been argued that information released voluntarily can be a powerful signal to indicate favourable attributes of a firm. For the purpose of the study, the analysis of annual reports permits a further investigation on how Australia's largest listed firms utilise annual reports to signal intangibles information when they intend to raise additional capital. As noted by Lang and Lundholm [20], voluntary disclosure of information reflects conscious decisions of managers. That is, the need to disclose additional information is even stronger when firms require a positive valuation from investors. In the case of Australia's largest listed firms, capital-raising activity motivates firms to report a wider variety and a higher level of intangibles of information. This particular disclosure behaviour gives an indication that companies provide a greater variety and a larger amount of intangibles information to compensate for the inadequacy of the financial reporting standards and that they want investors to be aware of the existence of intangibles.

#### IV. CONCLUSION

The importance of public voluntary disclosures made by listed companies is expected to increase in the future. This paper offers an addition to knowledge by establishing, exploring and demonstrating the concept of intensity of disclosure. The intensity of disclosure is defined as the strength of intangibles information which is represented by various components such as the use of pictures, the disclosure of quantitative information, placement of information and repetition of information. This paper has empirically tested the intensity index using annual reports of Australian companies.

Prior studies have investigated the content of annual reports including the use of pictures and the readability of the report but what has been contributed by the present paper is considered as a new area and a major contribution. In particular, based on the intensity index constructed, this paper provides evidence that not only firms signal wide variety and higher intangibles disclosure, but also more intense messages such as through pictures and repetition when they intend to raise additional capital.

In general, the disclosure in narrative sections of annual reports contains pictures, images and information in special characters besides information in plain text. This study's results agree with the argument in the literature that the financial reporting framework is rather irrelevant to today's business structure because it lacks relevance in providing sufficient information especially on intangibles. Future research could refine the components in the intensity of disclosure by including other components such as the use of colours, the use of different font types the placement of pictures and photographs, typography and page layout.

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