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SOFTWARE, METHOD, AND ANALYSIS: REFLECTIONS ON THE USE OF ATLAS.TI IN A DOCTORAL RESEARCH STUDY†

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Abstract

This paper presents evidence from a user of a computer-assisted qualitative data analysis software (CAQDAS) referred to as ATLAS.ti on its usefulness and challenges in the content analysis of corporate annual reports (CARs) of top South African companies. The paper illustrates how ATLAS.ti was employed to perform the content analysis of 60 corporate annual reports to determine the extent of human capital disclosures by the top South African companies. Useful reports generated from the "hermeneutic unit" known as "AdePhD" include the primary document list, the code list, the code families, the code summary, the code-primary document list, the code-quotation list, and the network views. The reports from this qualitative analysis software facilitated the observations on the frequency of ninety-one human capital disclosure items analyzed from the corporate annual reports of companies in our sample. Findings indicate that the use of ATLAS.ti enabled a faster and robust analysis that would have taken a much longer time if done manually. It also facilitated more coherent results. Nevertheless, the major challenge is the lack of adequate institutional support for users when compared with the level of institutional support available for quantitative data analysis software such as the Statistical Package for the Social Sciences (SPSS).

Keywords: ATLAS.ti, Content Analysis, Corporate Annual Reports, Corporate Reporting

JEL Classifications: D12, D14, E21

1. Introduction

The main aim of this paper is to navigate the process of a qualitative analysis software called ATLAS.ti that could be used to analyze large qualitative data as against manual coding which takes a lot of the researcher's time and resources. The study was motivated by the ease with which this software could be used to analyze a large number of pages of Corporate Annual Reports through non-manual coding processes. This was borne out of the author's practical experience in the use of ATLAS.ti for the analysis of a total number of sixty corporate annual reports of top listed companies in the Johannesburg Stock Exchange, South Africa. Considering the hundreds of pages of these reports, which were analyzed with the aid of ATLAS.ti, it would have been cumbersome and time–consuming if the analysis had been done manually. Thus, it is possible to save a considerable amount of time and resources when performing content analysis of textual documents with the aid of ATLAS.ti.

† This paper is based on the PhD thesis entitled "Human capital disclosure in corporate annual reports", authored by Michael Adelowotan.

The empirical method referred to as content analysis has been described as studies that analyze the content of texts or documents (such as letters, speeches, annual reports) and states that "content" refers to words, meanings, pictures, symbols, themes, or any message that can be communicated (Mouton, 2005). Content analysis is a research technique for making replicable and valid inferences from data according to their context (Krippendorf, 1980). The method has also been described as a qualitative technique for gathering data, in which qualitative information is codified into pre-defined items to derive quantitative scales (Abbott and Monsen, 1979). Other researchers described the method as a technique of data collection that involves codifying the text (or content) of a piece of writing into various groups (or categories) depending on selected criteria (Milne and Adler, 1999) as well as a research method for capturing and categorizing empirical data (Gray *et al.* 1995). The remaining aspects of this paper have been structured as follows: section 2 deals with the literature review, while sections 3 and 4 represent the methodology and analysis and results, respectively. Finally, section 5 deals with the conclusion.

2. Literature review

Over the last two decades, researchers have investigated the disclosure of human capital (HC) in corporate annual reports (CARs). Basing their studies on a single country, the level of disclosure of various components of intellectual capital (IC) was highlighted (Herli *et al.* 2021; Vitolla *et al.* 2020; Li *et al*. 2008; Abdolmohammadi, 2005; Abeysekera and Guthrie, 2005; April *et al.* 2003; Bozzolan *et al.* 2003; Brennan, 2001; Guthrie and Petty, 2000). Other researchers studied HC disclosure patterns among different cross-country countries (Guthrie *et al*. 2007; Vandemaele *et al*. 2005; Vergauwen and van Alem, 2005). These studies also revealed the relative importance of human capital items.

Although researchers seeking to understand intangible assets disclosure used various methods ranging from case studies, interviews, questionnaires, surveys of corporate annual reports, and focus groups (Al-ani and Tawfik, 2021; Budnik, 2020; Miller *et al*. 1999), the most popular method is content analysis. For example, Guthrie *et al.* (2004) used the content analysis method to examine voluntary and mandatory annual report disclosures in different countries.

Content analysis has become a widely used method of analysis in financial accounting research. In particular, the method has been used to explore the area of intellectual capital disclosures (ICD) by some researchers (Lindgren *et al*. 2020; Chen *et al.* 2020; Abeysekera, 2006; Guthrie *et al.* 2004). Another area where the method has been used is corporate social responsibility reporting (Mahjoub, 2019; Siueia *et al.* 2019; Unerman, 2000). This research method is therefore the ideal method to discover certain trends in the disclosure of information in CARs (Cronje, 2008). Moreover, the technique has been effectively used in previous studies conducted on voluntary disclosure in human capital disclosure studies, accounting studies, and social and environmental studies (Moloi and Adelowotan, 2019; Blanc *et al*. 2019; Ismail *et al.* 2018; Ismail and Rahman, 2016; Fatima *et al.* 2015; Adelowotan, 2013; Sen *et al*. 2011; Moloi, 2009; Abeysekera and Guthrie, 2005; Newson and Deegan, 2002; Olsson, 2001; Guthrie and Petty, 2000; Subbarao and Zeghal, 1997; Abbott and Monsen, 1979). In their study, Dumay and Cai (2014) provided a critique of content analysis as a methodology for inquiring into intellectual capital disclosure by reviewing a total of 131 articles where the authors have employed the methodology.

Generally, the content analysis technique involves codifying systematic, objective, and reliable qualitative and quantitative information into pre-defined categories in order to derive patterns in the presentation and reporting of information (Guthrie *et al.* 2004). To analyze the extent of voluntary disclosure of human capital, this research study employed content analysis to ascertain the patterns and context of human capital disclosure in CARs of 60 out of the top 100 Johannesburg Stock Exchange (JSE) listed companies. The reasons for using these companies are that they constitute about 80% of the total market capitalization of the companies listed on the JSE and that these big companies have the culture of providing more non-mandatory information in their CARs. This analytical content analysis was also undertaken to discover the extent to which disclosures in CARs relate to identified HC content categories.

3. Methodology

The use of CAQDAS such as ATLAS.ti, MAXQDA, and QSR-NVivo by qualitative researchers dates back to nearly three decades ago. Some of these CAQDAS have developed over the years to the extent that apart from analyzing data, they are now used to perform other tasks such as project management, literature reviews, data collection, and report writing (Hutchison *et al*. 2010; Johnston, 2006).

Manual coding is the common practice used in the majority of previous studies on disclosure practices. This approach involves a lot of time and paperwork given its attendant difficulty in coding and recoding. However, ATLAS.ti allows easy coding and recoding and the creation of networks showing how codes and themes interact in a complex manner thereby facilitating the interpretation process.

ATLAS.ti which was developed at the Technical University of Berlin, Germany is one of the major CAQDAS packages that can be used for the analysis of textual documents (Silver and Lewins, 2014). ATLAS.ti was also described as a textual laboratory that makes interconnectivity between every aspect of research possible and therefore enables data analysis to be done in a much easier and faster way (Konopasek, 2007).

ATLAS.ti version 7 was employed to store, organize, and analyze the data collected from the corporate annual reports of sixty companies listed on the Johannesburg Stock Exchange (JSE). Other researchers such as Paulus and Bennet (2017) emphasized the significance of integrating qualitative analysis software such as ATLAS.ti into graduate research methodology courses.

3.1 Procedures for content analysis of CARs

The first step for the content analysis of CARS was to select 60 companies from the top-100 JSE listed companies for content analysis. The reasons for using these companies are that they constitute about 80% of the total market capitalization of the companies listed on the JSE and that these big companies have the culture of providing more non-mandatory information in their CARs. The corporate annual reports of selected companies for the relevant year (2011) were downloaded in PDF format into CDs. These reports were subsequently loaded in the qualitative analysis software known as ATLAS.ti version 7 which was used for this study. The frequency of occurrence of each HC attribute was recorded through the coding framework in the software. This was determined by the number of times an HC attribute was described either qualitatively (non-numerically and non-fiscally) or quantitatively (numerically or fiscally).

The second step taken was to content analyze the CARs of the 60 companies in order to evaluate how and to what extent these entities disclose information on human capital. Invariably, the data collected for the purpose of this study involves the examination of CARs for 60 leading South African firms listed on the Johannesburg Stock Exchange. Of importance will be whether these companies showed evidence of disclosures on human capital in their CARs.

3.2. Procedures for ATLAS.ti

This section introduces the procedures followed in using ATLAS.ti for content analysis.

3.2.1. Creation of project file

Creation of project file is referred to as “Hermeneutic Unit (HU)” in ATLAS.ti. The HU or the project file could be likened to a container housing the primary documents, the codes, and the analysis of data as depicted in Figure 1. The first step taken was to create a new Hermeneutic unit for this project. The HU was named “AdePhD”.

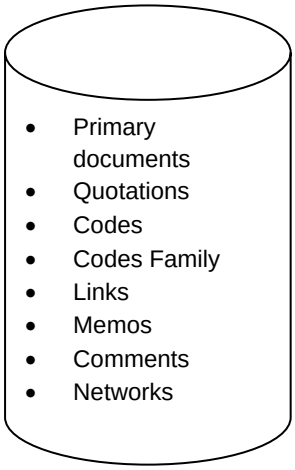

Figure 1. Hermeneutic Unit - AdePhD

3.2.2. Assigning documents to the HU

Textual data that could be imported into ATLAS.ti can be in the form of a word document, rich text format, or text only. The latter two options allow editing inside ATLAS.ti, but this is not possible if word document files are assigned.

The CARs of sampled companies in PDF format were assigned to ATLAS.ti as primary documents. The primary documents were imported into the library and assigned to the HU. These documents are identified as P1 (Primary document 1), P2, P3, and so on until P60.

3.2.3. Approach to coding

The two major approaches to coding are inductive and deductive. The former refers to the process of generating codes from relevant information identified in the data, while the latter refers to coding done according to a predefined area of interest. Deductive coding is more categorical about the items or themes to be considered before the coding process commences.

We chose the deductive approach because of the type of information that may be disclosed in CARs with respect to human capital guided by the theoretical framework. This supports the suggestion by Miles and Huberman (1994) that certain factors such as the conceptual framework, research questions, hypotheses, problem areas, etc., may necessitate the generation of a predetermined list of codes before coding, which should be seen as an integral part of the analytic process but not the actual analysis. Therefore, coding may be considered as a means to an end and not an end in itself.

3.2.4. Coding

A code is a word or a short phrase assigned to a selected segment of a text or data. The disclosure items were assigned to a segment of text selected from CARs of sampled companies. The coding exercise was performed in two stages.

3.2.4.1. Auto-coding

Auto-coding allows the search for a specific word or a string of text in form of a phrase, sentence, or paragraph in the primary documents**.** Selecting auto coding command automatically enables ATLAS.ti to link the codes to the CARs of the companies. Results are generated to show the number of times each disclosure item appears in all the CARs.

3.2.4.2. Auto-coding with "confirm always" command

On assessing the results generated by auto-coding, it was observed that some codes were linked to the segments of text which do not speak directly to the codes while some codes were not linked to the relevant segment of text. In order to resolve this issue, another command known as "confirm always" was selected. This command enables the researcher to read a particular segment of text and code if it is relevant and skip it is irrelevant. Thus, the coding press was intervened in order to ensure the accuracy of the results of the analysis. The steps taken are as follows:

1) On the coding menu in **ATLAS.ti,** the "**Code-Coding-Auto Coding"** was selected.
2) The auto-coding dialogue box is seen.
3) The code to be associated with a selection of text was selected from the drop-down box.
4) The text string or the search expression was entered.
5) The "**confirm always"** box is selected.
6) Auto-coding starts when "**start**" was clicked.
7) Each piece of text was read before indicating whether it should be coded or skipped.
8) The previous step was conducted for each of the **91 HC disclosure items** and the **60 CARs** considered in the study.
9) Auto-coding ended when the **"Close"** button was clicked.

4. Analysis and results

At the end of this analysis, network views and the code-primary-document table summary for each family/theme were generated by ATLAS.ti as shown in the following subsections.

4.1. Human capital terminology

Table 1 shows that the most frequent terminology used in the CARs of sampled companies is "human resources" with a total number of 546 disclosures. This is followed by the term "human capital" with a total number of 149 disclosures.

Table 1. Code-primary-document table summary: human capital terminology

Code	Frequency
Human assets	0
Human resources	546
Human value	0
Human capital	149
Total	695

The remaining two terminologies, "human assets" and "human value", were not mentioned at all by these companies. Although the terms can be used interchangeably, organizations preferred to use human resources possibly because the term linked resources to human assets. Most organizations establish as part of their organogram human resources directorates or departments charged with the responsibility of initiating and performing human capital management practices for value-added advantage.

4.2. Human capital features

Figure 2 shows various human capital features and their relative frequencies in parenthesis.

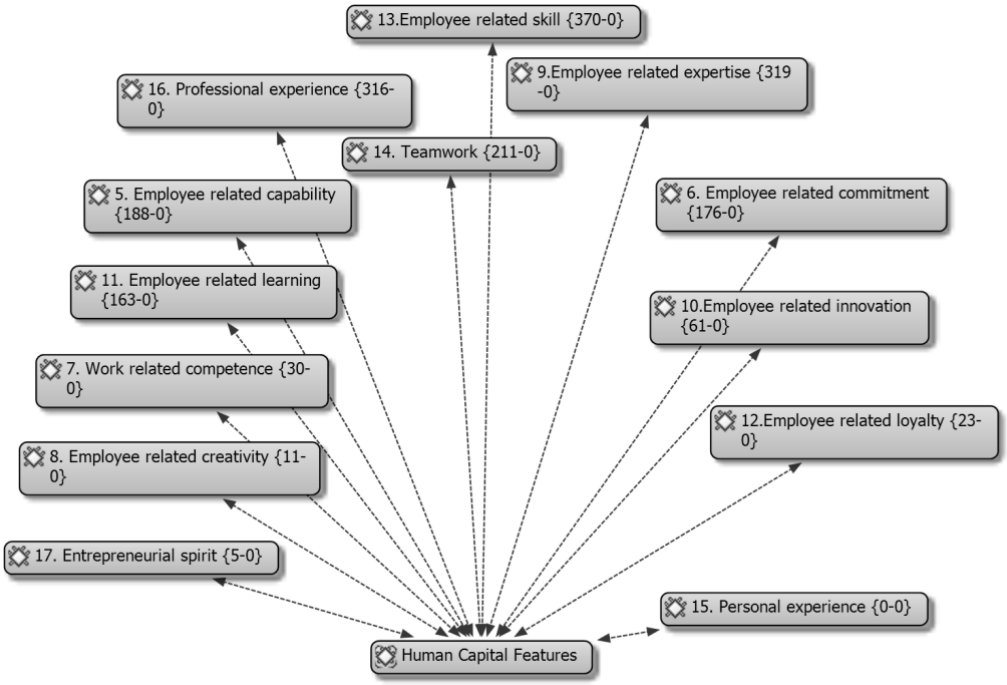

Figure 2. Network view: human capital features
Source: Author's compilation from ATLAS.ti version 7

Table 2 suggests that employees' skills, expertise, professional experience, capabilities, learning are the most disclosed attributes while the least disclosed attributes are innovation, work-related competence, loyalty, creativity, and entrepreneurial spirit. A possible reason for this is that skill, expertise, experience, and capabilities are direct consequences of learning and experience acquired on a particular job while the least disclosed items except for competence are more of innate characteristics of an employee than what could be acquired through education and learning.

Table 2. Code-primary-documents table summary: human capital features

Code	Frequency
Employee capability/ability	188
Employee commitment	176
Work-related competence	30
Employee creativity	11
Employee expertise	319
Employee Innovation	61
Employee learning	163
Employee loyalty	23
Employee skill	370
Teamwork	211
Personal experience	0
Professional experience	316
Entrepreneurial spirit	5
Total	1873

4.3. Human capital relations

Figure 3 illustrates the various Human Capital Disclosure (HCD) attributes in the human capital relations family with their relative frequencies in parenthesis.

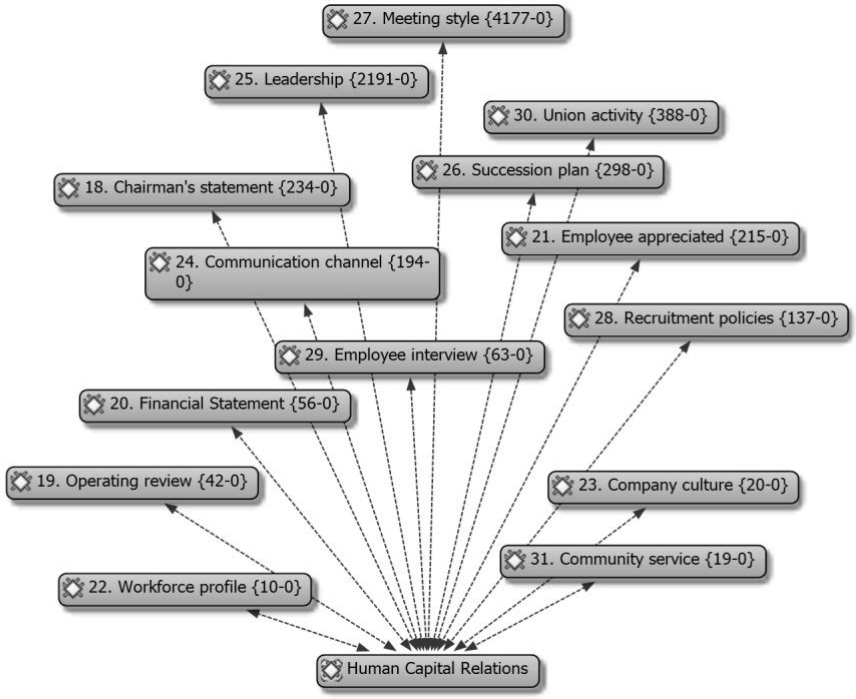

Figure 3. Network view: human capital relations
Source: Author's compilation from ATLAS.ti version 7

From Table 3, the total disclosures with regard to human capital relations amounted to 8044 from the 60 CARs analyzed.

Table 3. Code-Primary-Documents table summary: human capital relations

Code	Frequency
Chairman's statement	234
Operating review	42
Financial statement	56
Employee appreciated	215
Workforce profile	10
Company culture	20
Communication channel	194
Leadership	2191
Succession plan	298
Meeting style	4177
Recruitment policies	137
Employee interview	63
Union activity	388
Community service	19
Total	8044

4.4. Human capital measurements

Figure 4 shows the HC attributes in the human capital measurements family with their respective frequencies in parenthesis. Table 4 shows the respective disclosure frequencies of HC attributes in the human capital measurement family. The table indicates that only 5 out of 29 attributes in this family were disclosed by the companies. However, the most frequently disclosed is retention

rates with a disclosure frequency of 391. Most organizations report on their objective of retaining staff with key skills to ensure continuity and sustainability.

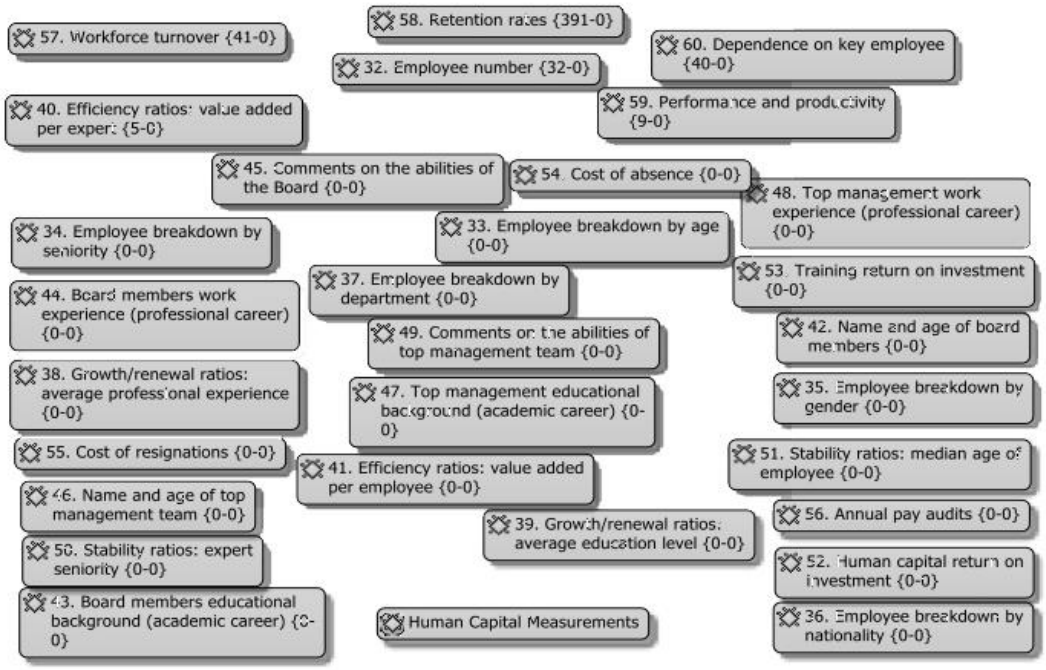

Figure 4. Network view: human capital measurements
Source: Author's compilation from ATLAS.ti version 7

Table 4. Code- primary-documents table summary: human capital measurements

Code	Frequency
Employee number	32
Employee breakdown by age	0
Employee breakdown by seniority	0
Employee breakdown by gender	0
Employee breakdown by nationality	0
Employee breakdown by department	0
Growth/renewal ratios: average professional experience	0
Growth/renewal ratios: average education level	0
Efficiency ratios: value added per expert	5
Efficiency ratios: value added per employee	0
Name and age of board members	0
Board members educational background (academic career)	0
Board members work experience (professional career)	0
Comments on the abilities of the board	0
Name and age of top management team	0
Top management educational background (academic career)	0
Top management work experience (professional career)	0
Comments on abilities of top management team	0
Stability ratios: expert seniority	0
Stability ratios: median age of employees	0
Human capital return on investment	0
Training return on investment	0
Cost of absence	0
Cost of resignations	0
Annual pay audits	0
Workforce turnover	41
Retention rates	391
Performance and productivity	9
Dependence on key employee	40
Total	518

4.5. Human capital training and development

Figure 5 portrays the HC attributes in the human capital training and development family with their respective frequencies in parenthesis.

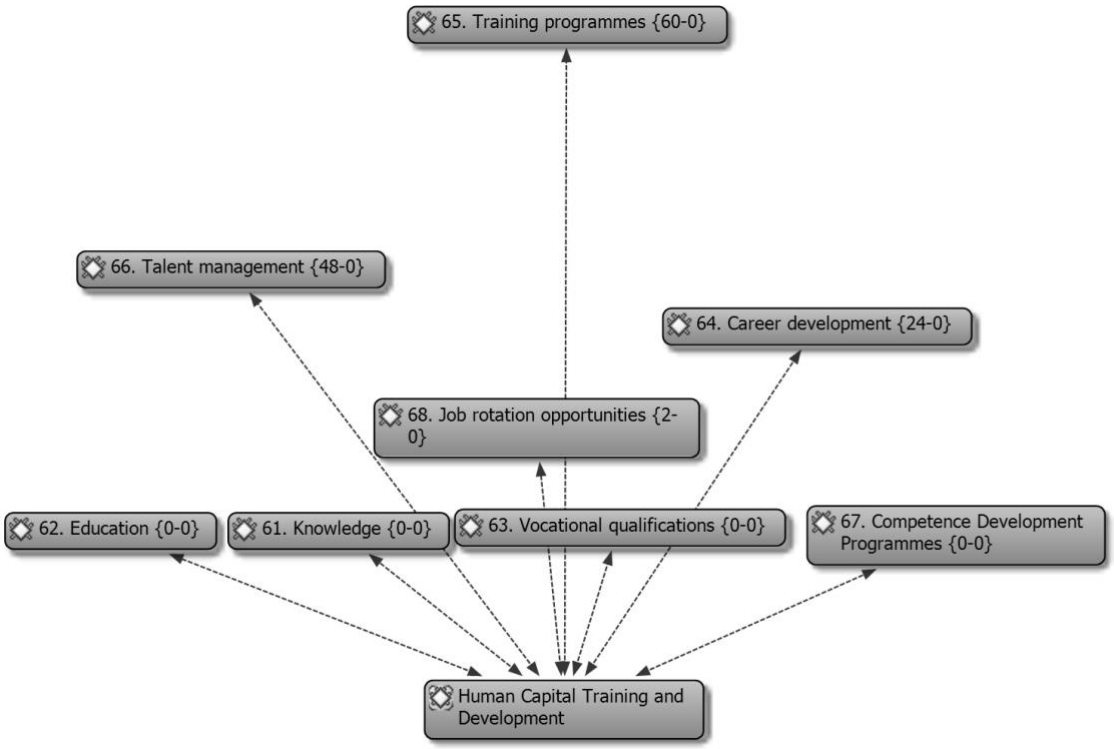

Figure 5. Network view: human capital training and development
Source: Author's compilation from Atlas.ti v.7

It could be observed from Table 5 that 4 out of 8 attributes in this family were mentioned in the annual reports even though the disclosure frequencies are low. Disclosures on training programs appear 60 times, talent management appears 48 times, career development 24 times, and job rotation opportunities 2 times. The remaining four attributes all have 0 disclosure frequencies. It could then be said that companies should provide more compressive reports and disclosures on these important attributes in their CARs as this will make these reports more decision-useful.

Table 5. Code-primary-documents table summary: human capital training and development

Code	Frequency
Knowledge	0
Education	0
Vocational qualifications	0
Career development	24
Training programs	60
Talent management	48
Competence development programs	0
Job rotation opportunities	2
Total	134

4.6. Human capital remuneration and welfare

Figure 6 exhibits the HCD attributes in the human capital remuneration and welfare family with their respective frequencies in parenthesis.

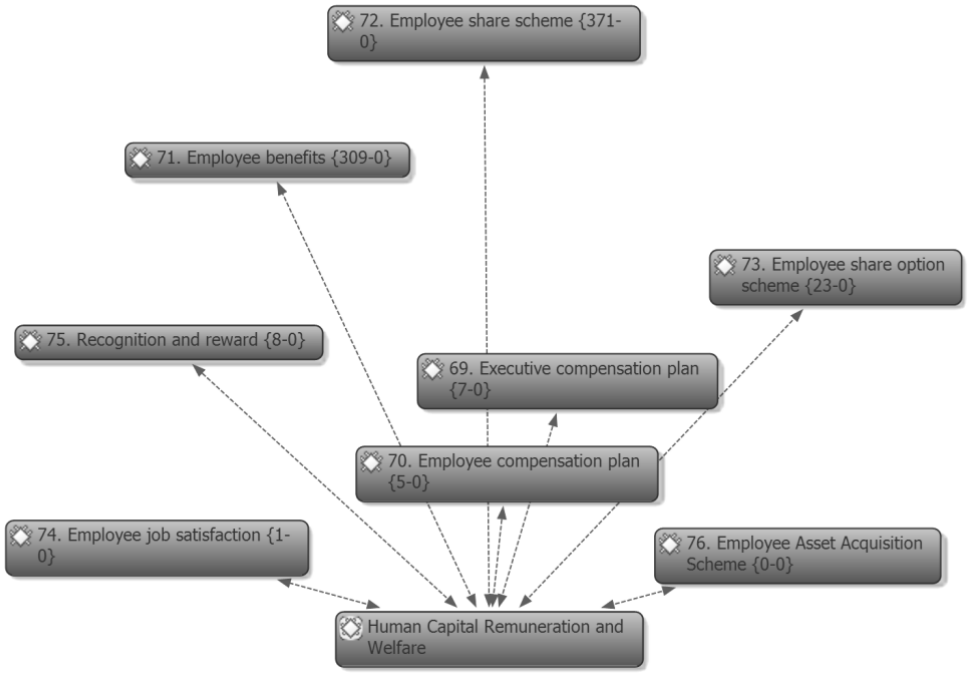

Figure 6. Network drive: human capital remuneration and welfare
Source: Author's compilation from ATLAS.ti version 7

Table 6 shows that employees' remuneration and welfare are important aspects of the annual reports of companies. Remuneration, incentives, and compensation are of varied nature and dimensions. The King III Code of Corporate Governance, the Companies' Act, and the JSE listing requirement require disclosure of information on compensation paid to board members and top executive management.

Table 6. Code-primary-document table summary: human capital remuneration and welfare

Code	Frequency
Executive compensation plan	7
Employee compensation plan	5
Employee benefits	309
Employee share scheme	371
Employee share option scheme	23
Employee job satisfaction	1
Recognition and reward	8
Employee asset acquisition scheme	0
Total	724

In addition, most companies deem it necessary to report various kinds of incentives available to employees in general. Generally, the motive behind this is to showcase the companies' remuneration and compensation policies in the pursuit of the acquisition and retention of relevant skills necessary for value creation.

4.7. Human capital equity issues

Figure 7 presents the HCD attributes in the human capital equity family with their respective frequencies in parenthesis.

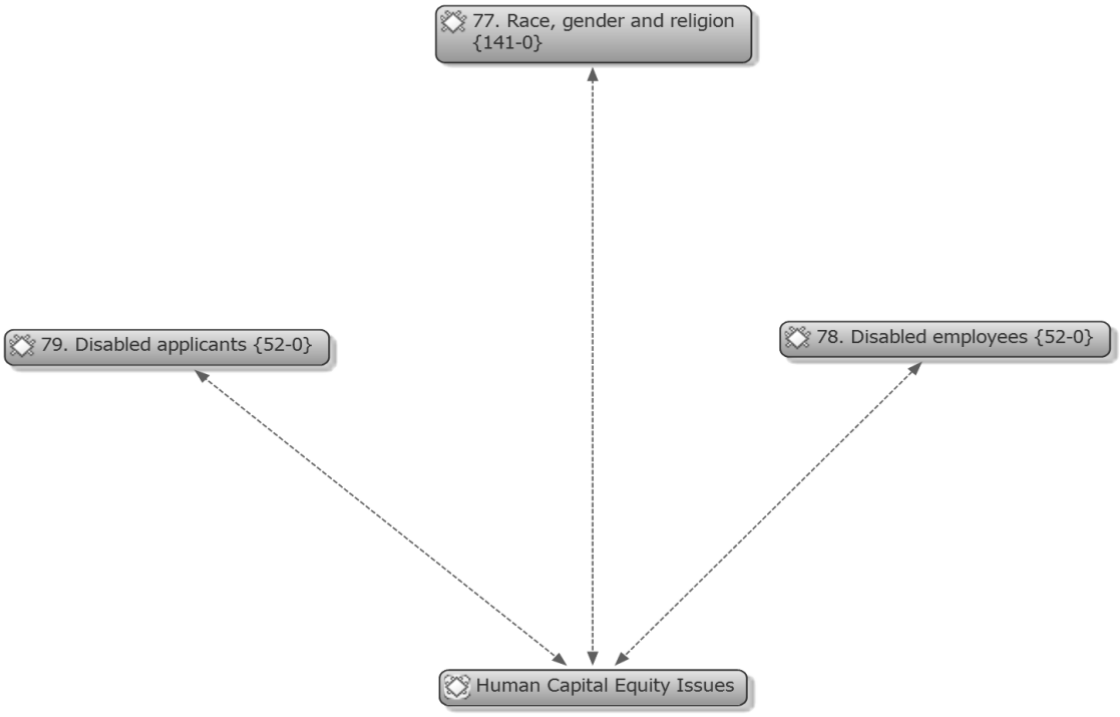

Figure 7. Network view: human capital equity issues
Source: Author's compilation from ATLAS.ti version 7

Table 7 illustrates the disclosure frequencies associated with human capital equity issues. In South Africa, all businesses are required to submit their annual employment equity reports to the Department of Labor.

Table 7. Code-primary-document table summary: Human capital equity issues

Code	Frequency
Race, gender, and religion	141
Disabled employees	52
Disabled applicants	52
Total	245

4.8. Human capital environmental safety

Figure 8 demonstrates the HCD attributes in the human capital environmental safety with their respective frequencies in parenthesis.

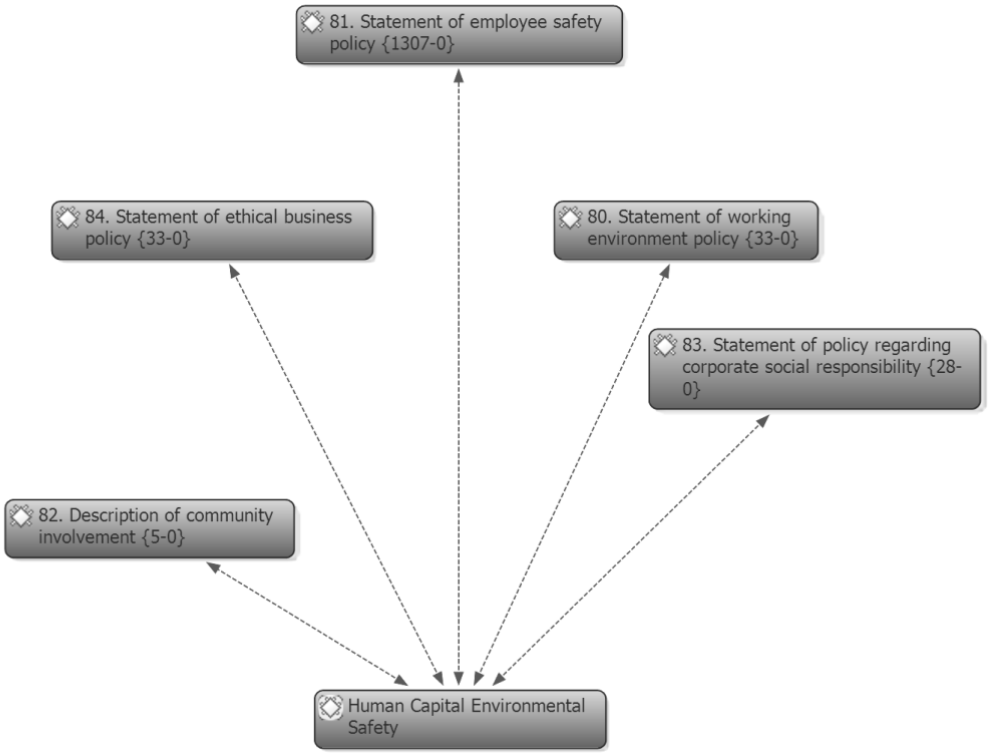

Figure 8. Network view: human capital environmental safety
Source: Author's compilation from ATLAS.ti version 7

Table 8 displays the frequencies of HC attributes in the human capital environmental safety family. Employee safety policy had a disclosure frequency of 1307 out of total disclosures of 1406. Other attributes such as working environment policy, community involvement, corporate social responsibility, and ethical business policy were slightly reported.

Table 8. Code-primary-document table summary: human capital environmental safety

Code	Frequency
Statement of working environment policy	33
Statement of employee safety policy	1307
Description of community involvement	5
Statement of policy regarding corporate social responsibility	28
Statement of ethical business policy	33
Total	1406

4.9. Human capital health and wellness

Figure 9 represents the HCD attributes in the human capital health and wellness family with their respective frequencies in parenthesis.

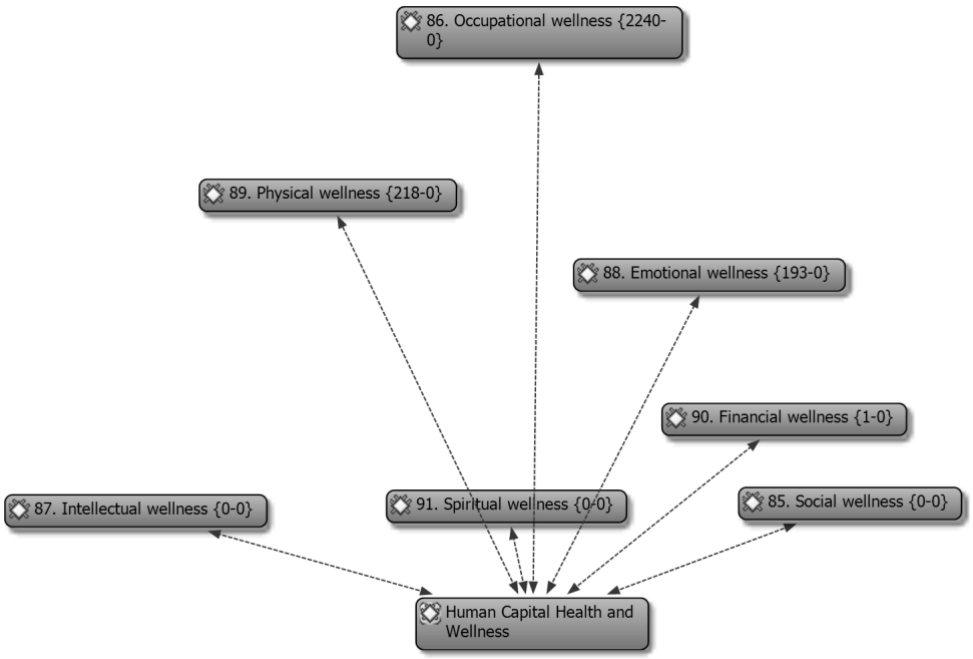

Figure 9. Network view: human capital health and wellness
Source: Author's compilation from ATLAS.ti version 7

Table 9 depicts the disclosure frequencies of various HC attributes in the human capital health and wellness family. Occupational wellness had the highest disclosure frequency of 2240, followed by physical wellness with 218, emotional wellness with disclosure frequency of 193, 1 for financial wellness while social wellness, intellectual wellness, and spiritual wellness all have disclosure frequencies 0 which means no disclosure was made of these attributes.

Table 9. Code-primary-document table summary: human capital health and wellness

Code	Frequency
Social wellness	0
Occupational wellness	2240
Intellectual wellness	0
Emotional wellness	193
Physical wellness	218
Financial wellness	1
Spiritual wellness	0
Total	2652

5. Conclusion

In conclusion, it was observed that ATLAS.ti is useful as an analytical tool for studies involving content analysis methodology because it enables the researchers to save time and energy which are exerted in manual coding. However, it is important to note that users of ATLAS.ti are responsible for giving instructions with regards to what they want ATLAS.ti to do. A qualitative methodology must be maintained by the researcher since ATLAS.ti is not a qualitative method

and does not know how to analyze data (Paulus *et al.* 2019). Thus, the study is in support of the argument of Paulus and Lester (2016) that ATLAS.ti does not take away control from the researchers but allows the analysts to provide solutions to problems relating to large data sets.

The results produced through ATLAS.ti enable adequate interaction of disclosure items by facilitating an efficient interpretation process. The software, therefore, supports a more robust analysis than what could have been done through manual coding and analysis (Paulus and Lester, 2016). Conclusions that are relevant to research matters could be drawn based on the efficient interpretation process.

Nevertheless, the usefulness of ATLAS.ti is being curtailed due to inadequate institutional support. It is, therefore, suggested that more aggressive marketing should be pursued in some parts of the world where ATLAS.ti is not well known. This must be coupled with plans to establish adequate institutional support for active and potential users.

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